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APPENDIX B

Air Quality and Greenhouse Gas Technical Report

Prepared for
California Energy Commission

Prepared by
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AIR QUALITY AND GREENHOUSE GAS TECHNICAL REPORT
MARTIN DATA CENTER
MARTIN AVENUE PROPERTIES, LLC
SANTA CLARA, CALIFORNIA

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ACRONYMS AND ABBREVIATIONS

AERMOD	American Meteorological Society/Environmental Protection Agency regulatory air dispersion model
AQ	Air Quality
ARB	California Air Resources Board
aREL	Acute Reference Exposure Level
ASF	Age Sensitivity Factor
BAAQMD	Bay Area Air Quality Management District
CalEEMod®	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAP	Criteria Air Pollutant
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
CPF	Cancer Potency Factor
cREL	Chronic Reference Exposure Level
DPF	Diesel Particulate Filter
DPM	Diesel Particulate Matter
GHG	Greenhouse Gas
HHDT	Heavy Heavy-Duty Trucks
HI	Hazard Index
HQ	Hazard Quotient
HRA	Health Risk Assessment
MAF	Modelling Adjustment Factor
MBGF	Martin Backup Generating Facility
MDC	Martin Data Center
MEDR	Maximally Exposed Daycare Receptor
MEIR	Maximally Exposed Individual Resident
MEISR	Maximally Exposed Individual Sensitive Receptor
MEIW	Maximally Exposed Individual Worker

MERR	Maximally Exposed Recreational Receptor
MESR	Maximally Exposed School Receptor
N_2O	Nitrogen Dioxide
NOx	Nitrous Oxide
OEHHA	Office of Environmental Health Hazard Assessment
$PM_{2.5}$	Fine Particulate Matter Less than 2.5 Micrometers in Aerodynamic Diameter
PM_{10}	Respirable Particulate Matter Less than 10 Micrometers in Aerodynamic Diameter
ROG	Reactive Organic Gas
SCR	Selective-Catalytic Reduction Unit
SPPE	Small Power Plant Exemption
SVP	Silicon Valley Power
TAC	Toxic Air Contaminant
TOG	Total Organic Gas
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compounds

Units

g	gram	ppm	parts per million
lb/day	pounds per day	s	second
m	meter	tpy	ton per year
MT	metric ton	yr	year
MW	megawatts		
MWh	megawatts hour		
$\mu g/m^3$	micrograms per cubic meter		

EXECUTIVE SUMMARY

Martin Avenue Properties, LLC (Martin LLC) is proposing to develop a new data center and backup generating facility at 651 Martin Avenue in Santa Clara, California ("Project" or "Facility"). The Facility would be located on an approximately 7.17-acre plot bounded to the north by an existing warehouse, to the west by a plaza of commercial businesses, to the south by Martin Avenue, and to the east by an existing railroad line operated by Union Pacific. The nearest residentially-zoned properties are approximately 3,000 feet to the south (near the intersection of Main Street and Cabrillo Avenue) and 5,800 feet to the north (at the intersection of Lafayette Street and Laurie Avenue). There are several residences approximately 1,400 feet to the southwest of the Project site, located on property zoned for heavy industrial uses.

The proposed buildout plan for the Project includes one (1) four-story building with four (4) 4-megawatts (MW) data halls per floor, providing 64 MW of power to information technology equipment. At full build-out, the Project would include forty-four (44) 2.75-megawatts (MW) capacity Tier-2 backup emergency generators with diesel particulate filters (DPF) and selective-catalytic reduction (SCR) units (equivalent to Tier 4 standards) with a total backup capacity of up to 96 MW, housed in a generator yard on the eastern side of a four-story data center building.

Construction of Facility which includes the Martin Data Center (MDC) and the Martin Backup Generating Facility (MBGF) would take place from January 2024 through March 2025. Project construction includes demolition of the existing structures and infrastructure that cannot be reused, grading of the entire site, installation of utility services, construction of an on-site substation, construction of the data center building, and paving of the site.

This report evaluates the air quality (AQ) and greenhouse gas (GHG) impacts, together with risks and hazards associated with Project construction and operational activities. The local air agency, the Bay Area Air Quality Management District (BAAQMD) has published California Environmental Quality Act (CEQA) Guidelines for use in determining significance, which will apply here for AQ and GHG (BAAQMD 2017).

The relevant thresholds for the Project include:

- Construction criteria air pollutant (CAP) and precursor emissions
- Operational CAP and precursor emissions
- Local carbon monoxide (CO) concentrations
- Operational GHG emissions
- Excess lifetime cancer risk, chronic hazard index (HI), acute HI, and fine particulate matter ($PM_{2.5}$) concentrations from construction of Project and MBGF operation on off-site receptors; and
- Cumulative excess lifetime cancer risk, chronic HI, acute HI, and $PM_{2.5}$ concentration from MBGF operation and surrounding sources on off-site receptors.

Furthermore, the Project's ambient air quality impacts from construction and operational emissions were evaluated against the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS).

Construction and operational CAP and GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod®) version 2022.1, using project-specific information where available. Emissions from backup generator operations were estimated using manufacturer specification sheets.

Health impacts from diesel particulate matter and speciated total organic gas (TOG) emissions were calculated consistent with guidance in BAAQMD's 2017 CEQA guidelines (BAAQMD 2017) and the 2015 California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) Hot Spots Guidance (2015). Consistent with BAAQMD and OEHHA Hot Spots guidance, health impacts were based on emissions of toxic air contaminants (TACs). Concentrations of TACs were estimated using AERMOD, a Gaussian air dispersion model recommended by United States Environmental Protection Agency (USEPA), California Air Resources Board (ARB), and BAAQMD for use in preparing environmental documentation for stationary sources. Health impacts were calculated using the TAC concentrations and TAC toxicities and exposure assumptions consistent with the 2015 OEHHA Hot Spots Guidance.

Table ES-1 shows the Project construction related emissions in comparison to the BAAQMD CEQA thresholds. GHG emissions related to Project construction are estimated to be 806 metric tons (MT) carbon dioxide equivalents (CO_2e).

Table ES-1: Summary of Project Construction Emissions

	ROG	NOx	PM_{10}	$PM_{2.5}$
Construction Daily Emissions (lb/day)				
Total	15.7	5.7	0.12	0.12
BAAQMD CEQA Thresholds	***54***	***54***	***82***	***54***

Table ES-2 shows the Project operational emissions at full buildout (in 2025), including emissions from generator testing and facility operation, and the BAAQMD CEQA thresholds. Project operational GHG emissions related to the emergency generators are 3,287 MT per year (MT/yr).

Table ES-2: Summary of Project Operational Emissions at Full Build-Out

	ROG[A]	NOx[A]	PM_{10}[A]	$PM_{2.5}$[A]
Operational Daily Emissions (lb/day)				
Generators	2.4	19	0.75	0.75
Site Operations	14.1	1.4	1.1	0.25
Stationary Source Offsets		-19		
Total[B]	**16.5**	**1.4**	**1.9**	**1.0**
BAAQMD CEQA Thresholds	***54***	***54***	***82***	***54***

Operational Annual Emissions (tpy)				
Generators	0.44	3.4	0.14	0.14
Site Operations	2.6	0.25	0.21	0.05
Stationary Source Offsets		-3.4		
Total^B	**3.0**	**0.25**	**0.34**	**0.18**
BAAQMD CEQA Thresholds	***10***	***10***	***15***	***10***

A – ROG, NOx, and PM emission factors are based on Tier 4 equivalent emissions standards

B – Totals may not add up due to rounding.

Maximum modeled ambient concentrations from Project construction and operation of the MBGF, when combined with background concentrations were found to be less than the applicable NAAQS and CAAQS for all pollutants, except the 24-hour and annual PM_{10} CAAQS. In these two cases, the PM_{10} background concentrations exceed the standards on their own. Therefore, Project concentrations were compared against the respective significant impact levels (SILs) and were found to be below those values. As a result, emissions from Project construction and operation of the MBGF would not cause or contribute to an exceedance of these standards.

Table ES-3 shows the health risk impacts due to Project Construction at the Maximally Exposed Individual Receptor, the receptor type and the BAAQMD CEQA thresholds.

Table ES-3: Summary of Construction Health Impacts at the Maximally Exposed Individual Receptor

	Excess Lifetime Cancer Risk in one million	**Noncancer Chronic HI (unitless)**	**Noncancer Acute HI (unitless)**	**$PM_{2.5}$ Concentration (µg/m^3)**
Maximum Impact	0.34	0.0050	--	0.025
Receptor Type	Worker	Worker	--	Worker
BAAQMD CEQA Thresholds	***10***	***1***	***1***	***0.3***

Table ES-4 shows the total health impacts due to Project operations at full build-out at the Maximally Exposed Individual Receptor, the receptor type and the BAAQMD CEQA thresholds.

Table ES-4: Summary of Operational Health Impacts at the Maximally Exposed Individual Receptor

	Excess Lifetime Cancer Risk in one million	**Noncancer Chronic HI (unitless)**	**Noncancer Acute HI (unitless)**	**$PM_{2.5}$ Concentration ($\mu g/m^3$)**
Maximum Impact	6.8	0.0053	0.37	0.026
Receptor Type	Worker	Worker	Worker	Worker
BAAQMD CEQA Thresholds	***10***	***1***	***1***	***0.3***

Table ES-5 shows the cumulative excess lifetime cancer risk, chronic HI, acute HI, and $PM_{2.5}$ concentration from MBGF operation and surrounding sources on the Maximally Exposed Individual Sensitive Receptor (MEISR), which for this Project is the worker receptor, and the BAAQMD CEQA thresholds**.**

Table ES-5: Summary of Health Risk Impacts at the Maximally Exposed Individual Sensitive Receptor

Emission Source	**Excess Lifetime Cancer Risk in one million**	**Noncancer Chronic HI (unitless)**	**Noncancer Acute HI (unitless)**	**$PM_{2.5}$ Concentration ($\mu g/m^3$)**
Project Generators (25% Load)	6.8	0.0053	0.37	0.026
Existing Stationary Sources	0.1	0.0011	NA	0.000
Railroad	57.3	NA	NA	0.081
Major Roadways	8.9	NA	NA	0.192
Highways	10.2	NA	NA	0.240
Total Cumulative Impact	76.5	0.0064	0.37	0.540
BAAQMD CEQA Thresholds	***100***	***10***	***10***	***0.80***

1. INTRODUCTION

At the request of Martin Avenue Properties, LLC (Martin LLC), Ramboll US Consulting, Inc. (Ramboll) has prepared this technical report documenting air quality (AQ) and greenhouse gas (GHG) analyses for the construction and operational activities of the 651 Martin Avenue data center project ("Project" or "Facility"), which includes the proposed Martin Data Center (MDC) and the proposed Martin Backup Generating Facility (MBGF), located at 651 Martin Avenue in Santa Clara, California. The analyses follow the Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) Guidelines released in 2017 (BAAQMD 2017).

1.1 Project Description

The proposed MDC and MBGF would be located on an approximately 7.17-acre lot at 651 Martin Avenue in Santa Clara, California and would be bounded to the north by an existing warehouse, to the west by a plaza of commercial businesses, to the south by Martin Avenue, and to the east by an existing railroad line operated by Union Pacific. The nearest residentially-zoned properties are approximately 3,000 feet to the south (near the intersection of Main Street and Cabrillo Avenue) and 5,800 feet to the north (at the intersection of Lafayette Street and Laurie Avenue). There are several residences approximately 1,400 feet to the southwest of the Project site, located on property zoned for heavy industrial uses. The proposed Project location and boundary are shown in **Figure 1**. The MDC and MBGF would be constructed from January 2024 through March 2025. At full build-out, the Project would include forty-four (44) 2.75-megawatts (MW) capacity Tier-2 backup emergency generators with diesel particulate filters (DPF) and selective-catalytic reduction (SCR) units (equivalent to Tier 4 standards) with a total backup capacity of up to 96 MW, housed in a generator yard on the eastern side of a four-story data center building. Driveways, surface parking spaces, and outdoor storage areas around the building are planned to be paved.

1.2 Objective and Methodology

The BAAQMD 2017 CEQA Guidelines contain recommended thresholds for criteria air pollutant (CAP) emissions, GHG emissions, and risks and hazards associated with toxic air contaminant (TAC) emissions from an individual project. This report evaluates the AQ and GHG impacts associated with the construction and operation of the MDC and MBGF. This report also evaluates the health risks and hazards associated with construction of the MDC and MBGF, and operations of the MBGF on off-site receptors.

1.3 Thresholds Evaluated

The AQ analysis of this report evaluates the average daily and maximum annual emissions of CAPs from construction and operation of the Project and evaluates these emissions against BAAQMD's significance thresholds for emissions (BAAQMD 2017). These thresholds are as follows:

Construction CAP Emissions:

- Average daily emissions of Reactive Organic Gases (ROG) greater than 54 pounds per day (lb/day);
- Average daily emissions of Nitrogen Oxides (NOx) greater than 54 lb/day;

- Average daily exhaust emissions of particulate matter less than 10 micrometers in diameter (PM_{10}) greater than 82 lb/day; and
- Average daily exhaust emissions of fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) greater than 54 lb/day.

Operational CAP Emissions:

- Average daily emissions of ROG greater than 54 lb/day, or maximum annual emissions of 10 tons per year (tpy);
- Average daily emissions of NOx greater than 54 lb/day, or maximum annual emissions of 10 tpy;
- Average daily emissions of PM_{10} greater than 82 lb/day, or maximum annual emissions of 15 tpy; and
- Average daily emissions of $PM_{2.5}$ greater than 54 lb/day, or maximum annual emissions of 10 tpy.

Local carbon monoxide (CO) concentrations:

- 8-hour average concentration of 9.0 parts per million (ppm)
- 1-hour average concentration of 20.0 ppm

The GHG analysis of this report evaluates the GHG emissions from operation of the MDC and MBGF and evaluates these emissions against BAAQMD's May 2017 significance thresholds for emissions. These thresholds are as follows:

- Stationary source direct GHG emissions of 10,000 metric tons per year (MT/yr)

The health risk assessment (HRA) in this report evaluates the estimated cancer risk, noncancer chronic hazard index (HI), acute HI, and $PM_{2.5}$ concentration associated with the MDC and MBGF construction, and MBGF's operational emissions of TACs. The TACs considered are those included in BAAQMD Rule 2-5, New Source Review of Toxic Air Contaminants. The HRA evaluates potential sensitive receptor locations including:

- "Residential dwellings, including apartments, houses, condominiums;
- Schools, colleges, and universities;
- Daycares;
- Hospitals; and
- Senior-care facilities." (BAAQMD 2012)

Ramboll conducted a sensitive receptor search within a 1,000-meter radius of the Project site and determined that the closest residential uses are to the southwest, located on property zoned for heavy industrial uses.

To meet the above stated objectives, this HRA was conducted consistent with the following guidance:

- Air Toxics Hot Spots Program Risk Assessment Guidelines (Office of Environmental Health Hazard Assessment [OEHHA] 2015);
- BAAQMD 2017 CEQA Guidelines (BAAQMD 2017); and

- BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards (BAAQMD 2012).

Ramboll compared the results of emissions and health risk analyses to the BAAQMD significance thresholds. Health risk impacts from construction of the Facility were compared against the single source impact thresholds. Operational health impacts of the backup emergency generators were also compared against the BAAQMD single source significance thresholds. The thresholds for single source impacts are:

- An excess lifetime cancer risk level of more than 10 in one million;
- A noncancer chronic HI greater than 1.0;
- A noncancer acute HI greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ concentration of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$).

The BAAQMD has also identified significance thresholds for cumulative impacts, and the thresholds of significance are:

- An excess lifetime cancer risk level of more than 100 in one million;
- A noncancer chronic HI greater than 10.0; and
- An annual average $PM_{2.5}$ concentration of greater than 0.8 $\mu g/m^3$.

1.4 Report Organization

This technical report is divided into eight sections as follows:

Section 1.0 – Introduction: describes the purpose and scope of this technical report, the objectives and methodology used, and the report organization.

Section 2.0 – Emission Estimates: describes the methods used to estimate the emissions of CAPs, GHGs, and TACs from the MDC and MBGF;

Section 3.0 – Ambient Air Quality Impact Assessment: discusses the air dispersion modeling, the selection of the dispersion models, the data used in the dispersion models (e.g., terrain, meteorology, source characterization), and evaluation of Project construction and operational impacts against the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS).

Section 4.0 – Health Risk Assessment: provides an overview of the methodology for conducting the HRA and evaluation of excess lifetime cancer risks, noncancer chronic HIs, noncancer acute HIs, and $PM_{2.5}$ concentrations related to construction of the MDC and MBGF and operation of the MBGF.

Section 5.0 – References: includes a listing of all references cited in this report.

2. EMISSION ESTIMATES

Ramboll estimated CAP, GHG, and TAC emissions from construction and operation of the Project. The CAPs of interest include ROG, NOx, $PM_{2.5}$ and PM_{10}. The GHGs of interest include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are commonly combined by global warming potential-weighted average into carbon dioxide equivalents (CO_2e). One of the TACs of interest on the Project is diesel particulate matter (DPM), emissions of which are assumed to be equal to exhaust PM_{10} from on- and off-road construction equipment, and exhaust PM_{10} from backup diesel engines during operation. Other TACs of interest are speciated from total organic gas (TOG) emissions. These estimates were used to compare emissions to BAAQMD significance thresholds and as inputs to the construction and operational HRAs. The methodologies used by Ramboll are summarized below.

Table 1 presents the Project characteristics and **Table 2** presents the land use assumptions used in the emissions estimation.

2.1 Calculation Methodologies for Construction Emissions

Emissions from construction activities were estimated using the California Emissions Estimator Model (CalEEMod®) version 2022.1. CalEEMod® was developed by the California Air Pollution Control Officers Association in coordination with California air districts for use in developing emission inventories suitable for CEQA analyses. Sources of construction CAP and TAC emissions are exhaust from off-road equipment, on-road vehicles, fugitive dust, and ROG emissions from architectural coating and paving activities.

2.1.1 Emissions from Off-road Equipment

CAP and TAC emissions from off-road equipment were based on the equipment inventory, equipment specifications, their daily usage and construction phasing schedule based on CalEEMod® defaults. All off-road equipment for construction was assumed to be Tier 4 Final engines. CalEEMod® defaults are based on the project land use area for each land use type. **Table 3** presents the construction schedule and **Table 4** presents the construction equipment list.

2.1.2 Emissions from On-road Vehicles

CalEEMod® estimates CAP and TAC emissions from on-road haul trucks and worker and vendor trips based on vehicle type, emission factor, distance travelled, and number of trips. The number of construction worker and vendor trips were derived from the CalEEMod® default trip rates. The number of haul truck trips related to material import was derived by dividing the estimated quantity of import material by an assumed haul truck capacity of 11 cubic yards. The construction trip generation rate for the Project is shown in **Table 5**. The emission factors used in the analysis are CalEEMod® defaults. All haul trucks were assumed by CalEEMod® to be Heavy Heavy-Duty Trucks (HHDT), vendor trucks were assumed to be 50% HHDT and 50% Medium Heavy-Duty Truck, and worker vehicles were assumed to be a 25%/50%/25% mix of Light Duty Automobiles, Light Duty Truck Class 1, and Light Duty Truck Class 2, consistent with CalEEMod® defaults. CalEEMod® contains fuel-type information by fleet mix for each year. The default trip lengths in CalEEMod® were used. That is, for haul trucks, a 20-mile one-way trip length was used. For worker trips, a 11.7-mile one-way trip length was used. For vendor trips, a 8.4-mile one-way trip length was used.

2.1.3 Emissions from Fugitive Dust

Fugitive dust emissions are typically generated during construction phases, and fugitive dust contributes to both PM_{10} and $PM_{2.5}$ emissions. Fugitive dust is generated by various activities during construction such as demolition, site preparation, and grading. Project-specific quantities for demolition and material import are specified in **Table 6**. On-road fugitive dust is also generated by vehicles traveling on paved and unpaved roads. Fugitive dust emissions associated with material movement and on-road sources were estimated based on CalEEMod® defaults. BAAQMD has identified eight best management practices (BMPs) to control fugitive dust emissions from construction activities. The proposed Project would commit to watering exposed areas twice daily, consistent with BAAQMD BMPs.

2.1.4 Emissions from Architectural Coating and Asphalt Paving

ROG off-gassing emissions from paving are calculated based on the paved parking area of the Project site using CalEEMod®'s volatile organic compounds (VOC) per square foot emission factor.

ROG off-gassing emissions from architectural coatings are calculated based on the square footage of the new buildings, an assumed VOC content of the paint, and an application rate of 100%, consistent with CalEEMod® methodology. The VOC content of the interior and exterior paints are assumed to be consistent with the limits set in BAAQMD Regulation 8, Rule 3 (BAAQMD 2009).

2.1.5 Summarized Construction Emissions

CAP and GHG emissions from on- and off-road construction sources are presented by construction phase in **Table 7**. To compute the average daily construction CAP emissions, CAP emissions from each construction phase were added and then normalized over the total number of days of construction. The resulting average daily construction CAP emissions are compared against the average daily BAAQMD construction CAP thresholds in **Table 7**.

CalEEMod® outputs for MDC and MBGF construction emissions are included in **Appendix A** of this technical report.

2.2 Calculation Methodologies for Operational Emissions

Emissions from MDC and MBGF operation were estimated using CalEEMod® for land use and building emissions (except energy) and manufacturer's data for stationary sources (emergency generators). Emissions from building energy usage were estimated separately outside of CalEEMod®.

2.2.1 Stationary Sources

The proposed MBGF includes 44 diesel backup emergency generators, the locations of which are shown in **Figure 1**. **Table 8** presents the uncontrolled and controlled emission factors used to calculate the average daily and maximum annual criteria pollutant emissions. Ramboll used emissions factors provided by Peterson Power Systems for the ecoCUBE engine configuration based on inlet and outlet emission performance, with the controlled emission factors accounting for the presence of DPF and SCR control devices. The supporting manufacturer specification sheets are provided in **Appendix B**.

Table 9 and **Table 10** present the average daily and maximum annual emissions, respectively, based on 35 hours of operations for testing and maintenance purposes, conservatively assuming operation at 100% load, consistent with BAAQMD permitting methods. GHG emissions from the diesel engines were calculated following the same methodology as described above for CAPs. GHG emission factors were obtained from AP-42 documentation for Large Stationary Diesel Engines. Ramboll used the United States Environmental Protection Agency's (USEPA's) Mandatory Reporting Rule emission factors for CH_4 and N_2O emissions (USEPA 2013a), which were used to develop a CO_2e emission factor using the same global warming potentials as in described in USEPA's 40 CFR Part 98 Vol. 78 rules and regulations (USEPA 2013b).

In addition, Ramboll evaluated the Project's potential obligations for emission offsets under BAAQMD Rule 2-2. According to BAAQMD Rule 2-2, emissions offsets are required at a 1:1 ratio for facilities with a potential to emit (PTE) more than 100 tpy of $PM_{2.5}$, PM_{10}, or SO_2. For emissions of NOx or precursor organic compounds (POC), offsets are required at a 1:1 ratio for facilities with a PTE more than 10 tpy, and these offsets are available from the BAAQMD Small Facility Banking Account (SFBA) until a facility's PTE exceeds 35 tpy. Offsets are required at a 1.15:1 ratio for facilities with a PTE more than 35 tons/year of NOx or POC, and such facilities must purchase their own offsets. In 2019, BAAQMD adopted a policy affecting emissions calculations for emergency generators. Under this policy, when evaluating regulatory applicability, annual emissions calculations must include 100 hours of operation for each engine during emergency periods, in addition to the allowable hours for non-emergency testing and maintenance operation. Therefore, when comparing emissions to the offset thresholds listed above, emissions from emergency and non-emergency operation must be included. BAAQMD's policy also states that emissions during emergency operation should not be included for compliance evaluations, such as determining the quantity of offsets that are required to be purchased.

To evaluate the Project's potential obligations for emission offsets, Ramboll estimated the annual emissions from the backup generators assuming 35 hours of operation for testing and maintenance purposes, plus an additional 100 hours of emergency operation. **Table 11** presents annual CAP emissions for 135 hours of operation per generator. The resulting emission estimate exceeds the offset threshold of 10 tpy NOx, thus the Project will offset these emissions consistent with BAAQMD Rule 2-2.

2.2.2 Land Use Sources

Ramboll used CalEEMod® to estimate CAP and GHG emissions due to mobile sources, area sources such as landscaping maintenance equipment, water treatment and distribution, and wastewater usage. GHG emissions due to electricity usage at the site were calculated outside of CalEEMod® based on the expected site's maximum annual energy consumption. The energy usage for building operations exclusive of the operations of the data center are included in this estimate.

The Project site is not expected to have any natural gas consumption. GHG emissions from energy use is reported in **Table 12**. Annual GHG emissions associated with electricity usage are the product of the maximum estimated annual electricity usage and the utility-specific carbon intensity factor, which depends on the utility's portfolio of power generation sources. The electricity for the MDC will be provided by Silicon Valley Power (SVP). The energy use emission estimate for operations were conservatively based on the default CO_2, CH_4, and N_2O intensity per MWh forecasted by CalEEMod® for SVP for 2025.

Energy use from the data center activities was estimated to be 840,960 MWh/year. Total energy usage estimates for MDC operations are presented in **Table 12**.

For trip-related emissions, Ramboll relied on a Project-specific estimate for operational trip generation of 463 trips per day. Ramboll conservatively did not account for the net change in trips at the site associated with the existing land use. The operational trip rates used in CalEEMod® are shown in **Table 13**.

In addition, annual GHG emissions associated with water usage were based on an estimated annual water usage of 911,000 gallons per year as provided by Martin LLC for site operations. Ramboll conservatively assumed CalEEMod® defaults outdoor water usage for the landscaping area, in addition to the proposed site consumption. Water usage rates for the Project are provided in **Table 14**.

Total MDC and MBGF operational CAP emissions are the sum of land-use and emergency generator emissions, as shown in **Table 15**. The average daily CAP emissions and annual CAP emissions are compared against the BAAQMD thresholds of significance for operational emissions. As discussed previously, the Project will be required to offset its NOx emissions consistent with BAAQMD Rule 2-2.

CalEEMod® outputs for MDC and MBGF operational emissions are included in **Appendix A** of this technical report.

2.2.3 Summary of Project Operational GHG Emissions

GHG emissions for MDC and MBGF operation are presented in **Table 16**. CalEEMod® outputs for MDC and MBGF operational emissions are included in **Appendix A** of this technical report. GHG emissions from the emergency generators are subject to the BAAQMD CEQA threshold for stationary sources.

Electricity usage makes up over 95% of the Project's operational GHG emissions. GHG emissions associated with electricity usage from the data center will continue to decline after 2025 due to increasing requirements for renewable power in California. As described above, electricity to the MDC would be provided by SVP, a utility that is on track to meet the 2030 Renewable Power Standards and its associated GHG emissions reductions.

3. AMBIENT AIR QUALITY IMPACT ASSESSMENT

3.1 Modeling Methodology, Settings, and Inputs

Ramboll conducted an air dispersion modeling analysis to determine compliance of MDC and MBGF construction and MBGF operation with the NAAQS and CAAQS. The analyses were conducted consistent with the following guidance documents:

- United States Environmental Protection Agency (USEPA) Guideline on Air Quality Models 40 CFR 51, Appendix W (Revised, January 17, 2017), herein referred to as Appendix W;
- USEPA's AERMOD Implementation Guide (Revised, June 2022);

The applicable NAAQS and CAAQS are shown in **Table 17**.

3.1.1 Background Concentrations

Background concentration data from 2019-2021 were obtained from the San Jose AQS Monitoring Station (Jackson, 06-085-0005) and are summarized in **Table 18**.

For the nitrogen dioxide (NO_2) modeling, hourly NO_2 data from 2019-2021 from the San Jose AQS Monitoring Station was used for background data, with missing data substituted in two stages. If one or two consecutive hours were missing, the values were replaced by the larger value of the preceding or following hour. If three or more consecutive hours were missing, the three-year (i.e., 2019-2021) 98th percentile value was used to substitute for the missing hours. Hourly ozone data for 2017-2021 was obtained from the San Jose AQS Monitoring Station, with missing data substituted in the same two stages. If one or two consecutive hours were missing, the values were replaced by the larger value of the preceding or following hour. If three or more consecutive hours were missing, the five-year (i.e., 2017-2021) 98th percentile value was used to substitute for the missing hours.

3.1.2 Model Selection and Settings

To estimate off-property ambient concentrations, Ramboll used version 22112 of the AERMOD modeling system. AERMOD is USEPA's recommended air dispersion model for near-field (within 50 kilometers [km]) modeling analyses. AERMOD is appropriate for use in estimating ground-level, short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple and complex terrain.

This analysis was conducted using AERMOD's regulatory default settings. Ambient concentrations were estimated using AERMOD in conjunction with information about the site, the locations of the emitting stacks, representative meteorological data, and nearby receptors. The North American Datum of 1983 (NAD83) of the Universal Transverse Mercator (UTM) Coordinate System (Zone 10) was used, which provides a constant distance relationship anywhere on the map or domain. The units of the coordinates are in meters.

3.1.3 Model Sources and Release Parameters

The NAAQS and CAAQS analyses added impacts from the Facility sources and the background to yield a cumulative impact. The following sections describe the release parameters that were used in the model.

3.1.4 Construction Sources

The emissions used in the air dispersion modeling analysis for construction of the MDC and MBGF include the exhaust emissions from the Project's on-site off-road construction equipment, as well as the exhaust emissions from the Project's off-site on-road mobile sources up to 1,000 feet from the Project boundary, as shown in **Table 19**. These emissions were estimated in CalEEMod following the methodology described in **Section 2**. The analysis does not include fugitive dust emissions. The BAAQMD 2017 CEQA Guidelines call for the use of its BMPs to reduce fugitive dust emissions to consider impacts from fugitive dust emissions less than significant. BAAQMD does not provide numerical thresholds for fugitive dust generated during construction. The construction of the proposed Project would involve implementation of the BAAQMD-recommended BMPs, thereby avoiding the potential for generating substantial pollutant concentrations due to fugitive dust.

Maximum hourly emission rates were derived by identifying the construction subphase with the maximum daily emissions for each pollutant from CalEEMod® and dividing by 8 hours per day. Daily emission rates were calculated by identifying the subphase with the maximum daily emissions for each pollutant from CalEEMod® and dividing by 11 hours per day to account for the full construction workday. Annual emission rates were calculated using the maximum annual emissions and dividing by 4,015 hours per year (365 days per year x 11 hours per day). These emission rates can be found in **Tables 20-22.** The EMISFACT option in AERMOD was utilized to indicate that construction activities would occur between the hours of 7 AM and 6 PM.

In the model, the construction emissions were represented as a single area source covering the entire Project site.

3.1.5 Operational Sources

For the air dispersion modeling analysis for operations of the MBGF, two readiness and maintenance testing scenarios were evaluated. The first scenario represents the proposed Project's monthly generator testing. During these tests, up to three generators will be operated concurrently at 0% load[1] for up to 15 minutes. These tests will solely be conducted at 0% load; therefore, no other load scenarios were evaluated. The second scenario represents the proposed Project's annual generator testing. These four-hour tests are conducted on individual generators once per year at a series of stepped loads up to 100% load beginning with 25% load, and increasing the hourly loads by 25%, and finishing with 100% load. All discrete loads levels for which emissions data is available (i.e., 10%, 25%, 50%, 75%, and 100%) were analyzed to identify the potential worst-case ambient air quality impacts.

At full buildout of the MBGF there will be a single row of backup emergency generators in a double-stacked arrangement with 22 generators on each level. The exhaust stacks for both levels of generators would be routed away from the building horizontally, penetrate an adjacent screening wall, and discharge at a 45-degree angle. **Figure 1** shows locations for all 44 generators and source parameters are detailed in **Table 23.** The generators were represented by point sources with identical exit temperatures, exit velocities, and exit diameters, specific to each load scenario and based on manufacturer provided information. Due to the 45-degree discharge point, only the vertical component of the exit velocity was included in the modeling.

Generator gram-per-second emission rates were derived using manufacturer-provided emission rates in grams per horsepower-hour. Hourly emission rates were calculated

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[1] 0% load emission factors are unavailable; therefore, emissions were estimated using 10% load emission factors as a surrogate.

assuming 15 minutes of operation for the monthly testing scenario and 60 minutes of operation for the annual testing scenario. Daily emission rates were calculated by dividing 15 minutes of operation for the monthly testing scenario and 60 minutes of operation for the annual testing scenario by a 10-hour maintenance period (7 AM to 5 PM). Annual emission rates for the daytime period between 7 AM and 5 PM were calculated assuming 35 hours per year of operation and dividing by 3,650 hours per year (365 days per year x 10 hours per day). For generator loads at or below 50%, NOx emissions were conservatively calculated assuming 15 minutes of uncontrolled emissions and 45 minutes of controlled emissions for every hour of operation, to account for the warm-up period of the SCR. For the monthly 15-minute testing scenario, all emissions were assumed to be uncontrolled. For generator loads greater than 50% that are only run during the annual test, NOx emissions were assumed fully controlled since during the annual test those loads are tested later in the run, after the SCR has warmed up. The final model emission rates can be found in **Tables 24-29**. The EMISFACT option in AERMOD was utilized to indicate that generator maintenance and readiness testing would only occur between the hours of 7 AM and 5 PM.

3.1.6 Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions used as inputs were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME). BPIP PRIME uses building downwash algorithms incorporated into AERMOD to account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures.

Ramboll evaluated onsite buildings at the Facility for downwash effects on each modeled point source, as well as nearby offsite buildings. It was determined that the nearby offsite buildings would not influence the generators based on the dimensions of those buildings and their distance from the generators (i.e., outside of the 5L downwind area of influence). Each generator is located inside its own weather-proof enclosure, which was included as a downwash structure in the model, as an onsite building. The modeled parameters for the buildings and the weather-proof enclosures for the generators are provided in **Table 30**.

3.1.7 Good Engineering Practice Stack Height Analysis

USEPA has promulgated regulations that limit the maximum stack height one may use in a modeling analysis to no more than the Good Engineering Practice (GEP) stack height. The purpose of this requirement is to prevent the use of excessively tall stacks to reduce the modeled concentrations of a pollutant. GEP stack height is impacted by the heights of nearby structures. In general, the maximum value for GEP stack height is 65 meters. The stack heights for the Facility’s generator stacks do not exceed the GEP stack height.

3.1.8 Terrain Data and Land Use

Per USEPA guidance, terrain elevations were incorporated into the model using the latest version (18081) of AERMAP, AERMOD’s terrain preprocessor. Terrain elevation data for the entire modeling domain was extracted from 1/3 arc-second National Elevation Data (NED) files with a resolution of approximately 10 meters. The NED files were obtained from the United States Geological Survey (USGS) Multi-Resolution Land Characteristics (MRLC) Consortium. AERMAP was configured to assign elevations for the property line receptors and discrete gridded receptors in the modeling domain. All onsite features (i.e., buildings) were assumed to be at the same elevation.

Land use classification determines the type of area to be modeled. The different classifications, urban or rural, incorporate distinct pollutant dispersion characteristics and affect the estimation of downwind concentrations when used in the model. Based on the land use around the Facility, the urban boundary layer option in the model was selected. The population for the urban mode was based on the population of the San Jose urban area.

3.1.9 Meteorological Data

AERMOD requires a meteorological input file to characterize the transport and dispersion of pollutants in the atmosphere. Surface and upper air meteorological data inputs, as well as surface parameter data describing the land use and surface characteristics near the site, are processed using AERMET, the meteorological preprocessor to AERMOD. The output file generated by AERMET is the meteorological input file required by AERMOD.

A representative meteorological data set was developed using a combination of surface data from the National Weather Service (NWS) station at the San Jose Airport (KSJC, located approximately 2 km west of the facility) and NWS upper air data from the Oakland Airport (KOAK, located approximately 50 km northwest of the facility).

Per Appendix W, five years of representative meteorological data are considered adequate for dispersion modeling applications. Hourly and 1-minute wind speed and wind direction data from January 2017 through December 2021 were processed using AERMINUTE (version 15272) and AERMET (version 22112). The meteorological data was processed using the ADJ_U* option that reduces overprediction of modeled concentrations that occur in stable conditions with low wind speeds due to underprediction of the surface friction velocity (u*). Underprediction of u* results in an underestimation of the mechanical mixing height and thus overprediction of ambient concentrations. The ADJ_U* option is now considered a regulatory default option with the recent update to Appendix W when it is used without onsite turbulence data.

Additional meteorological variables and geophysical parameters are required for use in the AERMOD dispersion modeling analysis to estimate the surface energy fluxes and construct boundary layer profiles. Surface characteristics including albedo, Bowen ratio, and surface roughness length were determined for the area surrounding the San Jose Airport meteorological station using the AERMET preprocessor, AERSURFACE (v20060), and the 2016 MRLC Consortium data sets including Land Cover, Tree Canopy, and Impervious Surface information. Monthly surface parameters were determined using AERSURFACE according to USEPA’s guidance.

3.1.10 Receptor Grid

Concentrations were calculated at receptors placed along the facility fence line and on a Cartesian grid. For this analysis, receptors extending up to 500 meters from the fence line were modeled using the following resolutions (**Figure 2**):

- 10-meter resolution for fence line receptors; and
- 20-meter resolution extending from the fence line to 500 meters.
- 50-meter resolution extending from 500 meters to 1,500 meters.
- 100-meter resolution extending from 1,500 meters to 3,000 meters.

3.1.11 Modeling Approach

For all pollutants except 1-hour NO_2, concentrations were modeled using 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). Emission rates for the appropriate averaging period were combined with the corresponding dispersion factors to obtain modeled concentrations.

To evaluate results against the NAAQS, the average three-year (2019-2021) background concentration from the San Jose AQS Monitoring Station was added to the maximum modeled concentration and compared against the applicable standard. To evaluate results against the CAAQS, the maximum 2019-2021 background concentration was added to the maximum modeled concentration and compared against the applicable standard.

1-Hour NO_2 Modeling

For the monthly testing scenario, where groups of engines were evaluated as operating simultaneously, the Tier 3 Ozone Limiting Method (OLM) Group option was used for evaluating source groups with multiple emission sources. The source groups for the monthly testing scenario are summarized in **Table 31** and presented in **Figure 3**. For the annual testing scenario, Tier 3 Plume Volume Molar Ratio Method (PVMRM) was used to demonstrate compliance with the 1-hour NO_2 NAAQS and CAAQS. As part of the recent Appendix W updates, USEPA incorporated the PVMRM as a regulatory default method for NO_2 modelling.

Ramboll used a NO_2/NO_X in-stack ratio of 0.10 for the Facility's proposed backup emergency generators. This value was selected based on data from onsite generators of the same make and model as the proposed generators, and from USEPA's In-Stack Ratio Database for diesel/kerosene-fired reciprocating internal combustion engines (RICE).[2]

For evaluations of 1-hour NO_2 impacts against the NAAQS, seasonal, hour-of-day background values were input into the model via the BACKGRND keyword. By using this approach, AERMOD automatically pairs the modeled impacts with the appropriate seasonal, hour-of-day value. For the CAAQS, AERMOD was run with the H1H setting on the POLLUTID line to produce the true highest-first-high (H1H) value for comparison to the 1-hour NO_2 CAAQS. A copy of the worksheet used to develop the seasonal hour-of-day values can be found in **Appendix C**. Results from that worksheet were processed using a python script where the seasonal-by-hour background values were determined. The output of the python script was used in the 1-hour NO_2 AERMOD input files.

3.2 Summary of Modeling Results

Tables 32-35 summarize the modeling results and comparison against the NAAQS and CAAQS. Maximum modeled ambient concentrations, when combined with background concentrations are less than the NAAQS and CAAQS for all pollutants, except the 24-hour and annual PM_{10} CAAQS. In these cases, the PM_{10} background concentrations exceed the standards on their own. Therefore, the Project concentrations were compared against the respective significant impact levels (SILs). As shown in **Tables 36 and 37**, the Project concentrations are below the SILs and thus would not be considered significant. As a result, emissions from construction of the MDC and MBGF and operation of the MBGF would not cause or contribute to an exceedance of these standards.

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[2] Available at: https://www.epa.gov/scram/nitrogen-dioxidenitrogen-oxide-stack-ratio-isr-database. Accessed: October 2022.

4. HEALTH RISK ASSESSMENT

Emissions during the construction of the MDC and MBGF and operation of the MBGF have the potential to be transported outside of the physical boundaries of the Project site and impact nearby sensitive receptors such as those in residential areas. To evaluate those potential impacts, Ramboll conducted a health risk assessment of the sources of TAC emissions from construction of the MDC and MBGF and operation of the MBGF and compared the results against BAAQMD significance thresholds.

4.1 Estimated Air Concentrations

To evaluate the health risks and concentration of air toxics in the surrounding community, BAAQMD recommends estimating concentrations using air dispersion modeling. The methodologies used to evaluate TAC emissions from the Project are based on the most recent BAAQMD Health Risk Assessment Guidelines (2020) and the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines from OEHHA and updated in 2015. The 2015 OEHHA guidelines are based on years of scientific studies evaluating health risks and include a number of conservative assumptions to be protective of human health and to estimate potentially higher risks and sensitivity factors for infants, children, and other sensitive receptors.

Similar to the Air Quality Impact Assessment described in **Section 3**, air concentrations of TACs from construction of the MDC and MBGF and operation of the MBGF were estimated using version 22112 of the AERMOD modeling system. Details on the inputs and methodology used in the dispersion modeling are discussed further in the sections below.

4.1.1 Sources of Emissions

The relevant sources of TAC emissions during construction of the MDC and MBGF are off-road equipment and on-road trucks, both of which are assumed to operate on diesel fuel. For operation of the MBGF, the relevant source of TAC emissions is maintenance and testing of the backup emergency generators, which also operate on diesel fuel. Emissions estimates for operational mobile sources were not included in the operational HRA since the total number of vehicle trips are estimated to be less than 500 trips per day which BAAQMD considers as a minor, low-impact source which does not pose a significant health risk (BAAQMD 2012).

4.1.2 Chemical Selection

The primary source of TAC emissions during construction of the MDC and MBGF and operation of the MBGF is diesel exhaust. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen (California Environmental Protection Agency [Cal/EPA] 1998). CARB classified "particulate emissions from diesel-fueled engines" (17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines, including: on-road diesel engines of trucks, buses, and cars, and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will outweigh the multi-pathway cancer risk from the speciated components" (OEHHA 2003). The DPM analyses for cancer and chronic hazards for this Project were based on the surrogate approach, as recommended by Cal/EPA. In the absence of an acute toxicity value for diesel exhaust, speciated diesel

TOG emissions were used as a conservative estimate for assessing acute hazards related to operation of the MBGF.

4.1.3 Air Dispersion Modeling

AERMOD Version 22112 was used to evaluate ambient air concentrations of DPM, $PM_{2.5}$ and TOG at off-site receptors from MBGF non-emergency use of the backup generators and during Project construction. Source parameters, terrain elevations, land use assumptions, and meteorological data were incorporated into the analysis consistent with the methodology for the Air Quality Impact Assessment described in **Section 3**.

Emission rates: Emissions were modeled using unit emission rates (i.e., 1 g/s), with the model estimating dispersion factors with units of $(\mu g/m^3)/(g/s)$. Emission rates for the appropriate averaging period were combined with the corresponding dispersion factors to obtain modeled concentrations.

For MBGF operation, the proposed generators will only be tested between 7 AM and 5 PM. Construction activities are restricted to take place between 7 AM and 6 PM. Modeled annual emission rates for construction were calculated by dividing total emissions for each year by 4,015 hours per year (365 days per year x 11 hours per day). Operational modeled annual emission rates were calculated assuming 35 hours of operation for each generator and dividing by 3,650 hours per year (365 days per year x 10 hours per day). The modeled emissions rate are shown in **Table 38**.

The greatest health risk impact is anticipated at 100% load, with the second greatest impact at 25% load. However, most maintenance activities are run at 0% load, making it impossible to run all 44 generators to operate at 100% load for the entire maximum run time in a year; as a result, the HRA was conducted at 25% load for all generators for all hours, which is more representative of actual conditions. When evaluating acute impacts related to operations, the generators were analyzed in the same test groups as presented in **Table 31.**

Receptors: Nearby sensitive receptor populations were identified within a 1,000-meter radius of the Project site, which is larger than Project's 1,000-foot zone of influence, as defined by BAAQMD. A receptor grid was created to cover all potential sensitive receptors within 1,000 meters of the Project site. Receptors falling on roadways or railways were labeled as such and removed from further analysis. A grid of receptors with 20-meter spacing was used and modeled off-site receptors are shown in **Figure 4.**

As discussed previously, nearby sensitive receptors include residents to the southwest of the Project site. In addition, a search for nearby schools and daycare facilities was conducted and sensitive receptors were modeled at these locations. Ramboll did not identify any schools or daycare facilities within 1,000 meters of the Project site; however, for completeness, Ramboll included a daycare/school facility located over 1,500 meters northwest of the Project site and a daycare facility located 1,470 meters south of the Project site as sensitive receptors to be included in the health risk assessment. All regions consisting of commercial and industrial land uses surrounding the Project site were conservatively modeled as worker receptors. A list of locations and types of sensitive receptors can be found in **Table 39.**

Receptors were modeled at 1.8 meters of height, consistent with BAAQMD guidance for breathing height. As discussed previously, average annual and maximum hourly dispersion factors were estimated for each receptor location.

Concentrations: For annual average ambient air concentrations, the estimated annual average dispersion factors were multiplied by the annual average emission rates. For maximum hourly ambient air concentrations, the estimated maximum hourly dispersion factors were multiplied by the maximum hourly emission rates.

4.2 Risk Characterization Methods

The following sections discuss in detail the various components required to conduct the HRA of the construction of the MDC and MBGF and operation of the MBGF.

4.2.1 Exposure Assessment

Potentially Exposed Populations: This assessment evaluated off-site receptors potentially exposed to MDC and MBGF construction and MBGF operations. These exposed populations include residential receptors, school receptors, daycare receptors and worker receptors. Both long-term health impacts (cancer risk, chronic HI, and $PM_{2.5}$ concentration) and acute hazards were evaluated for all sensitive receptor locations. Receptors falling within a roadway or railway were excluded from the analysis.

Exposure Assumptions: The exposure parameters used to estimate excess lifetime cancer risks due to Project construction and operational activities were obtained using risk assessment guidelines from OEHHA (2015) and guidelines from the BAAQMD that indicate how the BAAQMD would integrate the 2015 OEHHA Guidelines (BAAQMD 2020), unless otherwise noted, and are presented in **Table 40**. Based on the TACs considered, the only relevant exposure pathway is inhalation, so this analysis considers inhalation exposure only.

For offsite residential receptors, Ramboll selected conservative exposure parameters assuming that exposure would begin during the third trimester of a residential child's life. Ramboll used 95th percentile breathing rates up to age 2, and 80th percentile breathing rates above age 2, consistent with BAAQMD guidance (2020). For construction, off-site residents were assumed to be present at one location for the entire duration of the construction period. For operation, off-site residents were assumed to be present at one location for a 30-year period, beginning with exposure in the third trimester.

For offsite school and daycare receptors, Ramboll selected exposure parameters using the conservative assumption that a child would be located at the daycare facility starting at age of 6 weeks until age 6, and for the school receptor, a child would be at the school starting at age 6 until 18 years. For construction and operations, the child was assumed to be present at the location for 8 hours a day, for 5 days a week. Operational exposures used the 95th percentile 8-hour moderate intensity breathing rate from the OEHHA guidelines.

For offsite recreational receptors, exposure parameters were selected with the conservative assumption that a child would be present at a nearby soccer facility starting at age 2 for 2 hours a day and would be present for 30 years, 52 days per year. Operational exposures used the 95th percentile 8-hour moderate intensity breathing rate from the OEHHA guidelines.

For the remaining offsite receptors, including fenceline and adjacent sidewalk receptors, Ramboll adopted methodology consistent with past Commission Staff's requests which consists of assigning worker exposure parameters to those locations for assessment of health impacts. Ramboll is not in agreement with this methodology and believes every receptor should be assigned exposure parameters based on existing conditions and land uses or what could feasibly occur at each receptor over the duration of the project. It is not reasonable that a worker will be present for 25-30 years on the fenceline of the Site or the adjacent sidewalk. However, consistent with the Staff's request, Ramboll has provided results of an analysis that assumes every receptor that is not classified as a resident, school, recreational or daycare receptor is assumed to have worker exposure parameters. Operational exposure for a worker used the 95th percentile 8–hour breathing rate from the OEHHA guidelines (2015). A 25-year exposure duration for workers is assumed based on the OEHHA recommended exposure duration period and an exposure frequency of 250 days in a year is used in the analysis.

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 (2015).

4.2.2 Modeling Adjustment Factors

Cal/EPA recommends applying an adjustment factor to the annual average concentration determined through dispersion modeling by assuming continuous emissions (*i.e.*, 24 hours per day, 7 days per week), when the actual emissions occur less than 24 hours per day and exposures are concurrent with emissions-generating activities occurring at the Project. The modeling adjustment factors are discussed below.

Residents are assumed to be exposed to Project emissions 24 hours per day, seven days per week. This assumption is consistent with the modeled annual average air concentration. Thus, the annual average concentration need not be adjusted for residential receptors.

The emissions associated with reliability-related activities are conservatively assumed to occur during the hours of 7 AM to 5 PM and on the workdays only while the offsite workers are present and children are expected to be at school or daycare. Thus, a MAF of 4.2 was applied to the annual average concentration used in the evaluation of the offsite worker, school and daycare receptors to account for an emissions schedule equivalent to a worker's schedule of 8 hours per day, 260 days per year ([24 hours/8 hours]*[365 days/260 days]). These concentrations represent the theoretical maximum average concentrations over the operating period to which the offsite worker, school child, or daycare child might be exposed.

The exposure point concentrations for the offsite worker, school child, daycare child, and infant care child receptors will be calculated using the following equation:

$$C_i = C_{i,annual} \times MAF$$

4.2.3 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. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories – 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 HI calculations for Project construction and MBGF operation utilized the toxicity values for DPM. Acute HI calculations for operations utilized the toxicity values for TACs from speciated diesel TOG emissions. The speciation profiles used are presented in **Table 41**. The toxicities of each chemical are shown in **Table 42**. The TACs of concern have inhalation health effects only.

4.2.4 Age Sensitivity Factors

The estimated excess lifetime cancer risks for a resident child was adjusted using the age sensitivity factors (ASFs) recommended by OEHHA (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 to 30 years. **Table 40** shows the ASFs used.

4.2.5 Risk Characterization

4.2.5.1 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 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).

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 during $activities_i$ (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)

4.2.5.2 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.

$$HQi = Ci / cREL$$

Where:

HQi = Chronic hazard quotient for chemical i

HI = Hazard index

Ci = Annual average concentration of chemical i (µg/m^3)

cRELi = 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.

$$HQi = Ci / aREL$$

Where:

HQi = Acute hazard quotient for chemical i

HI = Hazard index

Ci = One-hour maximum concentration of chemical i (µg/m^3)

aRELi = Acute reference exposure level for chemical i (µg/m^3)

4.3 Summary of HRA Results

This section summarizes the results from the construction and operational HRAs as they relate to each of the BAAQMD CEQA thresholds for health risk and hazards. As discussed in **Section 1.3**, the single source significance thresholds for health risks and hazards from construction of Project and operation of CA4BGF are:

- An excess lifetime cancer risk level of more than 10 in one million;
- A chronic noncancer HI greater than 1.0;
- A noncancer acute HI greater than 1.0; and
- An incremental increase in the annual average $PM_{2.5}$ of greater than 0.3 µg/m^3.

The BAAQMD significance thresholds for cumulative health risk and hazard impacts are:

- An excess lifetime cancer risk level of more than 100 in one million;
- A noncancer chronic HI greater than 10.0; and
- An annual average $PM_{2.5}$ concentration of greater than 0.8 µg/m^3.

4.3.1 Construction HRA

Table 43 shows the excess lifetime cancer risk, chronic noncancer HI, and annual $PM_{2.5}$ concentration at the maximally exposed individual resident (MEIR), maximally exposed individual worker (MEIW), maximally exposed recreational receptor (MERR), and maximally exposed daycare/school receptor (MEDR/MESR) during construction of the Project. Project construction is expected to occur over about 15 months, from January 2024 through March 2025. Construction health risk impacts are based on the assumption that all construction offroad equipment meets Tier 4 final engine standards. The risks and health impacts reported here are for the entire duration of construction period. As shown in **Table 41**, the maximum cancer risk impact, chronic HI, and $PM_{2.5}$ concentrations at all receptors are below the BAAQMD single source significance thresholds for health risks and hazards.

4.3.2 Operational HRA

Table 44 shows the excess lifetime cancer risk, chronic noncancer HI, acute noncancer HI and annual $PM_{2.5}$ concentration at the MEIR, MEIW, MERR, and MEDR/MESR during backup generator operation at 25% load. The health impacts presented in this table are based on an annual maximum operating limit of 35 hours for testing and maintenance operations. As shown in **Table 44**, the maximum cancer risk impact, chronic HI, acute HI and $PM_{2.5}$ concentrations at all receptors are below the thresholds of significance.

4.3.3 Cumulative Health Risk Assessment

The BAAQMD 2017 CEQA Guidelines require an analysis of all past, present, and foreseeable future sources within 1,000 feet of the fence line for the Project.

Stationary sources contributing health risks and hazard impacts within a 1,000 ft radius of the Project site were determined using BAAQMD's updated CEQA Tool "Permitted Stationary

Sources Risk and Hazards Map,"[3] a GIS map which provides locations of stationary sources permitted by the District. Appropriate distance multipliers provided by the BAAQMD CEQA Tool "Health Risk Calculater with Distance Multipliers" were applied to represent adjusted risk and hazard impacts that can be expected with farther distances from the sources of emissions. Mobile impacts were determined using BAAQMD's raster tools which provide impacts from major streets, highways, and railroads. The tools developed by the District incorporate risk assessment procedures from the 2015 OEHHA Air Toxics Hot Spots Program Guidance.

Based on the stationary source data available from the BAAQMD's CEQA tool and the mobile source data available from BAAQMD's raster tools, **Table 45** provides a summary of cumulative health risk impacts at the Maximally Exposed Individual Sensitive Receptor (MEISR), which for this Project is the MEIW. Information on the cumulative health risk impacts at the MEIR, MERR, and MEDR/MESR are provided in **Appendix D**.

The cumulative health risk impact of the proposed Project in combination with stationary and mobile sources within 1,000 ft of the MEISR are below the BAAQMD's cumulative health risk thresholds.

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[3] Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=845658c19eae4594b9f4b805fb9d89a3 . Accessed: October 2022.

5. REFERENCES

BAAQMD. 2009. Regulation 8 Organic Compounds Rule 3 Architectural Coatings. July. Available online at: http://www.baaqmd.gov/rules-and-compliance/current-rules. Accessed: October 2022.

BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. May. Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Risk%20Modeling%20Approach%20May%202012.ashx?la=en. Accessed: October 2022.

BAAQMD. 2017. California Environmental Quality Act Air Quality Guidelines. May. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?. Accessed: October 2022.

BAAQMD. 2020. Health Risk Assessment Modeling Protocol. December. Available at: https://www.baaqmd.gov/~/media/files/ab617-community-health/facility-risk-reduction/documents/baaqmd_hra_modeling_protocol-pdf.pdf?la=en. Accessed: October 2022.

California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment (OEHHA). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting.

Office of Environmental Health Hazard Assessment (OEHHA). 2003. The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment. August. Available at: https://oehha.ca.gov/media/downloads/crnr/hrafinalnoapp.pdf

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: October 2022.

United States Environmental Protection Agency (USEPA). 2013a. General Stationary Fuel Combustion Sources. 40 Code of Federal Regulations, Part 98, Subpart C, Table C-2. Office of Air Quality Planning and Standards.

USEPA. 2013b. 78 FR 71904 Part VI. Revisions to Greenhouse Gas Reporting Rule and Final Confidentiality Determinations for New or Substantially Revised Data Elements. Available at: https://www.govinfo.gov/content/pkg/FR-2013-11-29/pdf/2013-27996.pdf. Accessed: October 2022.

TABLES

Table 1
Project Characteristics
651 Martin Avenue
Santa Clara, CA

Characteristic	Description
Location Scope	County
County	Santa Clara
Climate Zone	4
Operational Year	2025
Utility	SVP
CO_2 Intensity Factor (lbs CO_2/MWh)[1]	222
CH_4 Intensity Factor (lbs CH_4/MWh)[1]	0.033
N_2O Intensity Factor (lbs N_2O/MWh)[1]	0.004

Notes:

[1] Default CO_2, CH_4 and N_2O Intensity Factors for SVP, forecasted out to 2025 are from CalEEMod® v2022.1.

Abbreviations:

CalEEMod - California Emissions Estimator Model	MWh - megawatt hour
CO_2 - carbon dioxide	N_2O - nitrogen dioxide
CH_4 - methane	SVP - Silicon Valley Power
lbs - pounds	

References:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 2
Land Use Characteristics
651 Martin Avenue
Santa Clara, CA

Land Use Activity	CalEEMod Land Use Type[1]	Land Use Subtype[1]	Unit Amount[2]	Size Metric	Lot Acreage[3]
Data Halls and Mechanical Galleries	Industrial	Industrial Park	295.5	1000sqft	3.61
Electricity and MMR to Support Data Modules	Industrial	General Light Industry	50.0	1000sqft	0.61
Generator Area	Industrial	General Light Industry	25.5	1000sqft	0.59
Office and Lobby	Commercial	General Office Building	28.0	1000sqft	0.34
Tenant Storage	Commercial	General Office Building	30.0	1000sqft	0.37
Parking	Parking	Parking Lot	15.4	1000sqft	0.35
Landscaping	Recreational	City Park	0.75	Acre	0.75
Substation	Industrial	General Light Industry	24.2	1000sqft	0.55

Notes:

[1] CalEEMod® land use types were assumed based on data provide by project sponsor.

[2] Land use square footage for land use types were provided by project sponsor based on site drawings.

[3] Lot acreage for each land use type was estimated by scaling the total lot acreage by the square footage of development for each land use type.

Abbreviations:

CalEEMod - California Emissions Estimator Model	1000sqft - thousand square feet

References:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 3
Construction Schedule
651 Martin Avenue
Santa Clara, CA

Construction Phase	Start[1]	End	Days[2]
Demolition	1/1/2024	1/29/2024	20
Site Preparation	1/30/2024	2/13/2024	10
Grading	2/14/2024	3/13/2024	20
Building Construction	3/14/2024	1/30/2025	230
Paving	1/31/2025	2/28/2025	20
Architectural Coating	3/1/2025	3/29/2025	20

Notes:

[1] The construction schedule was estimated assuming that construction begins January 1, 2024 with an estimated operational year of 2025

[2] The number of days of construction was determined using CalEEMod® v2022.1 default assumptions.

Abbreviations:

CalEEMod - California Emissions Estimator Model

References:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 4
Construction Equipment List
651 Martin Avenue
Santa Clara, CA

Construction Subphase[1]	Equipment[1]	Construction Equipment Tier[2]	Number[1]	Daily Usage (hours/day)[1]	Horsepower[1]	Load Factor[1]
Demolition	Concrete/Industrial Saws	Tier 4 Final	1	8	33	0.73
	Excavators	Tier 4 Final	3	8	36	0.38
	Rubber Tired Dozers	Tier 4 Final	2	8	367	0.4
Site Preparation	Tractors/Loaders/Backhoes	Tier 4 Final	4	8	84	0.37
	Rubber Tired Dozers	Tier 4 Final	3	8	367	0.4
Grading	Excavators	Tier 4 Final	1	8	36	0.38
	Rubber Tired Dozers	Tier 4 Final	1	8	367	0.4
	Tractors/Loaders/Backhoes	Tier 4 Final	3	8	84	0.37
	Graders	Tier 4 Final	1	8	148	0.41
Building Construction	Cranes	Tier 4 Final	1	7	367	0.29
	Forklifts	Tier 4 Final	3	8	82	0.2
	Tractors/Loaders/Backhoes	Tier 4 Final	3	7	84	0.37
	Generator Sets	Tier 4 Final	1	8	14	0.74
	Welders	Tier 4 Final	1	8	46	0.45
	Pavers	Tier 4 Final	2	8	81	0.42
	Rollers	Tier 4 Final	2	8	36	0.38
	Paving Equipment	Tier 4 Final	2	8	89	0.36
Architectural Coating	Air Compressors	Tier 4 Final	1	6	37	0.48

Notes:

[1] Construction equipment assumptions including number of pieces of equipment, daily hours of usage, horsepower, and load factor are default values from CalEEMod® v2022.1 Appendix G and are based on site acreage.

[2] All off-road equipment for construction is assumed to be Tier 4 Final engines. All construction equipment is conservatively assumed to operate 100% of the subphase.

Abbreviations:

CalEEMod - California Emissions Estimator Model

References:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 5
Construction Trips
651 Martin Avenue
Santa Clara, CA

Subphase	Offroad Equipment Count	One Way Trips[1]		
		Worker Trips (trips/day)	Vendor Trips (trips/day)	Hauling Trips[2] (trips/phase)
Demolition	6	15	0	880
Site Preparation	7	18	0	1050
Grading	6	15	0	0
Building Construction	9	185	74	0
Paving	6	15	0	0
Architectural Coating	1	37	0	0

Notes:

[1] Trip rates for worker, vendor and demolition haul trips are based on CalEEMod® v2022.1 defaults.

[2] The haul truck trip rate during site preparation was calculated using the assumed soil import quantity and a haul truck capacity of 11 cubic yards.

Abbreviations:

CalEEMod - California Emissions Estimator Model

References:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 6
Additional Construction Inputs
651 Martin Avenue
Santa Clara, CA

Characteristic[1]		Value	Unit
Demolition Building Size		77,220	Square Feet
Imported Material Quantity		11,560	Cubic Yards
Paving Quantity	Concrete	31,704	Square Feet
	Asphalt[2]	92,441	Square Feet

Notes:

[1] Project-specific data provided by the project sponsor.

[2] This quantity is in addition to the value specified for parking at the site.

Table 7
Project Construction Emissions
651 Martin Avenue
Santa Clara, CA

Construction and Emissions by Year and Phase

Construction Phase	**Emissions Year**	**Source**	**Total Construction Emissions**[1]				**GHG Emissions**
			ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
			lbs				**MT**
Demolition	2024	On-Site Exhaust	7.3	91.3	1.8	1.8	31.1
		Off-Site Mobile Exhaust	3.7	85.8	1.8	1.8	32.1
		Fugitive Dust	0.0	0.0	82.1	12.8	0.0
Site Preparation	2024	On-Site Exhaust	3.7	25.6	1.8	1.8	24.2
		Off-Site Mobile Exhaust	3.7	104.0	1.8	1.8	37.2
		Fugitive Dust	0.0	0.0	85.8	43.8	0.0
Grading	2024	On-Site Exhaust	7.3	40.2	1.8	1.8	27.0
		Off-Site Mobile Exhaust	1.8	1.8	0.0	0.0	1.1
		Fugitive Dust	0.0	0.0	56.6	25.6	0.0
Building Construction	2024	On-Site Exhaust	69.4	591.3	14.6	14.6	228.3
		Off-Site Mobile Exhaust	142.4	700.8	7.3	7.3	348.0
		Fugitive Dust	0.0	0.0	40.2	7.3	0.0
	2025	On-Site Exhaust	7.3	62.1	1.8	1.8	23.3
		Off-Site Mobile Exhaust	12.8	69.4	1.8	1.8	35.0
		Fugitive Dust	0.0	0.0	7.3	1.8	0.0
Paving	2025	On-Site Exhaust	3.7	40.2	1.8	1.8	13.8
		Off-Site Mobile Exhaust	1.8	1.8	0.0	0.0	1.1
		Fugitive Dust	0.0	0.0	1.8	0.0	0.0
		Paving	3.7	--	--	--	--
Architectural Coating	2025	On-Site Exhaust	1.8	14.6	1.8	1.8	1.2
		Off-Site Mobile Exhaust	3.7	3.7	0.0	0.0	2.7
		Fugitive Dust	0.0	0.0	1.8	0.0	0.0
		Architectural Coating	4,745	--	--	--	--

Summary of Construction Emissions

	Average Daily CAP Emissions[2]				**Total GHG Emissions**
	ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	
	lb/day				**MT CO_2e**
Total	16	5.7	0.12	0.12	806
BAAQMD CEQA Threshold[3]	54	54	82	54	--

Notes:

[1] Construction emissions were estimated using CalEEMod ® v2022.1.

[2] Average daily emissions were calculated by dividing by the number of days of construction.

[3] Thresholds are from BAAQMD California Environmental Quality Act Guidelines, which specifies that the PM_{10} and $PM_{2.5}$ thresholds are for exhaust emissions only. Therefore fugitive dust emissions have been excluded from the estimate of average daily CAP emissions. The BAAQMD does not have an adopted significance threshold for construction-related GHG emissions.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod® - California Emissions Estimator Model
CAP - criteria air pollutant
CEQA - California Environmental Quality Act
CO_2e - carbon dioxide equivalent
GHG - Greenhouse Gases
MRR - Mandatory Reporting Regulation
MT - metric tons
ROG - reactive organic gases
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Reference:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

BAAQMD. 2017. California Environmental Quality Act Guidelines. May. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en&rev=3630ec102f78418d8a26eff9c3d9fd11.

CARB. 2018. Mandatory Greenhouse Gas Reporting Regulation (MRR). Available at: https://ww2.arb.ca.gov/mrr-regulation.

Table 8
Emergency Generator Information
651 Martin Avenue
Santa Clara, CA

Generator Information

Make	Caterpillar
Model	3516E
USEPA Tier Equivalent	4
Generator Output at 100% Load (kilowatt)	2,750
Engine Output at 100% Load (horsepower)	4,043
Make and Model of DPF and SCR	Safety Power ecoCUBE

Pollutant	Uncontrolled Emission Factors[1] (g/bhp-hr)	Controlled Emission Factors[2] (g/bhp-hr)
NOx	5.12	0.5
ROG	0.11	0.06
CO	0.64	0.64
PM	0.070	0.020
$PM_{2.5}$[3]	0.070	0.020
CO_2[4]	526.2	526.2
CH_4[5]	0.021	0.021
N_2O[5]	0.0042	0.0042
CO_2e[6]	528	528

Notes:

[1] Emissions factors from Peterson Power Systems ecoCUBE design criteria inlet emission performance.

[2] Emissions factors from Peterson Power Systems ecoCUBE design criteria outlet emission performance.

[3] Emission factors for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission factor.

[4] Emissions factor from AP-42, Vol. I, Section 3.4, Table 3.4-1 for Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual Fuel Engines.

[5] Emissions factors from 40 CFR 98, Subpart C, Table C-2. Petroleum emissions listed as 3 g CH_4/MMBtu and 0.6 g N_2O/MMBtu. Assumed conversion factor of 7000 Btu/hp-hr per AP-42 Vol I, Table 3.3-1.

[6] Global warming potential values of 1 for CO_2, 25 for CH_4, and 298 for N_2O from USEPA's Federal Register (FR) final rule published on November 29, 2013 [78 FR 71904] and effective on January 1, 2014, were used to convert emissions to metric tons of carbon dioxide equivalents.

Abbreviations:

CH_4 - methane
CO - carbon monoxide
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
DPF - Diesel Particulate Filter
g - gram
hp - horsepower
hr - hour
NO_x - nitrogen oxides
N_2O - nitrous oxide
PM - particulate matter
ROG - reactive organic gases
SCR - selective catalytic reduction
USEPA - United States Environmental Protection Agency

References:

40 CFR Appendix Table C-2 to Subpart C of Part 98. Available online at: https://www.law.cornell.edu/cfr/text/40/appendix-Table_C-2_to_subpart_C_of_part_98

USEPA. 78 FR 71904 Part VI. Revisions to Greenhouse Gas Reporting Rule and Final Confidentiality Determinations for New or Substantially Revised Data Elements. Available at: https://www.govinfo.gov/content/pkg/FR-2013-11-29/pdf/2013-27996.pdf

USEPA. AP-42 Vol 1, 3.4: Large Stationary Diesel And All Stationary Diesel-Fuel engines. Available at: https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s04.pdf

Table 9
Daily Emissions - Testing & Maintenance, Emergency Generators
651 Martin Avenue
Santa Clara, CA

Engine Model	Engine Horsepower	Emissions by Pollutant			
		Quantity of Engines	Operational Hours per Engine per Year[1]	Pollutant	Average Daily Emissions (lb/day)
3516E	4,043	44	35	NOx[2]	19
				ROG[3]	2.4
				CO	24
				PM_{10}[4]	0.75
				$PM_{2.5}$[4]	0.75

Notes:

[1] Daily emissions are based on an annual limit of 35 hours per generator for testing & maintenance operations of all 44 generators.

[2] Emission factors for NOx are based on a minimum abatement efficiency of 90% due to the proposed control device.

[3] Emission factors for ROG are based on a minimum abatement efficiency of 40% due to the proposed control device.

[4] Emission factors for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission factor. PM emissions for the emergency generators are based on a minimum control efficiency of 70% based on the proposed control device.

Abbreviations:

CO - carbon monoxide
lb - pounds
NOx - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases

Table 10
Annual Emissions - Testing & Maintenance, Emergency Generators
651 Martin Avenue
Santa Clara, CA

Engine Model	Engine Horsepower	Emissions by Pollutant			
		Quantity of Engines	Operational Hours per Engine per Year[1]	Pollutant	Average Annual Emissions (ton/year)
3516E	4,043	44	35	NOx[2]	3.4
				ROG[3]	0.4
				CO	4.4
				PM_{10}[3]	0.14
				$PM_{2.5}$[4]	0.14
				GHG[5]	3,287

Notes:

[1] Annual emissions are based on an annual limit of 35 hours per generator for testing & maintenance operations of all 44 generators.

[2] Emission factors for NOx are based on a minimum abatement efficiency of 90% due to the proposed control device.

[3] Emission factors for ROG are based on a minimum abatement efficiency of 40% due to the proposed control device.

[4] Emission factors for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission factor. PM emissions for the emergency generators are based on a minimum control efficiency of 70% based on the proposed control device.

[5] Annual greenhouse gas emissions are calculated in units of MT CO_2e/year.

Abbreviations:

CO - carbon monoxide	NOx - nitrogen oxides
CO_2e - carbon dioxide equivalents	PM_{10} - particulate matter less than 10 microns
GHG - greenhouse gases	$PM_{2.5}$ - particulate matter less than 2.5 microns
MT - metric tons	ROG - reactive organic gases

Table 11
Annual Emissions - Testing, Maintenance, & Emergency, Emergency Generators
651 Martin Avenue
Santa Clara, CA

Engine Model	Engine Horsepower	Emissions by Pollutant			
		Quantity of Engines	Operational Hours per Engine per Year[1]	Pollutant	Average Annual Emissions (ton/year)
3516E	4,043	44	135	NOx[2]	13
				ROG[3]	1.7
				CO	17
				PM_{10}[4]	0.53
				$PM_{2.5}$[4]	0.53

Notes:

1. Facility emissions estimate is based on 135 hours of operations per year, consisting of 35 hours for routine generator maintenance and testing and 100 hours for emergency backup use for each of the 44 generators.
2. Emission factors for NOx are based on a minimum abatement efficiency of 90% due to the proposed control device.
3. Emission factors for ROG are based on a minimum abatement efficiency of 40% due to the proposed control device.
4. Emission factors for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission factor. PM emissions for the emergency generators are based on a minimum control efficiency of 70% based on the proposed control device.

Abbreviations:

CO - carbon monoxide
NOx - nitrogen oxides
ROG - reactive organic gases
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 12
Operational Energy Use Emissions
651 Martin Avenue
Santa Clara, CA

Phase	Rating (MW)	Maximum Annual Energy Use (MWh/yr)[1]	CO_2 Intensity Factor[2] (lbs/MWh)	CH_4 Intensity Factor[2] (lbs/MWh)	N_2O Intensity Factor[2] (lbs/MWh)	CO_2e Intensity Factor[3] (lbs/MWh)	Annual CO_2e Emitted[4] (MT/yr)
Full Buildout	96	840,960	222	0.033	0.00400	224	85,344

Notes:

[1] Estimated maximum annual energy consumption was provided by the project sponsor.

[2] Intensity factors for CO_2, CH_4, and N_2O are default values forecasted out to 2025 from CalEEMod® v2022.1.

[3] Global warming potential values of 1 for CO_2, 25 for CH_4, and 298 for N_2O from USEPA's Federal Register (FR) final rule published on November 29, 2013 [78 FR 71904] and effective on January 1, 2014, were used to convert emissions to metric tons of carbon dioxide equivalents.

[4] Annual emissions are the product of the energy usage and the intensity factor.

Abbreviations:

CalEEMod - California Emissions Estimator Model
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
FR - Federal Register
lbs - pounds
MW - megawatt
MWh - megawatt-hours
MT - metric tons
N_2O - nitrogen dioxide
SVP - Silicon Valley Power
yr - year

References:

CAPCOA. 2017. California Emissions Estimator Model. Available at: http://www.caleemod.com

USEPA. 78 FR 71904 Part VI. Revisions to Greenhouse Gas Reporting Rule and Final Confidentiality Determinations for New or Substantially Revised Data Elements. Available at: https://www.govinfo.gov/content/pkg/FR-2013-11-29/pdf/2013-27996.pdf

Table 13
Project Operational Trips
651 Martin Avenue
Santa Clara, CA

Land Use	Land Use Square Footage[1]	CalEEMod Trip Rates[2]			CalEEMod Trip Totals[2]			Percent of Trips		
		Weekday	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
	(1000 sqft)	(rate/size/day)			(trips/day)					
General Light Industry	100	4.96	1.99	5.00	494	198	498	24%	18%	55%
Industrial Park	296	3.37	2.54	1.24	996	751	366	48%	70%	40%
General Office Building	58	9.74	2.21	0.70	565	128	41	27%	12%	4%
City Park[3]	0.75	0.78	1.96	2.19	0	0	0	0	0	0
Parking Lot[3]	15	0	0	0	0	0	0	0	0	0

Land Use	Total Project Trips[4]	Adjusted Average Daily Trips[5]			Adjusted Average Daily Trip Rate[6]		
		Weekday	Saturday	Sunday	Weekday	Saturday	Sunday
	(trips per day)	(trips per day)			(rate/size/day)		
General Light Industry	463	111	85	255	1.12	0.86	2.56
Industrial Park		224	323	187	0.76	1.09	0.63
General Office Building		127	55	21	2.19	0.95	0.36
City Park		0	0	0	0	0	0
Parking Lot		0	0	0	0	0	0
	Total	**463**	**463**	**463**	0	0	0

Notes:

[1] Land use square footage is summarized in Table 2.

[2] Trip rates for land use types are default values obtained from CalEEMod® v2022.1. Total trips are obtained by multiplying trip rates by the land use square footage.

[3] Trip rates for city park (i.e., landscaping) and parking lot are set to zero since these land use types will not generate any project trips.

[4] Project related trip rate was provided by the project sponsor.

[5] The adjusted average daily trips is calculated by multiplying the percent of trips by the total project trips.

[6] Adjusted average daily trip rates are calculated by dividing the adjusted average daily trips by the land use square footage.

Abbreviations:

CalEEMod - California Emissions Estimator Model

sqft - square feet

Table 14
Project Water Use Rates
651 Martin Avenue
Santa Clara, CA

Phase	Land Use Activity	CalEEMod Land Use Type	Land Use Subtype	Indoor Water Usage[1] (gal/yr)	Outdoor Water Usage[2] (gal/yr)
Phase 1	Data Halls and Mechanical Galleries	Industrial	Industrial Park	594,020	0
	Electricity and MMR to Support Data Modules	Industrial	General Light Industry	100,511	0
	Generator Area	Industrial	General Light Industry	51,281	0
	Office and Lobby	Commercial	General Office Building	56,286	0
	Tenant Storage	Commercial	General Office Building	60,307	0
	Parking	Parking	Parking Lot	0	0
	Landscaping[2]	Recreational	City Park	0	347,439
	Substation	Industrial	General Light Industry	48,595	0

Notes:

[1] Water use rates were calculated by taking the annual water usage provided by the project sponsor (911,000 gallons/year) and distributing across the phases and land uses in proportion to square footage.

[2] Annual outdoor water usage for landscaping area is based on CalEEMod® v2022.1 defaults for Santa Clara County.

Abbreviations:

CalEEMod - California Emissions Estimator Model	gal - gallons	yr - year

Table 15
Operational Mass Emissions of Criteria Air Pollutants
651 Martin Avenue
Santa Clara, CA

Emissions Source		CAP Emissions[1] [ton/year]				CAP Emissions[1] [lb/day]			
		ROG	NOx	PM_{10} Total	$PM_{2.5}$ Total	ROG	NOx	PM_{10} Total	$PM_{2.5}$ Total
Full Buildout	Architectural Coating	0.24	--	--	--	1.3	--	--	--
	Consumer Products	1.8	--	--	--	9.7	--	--	--
	Landscaping	0.29	0.01	0.005	0.005	1.6	0.05	0.03	0.03
	Building Energy Use[3]	--	--	--	--	--	--	--	--
	Mobile Emissions	0.27	0.24	0.20	0.040	1.5	1.3	1.10	0.22
Emergency Generators[2]		0.44	3.4	0.14	0.14	2.4	18.8	0.75	0.75
Stationary Source Offsets[4]		--	**-3.4**	--	--	--	**-18.8**	--	--
Full Buildout Operational Emissions		**3.0**	**0.25**	**0.34**	**0.18**	**16.5**	**1.4**	**1.9**	**1.0**
BAAQMD Significance Threshold[5]		**10**	**10**	**15**	**10**	**54**	**54**	**82**	**54**

Notes:

[1] Operational emissions estimated using CalEEMod® v2022.1 for all sources except building energy use and emergency generator usage.

[2] Emissions from testing and maintenance of emergency generator emissions are estimated in Table 9 and Table 10.

[3] The site does not have any natural gas consumption.

[4] The Project's stationary source NOx emissions are projected to require offsets and as such, would be reduced to zero.

[5] Significance thresholds are from BAAQMD California Environmental Quality Act Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
NOx - nitrogen oxides
ROG - reactive organic gases
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

References:

CAPCOA. 2017. California Emissions Estimator Model. Available at: http://www.caleemod.com

BAAQMD. 2017. CEQA Air Quality Guidelines. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

Table 16
Operational Mass Emissions of Greenhouse Gas Emissions
651 Martin Avenue
Santa Clara, CA

Emissions Source		GHG Emissions[1] MT CO_2e/yr
Full Buildout	Landscaping	6.6
	Data Center Energy Use[2]	85,344
	Water Use	2.0
	Waste Disposed	170
	Mobile Emissions	497
Total GHG Emissions During Full Buildout (Excluding Emergency Generators)		**86,020**

Emissions Source	**GHG Emissions[3] MT CO_2e/yr**
Emergency Generators	3,287
BAAQMD Stationary Source Threshold[4]	**10,000**

Notes:

[1] Operational emissions estimated using CalEEMod® v2022.1 for all sources except building energy use and emergency generator usage.

[2] Data center energy use was calculated based on maximum energy use projections and Silicon Valley Power carbon intensity estimates for operational year 2025.

[3] Calculated based on emission factors from AP-42 Chapter 3.4 Table 3.4-1 (Large Stationary Diesel and All Stationary Dual-fuel Engines) and scaled by engine horsepower, proposed annual operating hours, and number of proposed generators.

[4] Significance thresholds are from BAAQMD California Environmental Quality Act Guidelines.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CalEEMod - California Emissions Estimator Model
CEQA - California Environmental Quality Act
CO_2e - carbon dioxide equivalent
GHG - greenhouse gas
MT - metric ton
yr - year

References:

CAPCOA. 2017. California Emissions Estimator Model. Available at: http://www.caleemod.com

BAAQMD. 2017. CEQA Air Quality Guidelines. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

USEPA. AP-42 Chapter 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines. Available at: https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s04.pdf

Table 17
Ambient Air Quality Standards
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Time	California Standards[1]	National Standards[2]
		Concentration[3]	
NO_2 [4]	1-Hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
CO	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8-Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
SO_2 [5]	1-Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)
	24-Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (for certain areas)
	Annual Arithmetic Mean	--	0.030 ppm (for certain areas)
PM_{10}	24-Hour	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	20 µg/m^3	--
$PM_{2.5}$	24-Hour	--	35 µg/m^3
	Annual ArithmeticMean	12 µg/m^3	12 µg/m^3

Notes:

[1] California standards for carbon monoxide, sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm).

[5] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Abbreviations:

CO - carbon monoxide
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppb - parts per billion
ppm - parts per million
SO_2 - sulfur dioxide
µg/m^3 - micrograms per cubic meter

Table 18
Summary of Background Ambient Air Concentrations
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Units				3-Year Average (2019-2021)	3-Year Maximum (2019-2021)
			2019	2020	2021		
NO_2	1-Hour (maximum)	ppb	60	52	47	53	60
	1-Hour (98th percentile)	ppb	52	45	39	45	52
	Annual Mean	ppb	10.6	9.6	8.7	9.7	10.6
CO	1-Hour	ppm	1.7	1.9	1.7	1.8	1.9
	8-Hour	ppm	1.3	1.5	1.5	1.4	1.5
SO_2 [2]	1-Hour	ppb	15	2.9	1.8	6.4	15
	1-Hour (99th percentile)	ppb	2.2	2.3	1.5	2.0	2.3
	3-Hour	ppb	14.5	2.9	1.8	6.4	15
	24-Hour	ppb	1.5	0.8	0.7	1.0	1.5
	Annual Mean	ppb	0.14	0.17	0.17	0.16	0.17
PM_{10}	24-Hour (maximum)	μg/m^3	75	134	42	84	134
	Annual Mean	μg/m^3	18	25	19	21	25
$PM_{2.5}$	24-Hour (98th Percentile)	μg/m^3	21	56	23	33	56
	Annual Mean	μg/m^3	9.1	11.5	8.9	9.8	11.5

Notes:

[1] Background values were collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by the USEPA.

[2] The 1-hour maximum SO_2 background was conservatively used as the background value for the 3-hour SO_2 averaging period.

Abbreviations:

CO - carbon monoxide	ppb - parts per billion
NO_2 - nitrogen dioxide	ppm - parts per million
PM_{10} - particulate matter less than 10 microns	SO_2 - sulfur dioxide
$PM_{2.5}$ - particulate matter less than 2.5 microns	μg/m^3 - micrograms per cubic meter

Table 19
Project Construction Emissions - CAAQS/NAAQS Modeling
651 Martin Avenue
Santa Clara, CA

Construction and Emissions by Year and Phase

Construction Phase	Emissions Year	Source	Total Construction Emissions[1]					
			ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
			lbs					
Demolition	2024	On-Site Exhaust	7.3	91.3	365	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.0	0.8	1	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	76.7	11.0
Site Preparation	2024	On-Site Exhaust	3.7	25.6	285	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.0	1.0	1	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	76.7	40.2
Grading	2024	On-Site Exhaust	7.3	40.2	354	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.0	0.0	0	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	54.8	25.6
Building Construction	2024	On-Site Exhaust	69.4	591.3	3,103	3.7	14.6	14.6
		Off-Site Mobile Exhaust[2]	2.4	15.1	29	0.1	0.2	0.2
		Fugitive Dust[2]	0.0	0.0	0	0.0	0.8	0.2
	2025	On-Site Exhaust	7.3	62.1	318	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.2	1.5	3	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	0.1	0.0
Paving	2025	On-Site Exhaust	3.7	40.2	212	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.0	0.0	0	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	0.0	0.0
		Paving	3.7	--	--	--	--	--
Architectural Coating	2025	On-Site Exhaust	1.8	14.6	18	1.8	1.8	1.8
		Off-Site Mobile Exhaust[2]	0.1	0.1	0	0.0	0.0	0.0
		Fugitive Dust[2]	0.0	0.0	0	0.0	0.0	0.0
		Architectural Coating	4,745	--	--	--	--	--

Notes:

[1] Construction emissions were estimated using CalEEMod® v2022.1.

[2] Off-site on-road mobile exhaust and fugitive dust emissions have been limited to those within 1,000 feet of the project boundary.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CAAQS - California Ambient Air Quality Standards
CalEEMod® - California Emissions Estimator Model
CO - carbon monoxide
lbs - pounds
NAAQS - National Ambient Air Quality Standards
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ROG - reactive organic gases
SO_2 - sulfur dioxide
yr - year

Reference:

CAPCOA. 2022. California Emissions Estimator Model. Available at: http://www.caleemod.com.

Table 20
Construction 1-hr, 3-hr, 8-hr CAAQS/NAAQS Model Emission Rates
651 Martin Avenue
Santa Clara, CA

Subphase	Emission Rate[1] [lb/hr]			Emission Rate[1] [g/s]		
	NO_x	CO	SO_2	NO_x	CO	SO_2
Demolition	5.75E-01	2.28E+00	1.15E-02	7.25E-02	2.88E-01	1.45E-03
Site Preparation	3.32E-01	3.57E+00	2.30E-02	4.18E-02	4.49E-01	2.90E-03
Grading	2.51E-01	2.21E+00	1.14E-02	3.16E-02	2.79E-01	1.44E-03
Building Construction (2024)	3.63E-01	1.87E+00	2.23E-03	4.57E-02	2.36E-01	2.81E-04
Building Construction (2025)	3.78E-01	1.91E+00	1.11E-02	4.77E-02	2.40E-01	1.40E-03
Paving	2.51E-01	1.32E+00	1.14E-02	3.16E-02	1.67E-01	1.44E-03
Architectural Coating	9.16E-02	1.17E-01	1.14E-02	1.15E-02	1.47E-02	1.44E-03
Maximum Emission Rate	**0.58**	**3.57**	**0.023**	**0.073**	**0.45**	**0.0029**
Modeled Area Emission Rate[2] ($g/s/m^2$)				2.43E-06		

Notes:

[1] Emission rates calculated using CalEEMod® emission outputs in pounds, divided by the number of construction working days per year per phase, and 8 hours of assumed construction operation per day.

[2] The 1-hour NO_2 runs were conducted with actual emissions which require units of $g/s/m^2$. The other pollutants were evaluated using unit emission rates (e.g., 1 g/s), where the actual emission rate is applied outside of the model.

Abbreviations:

CO - carbon monoxide
g - gram
hr - hour
lb - pound
m^2 - meter squared
NO_x - nitrogen oxides
SO_2 - sulfur dioxide
s - second

Table 21
Construction 24-hr CAAQS/NAAQS Model Emission Rates
651 Martin Avenue
Santa Clara, CA

Subphase	Emission Rate[1] [lb/hr]			Emission Rate[1] [g/s]		
	SO_2	Exhaust PM_{10}	Exhaust $PM_{2.5}$	SO_2	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Demolition	8.37E-03	8.37E-03	8.37E-03	1.06E-03	1.06E-03	1.06E-03
Site Preparation	1.67E-02	1.67E-02	1.67E-02	2.11E-03	2.11E-03	2.11E-03
Grading	8.30E-03	8.30E-03	8.30E-03	1.05E-03	1.05E-03	1.05E-03
Building Construction (2024)	1.62E-03	6.42E-03	6.42E-03	2.05E-04	8.09E-04	8.09E-04
Building Construction (2025)	8.08E-03	8.08E-03	8.08E-03	1.02E-03	1.02E-03	1.02E-03
Paving	8.30E-03	8.30E-03	8.30E-03	1.05E-03	1.05E-03	1.05E-03
Architectural Coating	8.30E-03	8.30E-03	8.30E-03	1.05E-03	1.05E-03	1.05E-03
Maximum Emission Rate	**0.017**	**0.017**	**0.017**	**0.0021**	**0.0021**	**0.0021**

Notes:

[1] Emission rates calculated using CalEEMod® emission outputs in pounds, divided by the number of construction working days per year per phase, and 11 hours of assumed construction operation per day.

Abbreviations:

g - gram	PM_{10} - particulate matter less than 10 microns
hr - hour	$PM_{2.5}$ - particulate matter less than 2.5 microns
lb - pound	SO_2 - sulfur dioxide
m^2 - meter squared	s - second

Table 22
Construction Annual CAAQS/NAAQS Model Emission Rates
651 Martin Avenue
Santa Clara, CA

Source	**Subphase**	**Emissions[1] [lb/yr]**		
		NO_x	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**
Total	Demolition	9.21E+01	1.84E+00	1.84E+00
	Site Preparation	2.65E+01	1.84E+00	1.84E+00
	Grading	4.02E+01	1.83E+00	1.83E+00
	Building Construction (2024)	6.06E+02	1.48E+01	1.48E+01
	Building Construction (2025)	6.35E+01	1.87E+00	1.87E+00
	Paving	4.02E+01	1.83E+00	1.83E+00
	Architectural Coating	1.47E+01	1.83E+00	1.83E+00
	Total Emissions	**884**	**26**	**26**
	Maximum Annual Emissions	**765**	**20**	**20**
	Average Daily Emissions (lb/hr)	**0.19**	**0.0050**	**0.0050**
	Average Daily Emissions (g/s)	**0.024**	**0.00064**	**0.00064**
	Modeled Area Emission Rate[2] ($g/s/m^2$)	8.04E-07		

Notes:

[1] Emission rates calculated using CalEEMod® emission outputs in pounds, divided by 365 days of construction per year, and 11 hours of assumed construction operation per day.

[2] The annual NO_2 runs were conducted with actual emissions which require units of $g/s/m^2$. The other pollutants were evaluated using X/Q runs, where the emission rate in g/s is applied outside of the model.

Abbreviations:

g - gram
hr - hour
lb - pound
m^2 - meter squared
NO_x - nitrogen oxides
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
s - second
yr - year

Table 23
Modeling Parameters
651 Martin Avenue
Santa Clara, CA

Construction Model

Source	Source Type	Number of Sources	Source Dimension (m)	Release Height^3 (m)	Initial Vertical Dimension^4 (m)
Construction Equipment and Trucks On-Site	Area	1	29849.98876	5	1.4

Emergency Generator Model

Source	Source Type	Number of Sources^1	Load	Test Scenario	Release Height (m)	Exit Temperature (K)	Exhaust Vol. Flow Rate (cfm)	Exit Velocity (m/s)	Exit Velocity (y-component)^2 (m/s)	Exit Diameter (m)
Backup Generators	Point	44	10	Monthly	8.50 (Lower Generators) 16.84 (Upper Generators)	566.93	4,910.8	7.94	5.62	0.6096
			10	Annual		566.93	4,910.8	7.94	5.62	0.6096
			25	Annual		685.37	8,167.9	13.21	9.34	0.6096
			50	Annual		720.71	13,692.5	22.14	15.66	0.6096
			75	Annual		725.32	17,602.5	28.46	20.13	0.6096
			100	Annual		751.54	21,938.8	35.48	25.08	0.6096

Notes

1. Fourty-four identical 4,043 bhp generators will be installed at the Project site.
2. The stack outlets release at a 45-degree angle. Only the y-component of the exit velocity was modeled in order to conservatively reflect vertical dispersion only.

Abbreviations:

cfm - cubic feet per minute	m - meter
K - Kelvin	s - second

Table 24
Operational 1-hr, 3-hr, and 8-hr CAAQS/NAAQS Model Emission Rates - Monthly Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	Load-Specific Emission Rates[1,2] (g/hr)			Hourly Emission Rate per Generator[3] (g/s)		
	NOx	CO	SO_2	NOx	CO	SO_2
10	6,246	1,508	2.81	4.34E-01	1.05E-01	1.95E-04

Notes:

[1] Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation).

[2] The selective catalytic reduction device takes 15 minutes to warm up. Therefore, the NOx emission rates reflect uncontrolled conditions. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.

[3] Based on 15 minutes per hour of operation.

Abbreviations:

CO - carbon monoxide	SO_2 - sulfur dioxide
g - grams	NOx - nitrogen oxides
hr - hour	ppm - parts per million
s - second	

Table 25
Operational 24-hr CAAQS/NAAQS Model Emission Rates - Monthly Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	**Load-Specific Emission Rates[1,2] (g/hr)**			**24-Hour Emission Rate per Generator[3] (g/s)**		
	SO_2	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**$PM_{2.5}$**	**PM_{10}**
10	2.81	23.7	23.7	1.95E-05	1.64E-04	1.64E-04

Notes:

[1] Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied for PM.

[2] Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.

[3] Based on 15 minutes per day of operation and a 10-hour operating day (i.e., 7 AM to 5 PM).

Abbreviations:

g - grams
hr - hour
s - second
SO_2 - sulfur dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppm - parts per million

Table 26
Operational Annual CAAQS/NAAQS Model Emission Rates - Monthly Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	Load-Specific Emission Rates[1,2] (g/hr)			Annual Emission Rate per Generator[3] (g/s)		
	NOx	$PM_{2.5}$	PM_{10}	NOx	$PM_{2.5}$	PM_{10}
10	6,246	23.7	23.7	1.66E-02	6.31E-05	6.31E-05

Notes:

1. Emission rates from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied for PM.
2. The selective catalytic reduction device takes 15 minutes to warm up. Therefore, the NOx emission rates reflect uncontrolled conditions. Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate.
3. Based on 35 hours of operation per year and a 10-hour operating day (i.e., 7 AM - 5 PM).

Abbreviations:

g - grams

hr - hour

NO_x - nitrogen oxides

s - second

PM_{10} - particulate matter less than 10 microns

$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 27
Operational 1-hr, 3-hr, and 8-hr CAAQS/NAAQS Model Emission Rates - Annual Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)				Hourly Emission Rate per Generator[4,5] (g/s)		
	NO_X (Uncontrolled)	NO_X	CO	SO_2	NO_X	CO	SO_2
100	20,700	2,022	2,588	18.58	5.62E-01	7.19E-01	5.16E-03
75	14,241	1,391	1,658	13.99	3.86E-01	4.61E-01	3.88E-03
50	7,160	699	1,162	10.01	6.43E-01	3.23E-01	2.78E-03
25	3,813	372	2,015	5.51	3.42E-01	5.60E-01	1.53E-03
10	6,246	610	1,508	2.81	5.61E-01	4.19E-01	7.80E-04

Notes:

[1] Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.

[2] Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.

[3] The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.

[4] Based on 1 hour of operation.

[5] The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. NO_x emissions for 10-50% loads assume 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.

Abbreviations:

CO - carbon monoxide
g - grams
hr - hour
s - second

SO_2 - sulfur dioxide
NOx - nitrogen oxides
ppm - parts per million

Table 28
Operational 24-hr CAAQS/NAAQS Model Emission Rates - Annual Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)			24-Hour Emission Rate per Generator[4] (g/s)		
	SO_2	$PM_{2.5}$	PM_{10}	SO_2	$PM_{2.5}$	PM_{10}
100	18.58	80.9	80.9	5.16E-04	2.25E-03	2.25E-03
75	13.99	45.4	45.4	3.88E-04	1.26E-03	1.26E-03
50	10.01	44.6	44.6	2.78E-04	1.24E-03	1.24E-03
25	5.51	46.9	46.9	1.53E-04	1.30E-03	1.30E-03
10	2.81	23.7	23.7	7.80E-05	6.58E-04	6.58E-04

Notes:

[1] Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.

[2] Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.

[3] Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate. The SO_2 emission rate uses load-specific fuel consumption and assumes 15 ppm fuel sulfur content.

[4] Based on 1 hour per day of operation and a 10-hour operating day (i.e., 7 AM to 5 PM).

Abbreviations:

g - grams
hr - hour
s - second
SO_2 - sulfur dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
ppm - parts per million

Table 29
Operational Annual CAAQS/NAAQS Model Emission Rates - Annual Testing
651 Martin Avenue
Santa Clara, CA

Load (%)	Load-Specific Emission Rate[1,2,3] (g/hr)				Annual Emission Rate per Generator[4,5] (g/s)		
	NOx (Uncontrolled)	NOx	$PM_{2.5}$	PM_{10}	NOx	$PM_{2.5}$	PM_{10}
100	20,700	2,022	80.9	80.9	5.38E-03	2.15E-04	2.15E-04
75	14,241	1,391	45.4	45.4	3.70E-03	1.21E-04	1.21E-04
50	7,160	699	44.6	44.6	6.16E-03	1.19E-04	1.19E-04
25	3,813	372	46.9	46.9	3.28E-03	1.25E-04	1.25E-04
10	6,246	610	23.7	23.7	5.38E-03	6.31E-05	6.31E-05

Notes:

1. Emission rates for 100% load from Peterson Power Systems ecoCUBE design criteria emission performance.
2. Emission rates for 10-75% load from Caterpillar 3516E Diesel Generator Specification Sheet (Potential Site Variation) with control factors applied.
3. Emission rates for PM_{10} and $PM_{2.5}$ are conservatively assumed to be equal to the PM emission rate.
4. Based on 35 hours of operation per year and a 10-hour operating day (i.e., 7 AM - 5 PM).
5. The Selective Catalytic Reduction (SCR) device takes 15 minutes to warm up. Annual NO_x emissions for 10-50% loads assume annual operation will consist of 35 individual 1-hour operating periods, each consisting of 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.

Abbreviations:

g - grams

hr - hour

NOx - nitrogen oxides

s - second

PM_{10} - particulate matter less than 10 microns

$PM_{2.5}$ - particulate matter less than 2.5 microns

Table 30
Modeled Buildings
651 Martin Avenue
Santa Clara, CA

Model ID	Description	UTM Zone 10 Coordinates[1] (m)		Elevation (m)	Height (m)
		X	Y		
MAIN	Data Center Building - 1st Tier	593,236.10	4,136,105.00	13.89	26.67
MAIN	Data Center Building - 2nd Tier	593,236.10	4,136,228.09	13.89	36.48
LOADDOCK	Loading Dock	593,269.13	4,136,237.53	13.89	6.4
GEN_L22	Generator Enclosure	593,323.55	4,136,096.58	14.31	5.07
GEN_U22	Generator Enclosure	593,323.52	4,136,096.58	23.3	5.07
GEN_L21	Generator Enclosure	593,323.55	4,136,102.06	14.31	5.07
GEN_U21	Generator Enclosure	593,323.55	4,136,102.06	23.3	5.07
GEN_L20	Generator Enclosure	593,323.55	4,136,107.54	14.31	5.07
GEN_U20	Generator Enclosure	593,323.55	4,136,107.54	23.3	5.07
GEN_L19	Generator Enclosure	593,323.55	4,136,113.02	14.31	5.07
GEN_U19	Generator Enclosure	593,323.55	4,136,113.02	23.3	5.07
GEN_L18	Generator Enclosure	593,323.55	4,136,118.50	14.31	5.07
GEN_U18	Generator Enclosure	593,323.55	4,136,118.50	23.3	5.07
GEN_L17	Generator Enclosure	593,323.55	4,136,123.99	14.31	5.07
GEN_U17	Generator Enclosure	593,323.55	4,136,123.99	23.3	5.07
GEN_L16	Generator Enclosure	593,323.55	4,136,129.47	14.31	5.07
GEN_U16	Generator Enclosure	593,323.55	4,136,129.47	23.3	5.07
GEN_L15	Generator Enclosure	593,323.55	4,136,134.95	14.31	5.07
GEN_U15	Generator Enclosure	593,323.55	4,136,134.95	23.3	5.07
GEN_L14	Generator Enclosure	593,323.55	4,136,140.43	14.31	5.07
GEN_U14	Generator Enclosure	593,323.55	4,136,140.43	23.3	5.07
GEN_L13	Generator Enclosure	593,323.55	4,136,145.91	14.31	5.07
GEN_U13	Generator Enclosure	593,323.55	4,136,145.91	23.3	5.07
GEN_L12	Generator Enclosure	593,323.55	4,136,151.39	14.31	5.07
GEN_U12	Generator Enclosure	593,323.55	4,136,151.39	23.3	5.07
GEN_L11	Generator Enclosure	593,323.55	4,136,156.87	14.31	5.07
GEN_U11	Generator Enclosure	593,323.55	4,136,156.87	23.3	5.07
GEN_L10	Generator Enclosure	593,323.55	4,136,162.35	14.31	5.07
GEN_U10	Generator Enclosure	593,323.55	4,136,162.35	23.3	5.07
GEN_L9	Generator Enclosure	593,323.55	4,136,167.83	14.31	5.07
GEN_U9	Generator Enclosure	593,323.55	4,136,167.83	23.3	5.07
GEN_L8	Generator Enclosure	593,323.55	4,136,173.31	14.31	5.07
GEN_U8	Generator Enclosure	593,323.55	4,136,173.31	23.3	5.07
GEN_L7	Generator Enclosure	593,323.55	4,136,178.80	14.31	5.07
GEN_U7	Generator Enclosure	593,323.55	4,136,178.80	23.3	5.07
GEN_L6	Generator Enclosure	593,323.55	4,136,184.28	14.31	5.07
GEN_U6	Generator Enclosure	593,323.55	4,136,184.28	23.3	5.07
GEN_L5	Generator Enclosure	593,323.55	4,136,189.76	14.31	5.07
GEN_U5	Generator Enclosure	593,323.55	4,136,189.76	23.3	5.07
GEN_L4	Generator Enclosure	593,323.55	4,136,195.24	14.31	5.07
GEN_U4	Generator Enclosure	593,323.55	4,136,195.24	23.3	5.07
GEN_L3	Generator Enclosure	593,323.55	4,136,200.72	14.31	5.07
GEN_U3	Generator Enclosure	593,323.55	4,136,200.72	23.3	5.07
GEN_L2	Generator Enclosure	593,323.55	4,136,206.20	14.31	5.07
GEN_U2	Generator Enclosure	593,323.55	4,136,206.20	23.3	5.07
GEN_L1	Generator Enclosure	593,323.55	4,136,211.68	14.31	5.07
GEN_U1	Generator Enclosure	593,323.55	4,136,211.68	23.3	5.07

Notes:

[1] UTM coordinates shown here represent the lower left (southwest) corner of each modeled building.

Abbreviations:

m - meters

UTM - Universal Transverse Mercator

Table 31
Modeled Source Groups for Monthly Testing Scenario
651 Martin Avenue
Santa Clara, CA

Source Group	Source IDs
GROUP01X	STCKL1, STCKL2
GROUP01Y	STCKL3, STCKL4
GROUP01Z	STCKL5, STCKL6
GROUP02A	STCKL7, STCKL8
GROUP02B	STCKL9, STCKL10, STCKL11
GROUP03A	STCKL12, STCKL13, STCKL14
GROUP03B	STCKL15, STCKL16
GROUP04A	STCKL17, STCKL18, STCKL19
GROUP04B	STCKL20, STCKL21, STCKL22
GROUP05X	STCKU1, STCKU2
GROUP05Y	STCKU3, STCKU4
GROUP05Z	STCKU5, STCKU6
GROUP06A	STCKU7, STCKU8
GROUP06B	STCKU9, STCKU10, STCKU11
GROUP07A	STCKU12, STCKU13, STCKU14
GROUP07B	STCKU15, STCKU16
GROUP08A	STCKU17, STCKU18, STCKU19
GROUP08B	STCKU20, STCKU21, STCKU22

Table 32
Modeled Operational Concentrations and NAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor (μg/m^3)(g/s)$^{-1}$	Emission rate (g/s)	Modeled Concentrations (μg/m^3)	3-Year Average Background Concentrations (μg/m^3) [3]	Total Concentrations	NAAQS (μg/m^3)	Above NAAQS?
					X	Y							
NO$_2$ [1,2]	5-year average of 1-Hour Yearly 98th%	100	Annual	STKL1	593,359	4,136,185	--	--	85	N/A	85	188	No
		75	Annual	STKL1	593,353	4,136,202	--	--	87		87		
		50	Annual	STKL1	593,349	4,136,209	--	--	112		112		
		25	Annual	STKL1	593,353	4,136,202	--	--	104		104		
		10	Annual	STKU1	593,346	4,136,218	--	--	148		148		
		10	Monthly	GROUP01X	593,353	4,136,202	--	--	155		155		
	Annual	100	Annual	ALL	593,229	4,136,290	155	0.0054	0.8	18	19	100	No
		75	Annual	ALL	593,229	4,136,290	173	0.0037	0.6		19		
		50	Annual	ALL	593,229	4,136,290	194	0.0062	1.2		19		
		25	Annual	ALL	593,409	4,136,037	255	0.0033	0.8		19		
		10	Annual	ALL	593,409	4,136,037	359	0.0054	1.9		20		
		10	Monthly	ALL	593,409	4,136,037	359	0.017	6.0		24		
CO	1-Hour	100	Annual	STKL1	593,349	4,136,209	216	0.72	155	2,013	2,168	40,000	No
		75	Annual	STKL1	593,349	4,136,209	236	0.46	109		2,122		
		50	Annual	STKL1	593,349	4,136,209	261	0.32	84		2,097		
		25	Annual	STKU1	593,346	4,136,218	323	0.56	181		2,194		
		10	Annual	STKU1	593,346	4,136,218	421	0.42	176		2,190		
		10	Monthly	GROUP04A	593,351	4,136,065	822	0.10	86		2,099		
	8-Hour	100	Annual	STKL1	593,349	4,136,209	122	0.72	87	1,641	1,729	10,000	No
		75	Annual	STKL1	593,349	4,136,209	159	0.46	73		1,715		
		50	Annual	STKL1	593,349	4,136,209	217	0.32	70		1,712		
		25	Annual	STKL1	593,349	4,136,209	217	0.56	122		1,763		
		10	Annual	STKU1	593,346	4,136,218	262	0.42	110		1,751		
		10	Monthly	GROUP01X	593,349	4,136,209	507	0.10	53		1,695		
SO$_2$	3-year average of 1-Hour Yearly 99th%	100	Annual	STKL1	593,349	4,136,209	216	0.0052	1.11	5.2	6.4	196	No
		75	Annual	STKL1	593,349	4,136,209	236	0.0039	0.92		6.2		
		50	Annual	STKL1	593,349	4,136,209	261	0.0028	0.72		6.0		
		25	Annual	STKU1	593,346	4,136,218	323	0.0015	0.49		5.7		
		10	Annual	STKU1	593,346	4,136,218	421	0.00078	0.33		5.6		
		10	Monthly	GROUP04A	593,351	4,136,065	822	0.00020	0.16		5.4		
	3-Hour	100	Annual	STKL1	593,349	4,136,209	206	0.0052	1.06	17	18	1,300	No
		75	Annual	STKL1	593,349	4,136,209	215	0.0039	0.84		18		
		50	Annual	STKL1	593,349	4,136,209	243	0.0028	0.68		17		
		25	Annual	STKL1	593,349	4,136,209	265	0.0015	0.41		17		
		10	Annual	STKU1	593,346	4,136,218	382	0.00078	0.30		17		
		10	Monthly	GROUP01X	593,349	4,136,209	707	0.00020	0.14		17		

Table 32
Modeled Operational Concentrations and NAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations $(\mu g/m^3)$	3-Year Average Background Concentrations $(\mu g/m^3)$ [3]	Total Concentrations	NAAQS $(\mu g/m^3)$	Above NAAQS?
					X	Y							
PM_{10}	24-Hour 6th highest over 5 years	100	Annual	STKL2	593,219	4,136,263	50	0.0022	0.113	84	84	150	No
		75	Annual	STKL1	593,349	4,136,209	62	0.0013	0.078		84		
		50	Annual	STKL1	593,349	4,136,209	82	0.0012	0.102		84		
		25	Annual	STKL1	593,346	4,136,218	101	0.0013	0.131		84		
		10	Annual	STKL1	593,346	4,136,218	114	0.00066	0.075		84		
		10	Monthly	GROUP01X	593,349	4,136,209	194	0.00016	0.032		84		
$PM_{2.5}$	3-year average of 24-Hour Yearly 98th%	100	Annual	STKL2	593,219	4,136,263	50	0.0022	0.113	33	33	35	No
		75	Annual	STKL1	593,349	4,136,209	62	0.0013	0.078		33		
		50	Annual	STKL1	593,349	4,136,209	82	0.0012	0.102		33		
		25	Annual	STKL1	593,346	4,136,218	101	0.0013	0.131		33		
		10	Annual	STKL1	593,346	4,136,218	114	0.00066	0.075		33		
		10	Monthly	GROUP01X	593,349	4,136,209	194	0.00016	0.032		33		
	3-year average of annual concentrations	100	Annual	ALL	593,229	4,136,290	155	0.00022	0.033	9.8	9.9	12	No
		75	Annual	ALL	593,229	4,136,290	173	0.00012	0.021		9.9		
		50	Annual	ALL	593,229	4,136,290	194	0.00012	0.023		9.9		
		25	Annual	ALL	593,409	4,136,037	255	0.00013	0.032		9.9		
		10	Annual	ALL	593,409	4,136,037	359	0.000063	0.023		9.9		
		10	Monthly	ALL	593,409	4,136,037	359	0.000063	0.023		9.9		

Notes:

[1] Direct emissions rates for 1-hour NO_2 were used in the dispersion modeling to obtain 1-hour NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.

[2] For the 1-hour NO_2 runs, seasonal hour-of-day NO_2 background values were incorporated using AERMOD and are already included in the modeled concentrations presented.

[3] The 3-year average background concentrations were calculated using 2019-2021 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by the USEPA.

Abbreviations:

CO - carbon monoxide
g - grams
NAAQS - National Ambient Air Quality Standard
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 33
Modeled Operational Concentrations and CAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor (μg/m^3)(g/s)$^{-1}$	Emission rate (g/s)	Modeled Concentrations (μg/m^3)	Maximum Background Concentrations (μg/m^3) [3]	Total Concentrations	CAAQS (μg/m^3)	Above CAAQS?
					X	Y							
NO_2 [1,2]	1-Hour Maximum	100	Annual	STKL1	593,349	4,136,209	--	--	197	N/A	197	339	No
		75	Annual	STKL1	593,349	4,136,209	--	--	170		170		
		50	Annual	STKL1	593,349	4,136,209	--	--	239		239		
		25	Annual	STKU1	593,346	4,136,218	--	--	187		187		
		10	Annual	STKU1	593,346	4,136,218	--	--	291		291		
		10	Monthly	GROUP01X	593,349	4,136,209	--	--	323		323		
	Annual Maximum	100	Annual	ALL	593,229	4,136,290	155	0.0054	0.8	20	21	57	No
		75	Annual	ALL	593,229	4,136,290	173	0.0037	0.6		21		
		50	Annual	ALL	593,229	4,136,290	194	0.0062	1.2		21		
		25	Annual	ALL	593,409	4,136,037	255	0.0033	0.8		21		
		10	Annual	ALL	593,409	4,136,037	359	0.0054	1.9		22		
		10	Monthly	ALL	593,409	4,136,037	359	0.017	6.0		26		
CO	1-Hour Maximum	100	Annual	STKL1	593,349	4,136,209	216	0.72	155	2,129	2,284	23,000	No
		75	Annual	STKL1	593,349	4,136,209	236	0.46	109		2,238		
		50	Annual	STKL1	593,349	4,136,209	261	0.32	84		2,213		
		25	Annual	STKU1	593,346	4,136,218	323	0.56	181		2,309		
		10	Annual	STKU1	593,346	4,136,218	421	0.42	176		2,305		
		10	Monthly	GROUP04A	593,351	4,136,065	822	0.10	86		2,215		
	8-Hour Maximum	100	Annual	STKL1	593,349	4,136,209	122	0.72	87	1,718	1,805	10,000	No
		75	Annual	STKL1	593,349	4,136,209	159	0.46	73		1,791		
		50	Annual	STKL1	593,349	4,136,209	217	0.32	70		1,788		
		25	Annual	STKL1	593,349	4,136,209	217	0.56	122		1,839		
		10	Annual	STKU1	593,346	4,136,218	262	0.42	110		1,828		
		10	Monthly	GROUP01X	593,349	4,136,209	507	0.10	53		1,771		
SO_2	1-Hour Maximum	100	Annual	STKL1	593,349	4,136,209	216	0.0052	1.11	38.0	39.1	655	No
		75	Annual	STKL1	593,349	4,136,209	236	0.0039	0.92		38.9		
		50	Annual	STKL1	593,349	4,136,209	261	0.0028	0.72		38.7		
		25	Annual	STKU1	593,346	4,136,218	323	0.0015	0.49		38.5		
		10	Annual	STKU1	593,346	4,136,218	421	0.00078	0.33		38.3		
		10	Monthly	GROUP04A	593,351	4,136,065	822	0.00020	0.16		38.1		
	24-Hour Maximum	100	Annual	STKL2	593,219	4,136,263	50	0.00052	0.026	3.9	4.0	105	No
		75	Annual	STKL1	593,349	4,136,209	62	0.00039	0.024		4.0		
		50	Annual	STKL1	593,349	4,136,209	82	0.00028	0.023		4.0		
		25	Annual	STKL1	593,346	4,136,218	101	0.00015	0.015		3.9		
		10	Annual	STKL1	593,346	4,136,218	114	0.000078	0.0089		3.9		
		10	Monthly	GROUP01X	593,349	4,136,209	194	0.000020	0.0038		3.9		

Table 33
Modeled Operational Concentrations and CAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor (µg/m^3)(g/s)$^{-1}$	Emission rate (g/s)	Modeled Concentrations (µg/m^3)	Maximum Background Concentrations (µg/m^3) [3]	Total Concentrations	CAAQS (µg/m^3)	Above CAAQS?
					X	Y							
PM$_{2.5}$	Annual Maximum	100	Annual	ALL	593,229	4,136,290	155	0.00022	0.033	11.5	11.5	12	No
		75	Annual	ALL	593,229	4,136,290	173	0.00012	0.021		11.5		
		50	Annual	ALL	593,229	4,136,290	194	0.00012	0.023		11.5		
		25	Annual	ALL	593,409	4,136,037	255	0.00013	0.032		11.5		
		10	Annual	ALL	593,409	4,136,037	359	0.000063	0.023		11.5		
		10	Monthly	ALL	593,409	4,136,037	359	0.000063	0.023		11.5		

Notes:

[1] Direct emissions rates for 1-hour NO_2 were used in the dispersion modeling to obtain 1-hour NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.

[2] For the 1-hour NO_2 runs, the maximum single-hour background concentration during the hours in which the generators will be tested (i.e., 7 AM to 5 PM) was incorporated using AERMOD and is already included in the modeled concentrations presented.

[3] The 3-year maximum background concentrations were calculated using 2019-2021 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by the USEPA.

Abbreviations:

CAAQS - California Ambient Air Quality Standard
CO - carbon monoxide
g - grams
NO_2 - nitrogen dioxide
SO_2 - sulfur dioxide
s - second
µg/m^3 - micrograms per cubic meter

Table 34
Modeled Construction Concentrations and NAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration $(\mu g/m^3)$	3-Year Average Background Concentrations $(\mu g/m^3)$ [3]	Total Concentrations	NAAQS $(\mu g/m^3)$	Above NAAQS?
		X	Y							
NO_2 [1,2]	5-year average of 1-Hour Yearly 98th%	593,239	4,136,291	--	--	92	--	92	188	No
	Annual Arithmetic Mean	593,360	4,136,115	--	--	0.94	18	19	100	No
CO	1-Hour	593,219	4,136,273	708	0.45	318	2,013	2,331	40,000	No
	8-Hour	593,297	4,136,279	239	0.45	107	1,641	1,749	10,000	No
SO_2	5-year average of 1-Hour Yearly 99th%	593,219	4,136,273	708	0.0029	2.1	5.2	7.3	196	No
	3-Hour	593,279	4,136,287	425	0.0029	1.2	17	18	1,300	No
PM_{10}	24-Hour 6th highest over 5 years	593,249	4,136,291	109	0.0021	0.23	84	84	150	No
$PM_{2.5}$	5-year average of 24-Hour Yearly 98th%	593,249	4,136,291	109	0.0021	0.23	33	34	35	No
	3-year average of annual concentrations	593,360	4,136,115	39	0.00064	0.025	9.8	9.9	12	No

Notes:

[1] Direct emissions rates for NO_2 were used in the dispersion modeling to obtain NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.

[2] For the 1-hour NO_2 runs, seasonal hour-of-day NO_2 background values were incorporated using AERMOD and are already included in the modeled concentrations presented.

[3] The 3-year average background concentrations were calculated using 2019-2021 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by the USEPA.

Abbreviations:

CO - carbon monoxide
g - grams
NAAQS - National Ambient Air Quality Standard
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 35
Modeled Construction Concentrations and CAAQS
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration $(\mu g/m^3)$	Maximum Background Concentrations $(\mu g/m^3)^2$	Total Concentrations	CAAQS $(\mu g/m^3)$	Above CAAQS?
		X	Y							
NO_2[1]	1-Hour Maximum	593,229	4,136,290	--	--	42	112	155	339	No
	Annual Maximum	593,360	4,136,115	--	--	0.94	20	21	57	No
CO	1-Hour Maximum	593,219	4,136,273	708	0.45	318	2,129	2,447	23,000	No
	8-Hour Maximum	593,297	4,136,279	239	0.45	107	1,718	1,825	10,000	No
SO_2	1-Hour Maximum	593,219	4,136,273	708	0.0029	2.05	38	40	655	No
	24-Hour Maximum	593,249	4,136,291	109	0.0021	0.23	3.9	4.2	105	No
$PM_{2.5}$	Annual Maximum	593,360	4,136,115	39	0.00064	0.025	11.5	11.5	12	No

Notes:

[1] Direct emissions rates for NO_2 were used in the dispersion modeling to obtain NO_2 concentrations directly. Since unit emission rates were not used, there are no values for NO_2 emission rates in this table.

[2] The 3-year maximum background concentrations were calculated using 2019-2021 data collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by the USEPA.

Abbreviations:

CAAQS - California Ambient Air Quality Standard
CO - carbon monoxide
g - grams
NO_2 - nitrogen dioxide
$PM_{2.5}$ - particulate matter less than 2.5 microns
SO_2 - sulfur dioxide
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 36
Comparison of Modeled Operational PM10 Results to Significance Impact Levels
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	Load (%)	Test Scenario	Source Group	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentrations $(\mu g/m^3)$	SIL $(\mu g/m^3)$ [1]	Above SIL?
					X	Y					
PM_{10}	24-Hour Maximum	100	Annual	STKL2	593,219	4,136,263	50	0.00225	0.113	5	No
		75	Annual	STKL1	593,349	4,136,209	62	0.00126	0.078		
		50	Annual	STKL1	593,349	4,136,209	82	0.00124	0.102		
		25	Annual	STKL1	593,346	4,136,218	101	0.00130	0.131		
		10	Annual	STKL1	593,346	4,136,218	114	0.00066	0.075		
		10	Monthly	GROUP01X	593,349	4,136,209	194	0.00016	0.032		
	Annual Maximum	100	Annual	ALL	593,229	4,136,290	155	0.00022	0.033	1	No
		75	Annual	ALL	593,229	4,136,290	173	0.00012	0.021		
		50	Annual	ALL	593,229	4,136,290	194	0.00012	0.023		
		25	Annual	ALL	593,409	4,136,037	255	0.00013	0.032		
		10	Annual	ALL	593,409	4,136,037	359	0.000063	0.023		
		10	Monthly	ALL	593,409	4,136,037	359	0.000063	0.023		

Notes:

[1] Significance Impact Level (SIL) value taken from the EPA's "Guidance on Significance Impact Levels for Ozone and Fine Particles in the Prevention of Significance Deterioration Permitting Program" Memorandum dated April 17, 2018.

Abbreviations:

g - grams	SIL - Significance Impact Level
PM_{10} - particulate matter less than 10 microns	s - second
$PM_{2.5}$ - particulate matter less than 2.5 microns	$\mu g/m^3$ - micrograms per cubic meter

Table 37
Comparison of Modeled Construction PM10 Results to Significance Impact Levels
651 Martin Avenue
Santa Clara, CA

Pollutant	Averaging Period	UTM Zone 10 Coordinates (m)		Max. Dispersion Factor $(\mu g/m^3)(g/s)^{-1}$	Emission rate (g/s)	Modeled Concentration $(\mu g/m^3)$	SIL $(\mu g/m^3)^1$	Above SIL?
		X	Y					
PM_{10}	24-Hour Maximum	593,249	4,136,291	109	0.0021	0.23	5.0	No
	Annual Maximum	593,360	4,136,115	39	0.00064	0.025	1.0	No

Notes:

[1.] Significance Impact Level (SIL) values taken from the EPA's "Guidance on Significance Impact Levels for Ozone and Fine Particles in the Prevention of Significance Deterioration Permitting Program" Memorandum dated April 17, 2018.

Abbreviations:

g - grams
PM_{10} - particulate matter less than 10 microns
$PM_{2.5}$ - particulate matter less than 2.5 microns

SIL - Significance Impact Level
s - second
$\mu g/m^3$ - micrograms per cubic meter

Table 38
Modeled Emissions Rate for Health Risk Assessment
651 Martin Avenue
Santa Clara, CA

Scenario	Source	Year	Emission Rate (g/s)		
			Yearly		Hourly
			DPM[1]	$PM_{2.5}$[2]	TOG
Construction	Off-road and On-road Diesel Exhaust	2024	6.36E-04	6.36E-04	--
		2025	1.73E-04	1.73E-04	--

Scenario	Source	Load	Year	Emission Rate (g/s)		
				Yearly		Hourly
				DPM[3]	$PM_{2.5}$[4]	TOG
Operations[5]	Diesel Backup Generators	25	All	1.25E-04	1.25E-04	5.92E-02

Notes

[1] The DPM emission rate during construction includes exhaust from all onsite off-road construction equipment, and exhaust emissions from vendor and hauling trucks (out to a distance of 1,000 feet from the project site) which are assumed to be diesel vehicles. All exhaust PM_{10} is assumed to be DPM.

[2] Construction related $PM_{2.5}$ emissions are from on-site off-road equipment and on-road vehicle exhaust (out to a radius of 1,000 feet from the project site).

[3] DPM emissions from operations are from diesel generators. DPM emissions from operational traffic are not included since the average number of vehicle trips per day is very small.

[4] $PM_{2.5}$ emissions from operations are from diesel generators alone. $PM_{2.5}$ emissions from operational traffic are not included since the average number of vehicle trips per day is very small.

[5] Emission rates for generators are given as the emission rate from a single generator.

Abbreviations

DPM - diesel particulate matter
g - grams
$PM_{2.5}$ - particulate matter less than 2.5 microns
PM_{10} - particulate matter less than 10 microns
s - seconds
TOG - total organic gases

Table 39
Locations and Types of Nearby Sensitive Receptors
651 Martin Avenue
Santa Clara, CA

Receptor No.	Name	Type	Address	Latitude	Longitude
1	Santa Clara Montessori	Daycare/School	1041 El Camino Real Rd., Santa Clara, CA 95050	37.35438	-121.94799
2	Granada Islamic School	Daycare/School	3003 Scott Blvd., Santa Clara, CA 95054	37.37676	-121.95981
3	Muslim Community Association	School	3003 Scott Blvd., Santa Clara, CA 95054	37.3775	-121.95979
4	Noor Hifz Academy	School	3003 Scott Blvd., Santa Clara, CA 95054	37.37718	-121.95905
5	Off the Wall Soccer	Recreational	700 Mathew St., Santa Clara, CA 95050	37.36284	-121.94742

Table 40
Exposure Parameters
651 Martin Avenue
Santa Clara, California

				Exposure Parameters								
Period[1]	Receptor Type[2]	Year	Receptor Age Group[3]	Daily Breathing Rate (DBR)[4,5,6]	Exposure Duration (ED)[7]	Fraction of Time at Home (FAH)[8]	Exposure Frequency (EF)[9]	Averaging Time (AT)	Modeling Adjustment Factor (MAF)[10]	Age Sensitivity Factor (ASF)[11]	Intake Factor, Inhalation (If_{inh})	Cumulative Intake Factor, Inhalation (If_{inh})
				(L/kg-day)	(years)	(unitless)	(days/year)	(days)	(unitless)	(unitless)	(m^3/kg-day)	(m^3/kg-day)
Construction	Residential	2024	3rd Trimester	361	0.25	1	350	25,550	1	10	0.012	0.124
			Age 0-<2 Years	1,090	0.75	1			1	10	0.1120	
		2025	Age 0-<2 Years	1,090	1	1			1	10	0.149	0.149
	Daycare/School	2024	Age 0-<2 Years	1,200	1	1	250		4.2	10	0.4932	0.4932
		2025	Age 2-<9 Years	640	1	1			4.2	3	0.0789	0.0789
	Recreational	2024	Age 2-<9 Years	80	1	1	52		4.2	3	0.0021	0.0021
		2025	Age 2-<9 Years	80	1	1			4.2	3	0.0021	0.0021
	Worker	2024	Age 16-30 Years	240	1	1	250		4.2	1	0.0099	0.009863014
		2025	Age 16-30 Years	240	1	1			4.2	1	0.0099	0.009863014
Operations	Residential	All	3rd Trimester	361	0.25	1	350	25,550	1	10	0.0124	0.6936
			Age 0-<2 Years	1090	2	1			1	10	0.299	
			Age 2-<9 Years	631	7	1			1	3	0.1815	
			Age 2-<16 Years	572	7	1			1	3	0.1645	
			Age 16-30 Years	261	14	0.73			1	1	0.0365	
	Daycare/School		Age 0-<2 Years	1200	2	1	250		4.2	10	0.9863	1.8617
			Age 2-<9 Years	640	7	1			4.2	3	0.5523	
			Age 2-<16 Years	520	7	1	180		4.2	3	0.3231	
	Recreational		Age 2-<9 Years	80	7	1	52		4.2	3	0.0144	0.0301
			Age 2-<16 Years	65	7	1			4.2	3	0.0117	
			Age 16-30 Years	30	16	1			4.2	1	0.0041	
	Worker		Age 16-70 Years	230	25	1	250		4.2	1	0.2363	0.2363

Notes:

[1] Construction exposure starts at the assumed start of construction, January 1, 2024. Operational exposure begins at the assumed start of operations, March 30, 2025.

[2] Sensitive receptors within a 1,000 meter buffer were analyzed in the HRA. These include residents and workers in the area, as well as recreational receptors, specifically children that use the soccer facility southwest of the project site. To be conservative, additional sensitive receptors outside of the 1,000m buffer were included. These include a daycare (infants-elementary school age children) and a daycare/school (0 month olds - 9th grade students). The daycare was conservatively modeled as the daycare/school.

[3] Age bin 2-<9 Years was used where applicable, and age bin 2-<16 Years was conservatively used for ages 9-<16 Years.

[4] Daily breathing rates for residents reflect default breathing rates from Cal/EPA 2015 as follows:

95th percentile 24-hour daily breathing rate for age 3rd trimester and 0-<2 years

80th percentile 24-hour daily breathing rate for age 2-<9 years

80th percentile 24-hour daily breathing rate for age 2-<16 years

80th percentile 24-hour daily breathing rate for age 16-30 years

[5] Daily breathing rates for daycare and school children and recreational (soccer field) users assumes 95th Percentile Eight-Hour Breathing Rates for Moderate Intensity Activities for all ages. Daily breathing rates for recreational (soccer field) users are divided by 8 hours/day to convert from L/kg-day to L/kg-hr to account for hourly usage of soccer field.

[6] Daily breathing rates for workers assumes 95th Percentile Eight-Hour Breathing Rates.

[7] The total exposure duration for residents reflects the default residential exposure duration from Cal/EPA 2015, 30.25 years including third trimester exposure. Daycare/school children are assumed to remain in daycare/school from ages 0 months to 16 years. The worker exposure duration is set to 25 years per Cal/EPA guidance. Recreational exposure duration was evaluated starting at age 2 and the 16-30 year breathing rate was assumed for ages 16-32.

[8] Fraction of time spent at home is conservatively assumed to be 1 (i.e. 24 hours/day) for all age bins except Age 16-30 Years. Fraction of time spent at home is assumed to be 0.73 for Ages 16-30 Years.

[9] Exposure frequency was determined as follows:

Residents: reflects default residential exposure frequency from Cal/EPA 2015.

Daycare/School: for ages 0 month to 9 years, reflects default worker exposure frequency from Cal/EPA 2015, assuming a daycare child is at the daycare center when the parents are at work. For ages 9 years to 16 years, reflects default number of school days per year.

Worker: reflects default worker exposure frequency from Cal/EPA 2015.

Recreational (Soccer Child): reflects assumption that child attends soccer facility for 1 hour every week, 52 weeks/year.

[10] The Modeling Adjustment Factor for all non-residential receptor types in both the construction and operational phases is calculated to adjust from 24 hours/day to 8 hours/day and from 7 days/week to 5 days/week ([24 hours/8 hours] * [7 days/5days] =

[11] Age sensitivity factors account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (Cal/EPA 2009) and current OEHHA guidance (Cal/EPA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD (BAAQMD 2016).

Abbreviations:

AT - averaging time	FAH - fraction of time at home
Cal/EPA - California Environmental Protection Agency	kg - kilogram
DBR - daily breathing rate	L - liter
EF - exposure frequency	

Reference:

Cal/EPA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 41
Speciation Values
651 Martin Avenue
Santa Clara, CA

Source	Emission Type	Fraction	Chemical[1]
Diesel Offroad Equipment (Generators)	**Exhaust PM**	1.0	Diesel PM
	Exhaust TOG	0.0019	1,3-Butadiene
		0.074	Acetaldehyde
		0.020	Benzene
		0.0031	Ethylbenzene
		0.15	Formaldehyde
		0.0016	n-Hexane
		3.0E-04	Methanol
		0.015	Methyl Ethyl Ketone
		9.0E-04	Naphthalene
		0.026	Propylene
		6.0E-04	Styrene
		0.015	Toluene
		0.0061	m-Xylene
		0.0034	o-Xylene
		0.0010	p-Xylene

Notes:

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: CARB 818 / EPA 3161

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
Cal/EPA - California Environmental Protection Agency
CARB - California Air Resources Board
PM - particulate matter
TOG - total organic gases
USEPA - United States Environmental Protection Agency

References:

CARB. Speciation Profiles Used in ARB Modeling. Available online at: http://www.arb.ca.gov/ei/speciate/speciate.htm#specprof

BAAQMD. 2012. Recommended Methods for Screening and Modeling Local Risks and Hazards. October.

Cal/EPA. 2022. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. October.

USEPA. SPECIATE 5.2. Available online at: https://www.epa.gov/air-emissions-modeling/speciate

Table 42
Toxicity Values
651 Martin Avenue
Santa Clara, CA

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	5.0	--
1,3-Butadiene	0.600	2.0	660
Acetaldehyde	0.01	140.0	470
Benzene	0.10	3.0	27
Ethylbenzene	0.0087	2,000	--
Formaldehyde	0.021	9.0	55
n-Hexane	--	7,000	--
Methanol	--	4,000	28,000
Methyl Ethyl Ketone	--	--	13,000
Naphthalene	0.12	9.000	--
Propylene	--	3,000	--
Styrene	--	900	21,000
Toluene	--	420	5,000
m-Xylene	--	700	22,000
o-Xylene	--	700	22,000
p-Xylene	--	700	22,000

Notes:

[1] Chemicals presented in this table reflect air toxic contaminants in the proposed fuel types that are expected from diesel off-road equipment (i.e., generators).

Abbreviations:

- - not available or not applicable

$\mu g/m^3$ - micrograms per cubic meter

Cal/EPA - California Environmental Protection Agency

CARB - Air Resources Board

$(mg/kg\text{-}day)^{-1}$ - per milligram per kilogram-day

OEHHA - Office of Environmental Health Hazard Assessment

PM - particulate matter

REL - reference exposure level

Reference:

Cal/EPA. 2022. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13.

Table 43
Construction Health Impacts Summary
651 Martin Avenue
Santa Clara, CA

Receptor Type		Cancer Risk	Chronic Hazard Index	$PM_{2.5}$ Concentation
		(in a million)	(unitless)	($\mu g/m^3$)
Daycare/ School	**Total Risk**	**0.040**	**0.000014**	**0.000071**
	UTMx	592,190	592,190	592,190
	UTMy	4,137,150	4,137,150	4,137,150
Worker	**Total Risk**	**0.34**	**0.0050**	**0.025**
	UTMx	593,360	593,360	593,360
	UTMy	4,136,105	4,136,105	4,136,105
Recreational	**Total Risk**	**0.00076**	**0.000053**	**0.00027**
	UTMx	593,270	593,270	593,270
	UTMy	4,135,670	4,135,670	4,135,670
Residential	**Total Risk**	**0.011**	**0.000012**	**0.000059**
	UTMx	593,310	593,310	593,310
	UTMy	4,135,070	4,135,070	4,135,070
BAAQMD Significance Threshold		10	1	0.3

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
$PM_{2.5}$ - particulate matter less than 2.5 microns
$\mu g/m^3$ - micrograms per cubic meter

Table 44
Project-Related Operational Health Impacts Summary
651 Martin Avenue
Santa Clara, CA

Load Scenario			Receptor Type				PMI	BAAQMD Significance Threshold
			Daycare/School	**Worker**	**Recreational**	**Residential**		
Cancer Risk (in a million)	25%	Risk	0.79	6.8	0.028	0.28	6.8	10
		UTMx	592,190	593,390	593,270	593,070	593,390	
		UTMy	4,137,150	4,136,070	4,135,670	4,135,570	4,136,070	
		RecType	--	--	--	--	Worker	
Chronic Risk (unitless)	25%	Risk	0.000077	0.0053	0.00017	0.000073	0.0053	1
		UTMx	592,190	593,390	593,270	593,070	593,390	
		UTMy	4,137,150	4,136,070	4,135,670	4,135,570	4,136,070	
		RecType	--	--	--	--	Worker	
Acute Risk (unitless)	25%	Risk	0.053	0.37	0.072	0.075	0.37	1
		UTMx	592,150	593,351	593,190	593,010	593,351	
		UTMy	4,137,130	4,136,065	4,135,650	4,135,590	4,136,065	
		Worst-Case Generator	GRP04A	GRP04A	GRP03A	GRP02B	GRP04A	
		RecType	--	--	--	--	Worker	
$PM_{2.5}$ Concentration ($\mu g/m^3$)	25%	Risk	0.00039	0.026	0.00085	0.00037	0.026	0.3
		UTMx	592,190	593,390	593,270	593,070	593,390	
		UTMy	4,137,150	4,136,070	4,135,670	4,135,570	4,136,070	
		RecType	--	--	--	--	Worker	

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
$PM_{2.5}$ - particulate matter less than 2.5 microns
PMI - point of maximum impact
$\mu g/m^3$ - micrograms per cubic meter

Table 45
Summary of Cumulative Health Impacts at the MEISR
651 Martin Avenue
Santa Clara, CA

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Operational Generators (25% Load)	6.8	0.0053	0.37	0.026
Subtotal, Project Impacts	**6.8**	**0.0053**	**0.37**	**0.026**
Existing Stationary Sources[1]				
The Home Depot (Facility #6023)	0.1	0.0000	NA	0.000
88 Auto Body (Facility #11223)	0.0	0.0005	NA	0.000
Caliber Collision (Facility #200928)	0.0	0.0004	NA	0.000
Service King Paint & Body (Facility #22712)	0.0	0.0002	NA	0.000
Subtotal, Background Sources	**0.1**	**0.0011**	**0**	**0.000**
Existing Rail and Roadway Sources[2,3]				
Railroad	57.3	NA	NA	0.081
Major Roadways	8.9	NA	NA	0.192
Highways	10.2	NA	NA	0.240
Subtotal, Mobile Sources	**76.4**	**0**	**0**	**0.513**
Subtotal, Background and Mobile Sources	**76.5**	**0.0011**	**0**	**0.513**
Total Cumulative Impact	**83.3**	**0.0064**	**0.37**	**0.540**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?	No	No	No	No
Receptor Type	Worker	Worker	Worker	Worker
Receptor Location (UTMx)	593,390	593,390	593,390	593,390
Receptor Location (UTMy)	4,136,070	4,136,070	4,136,070	4,136,070

Notes:

1. Health impacts data for stationary sources within 1,000 ft of the MEISR were obtained from BAAQMD's Permitted Stationary Source Risks and Hazards Screening Tool.
2. Health impacts data for existing rail and roadway sources were estimated using BAAQMD's source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located at the MEISR.
3. Health impacts from existing rail and roadway sources conservatively do not account for the fact that the receptor is only present at this location for a portion of the day/week.

Abbreviations:

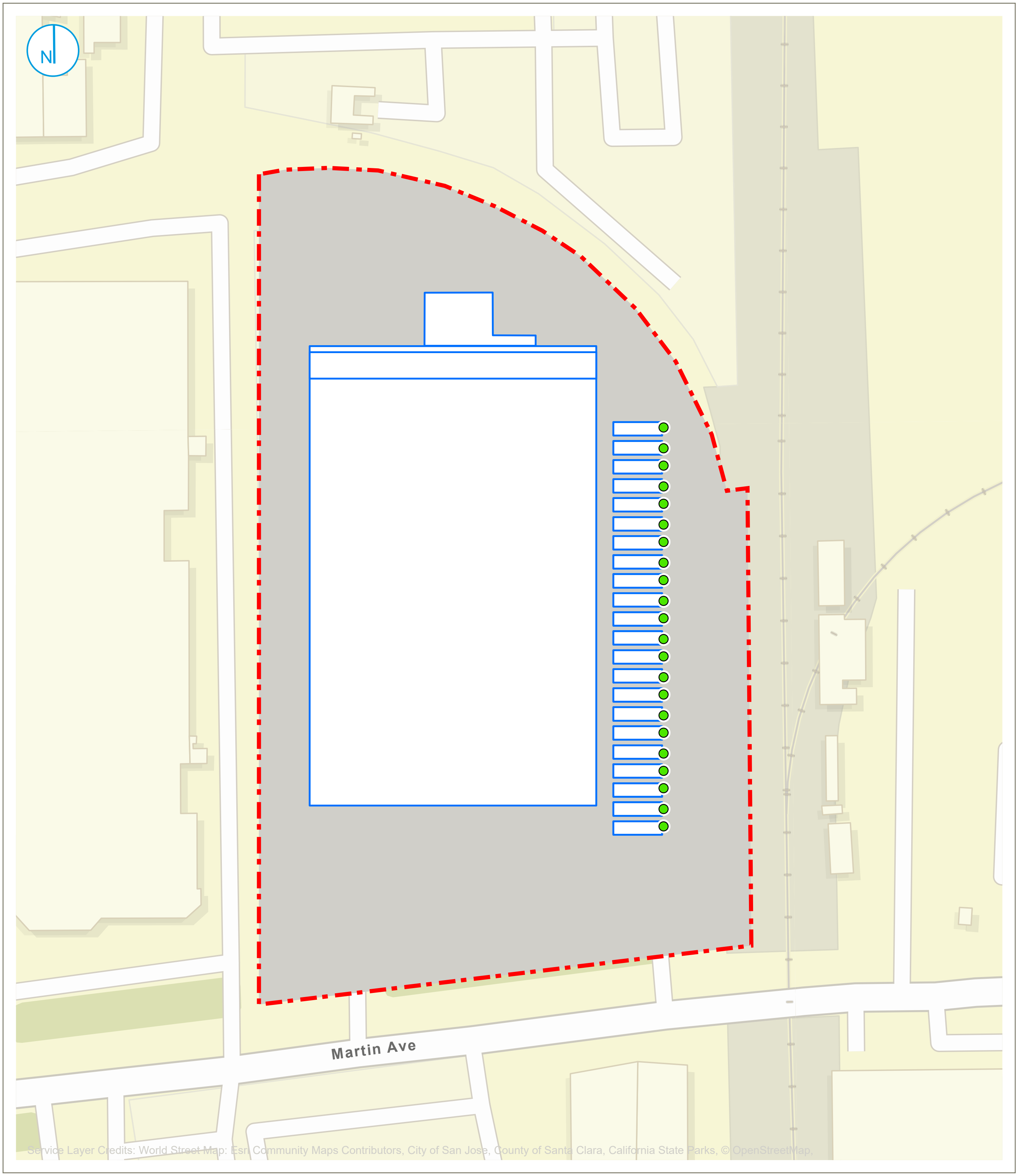
BAAQMD - Bay Area Air Quality Management District	NA - not applicable
CEQA - California Environmental Quality Act	$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
HI - health index	$\mu g/m^3$ - micrograms per cubic meter
MEISR - Maximally Exposed Individual Sensitive Receptor	UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=845658c19eae4594b9f4b805fb9d89a3.

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018.

FIGURES



Service Layer Credits: World Street Map: Esri Community Maps Contributors, City of San Jose, County of Santa Clara, California State Parks, © OpenStreetMap.

▨ Facility Boundary

☐ Buildings and Structures

● Emergency Generator Stacks
(each dot represents two stacks)

0 62.5 125 Feet

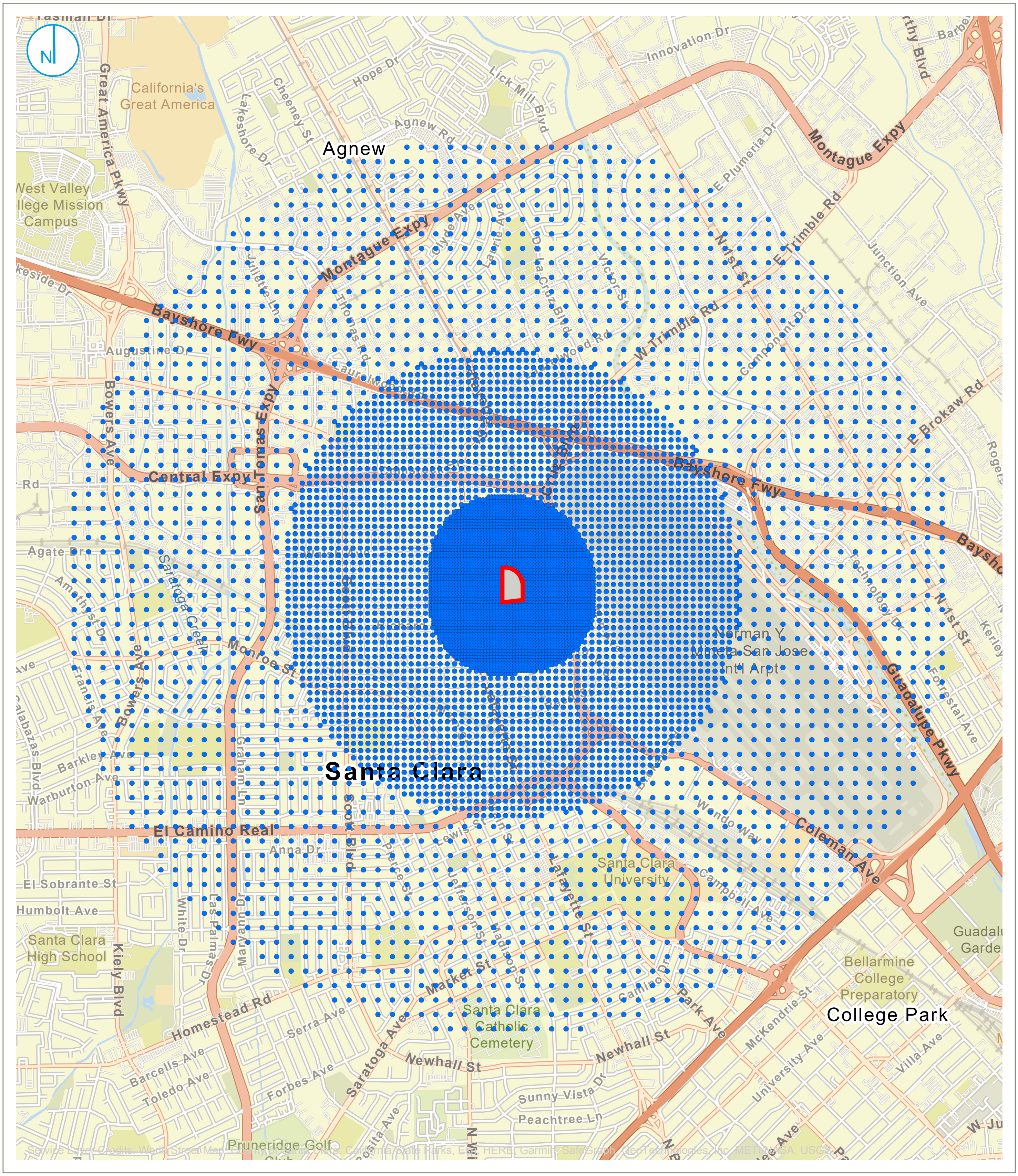
FACILITY LAYOUT
MARTIN AVENUE PROPERTIES
DATA CENTER

651 Martin Avenue
Santa Clara, California

FIGURE 01

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL



🟥 Facility Boundary

● CAAQS/NAAQS Receptor

0 1,500 3,000 Feet

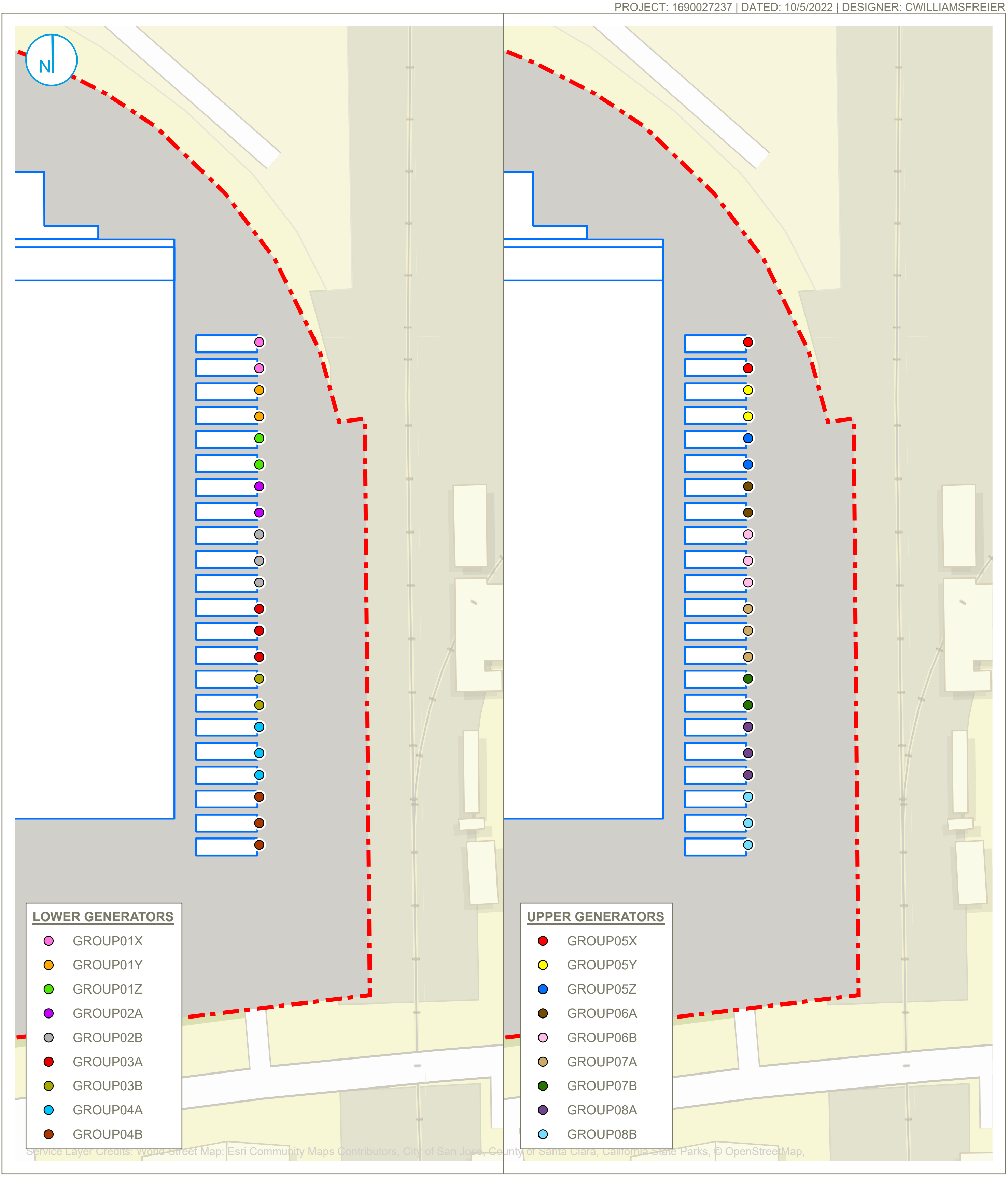
RECEPTOR GRID CAAQS/NAAQS ANALYSIS

MARTIN AVENUE PROPERTIES DATA CENTER

651 Martin Avenue
Santa Clara, California

FIGURE 02

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY



Service Layer Credits: World Street Map: Esri Community Maps Contributors, City of San Jose, County of Santa Clara, California State Parks, © OpenStreetMap,

C:\Users\CWILLIAMSFREIER\Ramboll\Melody Kneale - Projects\Vantage\03_GIS\Vantage CA4 651 Martin\20220912_FigureCreation.aprx\Figure 03 - Generator Monthly Test Groups

▨ Facility Boundary
☐ Buildings and Structures

0 15 30 Meters

GENERATOR MONTHLY TEST GROUPS
MARTIN AVENUE PROPERTIES DATA CENTER

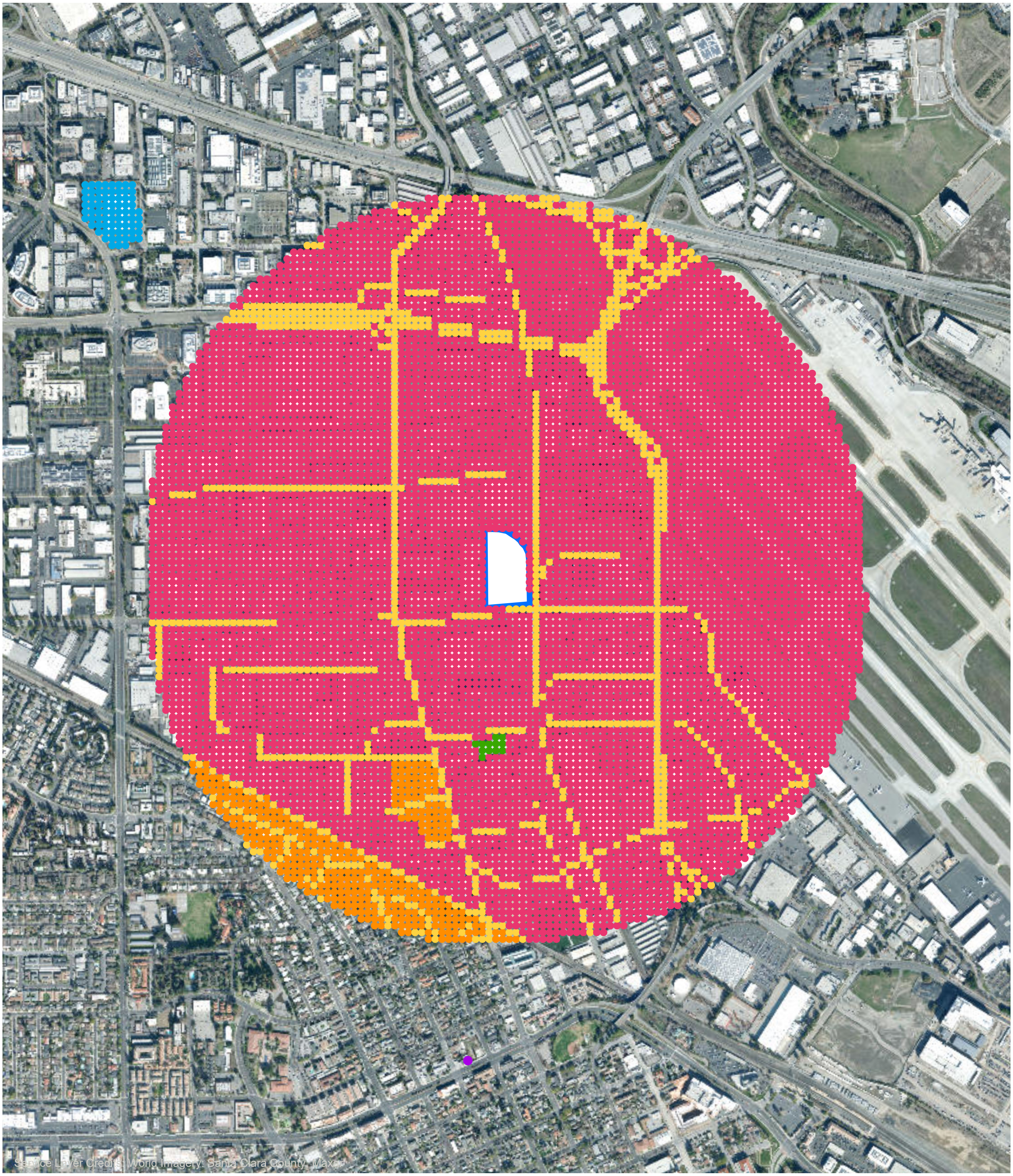
651 Martin Avenue
Santa Clara, California

FIGURE 03

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

C:\Users\SBISOGNO\OneDrive - Ramboll\Documents\ArcGIS\Projects\VantageCA4\VantageCA4.aprx\Ramboll_ANSI_A_Portrait

PROJECT: 169000XXXX | DATED: 9/30/2022 | DESIGNER: SBISOGNO



● Recreational (Soccer Field)
● Residential
● Roadway/Railroad
● Worker
● Day Care/School
● Day Care
▭ Site Area

0 2,500 5,000 Feet

RECEPTOR GRID
HEALTH RISK ASSESSMENT
MARTIN AVENUE PROPERTIES
DATA CENTER

651 Martin Ave
Santa Clara, CA

FIGURE 04

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

APPENDIX A
CALEEMOD® CONSTRUCTION AND OPERATIONAL EMISSIONS OUTPUTS

651 Martin Ave Operations Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	651 Martin Ave Operations
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	31.0
Location	651 Martin Ave, Santa Clara, CA 95050, USA
County	Santa Clara
City	Santa Clara
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1875
EDFZ	1
Electric Utility	Silicon Valley Power
Gas Utility	Pacific Gas & Electric

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Industrial Park	296	1000sqft	3.61	295,500	0.00	—	—	Data Halls and Mechanical Galleries
General Light Industry	50.0	1000sqft	0.61	50,000	0.00	—	—	Electricity and MMR to Support Data Modules

General Light Industry	25.5	1000sqft	0.59	25,510	0.00	—	—	Generator Area
General Office Building	28.0	1000sqft	0.34	28,000	0.00	—	—	Office and Lobby
General Office Building	30.0	1000sqft	0.37	30,000	0.00	—	—	Tenant Storage
Parking Lot	15.4	1000sqft	0.35	0.00	0.00	—	—	Parking
City Park	0.75	Acre	0.75	0.00	32,500	0.00	—	Landscaping
General Light Industry	24.2	1000sqft	0.55	24,174	0.00	—	—	Substation

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-10-A	Water Exposed Surfaces

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	6.09	16.6	1.95	39.6	0.05	0.06	1.68	1.73	0.06	0.29	0.36	295	4,830	5,125	29.7	0.19	18.6	5,942
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.48	13.3	2.10	18.6	0.04	0.03	1.68	1.71	0.03	0.29	0.32	295	4,463	4,758	29.7	0.21	0.48	5,563

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.34	14.1	1.38	21.6	0.03	0.03	1.10	1.14	0.04	0.19	0.23	295	3,002	3,296	29.6	0.13	5.27	4,082
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.61	2.57	0.25	3.94	0.01	0.01	0.20	0.21	0.01	0.04	0.04	48.8	497	546	4.90	0.02	0.87	676

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	2.59	2.39	1.79	19.9	0.05	0.03	1.68	1.71	0.03	0.29	0.32	—	4,744	4,744	0.20	0.18	18.6	4,822
Area	3.50	14.2	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Total	6.09	16.6	1.95	39.6	0.05	0.06	1.68	1.73	0.06	0.29	0.36	295	4,830	5,125	29.7	0.19	18.6	5,942
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	2.48	2.28	2.10	18.6	0.04	0.03	1.68	1.71	0.03	0.29	0.32	—	4,458	4,458	0.22	0.20	0.48	4,525
Area	—	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Total	2.48	13.3	2.10	18.6	0.04	0.03	1.68	1.71	0.03	0.29	0.32	295	4,463	4,758	29.7	0.21	0.48	5,563
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.61	1.48	1.30	11.9	0.03	0.02	1.10	1.12	0.02	0.19	0.21	—	2,957	2,957	0.14	0.13	5.27	3,004

Area	1.73	12.6	0.08	9.72	< 0.005	0.01	—	0.01	0.02	—	0.02	—	40.0	40.0	< 0.005	< 0.005	—	40.1
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Total	3.34	14.1	1.38	21.6	0.03	0.03	1.10	1.14	0.04	0.19	0.23	295	3,002	3,296	29.6	0.13	5.27	4,082
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.29	0.27	0.24	2.16	0.01	< 0.005	0.20	0.20	< 0.005	0.04	0.04	—	490	490	0.02	0.02	0.87	497
Area	0.32	2.30	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64
Water	—	—	—	—	—	—	—	—	—	—	—	0.29	0.77	1.05	0.03	< 0.005	—	2.01
Waste	—	—	—	—	—	—	—	—	—	—	—	48.5	0.00	48.5	4.85	0.00	—	170
Total	0.61	2.57	0.25	3.94	0.01	0.01	0.20	0.21	0.01	0.04	0.04	48.8	497	546	4.90	0.02	0.87	676

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	2.59	2.39	1.79	19.9	0.05	0.03	1.68	1.71	0.03	0.29	0.32	—	4,744	4,744	0.20	0.18	18.6	4,822
Area	3.50	14.2	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Total	6.09	16.6	1.95	39.6	0.05	0.06	1.68	1.73	0.06	0.29	0.36	295	4,830	5,125	29.7	0.19	18.6	5,942
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	2.48	2.28	2.10	18.6	0.04	0.03	1.68	1.71	0.03	0.29	0.32	—	4,458	4,458	0.22	0.20	0.48	4,525
Area	—	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026

Total	2.48	13.3	2.10	18.6	0.04	0.03	1.68	1.71	0.03	0.29	0.32	295	4,463	4,758	29.7	0.21	0.48	5,563
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.61	1.48	1.30	11.9	0.03	0.02	1.10	1.12	0.02	0.19	0.21	—	2,957	2,957	0.14	0.13	5.27	3,004
Area	1.73	12.6	0.08	9.72	< 0.005	0.01	—	0.01	0.02	—	0.02	—	40.0	40.0	< 0.005	< 0.005	—	40.1
Water	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Waste	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Total	3.34	14.1	1.38	21.6	0.03	0.03	1.10	1.14	0.04	0.19	0.23	295	3,002	3,296	29.6	0.13	5.27	4,082
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.29	0.27	0.24	2.16	0.01	< 0.005	0.20	0.20	< 0.005	0.04	0.04	—	490	490	0.02	0.02	0.87	497
Area	0.32	2.30	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64
Water	—	—	—	—	—	—	—	—	—	—	—	0.29	0.77	1.05	0.03	< 0.005	—	2.01
Waste	—	—	—	—	—	—	—	—	—	—	—	48.5	0.00	48.5	4.85	0.00	—	170
Total	0.61	2.57	0.25	3.94	0.01	0.01	0.20	0.21	0.01	0.04	0.04	48.8	497	546	4.90	0.02	0.87	676

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	1.18	1.09	0.82	9.10	0.02	0.01	0.12	0.13	0.01	0.04	0.05	—	2,170	2,170	0.09	0.08	8.49	2,205

General Light Industry	0.94	0.87	0.65	7.21	0.02	0.01	0.09	0.11	0.01	0.03	0.04	—	1,719	1,719	0.07	0.07	6.72	1,747
General Office Building	0.47	0.43	0.32	3.59	0.01	0.01	0.05	0.05	0.01	0.01	0.02	—	856	856	0.04	0.03	3.35	870
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.59	2.39	1.79	19.9	0.05	0.03	0.26	0.29	0.03	0.08	0.11	—	4,744	4,744	0.20	0.18	18.6	4,822
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	1.13	1.04	0.96	8.50	0.02	0.01	0.12	0.13	0.01	0.04	0.05	—	2,039	2,039	0.10	0.09	0.22	2,069
General Light Industry	0.90	0.83	0.76	6.73	0.02	0.01	0.09	0.11	0.01	0.03	0.04	—	1,615	1,615	0.08	0.07	0.17	1,640
General Office Building	0.45	0.41	0.38	3.35	0.01	0.01	0.05	0.05	0.01	0.01	0.02	—	804	804	0.04	0.04	0.09	816
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.48	2.28	2.10	18.6	0.04	0.03	0.26	0.29	0.03	0.08	0.11	—	4,458	4,458	0.22	0.20	0.48	4,525
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	0.15	0.14	0.12	1.09	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	246	246	0.01	0.01	0.44	250
General Light Industry	0.08	0.07	0.07	0.60	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	136	136	0.01	0.01	0.24	138
General Office Building	0.06	0.06	0.05	0.47	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	107	107	0.01	< 0.005	0.19	109

Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.29	0.27	0.24	2.16	0.01	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	490	490	0.02	0.02	0.87	497

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	1.18	1.09	0.82	9.10	0.02	0.01	0.12	0.13	0.01	0.04	0.05	—	2,170	2,170	0.09	0.08	8.49	2,205
General Light Industry	0.94	0.87	0.65	7.21	0.02	0.01	0.09	0.11	0.01	0.03	0.04	—	1,719	1,719	0.07	0.07	6.72	1,747
General Office Building	0.47	0.43	0.32	3.59	0.01	0.01	0.05	0.05	0.01	0.01	0.02	—	856	856	0.04	0.03	3.35	870
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.59	2.39	1.79	19.9	0.05	0.03	0.26	0.29	0.03	0.08	0.11	—	4,744	4,744	0.20	0.18	18.6	4,822
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	1.13	1.04	0.96	8.50	0.02	0.01	0.12	0.13	0.01	0.04	0.05	—	2,039	2,039	0.10	0.09	0.22	2,069
General Light Industry	0.90	0.83	0.76	6.73	0.02	0.01	0.09	0.11	0.01	0.03	0.04	—	1,615	1,615	0.08	0.07	0.17	1,640

General Office Building	0.45	0.41	0.38	3.35	0.01	0.01	0.05	0.05	0.01	0.01	0.02	—	804	804	0.04	0.04	0.09	816
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.48	2.28	2.10	18.6	0.04	0.03	0.26	0.29	0.03	0.08	0.11	—	4,458	4,458	0.22	0.20	0.48	4,525
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	0.15	0.14	0.12	1.09	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	246	246	0.01	0.01	0.44	250
General Light Industry	0.08	0.07	0.07	0.60	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	136	136	0.01	0.01	0.24	138
General Office Building	0.06	0.06	0.05	0.47	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	107	107	0.01	< 0.005	0.19	109
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.29	0.27	0.24	2.16	0.01	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	490	490	0.02	0.02	0.87	497

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consumer	—	9.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	1.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	3.50	3.23	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Total	3.50	14.2	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	9.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	1.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.32	0.29	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64
Total	0.32	2.30	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64

4.3.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	9.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	1.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	3.50	3.23	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Total	3.50	14.2	0.17	19.7	< 0.005	0.03	—	0.03	0.04	—	0.04	—	81.1	81.1	< 0.005	< 0.005	—	81.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	9.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	1.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipme	0.32	0.29	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64
Total	0.32	2.30	0.01	1.77	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.62	6.62	< 0.005	< 0.005	—	6.64

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	1.14	2.34	3.47	0.12	< 0.005	—	7.24
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.38	0.79	1.17	0.04	< 0.005	—	2.44
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.22	0.46	0.68	0.02	< 0.005	—	1.42
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	1.04	1.04	< 0.005	< 0.005	—	1.05
Total	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	1.14	2.34	3.47	0.12	< 0.005	—	7.24

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.38	0.79	1.17	0.04	< 0.005	—	2.44
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.22	0.46	0.68	0.02	< 0.005	—	1.42
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	1.04	1.04	< 0.005	< 0.005	—	1.05
Total	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	0.19	0.39	0.58	0.02	< 0.005	—	1.20
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.06	0.13	0.19	0.01	< 0.005	—	0.40
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.04	0.08	0.11	< 0.005	< 0.005	—	0.24
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.17	0.17	< 0.005	< 0.005	—	0.17
Total	—	—	—	—	—	—	—	—	—	—	—	0.29	0.77	1.05	0.03	< 0.005	—	2.01

4.4.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	1.14	2.34	3.47	0.12	< 0.005	—	7.24

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.38	0.79	1.17	0.04	< 0.005	—	2.44
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.22	0.46	0.68	0.02	< 0.005	—	1.42
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	1.04	1.04	< 0.005	< 0.005	—	1.05
Total	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	1.14	2.34	3.47	0.12	< 0.005	—	7.24
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.38	0.79	1.17	0.04	< 0.005	—	2.44
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.22	0.46	0.68	0.02	< 0.005	—	1.42
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	1.04	1.04	< 0.005	< 0.005	—	1.05
Total	—	—	—	—	—	—	—	—	—	—	—	1.75	4.62	6.37	0.18	< 0.005	—	12.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	0.19	0.39	0.58	0.02	< 0.005	—	1.20
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.06	0.13	0.19	0.01	< 0.005	—	0.40
General Office Building	—	—	—	—	—	—	—	—	—	—	—	0.04	0.08	0.11	< 0.005	< 0.005	—	0.24

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.17	0.17	< 0.005	< 0.005	—	0.17
Total	—	—	—	—	—	—	—	—	—	—	—	0.29	0.77	1.05	0.03	< 0.005	—	2.01

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	197	0.00	197	19.7	0.00	—	691
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	0.00	66.6	6.66	0.00	—	233
General Office Building	—	—	—	—	—	—	—	—	—	—	—	29.1	0.00	29.1	2.91	0.00	—	102
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.03	0.00	0.03	< 0.005	0.00	—	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	197	0.00	197	19.7	0.00	—	691

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	0.00	66.6	6.66	0.00	—	233
General Office Building	—	—	—	—	—	—	—	—	—	—	—	29.1	0.00	29.1	2.91	0.00	—	102
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.03	0.00	0.03	< 0.005	0.00	—	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	32.7	0.00	32.7	3.27	0.00	—	114
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.6
General Office Building	—	—	—	—	—	—	—	—	—	—	—	4.81	0.00	4.81	0.48	0.00	—	16.8
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.01	0.00	0.01	< 0.005	0.00	—	0.02
Total	—	—	—	—	—	—	—	—	—	—	—	48.5	0.00	48.5	4.85	0.00	—	170

4.5.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	197	0.00	197	19.7	0.00	—	691

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	0.00	66.6	6.66	0.00	—	233
General Office Building	—	—	—	—	—	—	—	—	—	—	—	29.1	0.00	29.1	2.91	0.00	—	102
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.03	0.00	0.03	< 0.005	0.00	—	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	197	0.00	197	19.7	0.00	—	691
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	0.00	66.6	6.66	0.00	—	233
General Office Building	—	—	—	—	—	—	—	—	—	—	—	29.1	0.00	29.1	2.91	0.00	—	102
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.03	0.00	0.03	< 0.005	0.00	—	0.12
Total	—	—	—	—	—	—	—	—	—	—	—	293	0.00	293	29.3	0.00	—	1,026
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Industrial Park	—	—	—	—	—	—	—	—	—	—	—	32.7	0.00	32.7	3.27	0.00	—	114
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	11.0	0.00	11.0	1.10	0.00	—	38.6
General Office Building	—	—	—	—	—	—	—	—	—	—	—	4.81	0.00	4.81	0.48	0.00	—	16.8

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
City Park	—	—	—	—	—	—	—	—	—	—	—	0.01	0.00	0.01	< 0.005	0.00	—	0.02
Total	—	—	—	—	—	—	—	—	—	—	—	48.5	0.00	48.5	4.85	0.00	—	170

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipme Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Industrial Park	225	322	186	85,053	1,947	2,792	1,614	737,242
General Light Industry	56.0	43.0	128	23,516	485	373	1,110	203,840
General Light Industry	28.6	21.9	65.3	11,998	248	190	566	103,999
General Office Building	61.3	26.6	10.1	17,900	532	231	87.4	155,154
General Office Building	65.7	28.5	10.8	19,178	569	247	93.6	166,236
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
General Light Industry	27.1	20.8	61.9	11,370	235	180	536	98,553

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Industrial Park	225	322	186	85,053	1,947	2,792	1,614	737,242
General Light Industry	56.0	43.0	128	23,516	485	373	1,110	203,840

General Light Industry	28.6	21.9	65.3	11,998	248	190	566	103,999
General Office Building	61.3	26.6	10.1	17,900	532	231	87.4	155,154
General Office Building	65.7	28.5	10.8	19,178	569	247	93.6	166,236
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
General Light Industry	27.1	20.8	61.9	11,370	235	180	536	98,553

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	679,776	226,592	925

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Industrial Park	594,020	0.00
General Light Industry	100,511	0.00
General Light Industry	51,281	0.00
General Office Building	56,286	0.00
General Office Building	60,307	0.00
Parking Lot	0.00	0.00
City Park	0.00	347,439
General Light Industry	48,595	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Industrial Park	594,020	0.00
General Light Industry	100,511	0.00
General Light Industry	51,281	0.00
General Office Building	56,286	0.00
General Office Building	60,307	0.00
Parking Lot	0.00	0.00
City Park	0.00	347,439
General Light Industry	48,595	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Industrial Park	366	0.00
General Light Industry	62.0	0.00
General Light Industry	31.6	0.00
General Office Building	26.0	0.00
General Office Building	27.9	0.00
Parking Lot	0.00	0.00
City Park	0.06	0.00
General Light Industry	30.0	0.00

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)

Industrial Park	366	0.00
General Light Industry	62.0	0.00
General Light Industry	31.6	0.00
General Office Building	26.0	0.00
General Office Building	27.9	0.00
Parking Lot	0.00	0.00
City Park	0.06	0.00
General Light Industry	30.0	0.00

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	11.8	annual days of extreme heat
Extreme Precipitation	2.65	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack	N/A	N/A	N/A	N/A
Air Quality	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	1	1	2
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack	N/A	N/A	N/A	N/A

Air Quality	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	17.6
AQ-PM	22.5
AQ-DPM	79.3
Drinking Water	50.2
Lead Risk Housing	56.7
Pesticides	1.97
Toxic Releases	37.8
Traffic	82.5
Effect Indicators	—
CleanUp Sites	99.9
Groundwater	98.4
Haz Waste Facilities/Generators	98.4
Impaired Water Bodies	33.2
Solid Waste	95.0

Sensitive Population	—
Asthma	28.6
Cardio-vascular	47.5
Low Birth Weights	54.6
Socioeconomic Factor Indicators	—
Education	55.8
Housing	89.2
Linguistic	15.6
Poverty	35.2
Unemployment	4.89

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	45.14307712
Employed	91.65918132
Median HI	61.15744899
Education	—
Bachelor's or higher	65.78981137
High school enrollment	100
Preschool enrollment	13.49929424
Transportation	—
Auto Access	27.46054151
Active commuting	73.93814962
Social	—
2-parent households	61.7862184

Voting	61.15744899
Neighborhood	—
Alcohol availability	28.82073656
Park access	60.96496856
Retail density	92.32644681
Supermarket access	33.32477865
Tree canopy	70.70447838
Housing	—
Homeownership	12.81919672
Housing habitability	13.48646221
Low-inc homeowner severe housing cost burden	53.29141537
Low-inc renter severe housing cost burden	41.94790196
Uncrowded housing	15.44976261
Health Outcomes	—
Insured adults	32.06723983
Arthritis	83.7
Asthma ER Admissions	64.9
High Blood Pressure	83.5
Cancer (excluding skin)	68.9
Asthma	49.0
Coronary Heart Disease	74.7
Chronic Obstructive Pulmonary Disease	62.6
Diagnosed Diabetes	65.9
Life Expectancy at Birth	62.1
Cognitively Disabled	52.2
Physically Disabled	19.5
Heart Attack ER Admissions	48.1

Mental Health Not Good	47.3
Chronic Kidney Disease	79.8
Obesity	59.2
Pedestrian Injuries	89.9
Physical Health Not Good	53.6
Stroke	70.4
Health Risk Behaviors	—
Binge Drinking	61.9
Current Smoker	48.5
No Leisure Time for Physical Activity	45.4
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	31.0
Elderly	65.5
English Speaking	23.0
Foreign-born	90.5
Outdoor Workers	43.6
Climate Change Adaptive Capacity	—
Impervious Surface Cover	22.9
Traffic Density	71.8
Traffic Access	74.4
Other Indices	—
Hardship	56.2
Other Decision Support	—
2016 Voting	56.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	60.0
Healthy Places Index Score for Project Location (b)	56.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Land use square footage and lot acreage for each land use type was estimated by scaling the total lot acreage provided by 651 Martin Ave based on site drawings, by the square footage of development for each land use type.
Construction: Trips and VMT	Project specific haul trips for site preparation.
Construction: Architectural Coatings	Project specific information.
Construction: Paving	Project specific information provided by project sponsor.
Construction: Off-Road Equipment	Updated Engine Tiers to Tier 4 Final

Operations: Water and Waste Water	Indoor water use rates were calculated by taking the annual water usage provided by Martin Avenue Properties (911,000 gallons/year) and distributing across the phases and land uses proportionally to its land use square footage.
Operations: Refrigerants	Provided no refrigerants for emissions.
Operations: Energy Use	Operational energy usage calculated outside of CalEEMod.
Operations: Vehicle Data	Default sum of non res H-W, non res W-O, and non res O-O trips was over 100%. Conservatively adjusted down non res O-O trip percentage (since that corresponds to the lowest trip length) to sum to 100%. Updated to use Project-specific daily trip rates.

651 Martin Ave Mitigated Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	651 Martin Ave Mitigated Construction
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	31.0
Location	651 Martin Ave, Santa Clara, CA 95050, USA
County	Santa Clara
City	Santa Clara
Air District	Bay Area AQMD
Air Basin	San Francisco Bay Area
TAZ	1875
EDFZ	1
Electric Utility	Silicon Valley Power
Gas Utility	Pacific Gas & Electric

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Industrial Park	296	1000sqft	3.61	295,500	0.00	—	—	Data Halls and Mechanical Galleries
General Light Industry	50.0	1000sqft	0.61	50,000	0.00	—	—	Electricity and MMR to Support Data Modules

General Light Industry	25.5	1000sqft	0.59	25,510	0.00	—	—	Generator Area
General Office Building	28.0	1000sqft	0.34	28,000	0.00	—	—	Office and Lobby
General Office Building	30.0	1000sqft	0.37	30,000	0.00	—	—	Tenant Storage
Parking Lot	15.4	1000sqft	0.35	0.00	0.00	—	—	Parking
City Park	0.75	Acre	0.75	0.00	32,500	0.00	—	Landscaping
General Light Industry	24.2	1000sqft	0.55	24,174	0.00	—	—	Substation

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-10-A	Water Exposed Surfaces

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.26	1.05	6.02	24.2	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	6,048	6,048	0.25	0.38	12.2	6,180
Mit.	1.26	1.05	6.02	24.2	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	6,048	6,048	0.25	0.38	12.2	6,180
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.35	237	12.9	33.6	0.10	0.24	21.8	22.1	0.19	10.7	10.9	—	13,104	13,104	0.85	1.28	0.45	13,508
Mit.	1.35	237	12.9	33.6	0.10	0.24	9.79	10.0	0.19	4.51	4.70	—	13,104	13,104	0.85	1.28	0.45	13,508
% Reduced	—	—	—	—	—	—	55%	55%	—	58%	57%	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.80	13.1	4.49	16.2	0.03	0.08	2.41	2.48	0.07	0.81	0.88	—	4,309	4,309	0.20	0.29	3.41	4,403
Mit.	0.80	13.1	4.49	16.2	0.03	0.08	1.84	1.92	0.07	0.53	0.60	—	4,309	4,309	0.20	0.29	3.41	4,403
% Reduced	—	—	—	—	—	—	24%	23%	—	35%	32%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.15	2.38	0.82	2.96	0.01	0.01	0.44	0.45	0.01	0.15	0.16	—	713	713	0.03	0.05	0.56	729
Mit.	0.15	2.38	0.82	2.96	0.01	0.01	0.34	0.35	0.01	0.10	0.11	—	713	713	0.03	0.05	0.56	729
% Reduced	—	—	—	—	—	—	24%	23%	—	35%	32%	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.26	1.05	6.02	24.2	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	6,048	6,048	0.25	0.38	12.2	6,180
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.35	1.02	12.9	33.6	0.10	0.24	21.8	22.1	0.19	10.7	10.9	—	13,104	13,104	0.85	1.28	0.45	13,508

2025	1.14	237	6.09	22.6	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	5,868	5,868	0.24	0.37	0.30	5,985
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.80	0.65	4.49	16.2	0.03	0.08	2.41	2.48	0.07	0.81	0.88	—	4,309	4,309	0.20	0.29	3.41	4,403
2025	0.09	13.1	0.50	2.05	< 0.005	0.01	0.14	0.15	0.01	0.03	0.04	—	458	458	0.02	0.02	0.33	466
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.15	0.12	0.82	2.96	0.01	0.01	0.44	0.45	0.01	0.15	0.16	—	713	713	0.03	0.05	0.56	729
2025	0.02	2.38	0.09	0.37	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	75.9	75.9	< 0.005	< 0.005	0.06	77.2

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.26	1.05	6.02	24.2	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	6,048	6,048	0.25	0.38	12.2	6,180
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.35	1.02	12.9	33.6	0.10	0.24	9.79	10.0	0.19	4.51	4.70	—	13,104	13,104	0.85	1.28	0.45	13,508
2025	1.14	237	6.09	22.6	0.04	0.10	2.05	2.15	0.10	0.50	0.60	—	5,868	5,868	0.24	0.37	0.30	5,985
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.80	0.65	4.49	16.2	0.03	0.08	1.84	1.92	0.07	0.53	0.60	—	4,309	4,309	0.20	0.29	3.41	4,403
2025	0.09	13.1	0.50	2.05	< 0.005	0.01	0.14	0.15	0.01	0.03	0.04	—	458	458	0.02	0.02	0.33	466
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.15	0.12	0.82	2.96	0.01	0.01	0.34	0.35	0.01	0.10	0.11	—	713	713	0.03	0.05	0.56	729
2025	0.02	2.38	0.09	0.37	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	75.9	75.9	< 0.005	< 0.005	0.06	77.2

3. Construction Emissions Details

3.1. Demolition (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.36	4.51	18.2	0.03	0.06	—	0.06	0.06	—	0.06	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	3.90	3.90	—	0.59	0.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.25	1.00	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	188	188	0.01	< 0.005	—	188
Demolition	—	—	—	—	—	—	0.21	0.21	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.05	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.1	31.1	< 0.005	< 0.005	—	31.2
Demolition	—	—	—	—	—	—	0.04	0.04	—	0.01	0.01	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.57	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	121	121	< 0.005	0.01	0.01	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.33	0.06	4.35	1.98	0.02	0.06	0.24	0.29	0.04	0.08	0.12	—	3,245	3,245	0.27	0.52	0.18	3,408
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.73	6.73	< 0.005	< 0.005	0.01	6.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.23	0.11	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	0.01	—	178	178	0.01	0.03	0.17	187
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.11	1.11	< 0.005	< 0.005	< 0.005	1.13
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	29.4	29.4	< 0.005	< 0.005	0.03	30.9

3.2. Demolition (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.36	4.51	18.2	0.03	0.06	—	0.06	0.06	—	0.06	—	3,425	3,425	0.14	0.03	—	3,437
Demolition	—	—	—	—	—	—	3.90	3.90	—	0.59	0.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.25	1.00	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	188	188	0.01	< 0.005	—	188
Demolition	—	—	—	—	—	—	0.21	0.21	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.05	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.1	31.1	< 0.005	< 0.005	—	31.2
Demolition	—	—	—	—	—	—	0.04	0.04	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.57	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	121	121	< 0.005	0.01	0.01	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.33	0.06	4.35	1.98	0.02	0.06	0.24	0.29	0.04	0.08	0.12	—	3,245	3,245	0.27	0.52	0.18	3,408
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.73	6.73	< 0.005	< 0.005	0.01	6.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.23	0.11	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	0.01	—	178	178	0.01	0.03	0.17	187
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.11	1.11	< 0.005	< 0.005	< 0.005	1.13
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	29.4	29.4	< 0.005	< 0.005	0.03	30.9

3.3. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.50	2.59	28.3	0.05	0.10	—	0.10	0.10	—	0.10	—	5,296	5,296	0.21	0.04	—	5,314
Dust From Material Movemen	—	—	—	—	—	—	19.7	19.7	—	10.1	10.1	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.01	0.07	0.78	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	145	145	0.01	< 0.005	—	146
Dust From Material Movemen	—	—	—	—	—	—	0.54	0.54	—	0.28	0.28	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.0	24.0	< 0.005	< 0.005	—	24.1
Dust From Material Movemen	—	—	—	—	—	—	0.10	0.10	—	0.05	0.05	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.06	0.66	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	142	142	< 0.005	0.01	0.02	144
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.79	0.15	10.3	4.68	0.05	0.14	0.56	0.69	0.09	0.19	0.28	—	7,666	7,666	0.63	1.23	0.43	8,050
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.92	3.92	< 0.005	< 0.005	0.01	3.98
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.28	0.13	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	210	210	0.02	0.03	0.20	221
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.65	0.65	< 0.005	< 0.005	< 0.005	0.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	34.8	34.8	< 0.005	0.01	0.03	36.5

3.4. Site Preparation (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.50	2.59	28.3	0.05	0.10	—	0.10	0.10	—	0.10	—	5,296	5,296	0.21	0.04	—	5,314
Dust From Material Movemen	—	—	—	—	—	—	7.70	7.70	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.78	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	145	145	0.01	< 0.005	—	146
Dust From Material Movemen	—	—	—	—	—	—	0.21	0.21	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	< 0.005	0.01	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.0	24.0	< 0.005	< 0.005	—	24.1
Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.06	0.66	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	142	142	< 0.005	0.01	0.02	144
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.79	0.15	10.3	4.68	0.05	0.14	0.56	0.69	0.09	0.19	0.28	—	7,666	7,666	0.63	1.23	0.43	8,050
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.92	3.92	< 0.005	< 0.005	0.01	3.98
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.28	0.13	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	210	210	0.02	0.03	0.20	221
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.65	0.65	< 0.005	< 0.005	< 0.005	0.66
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	34.8	34.8	< 0.005	0.01	0.03	36.5

3.5. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.29	2.04	17.8	0.03	0.06	—	0.06	0.06	—	0.06	—	2,958	2,958	0.12	0.02	—	2,969
Dust From Material Movement	—	—	—	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.11	0.97	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	162	162	0.01	< 0.005	—	163
Dust From Material Movement	—	—	—	—	—	—	0.39	0.39	—	0.19	0.19	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.8	26.8	< 0.005	< 0.005	—	26.9
Dust From Material Movement	—	—	—	—	—	—	0.07	0.07	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.57	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	121	121	< 0.005	0.01	0.01	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.73	6.73	< 0.005	< 0.005	0.01	6.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.11	1.11	< 0.005	< 0.005	< 0.005	1.13
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Grading (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.29	2.04	17.8	0.03	0.06	—	0.06	0.06	—	0.06	—	2,958	2,958	0.12	0.02	—	2,969

Dust From Material Movemen	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.11	0.97	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	162	162	0.01	< 0.005	—	163
Dust From Material Movemen	—	—	—	—	—	—	0.15	0.15	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.8	26.8	< 0.005	< 0.005	—	26.9
Dust From Material Movemen	—	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.57	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	121	121	< 0.005	0.01	0.01	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.73	6.73	< 0.005	< 0.005	0.01	6.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.11	1.11	< 0.005	< 0.005	< 0.005	1.13
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.83	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.83	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.20	0.19	1.62	8.50	0.01	0.04	—	0.04	0.04	—	0.04	—	1,375	1,375	0.06	0.01	—	1,379
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.30	1.55	< 0.005	0.01	—	0.01	0.01	—	0.01	—	228	228	0.01	< 0.005	—	228
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.71	0.64	0.50	8.11	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,613	1,613	0.03	0.06	6.87	1,639
Vendor	0.20	0.08	2.69	1.29	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,037	2,037	0.13	0.30	5.35	2,135
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.68	0.62	0.62	6.98	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,494	1,494	0.04	0.06	0.18	1,514
Vendor	0.20	0.07	2.85	1.32	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,038	2,038	0.13	0.30	0.14	2,131
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.32	3.94	0.00	0.00	0.05	0.05	0.00	0.00	0.00	—	866	866	0.02	0.04	1.69	879
Vendor	0.12	0.04	1.60	0.75	0.01	0.02	0.06	0.08	0.02	0.02	0.04	—	1,168	1,168	0.07	0.17	1.32	1,223
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.72	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	143	143	< 0.005	0.01	0.28	146
Vendor	0.02	0.01	0.29	0.14	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.01	—	193	193	0.01	0.03	0.22	202
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.83	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.83	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.19	1.62	8.50	0.01	0.04	—	0.04	0.04	—	0.04	—	1,375	1,375	0.06	0.01	—	1,379
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.30	1.55	< 0.005	0.01	—	0.01	0.01	—	0.01	—	228	228	0.01	< 0.005	—	228
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.71	0.64	0.50	8.11	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,613	1,613	0.03	0.06	6.87	1,639
Vendor	0.20	0.08	2.69	1.29	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,037	2,037	0.13	0.30	5.35	2,135
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.68	0.62	0.62	6.98	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,494	1,494	0.04	0.06	0.18	1,514
Vendor	0.20	0.07	2.85	1.32	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,038	2,038	0.13	0.30	0.14	2,131
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.32	3.94	0.00	0.00	0.05	0.05	0.00	0.00	0.00	—	866	866	0.02	0.04	1.69	879
Vendor	0.12	0.04	1.60	0.75	0.01	0.02	0.06	0.08	0.02	0.02	0.04	—	1,168	1,168	0.07	0.17	1.32	1,223
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.72	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	143	143	< 0.005	0.01	0.28	146
Vendor	0.02	0.01	0.29	0.14	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.01	—	193	193	0.01	0.03	0.22	202
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.87	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	23.3	23.3	< 0.005	< 0.005	—	23.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.61	0.59	0.57	6.47	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,465	1,465	0.04	0.06	0.16	1,485
Vendor	0.19	0.07	2.70	1.26	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,005	2,005	0.11	0.29	0.14	2,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.03	0.37	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	86.9	86.9	< 0.005	< 0.005	0.16	88.2
Vendor	0.01	< 0.005	0.16	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	118	118	0.01	0.02	0.14	123
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	14.4	14.4	< 0.005	< 0.005	0.03	14.6
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	19.5	19.5	< 0.005	< 0.005	0.02	20.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.82	14.8	0.02	0.08	—	0.08	0.07	—	0.07	—	2,398	2,398	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.87	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	141	141	0.01	< 0.005	—	141
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.16	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	23.3	23.3	< 0.005	< 0.005	—	23.4
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.61	0.59	0.57	6.47	0.00	0.00	0.10	0.10	0.00	0.00	0.00	—	1,465	1,465	0.04	0.06	0.16	1,485
Vendor	0.19	0.07	2.70	1.26	0.01	0.03	0.11	0.14	0.03	0.04	0.07	—	2,005	2,005	0.11	0.29	0.14	2,094
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.03	0.37	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	86.9	86.9	< 0.005	< 0.005	0.16	88.2
Vendor	0.01	< 0.005	0.16	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	118	118	0.01	0.02	0.14	123
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	14.4	14.4	< 0.005	< 0.005	0.03	14.6
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	19.5	19.5	< 0.005	< 0.005	0.02	20.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517

Paving	—	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.58	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	82.8	82.8	< 0.005	< 0.005	—	83.1
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.8
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.53	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	119	119	< 0.005	0.01	0.01	121
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.60	6.60	< 0.005	< 0.005	0.01	6.69
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.09	1.09	< 0.005	< 0.005	< 0.005	1.11
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Paving (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.16	1.93	10.6	0.01	0.03	—	0.03	0.03	—	0.03	—	1,511	1,511	0.06	0.01	—	1,517
Paving	—	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.11	0.58	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	82.8	82.8	< 0.005	< 0.005	—	83.1
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.8
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.53	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	119	119	< 0.005	0.01	0.01	121
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	6.60	6.60	< 0.005	< 0.005	0.01	6.69
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	1.09	1.09	< 0.005	< 0.005	< 0.005	1.11
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	237	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	—	7.34
Architectural Coatings	—	13.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	—	1.22
Architectural Coatings	—	2.37	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.12	0.11	1.29	0.00	0.00	0.02	0.02	0.00	0.00	0.00	—	293	293	0.01	0.01	0.03	297

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	16.2	16.2	< 0.005	< 0.005	0.03	16.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.69	2.69	< 0.005	< 0.005	< 0.005	2.73
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Architectural Coating (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.65	0.96	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	237	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.32	7.32	< 0.005	< 0.005	—	7.34
Architectural Coatings	—	13.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.21	1.21	< 0.005	< 0.005	—	1.22
Architectural Coatings	—	2.37	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.12	0.11	1.29	0.00	0.00	0.02	0.02	0.00	0.00	0.00	—	293	293	0.01	0.01	0.03	297
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	16.2	16.2	< 0.005	< 0.005	0.03	16.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.69	2.69	< 0.005	< 0.005	< 0.005	2.73

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	1/1/2024	1/29/2024	5.00	20.0	—
Site Preparation	Site Preparation	1/30/2024	2/13/2024	5.00	10.0	—

Grading	Grading	2/14/2024	3/13/2024	5.00	20.0	—
Building Construction	Building Construction	3/14/2024	1/30/2025	5.00	230	—
Paving	Paving	1/31/2025	2/28/2025	5.00	20.0	—
Architectural Coating	Architectural Coating	3/1/2025	3/29/2025	5.00	20.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Tier 4 Final	1.00	8.00	33.0	0.73
Demolition	Excavators	Diesel	Tier 4 Final	3.00	8.00	36.0	0.38
Demolition	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Tier 4 Final	1.00	8.00	36.0	0.38
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Tier 4 Final	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Tier 4 Final	1.00	8.00	33.0	0.73
Demolition	Excavators	Diesel	Tier 4 Final	3.00	8.00	36.0	0.38
Demolition	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4.00	8.00	84.0	0.37
Grading	Excavators	Diesel	Tier 4 Final	1.00	8.00	36.0	0.38
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Tier 4 Final	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Tier 4 Final	1.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Tier 4 Final	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Tier 4 Final	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	11.7	LDA,LDT1,LDT2
Demolition	Vendor	—	8.40	HHDT,MHDT
Demolition	Hauling	44.5	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	105	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	185	11.7	LDA,LDT1,LDT2
Building Construction	Vendor	74.3	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT

Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	36.9	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	15.0	11.7	LDA,LDT1,LDT2
Demolition	Vendor	—	8.40	HHDT,MHDT
Demolition	Hauling	44.5	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	11.7	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.40	HHDT,MHDT
Site Preparation	Hauling	105	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	15.0	11.7	LDA,LDT1,LDT2
Grading	Vendor	—	8.40	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	185	11.7	LDA,LDT1,LDT2

Building Construction	Vendor	74.3	8.40	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.7	LDA,LDT1,LDT2
Paving	Vendor	—	8.40	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	36.9	11.7	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.40	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	680,469	226,823	925

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)

Demolition	0.00	0.00	0.00	77,220	—
Site Preparation	11,560	—	15.0	0.00	—
Grading	—	—	20.0	0.00	—
Paving	0.00	0.00	0.00	0.00	2.12

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Industrial Park	1.26	59%
General Light Industry	0.21	10%
General Light Industry	0.20	10%
General Office Building	0.12	6%
General Office Building	0.13	6%
Parking Lot	0.00	0%
City Park	0.00	0%
General Light Industry	0.19	9%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	387	0.03	< 0.005
2025	0.00	387	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	11.8	annual days of extreme heat
Extreme Precipitation	2.65	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack	N/A	N/A	N/A	N/A
Air Quality	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	1	1	2
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack	N/A	N/A	N/A	N/A
Air Quality	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	17.6

AQ-PM	22.5
AQ-DPM	79.3
Drinking Water	50.2
Lead Risk Housing	56.7
Pesticides	1.97
Toxic Releases	37.8
Traffic	82.5
Effect Indicators	—
CleanUp Sites	99.9
Groundwater	98.4
Haz Waste Facilities/Generators	98.4
Impaired Water Bodies	33.2
Solid Waste	95.0
Sensitive Population	—
Asthma	28.6
Cardio-vascular	47.5
Low Birth Weights	54.6
Socioeconomic Factor Indicators	—
Education	55.8
Housing	89.2
Linguistic	15.6
Poverty	35.2
Unemployment	4.89

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract

Economic	—
Above Poverty	45.14307712
Employed	91.65918132
Median HI	61.15744899
Education	—
Bachelor's or higher	65.78981137
High school enrollment	100
Preschool enrollment	13.49929424
Transportation	—
Auto Access	27.46054151
Active commuting	73.93814962
Social	—
2-parent households	61.7862184
Voting	61.15744899
Neighborhood	—
Alcohol availability	28.82073656
Park access	60.96496856
Retail density	92.32644681
Supermarket access	33.32477865
Tree canopy	70.70447838
Housing	—
Homeownership	12.81919672
Housing habitability	13.48646221
Low-inc homeowner severe housing cost burden	53.29141537
Low-inc renter severe housing cost burden	41.94790196
Uncrowded housing	15.44976261
Health Outcomes	—

Insured adults	32.06723983
Arthritis	83.7
Asthma ER Admissions	64.9
High Blood Pressure	83.5
Cancer (excluding skin)	68.9
Asthma	49.0
Coronary Heart Disease	74.7
Chronic Obstructive Pulmonary Disease	62.6
Diagnosed Diabetes	65.9
Life Expectancy at Birth	62.1
Cognitively Disabled	52.2
Physically Disabled	19.5
Heart Attack ER Admissions	48.1
Mental Health Not Good	47.3
Chronic Kidney Disease	79.8
Obesity	59.2
Pedestrian Injuries	89.9
Physical Health Not Good	53.6
Stroke	70.4
Health Risk Behaviors	—
Binge Drinking	61.9
Current Smoker	48.5
No Leisure Time for Physical Activity	45.4
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	31.0

Elderly	65.5
English Speaking	23.0
Foreign-born	90.5
Outdoor Workers	43.6
Climate Change Adaptive Capacity	—
Impervious Surface Cover	22.9
Traffic Density	71.8
Traffic Access	74.4
Other Indices	—
Hardship	56.2
Other Decision Support	—
2016 Voting	56.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	60.0
Healthy Places Index Score for Project Location (b)	56.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Land use square footage and lot acreage for each land use type was estimated by scaling the total lot acreage provided by 651 Martin Ave based on site drawings, by the square footage of development for each land use type.
Construction: Trips and VMT	Project specific haul trips for site preparation.
Construction: Architectural Coatings	Project specific information.
Construction: Paving	Project specific information provided by project sponsor.
Construction: Off-Road Equipment	Tier 4 Final engines is project-specific.

APPENDIX B
MANUFACTURER SPECIFICATION SHEETS

APPENDIX C
NO_2 SEASONAL HOUR-OF-DAY ANALYSIS (ELECTRONIC APPENDIX)

APPENDIX D

SUPPLEMENTAL CUMULATIVE HEALTH RISK ANALYSIS INFORMATION

Table D1
Summary of Cumulative Health Impacts at the MEIR
651 Martin Avenue
Santa Clara, CA

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Operational Generators (25% Load)	0.28	0.000073	0.075	0.00037
Subtotal, Project Impacts	**0.28**	**0.000073**	**0.075**	**0.00037**
Existing Stationary Sources[1]				
M's Refinishing (Facility #5269)	0.21	0.0057	NA	0.00
Mission Trail Waste Systems (Facility #8313)	0.03	0.0002	NA	3.67
FMG Enterprises Inc (Facility #4400)	0.01	0.0000	NA	0.00
Byington Steel Treating, Inc (Facility #4712)	0.00	0.0000	NA	0.00
Bay Area Surgical Group (Facility #16964)	1.49	0.0004	NA	0.00
Choice Auto Body (Facility #17000)	0.00	0.0000	NA	0.00
Process Stainless Lab, Inc (Facility #17041)	0.00	0.0000	NA	0.00
Leon's Powder Coating SC (Facility #23266)	0.00	0.0000	NA	0.00
Vantage Data Centers Management Co. (Facility #24042)	0.79	0.0053	NA	0.00
West Coast Auto Body (Facility #21965)	0.00	0.0007	NA	0.00
Microsoft Corporation (Facility #19686_13)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_14)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_15)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_16)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_17)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_18)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_19)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_2)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_20)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_21)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_22)	0.04	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_23)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_24)	0.03	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_3)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_4)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_5)	0.03	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_6)	0.02	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_7)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_8)	0.01	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_9)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_1)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_10)	0.03	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_11)	0.03	0.0000	NA	0.00
Microsoft Corporation (Facility #19686_12)	0.03	0.0000	NA	0.00
Subtotal, Background Sources	**3.2**	**0.0134**	**0**	**3.67**
Existing Rail and Roadway Sources[2]				
Railroad	33.2	NA	NA	0.06
Major Roadways	7.0	NA	NA	0.15
Highways	8.4	NA	NA	0.20
Subtotal, Mobile Sources	**48.5**	**0**	**0**	**0.41**
Subtotal, Background and Mobile Sources	**51.7**	**0.0134**	**0**	**4.08**
Total Cumulative Impact	**52.0**	**0.0134**	**0.075**	**4.08**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?[3]	No	No	No	Yes
Receptor Type	Residential	Residential	Residential	Residential
Receptor Location (UTMx)	593,070	593,070	593,070	593,070
Receptor Location (UTMy)	4,135,570	4,135,570	4,135,570	4,135,570

Notes:

1. Health impacts data for stationary sources within 1,000 ft of the MEIR were obtained from BAAQMD's Permitted Stationary Source Risks and Hazards Screening Tool.
2. Health impacts data for existing rail and roadway sources were estimated using BAAQMD's source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located at the MEIR.
3. Although the annual $PM_{2.5}$ concentration at the MEIR exceeds the BAAQMD cumulative threshold, this exceedance is predominantly caused by a single permitted stationary source (Facility #8313). The contribution from the project at the receptor is de minimis.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District	NA - not applicable
CEQA - California Environmental Quality Act	$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
HI - health index	$\mu g/m^3$ - micrograms per cubic meter
MEIR - Maximally Exposed Individual Resident	UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=845658c19eae4594b9f4b805fb9d89a3.

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018.

Table D2
Summary of Cumulative Health Impacts at the MESR/MEDR
651 Martin Avenue
Santa Clara, CA

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Operational Generators (25% Load)	0.79	0.000077	0.053	0.00039
Subtotal, Project Impacts	**0.79**	**0.000077**	**0.053**	**0.00039**
Existing Stationary Sources[1]				
Equinix LLC (Facility #13306)	5.0	0.0099	NA	0.01
Verizon Wireless Santa Clara Switch (Facility #13567)	1.2	0.0025	NA	0.00
Pacific Bell Corp dba AT&T CA (Facility #13711)	9.6	0.0182	NA	0.01
Digital Realty Trust (Facility #20256)	0.3	0.0009	NA	0.00
Digital Alfred, LLC (Facility #20326)	0.3	0.0006	NA	0.00
Harbor Electronics, Inc (Facility #23420)	0.3	0.0005	NA	0.00
Cyxtera Communications, LLC (Facility #24421)	1.2	0.0037	NA	0.00
Applies Materials (Facility #24589)	1.5	0.0038	NA	0.04
Subtotal, Background Sources	**19.4**	**0.0400**	**0**	**0.07**
Existing Rail and Roadway Sources[2,3]				
Railroad	13.9	NA	NA	0.02
Major Roadways	11.5	NA	NA	0.25
Highways	19.9	NA	NA	0.45
Subtotal, Mobile Sources	**45.3**	**0**	**0**	**0.73**
Subtotal, Background and Mobile Sources	**64.7**	**0.0400**	**0**	**0.79**
Total Cumulative Impact	**65.5**	**0.0401**	**0.053**	**0.79**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?	No	No	No	No
Receptor Type	School/Daycare	School/Daycare	School/Daycare	School/Daycare
Receptor Location (UTMx)	592,190	592,190	592,190	592,190
Receptor Location (UTMy)	4,137,150	4,137,150	4,137,150	4,137,150

Notes:

1. Health impacts data for stationary sources within 1,000 ft of the MESR/MEDR were obtained from BAAQMD's Permitted Stationary Source Risks and Hazards Screening Tool.
2. Health impacts data for existing rail and roadway sources were estimated using BAAQMD's source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located at the MESR/MEDR.
3. Health impacts from existing rail and roadway sources conservatively do not account for the fact that the receptor is only present at this location for a portion of the day/week.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - health index
MEDR - Maximally Exposed Daycare Receptor
MESR - Maximally Exposed School Receptor
NA - not applicable
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
$\mu g/m^3$ - micrograms per cubic meter
UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=845658c19eae4594b9f4b805fb9d89a3.

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018.

Table D3
Summary of Cumulative Health Risk Impacts to the MERR
651 Martin Avenue
Santa Clara, CA

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Operational Generators (25% Load)	0.028	0.00017	0.072	0.00085
Subtotal, Project Impacts	**0.028**	**0.00017**	**0.072**	**0.00085**
Existing Stationary Sources[1]				
The Home Depot (Facility #6023)	0.1	0.0000	NA	0.00
88 Auto Body (Facility #11223)	0.0	0.0005	NA	0.00
City of Santa Clara (Facility #621)	2.2	0.0164	NA	9.76
Bay Area Surgical Group (Facility #16964)	0.1	0.0000	NA	0.00
Leon's Powder Coating SC (Facility #23266)	0.0	0.0000	NA	0.00
Vantage Data Centers Management Co. (Facility #24042)	1.7	0.0113	NA	0.00
Microsoft Corporation (Facility #19686_13)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_14)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_15)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_16)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_17)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_18)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_19)	0.1	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_2)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_20)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_21)	0.1	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_22)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_23)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_24)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_3)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_4)	0.2	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_5)	0.2	0.0003	NA	0.00
Microsoft Corporation (Facility #19686_6)	0.1	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_7)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_8)	0.0	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_9)	0.1	0.0001	NA	0.00
Microsoft Corporation (Facility #19686_1)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_10)	0.1	0.0002	NA	0.00
Microsoft Corporation (Facility #19686_11)	0.1	0.0001	NA	0.00
Subtotal, Background Sources	**7.1**	**0.0328**	**0**	**9.76**
Existing Rail and Roadway Sources[2,3]				
Railroad	37	NA	NA	0.06
Major Roadways	7.6	NA	NA	0.16
Highways	8.6	NA	NA	0.20
Subtotal, Mobile Sources	**52.8**	**0**	**0**	**0.43**
Subtotal, Background and Mobile Sources	**59.9**	**0.0328**	**0**	**10.2**
Total Cumulative Impact	**59.9**	**0.0330**	**0.072**	**10.2**
BAAQMD Significance Threshold	100	10	10	0.80
Exceed?[4]	No	No	No	Yes
Receptor Type	Recreational	Recreational	Recreational	Recreational
Receptor Location (UTMx)	593,270	593,270	593,270	593,270
Receptor Location (UTMy)	4,135,670	4,135,670	4,135,670	4,135,670

Notes:

1. Health impacts data for stationary sources within 1,000 ft of the MERR were obtained from BAAQMD's Permitted Stationary Source Risks and Hazards Screening Tool.
2. Health impacts data for existing rail and roadway sources were estimated using BAAQMD's source raster files for cancer risks and $PM_{2.5}$. Impacts were determined based on the maximum impact of a raster cell located at the MERR.
3. Health impacts from existing rail and roadway sources conservatively do not account for the fact that the receptor is only present at this location for a portion of the day/week.
4. Although the annual $PM_{2.5}$ concentration at the MERR exceeds the BAAQMD cumulative threshold, this exceedance is predominantly caused by a single permitted stationary source (Facility #621). The contribution from the project at the receptor is de minimis.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
CEQA - California Environmental Quality Act
HI - health index
MERR - Maximally Exposed Recreational Receptor

NA - not applicable
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
$\mu g/m^3$ - micrograms per cubic meter
UTM - Universal Transverse Mercator coordinate system

References:

BAAQMD Permitted Stationary Source Risk and Hazards tool. Available at: https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=845658c19eae4594b9f4b805fb9d89a3.

BAAQMD raster tools received by Ramboll through personal communication with Areana Flores from BAAQMD on April 20, 2018.

APPENDIX C

Biological Resources Assessment
Arborist Report

FIRSTCARBON SOLUTIONS™

Biological Resources Assessment
651 Martin Avenue Project
City of Santa Clara, Santa Clara County, California

Prepared for:
Martin Avenue Properties
651 Martin Avenue
Santa Clara, California

Contact: Brandee Mitchell

Prepared by:
FirstCarbon Solutions
2999 Oak Road, Suite 250
Walnut Creek, CA 94597
888.826.5814

Contact: Jason Brandman, Vice President

Date: November 4, 2022

Table of Contents

List of Tables

List of Exhibits

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SECTION 1: INTRODUCTION

At the request of Martin Avenue Properties (Applicant), FirstCarbon Solutions (FCS) prepared a Biological Resource Assessment (BRA) for the proposed 561 Martin Avenue Project (proposed project) located in Santa Clara, California. The purpose of the BRA was to (1) document existing and potentially occurring biological resources on the project site and adjacent areas; (2) summarize relevant local, State, and federal laws and regulations pertaining to biological resources; (3) analyze potential project-related impacts on protected biological resources; and (4) recommend appropriate measures to mitigate potential impacts on biological resources to less than significant levels.

1.1 - Project Location

The proposed project site is located in the City of Santa Clara, in Santa Clara County, California (Exhibit 1). The project site encompasses approximately 7.17 acres and is located at 561 Martin Avenue in Santa Clara, California, Assessor's Parcel Number (APN) 224-04-071 (Exhibit 2). The project site is located within the *San Jose West*, *California* United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle Map.

1.2 - Project Description

The Applicant proposes to construct a new 4-story building accommodating administrative, storage, loading, facility ops, common area, data hall, and data module support; a generator yard, and an electrical substation on a 7.17-acre property.

The existing buildings would be demolished. The proposed project would remove the existing shrubs and groundcovers on the site, while protecting in-place trees that are not in conflict with proposed utilities, grading, stormwater treatment facilities, and architectural improvements.

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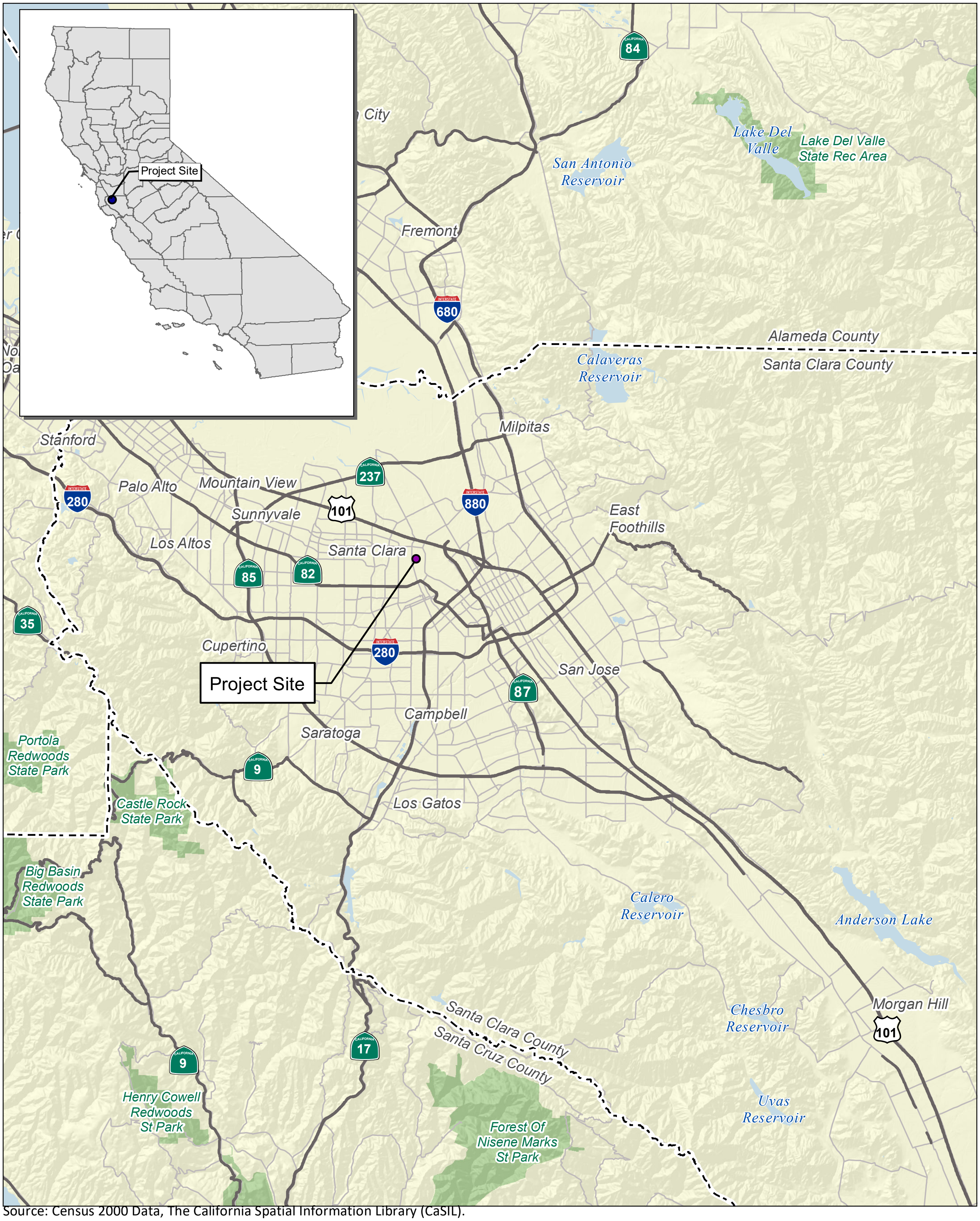

Source: Census 2000 Data, The California Spatial Information Library (CaSIL).

FIRSTCARBON SOLUTIONS™

5 2.5 0 5
Miles

Exhibit 1

Regional Location Map

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MARTIN AVENUE PROPERTIES
651 MARTIN AVENUE PROJECT
BIOLOGICAL RESOURCES ASSESSMENT

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Source: Bing Aerial Imagery.

Exhibit 2
Local Vicinity Map

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MARTIN AVENUE PROPERTIES
651 MARTIN AVENUE PROJECT
BIOLOGICAL RESOURCES ASSESSMENT

SECTION 2: REGULATORY SETTING

2.1 - Federal

2.1.1 - Endangered Species Act of 1973

The United States Fish and Wildlife Service (USFWS) has jurisdiction over species listed as threatened or endangered under the federal Endangered Species Act of 1973. Section 9 of the Endangered Species Act protects listed species from "take," which is broadly defined as actions taken to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." The Endangered Species Act protects threatened and endangered plants and animals and their habitats. Additionally, the USFWS designates specific areas as "Critical Habitat" for Endangered Species Act-listed species.

Candidate species are those proposed for listing; these species are usually treated by resource agencies as if they were actually listed during the environmental review process.

2.1.2 - Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. All migratory birds and their nests are protected from take and other impacts under the MBTA (16 United States Code [USC] § 703, *et seq*.).

2.1.3 - Bald and Golden Eagle Protection Act

The golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*) are afforded additional protection under the Eagle Protection Act, amended in 1973 (16 USC § 669, *et seq*.) and the Bald and Golden Eagle Protection Act (16 USC §§ 668–668d).

2.2 - State

2.2.1 - CEQA Guidelines

The California Environmental Quality Act (CEQA) requires public agencies to evaluate potential impacts to special-status species and their habitat. The following CEQA Guidelines Appendix G checklist questions serve as thresholds of significance when evaluating the potential impacts of a proposed project on biological resources. Impacts are considered significant if a project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as being a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

- Have a substantial adverse effect on federally and State-protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan.

2.2.2 - California Endangered Species Act

The State of California enacted the California Endangered Species Act (CESA) in 1984. CESA pertains to State-listed endangered and threatened species. CESA requires State agencies to consult with the CDFW when preparing CEQA documents to ensure that the State lead agency actions do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available (Fish and Game Code [FGC] § 2080). CESA directs agencies to consult with the CDFW on projects or actions that could affect listed species, directs the CDFW to determine whether jeopardy would occur, and allows the CDFW to identify “reasonable and prudent alternatives” to the project consistent with conserving the species. CESA allows the CDFW to authorize exceptions to the State’s prohibition against take of a listed species if the “take” of a listed species is incidental to carrying out an otherwise lawful project that has been approved under CEQA (FGC § 2081).

2.2.3 - California Fish and Game Code

Under CESA, the CDFW has the responsibility for maintaining a list of endangered and threatened species (FGC § 2070). Fish and Game Code Sections 2050–2098 outline the protection provided to California’s rare, endangered, and threatened species. Fish and Game Code Section 2080 prohibits the taking of plants and animals listed under the CESA. Fish and Game Code Section 2081 established an incidental take permit program for State-listed species. The CDFW maintains a list of “candidate species,” which it formally notices as being under review for addition to the list of endangered or threatened species.

In addition, the Native Plant Protection Act of 1977 (NPPA) (FGC § 1900, *et seq*.) prohibits the taking, possessing, or sale within the State of any plants with a State designation of rare, threatened, or endangered (as defined by the CDFW). An exception to this prohibition in the NPPA allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify the CDFW and give the agency at least 10 days to come and retrieve (and presumably replant) the plants before they are plowed under or otherwise destroyed. Fish and Game Code Section 1913 exempts from “take” prohibition “the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way.” Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed project.

In addition to formal listing under the Endangered Species Act and CESA, some species receive additional consideration by the CDFW and local lead agencies during the CEQA process. Species that may be considered for review are those listed as a "Species of Special Concern." Species with this status may have limited distributions or limited populations and/or the extent of their habitats has been reduced substantially, such that their populations may be threatened. Thus, their populations are monitored, and they may receive special attention during environmental review. While they do not have statutory protection, they may be considered rare under CEQA and specific protection measures may be warranted. In addition to Species of Special Concern, the CDFW Special Animals List identifies animals that are tracked by the California Natural Diversity Database (CNDDB) and may be potentially vulnerable but warrant no federal interest and no legal protection.

CDFW maintains a separate Watch List. Species on the Watch List are generally not treated as special-status species in CEQA analyses and the threshold for significant impacts would be higher than for species of special concern. Impacts to Watch List species may be considered significant pursuant to CEQA Section 15065 or 15380 on a case-specific basis.

Sensitive species that would qualify for listing but are not currently listed are afforded protection under CEQA. CEQA Guidelines Section 15065 (Mandatory Findings of Significance) requires that a substantial reduction in numbers of a rare or endangered species be considered a significant effect. CEQA Guidelines Section 15380 (Rare or Endangered Species) provides for the assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing. Unlisted plant species with a California Rare Plant Rank of 1A, 1B, and 2 would typically require evaluation under CEQA.

Fish and Game Code Sections 3500 to 5500 outline protection for fully protected species of mammals, birds, reptiles, amphibians, and fish. Species that are fully protected by these sections may not be taken or possessed at any time. The CDFW cannot issue permits or licenses that authorize the take of any fully protected species, except under certain circumstances such as scientific research and live capture and relocation of such species pursuant to a permit for the protection of livestock.

Under Fish and Game Code Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. To comply with the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project Study Area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species.

California Fish and Game Code continues to protect non-listed bat species and their roosting habitat, including individual roosts and maternity colonies. Relevant regulations include California Fish and

Game Code Sections 86; 2000; 2014; 3007; and 4150, along with Title 14 of California Code of Regulations.

Fish and Game Code Section 1602 requires any entity to notify the CDFW before beginning any activity that "may substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake" or "deposit debris, waste, or other materials that could pass into any river, stream, or lake." "River, stream, or lake" includes waters that are episodic and perennial and ephemeral streams, desert washes, and watercourses with a subsurface flow. A Lake or Streambed Alteration Agreement will be required if the CDFW determines that project activities may substantially adversely affect fish or wildlife resources through alterations to a covered body of water.

2.2.4 - California Native Plant Society

The CNPS, in collaboration with the CDFW, maintains a rank of plant species that are native to California and that have low population numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Following are the definitions of the California Rare Plant Rank (CRPR) designations:

- **Rank 1A:** Plants presumed extirpated in California and either rare or extinct elsewhere
- **Rank 1B:** Plants rare, threatened, or endangered in California and elsewhere
- **Rank 2A:** Plants presumed extirpated in California but common elsewhere
- **Rank 2B:** Plants rare, threatened, or endangered in California but more common elsewhere
- **Rank 3:** Plants about which more information is needed, a review list
- **Rank 4:** Watch List: Plants of limited distribution

Potential impacts to populations of CNPS-ranked plants receive consideration under CEQA review. All plants appearing on the CNPS List ranked 1 or 2 are considered to meet the CEQA Guidelines Section 15380 criteria. Rank 3 and 4 plants do not automatically meet this definition. Rank 4 plants do not clearly meet CEQA standards and thresholds for impact considerations. Nevertheless, some level of CEQA review is justified for CRPR 4 taxa, and under some circumstances, a full impact analysis is warranted. Taxa that can be shown to meet the criteria for endangered, rare, or threatened status under CEQA Section 15380(d) or that can be shown to be regionally rare or unique as defined in CEQA Section 15125(c) must be fully analyzed in a CEQA document. Some circumstances, such as local rarity, having occurrences peripheral to the taxon's distribution, or having occurrences on unusual substrates or rare and declining habitats, provide justification for treating some CRPR 4 taxa occurrences as regionally rare or unique. One limitation to fully analyzing impacts on CRPR 4 taxa is the difficulty in obtaining current data on the number and condition of the occurrences.[1]

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[1] California Native Plant Society (CNPS). 2020. Considerations for Including CRPR 4 Plant Taxa in CEQA Biological Resource Impact Analysis. Sacramento, CA. January 21, 2020.

2.2.5 - Regional and Local

Habitat Conservation Plan

The proposed project is not located within the boundaries of any adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or State habitat conservation plan. The Santa Clara Valley Habitat Plan study boundary is outside to the east of the project site.

City of Santa Clara General Plan

The Conservation Goals and Policies Element of the Santa Clara General Plan includes the following goals and policies relevant to biological resources.

5.10.1 Conservation Goals and Policies

Conservation Goals:

5.10.1-G1 The protection of fish, wildlife and their habitats, including rare and endangered species.

5.10.1-G2 Conservation and restoration of riparian vegetation and habitat.

5.10.1-G3 Adequate solid waste disposal capacity through effective programs for recycling and composting.

5.10.1-G4 Adequate wastewater treatment and conveyance capacities.

Conservation Policies:

5.10.1-P1 Require environmental review prior to approval of any development with the potential to degrade the habitat of any threatened or endangered species.

5.10.1-P2 Work with Santa Clara Valley Water District and require that new development follow the "Guidelines and Standards for Lands Near Streams" to protect streams and riparian habitats.

5.10.1-P3 Require preservation of all City-designated heritage trees listed in the Heritage Tree Appendix 8.10 of the General Plan.

5.10.1-P4 Protect all healthy cedars, redwoods, oaks, olives, bay laurel and pepper trees of any size, and all other trees over 36 inches in circumference measured from 48 inches above-grade on private and public property as well as in the public right-of-way.

5.10.1-P5 Encourage enhancement of land adjacent to creeks in order to foster the reinstatement of natural riparian corridors where possible.

5.10.1-P6 Require adequate wastewater treatment and sewer conveyance capacity for all new development.

5.10.1-P7 Encourage the use of local recycling facilities to divert waste from landfills.

5.10.1-P8 Increase to 80 percent reduction for solid waste tonnage by 2020, or as consistent with the CAP.

5.10.1-P9 Encourage curbside recycling and composting of organic and yard waste.

5.10.1-P10 Promote the reduction, recycling and safe disposal of household hazardous wastes through public education and awareness and through an increase in hazardous waste collection events.

5.10.1-P11 Require use of native plants and wildlife-compatible non-native plants, when feasible, for landscaping on City property.

5.10.1-P12 Encourage property owners and landscapers to use native plants and wildlife-compatible non-native plants, when feasible.

Santa Clara City Code

Chapter 12.35 of the Santa Clara City Code defines codes regarding trees and shrubs.

12.35.020 Alteration or removal–Permit required

No tree, plant or shrub planted or growing in the streets or public places of the City shall be altered or removed without obtaining a written permit from the superintendent of streets. No person without such authorization shall trench around or alongside of any such tree, plant or shrub with the intent of cutting the roots thereof or otherwise damaging the same. (Ord. 931 § 2; Ord. 1140 § 7, 4-19-68. Formerly § 30-2).

A protected tree is:

1. Heritage Trees in all zoning districts.
2. All specimen trees with a diameter of twelve (12) inches or more when measured at fifty-four (54) inches above natural grade of the following species on private property: a. Aesculus californica (California Buckeye); b. Acer macrophyllum (Big Leaf Maple); c. Cedrus deodara (Deodar Cedar); d. Cedrus atlantica 'Glauca' (Blue Atlas Cedar); e. Cinnamomum camphora (Camphor Tree); f. Platanus racemosa (Western Sycamore); g. Quercus (native oak tree species), including: i. Quercus agrifolia (Coast Live Oak); ii. Quercus lobata (Valley Oak); iii. Quercus kelloggii (Black Oak); iv. Quercus douglasii (Blue Oak); v. Quercus wislizeni (Interior Live Oak); h. Sequoia sempervirens (Coast Redwood); and i. Umbellularia californica (Bay Laurel or California Bay).
3. Approved development trees.
4. A private tree which has a trunk with a diameter of thirty-eight (38) inches or more measured at fifty-four (54) inches above natural grade.

5. A multi-branched private tree which has major branches below fifty-four (54) inches above the natural grade with a diameter of thirty-eight (38) inches or more measured just below the first major trunk fork.

SECTION 3: METHODS

3.1 - Literature Review

FCS conducted a literature review of existing documentation, topographic maps and aerial photographs, soil surveys, special-status species databases, and local tree ordinances to provide a baseline from which to evaluate the biological resources that occur or have the potential to occur on the project site and/or in the project vicinity.

3.1.1 - Existing Documentation

As part of the literature review, an FCS Biologist examined existing environmental documentation for the project site and local vicinity. This documentation included literature pertaining to the habitat requirements of special-status species with the potential to occur in the project vicinity; and federal register listings, protocols, and species data provided by the USFWS and CDFW. These and other documents are cited within this report.

3.1.2 - Topographic Maps and Aerial Photographs

An FCS Biologist reviewed current USGS 7.5-minute topographic quadrangle map(s) and aerial photographs as a preliminary analysis of the existing conditions within the project site and immediate vicinity.[2] Information obtained from the topographic maps included elevation, general watershed information, and potential drainage feature locations. Aerial photographs provided a perspective of the current site conditions relative to on-site and off-site land use, plant community locations, and potential locations of wildlife movement corridors.

3.1.3 - Soil Surveys

An FCS Biologist reviewed United States Department of Agriculture (USDA) published soil surveys to determine soil series (i.e., group of soils with similar profiles) and soil mapping units occurring on the project site.[3] The soil profiles include major horizons with similar thickness, arrangement, and other important characteristics. The soil series are further subdivided into soil mapping units that provide specific information regarding soil characteristics. Many special-status plant species have a limited distribution based exclusively on soil type. Therefore, pertinent USDA soil survey maps were reviewed to determine the existing soil mapping units within the project site and to establish whether the soil conditions on-site are suitable for any special-status plant species.

3.1.4 - Special-status Species Database Search

An FCS Biologist compiled a list of threatened, endangered, and otherwise special-status species previously recorded within the project vicinity based on a search of the CNDDB and the CNPS

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[2] United States Geological Survey (USGS). 2022. National Geospatial Program. Website: https://www.usgs.gov/core-science-systems/national-geospatial-program/us-topo-maps-america?qt-science_support_page_related_con=4#qt-science_support_page_related_con. Accessed October 24, 2022.

[3] Natural Resources Conservation Service (NRCS). 2021. Web Soil Survey (WSS). United States Department of Agriculture (USDA). Website: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed October 24, 2022.

Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California for the *San Jose West*, California USGS 7.5-minute Topographic Quadrangle Map. [4,5]

The CNDDB Biogeographic Information and Observation System (BIOS 5) database was used to determine the distance between the known occurrences of special-status species and the project site.[6]

3.1.5 - Trees

Prior to conducting the reconnaissance-level field survey, an FCS Biologist reviewed applicable City ordinances pertaining to tree preservation and protection and ascertained whether tree replacement measures or permits for the removal of protected trees are required. Additionally, the Arborist Report for the project site was reviewed, and is included in this BRA (Appendix C).

3.1.6 - State or Federally Protected Waters and Wetlands

Prior to conducting the reconnaissance-level survey, an FCS Biologist reviewed the United States Environmental Protection Agency Watershed Assessment, Tracking and Environmental Results System (EPA WATERS) and aerial photographs to identify potential natural drainage features and water bodies.[7] At a minimum, all surface drainage features identified as blue-line streams on USGS maps are generally considered potentially subject to State and federal regulatory authority as waters of the United States and/or State, and in the case of streams and lakes, subject to CDFW's lake and streambed alteration program.

3.2 - Field Survey

An FCS Senior Biologist conducted a field survey of the project site on October 25, 2022, during daylight hours. The objective of the survey was to evaluate general site conditions as they pertain to biological resources, including whether existing land cover and vegetation communities provide suitable habitat for special-status plant or wildlife species. Special-status or unusual biological resources identified during the literature review would be ground-truthed during the field survey for mapping accuracy. Special attention was paid to sensitive habitats and areas potentially supporting special-status floral and faunal species.

3.2.1 - Vegetation

Common plant species observed during the reconnaissance-level survey were identified by visual characteristics and morphology in the field and recorded in a field notebook. Uncommon and fewer familiar plants were identified with the use of taxonomical guides, including Jepson eFlora and

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[4] California Department of Fish and Wildlife (CDFW). 2021. CNDDB RareFind 5 California Natural Diversity Database Query for Special-Status Species. Website: https://map.dfg.ca.gov/rarefind/view/RareFind.aspx. Accessed October 24, 2022.

[5] California Native Plant Society (CNPS). 2021. California Native Plant Society Rare and Endangered Plant Inventory. Website: http://www.rareplants.cnps.org/. Accessed October 24, 2022.

[6] California Department of Fish and Wildlife (CDFW). 2021. Biogeographic Information and Observation System (BIOS 5). Website: https://map.dfg.ca.gov/bios/. Accessed October 24, 2022.

[7] United States Environmental Protection Agency (EPA). 2021. Watershed Assessment, Tracking and Environmental Results System (WATERS). Website: https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system. Accessed October 24, 2022.

Calflora.[8,9] Taxonomic nomenclature used in this study follows The Jepson Manual: Vascular Plants of California.[10] Common plant names, when not available from The Jepson Manual, were taken from other regionally specific references. Vegetation types and boundaries were noted on aerial photographs, verified through field observation, and digitized using ESRI ArcGIS software® ArcMap 10.0. By incorporating collected field data and interpreting aerial photographs, a map of habitat types, land cover types, and other biological resources within the project site was prepared. Vegetation community and land cover types used to help classify habitat types are based on the Manual of California Vegetation (MCV) and cross-referenced with the CDFW Natural Communities List.[11,12]

3.2.2 - Wildlife

Wildlife species detected during the reconnaissance-level survey by sight, calls, tracks, scat, or other signs were recorded. Notations were made regarding suitable habitat for those special-status species determined to have the potential to occur within the project site.[13] Appropriate field guides were used to assist in species identification during surveys, such as Peterson, Reid, and Stebbins.[14,15,16] Online resources such as eBird and California Herps were also consulted, as necessary.[17,18]

3.2.3 - Wildlife Movement Corridors

Wildlife movement corridors link areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. Urbanization and the resulting fragmentation of open space areas create isolated “islands” of wildlife habitat, forming separated populations. Corridors act as an effective link between populations.

The project site was evaluated for evidence of a wildlife movement corridor during the reconnaissance-level survey. The scope of the biological resource assessment did not include a formal wildlife movement corridor study utilizing track plates, camera stations, scent stations, or snares. Rather, the focus of this study was to determine whether a change in land use at the project site could have significant impacts on the regional movement of wildlife. Conclusions are based on the information compiled during the literature review, including aerial photographs, USGS topographic maps and resource maps for the vicinity; the field survey; and professional experience with the desired topography, habitat, and resource requirements of the special-status species potentially utilizing the project site and vicinity.

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[8] Jepson Flora Project (eds.) 2021. Jepson eFlora, https://ucjeps.berkeley.edu/eflora/. Accessed October 24, 2022.

[9] Calflora. 2021. Calflora: Information on California plants for education, research, and conservation. Website: http://www.calflora.org/. Accessed October 24, 2022.

[10] Baldwin, B. et al. 2012. The Jepson Manual: Vascular Plants of California. Berkeley: University of California Press. County of San Bernardino (Bernardino). 2007 (amended 2015).

[11] Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp.

[12] California Department of Fish and Wildlife (CDFW). 2022. Natural Communities List, Sacramento: California Department of Fish and Wildlife. Website: https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities#sensitive%20natural%20communities. Accessed October 24, 2022.

[13] California Department of Fish and Wildlife (CDFW). 2020. CNDDB RareFind 5 California Natural Diversity Database Query for Special-Status Species. Website: https://map.dfg.ca.gov/rarefind/view/RareFind.aspx. Accessed October 24, 2022.

[14] Peterson, T.R. 2010. A Field Guide to Birds of Western North America, 4th Edition. Boston: Houghton Mifflin Harcourt.

[15] Reid, F. 2006. A Field Guide to Mammals of North America, 4th Edition. Boston: Houghton Mifflin Harcourt.

[16] Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians. Third Edition. Boston: Houghton Mifflin Harcourt.

[17] eBird. 2020. Online bird occurrence database. Website: http://ebird.org/content/ebird/. Accessed October 24, 2022.

[18] California Herps. 2021. A Guide to the Amphibians and Reptiles of California. Website: http://www.californiaherps.com/ Accessed October 24, 2022.

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SECTION 4: RESULTS

This section summarizes the results of the literature search, database review, and reconnaissance-level survey (see Methods section, above). Weather conditions during the field survey were sunny, with an average temperature around 60°F (degrees Fahrenheit). Winds were minimal at the time of the survey.

4.1 - Environmental Setting

The project site is currently developed with active commercial and industrial uses, including an auto body shop, and off-site parking for San Jose International Airport. Ornamental trees line the northern and western site boundary, while the southern boundary has small, actively managed landscaped areas that are planted with various ornamental trees and shrubs. The project site and vicinity are generally flat and drain to the City's storm drainage system. The site is surrounded on all sides by industrial and commercial development. A railway line runs along the western boundary of the site. This boundary supports a narrow strip of invasive forbs and shrubs. Conditions are shown in Appendix A.

4.1.1 - Soils

The site is fully developed, with the majority of the site sealed by hardscape, and surface soil substrate is exposed only on small strips at the site margins. The Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) depicts one soil type within the project site (Exhibit 3).[19] This soil type and its primary characteristics are summarized in Table 1.

Table 1: Soil Type Present within Project Site

Soil Name	Slope	Description	Acreage On-site
Urban Land, Basins	0–2%	The Urban Land soil type is derived from disturbed and human transported material in highly urbanized areas.	7.17 acres

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[19] Natural Resources Conservation Service (NRCS). 2022. Web Soil Survey (WSS). United States Department of Agriculture (USDA). Website: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed October 14, 2022.

Source: Bing Aerial Imagery. USDA Soils Data Mart, Santa Clara Western Area.

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Exhibit 3
Soils Map

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MARTIN AVENUE PROPERTIES
651 MARTIN AVENUE PROJECT
BIOLOGICAL RESOURCES ASSESSMENT

4.2 - Vegetation Communities and Land Cover

4.2.1 - Urban/Developed

Urban/developed land includes areas that have been constructed upon or physically altered to an extent that native vegetation is no longer supported, and the site retains no soil substrate. Developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation. Areas where no natural land is evident because a large quantity of debris or other materials has been placed upon it may also be considered urban/developed. Urban/developed areas are typically unvegetated or landscaped with a variety of ornamental (usually non-native) plants.

The project site is entirely covered with pavement, buildings, parking lots, and landscaped areas with planted and maintained ornamental trees and shrubs (Exhibit 4). Non-native ruderal vegetation lines the western site boundary.

4.3 - Common Wildlife

Urban/developed land cover types provide limited habitat for wildlife species. Wildlife activity was low during the field survey and consisted of avian species. The following discussions regarding the wildlife species observed within the project site are organized by taxonomic group. Each discussion contains representative examples of a particular taxonomic group either observed or expected to occur on-site. Special-status wildlife species are addressed separately in Section 5.2, below.

4.3.1 - Amphibians

No amphibian species were observed on-site during the field survey, and no habitat for amphibians is on or adjacent to the project site.

4.3.2 - Birds

Bird species observed on-site included Say's phoebe (*Sayornis saya*), house finch (*Haemorhous mexicanus*), American crow (*Corvus brachyrhynchos*), rock pigeon (*Columba livia*), and house sparrow (*Passer domesticus*). With more than 100 trees on-site, nesting and roosting habitat is available for common bird species habituated to a moderate to high level of anthropogenic disturbance.

4.3.3 - Mammals

No small mammal burrows were observed in landscaped portions of the project site. It is expected that wildlife adapted to urban areas (e.g., racoons, opossums, and rats) may utilize the landscaped areas and travel in the shrub and tree line along the railroad corridor adjacent to the rear parking lot.

The existing building could potentially house disturbance-tolerant bat species in roof cavities or other suitable crevasses, especially when the building is unused. The building was thoroughly investigated for signs of bats (e.g., large cracks and cavities, bat guano). Although there are small cavities in roof structures, there was no sign of bat guano on the building or the ground around the perimeter of the building.

4.3.4 - Reptiles

No reptiles or signs thereof were observed on-site during the field survey. No other species or habitats for reptiles were observed.

4.4 - Wildlife Movement Corridors

The entire site is urban/developed and does not contain habitat features such as riparian corridors or waterways that could function as wildlife corridors. The project site is also surrounded by roads, highways, and a railroad corridor, as well as other urban development that limits wildlife movement.

4.5 - Trees

A tree inventory conducted by HMH inventoried 33 trees on-site (Appendix C), including identification of tree species, tree locations, trunk circumference measurements, and health and structure evaluation, and recommendations and determination of protective status (see Sections 5.6 and 6.2).

SECTION 5: SENSITIVE BIOLOGICAL RESOURCES

The following section discusses the existing site conditions and potential for sensitive biological resources to occur within the project site.

5.1 - Sensitive Natural Communities

Sensitive natural communities are classified based on the federal, State, or local laws that limit development, limited distributions, and habitat requirements of special-status plant or wildlife species that occur within them.

The project site does not contain sensitive natural communities because of past and current land use (including existing development and ongoing disturbance) and the absence of any natural communities within the project site.

5.2 - Special-status Plant Species

The Special-status Plant Species Occurrence Evaluation (Appendix B) lists 65 extant special-status plant species and CNPS sensitive species identified as extant within the *San Jose West*, California USGS Topographic Quadrangle Map and the eight surrounding quadrangles by the CNDDB and CNPSEI.[20,21,22] The table also includes the species' status and required habitat. None of the species in the table has the potential to occur within the project site because no native natural habitat that could support native special-status plant species occurs within the project site.

Based upon the literature review, field survey, and professional experience, no special-status plant species are expected to occur within the project site because of the absence of suitable habitat, previous land use, and the urban/developed land cover.

5.3 - Special-status Wildlife Species

The Special-status Wildlife Species Occurrence Evaluation (Appendix B) identifies 38 federally and State-listed threatened or endangered wildlife species and State Species of Special Concern identified as potentially or confirmed extant and occurring within the *San Jose West, California* USGS Topographic Quadrangle and the eight surrounding quadrangles. The table includes the species' status, required habitat types and features. None of the special-status wildlife species are unlikely to occur on-site due to the lack of suitable habitat on-site and adjacent to the site, and the species-specific analysis provided below.

Pallid bat (*Antrozous pallidus*) is listed as a California Species of Special Concern by the CDFW. The pallid bat is a light-brown or sandy colored, long-eared, moderately-sized bat that occurs throughout

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[20] United States Geological Survey (USGS). 2020. National Geospatial Program. Website: https://www.usgs.gov.

[21] California Department of Fish and Wildlife (CDFW). 2022. CNDDB RareFind 5 California Natural Diversity Database Query for Special-Status Species. Website: https://map.dfg.ca.gov/rarefind/view/RareFind.aspx. Accessed October 26, 2022.

[22] California Native Plant Society (CNPS). 2021. California Native Plant Society Rare and Endangered Plant Inventory. Website: http://www.rareplants.cnps.org/. Accessed October 26, 2022.

California except for the northwest corner of the State and the high Sierra Nevada.[23] Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridge structures that are used for roosting.[24,25] Coastal colonies commonly roost in deep crevices in rocky outcroppings; in buildings; under bridges; and in the crevices, hollows, and exfoliating bark of trees. Night roosts often occur in open buildings, porches, garages, highway bridges, and mines. Colonies can range in size from a few individuals to more than 100;[26] they usually consist of at least 20 individuals.[27] Pallid bats typically winter in canyon bottoms and riparian areas. After mating during the late fall and winter, females leave to form maternity colonies, often on ridge tops or other warmer locales.[28] Pallid bat roosts are very susceptible to human disturbance, and urban development has been cited as the most significant factor contributing to their regional decline.[29]

Maternity colonies for pallid bat or any other bat species are unlikely to be present within the project site; no evidence of a bat roost was observed, and no structures or trees with high-quality roost sites were detected on the site during the reconnaissance-level site visit. Pallid bats may move through the site occasionally because this species forages for miles surrounding a maternity colony; however, the site does not provide foraging habitat (other than illuminated lamps in the parking lot that attract insects) because of the lack of open habitat.

Swainson’s hawk is listed as threatened under CESA.[30] Swainson's hawk is a medium-sized bird of prey with relatively long, pointed wings that curve up somewhat in a slight dihedral while the bird is in flight. Adult females weigh between 900 and 1,100 grams (32 to 39 ounces), and males from 800 to 1,000 grams (28 to 35 ounces). The most distinctive identifying features of an adult Swainson’s hawk are its dark head and breast band that is distinctive from the lighter-colored belly, and the lighter linings on the underside of the wing that are lighter than the dark-gray flight feathers.

The Swainson's hawk breeds in the western United States and Canada and winters in South America as far south as Argentina. The breeding season for Swainson’s hawk in the Central Valley typically lasts from March to the end of July.[31] It typically forages in open grasslands and has become increasingly dependent on agriculture, especially alfalfa crops, as native communities are converted to agricultural lands. The diet of the Swainson's hawk in California consists of small rodents such as voles; however, other small mammals, birds, and insects are also preyed upon. Swainson's hawk often nests near riparian woodlands. They will also use lone trees in agricultural fields or pastures, and roadside trees that are adjacent to suitable foraging habitat.[32]

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[23] Zeiner, D., Laudenslayer, W.F. and Mayer, K.E. eds., 1990. California's wildlife (Vol. 2). State of California, Resources Agency, Department of Fish and Game.

[24] Ibid.

[25] Ferguson H, Azerrad JM. Pallid bat, Antrozous pallidus. Management Recommendations for Washington’s Priority Species. 2004;5:14.

[26] Barbour, R.W. and Davis, W.H., 1969. Bats of America (No. 599.40973 B3).

[27] Wilson, D.E. and Ruff, S., 1999. North American I Mammals. Smithsonian Institute, Washington, DC.

[28] Johnston, D.S., B. Hepburn, J. Krauel, T. Stewart, and D. Rambaldini. 2006. Winter roosting and foraging ecology of pallid bats in central coastal California. Abstract. Bat Research News 47:115.

[29] Miner, K.L. and Stokes, D.C., 2005. Bats in the south coast ecoregion: status, conservation issues, and research needs. In: Kus, Barbara E., and Beyers, Jan L., technical coordinators. Planning for Biodiversity: Bringing Research and Management Together. Gen. Tech. Rep. PSW-GTR-195. Albany, CA: Pacific Southwest Research Station, Forest Service, US Department of Agriculture: 211-227, 195.

[30] California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database (CNDDB). Special Animals List. Sacramento, CA. Updated October 2022.

[31] California Department of Fish and Wildlife (CDFW). 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley. Swainson’s Hawk Technical Advisory Committee. Sacramento, California. May 31, 2000. Website: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83990&inline.

[32] California Department of Fish and Wildlife (CDFW). 2020. Swainson's Hawks in California. Website: https://wildlife.ca.gov/Conservation/Birds/Swainson-Hawks.

CNDDB records indicate the closest potentially extant Swainson's hawk occurring approximately 16 miles to the southeast of the project site. The project site does not lie in what is typically considered the range of this species. Given this fact and the lack of suitable foraging habitat in the highly developed site context, presence of Swainson's hawk on the project site is unlikely.

Burrowing owl occurs in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. This species utilizes, modifies, and nests in burrows created by other species, most notably the California ground squirrel (*Otospermophilus beecheyi*). There are several recorded occurrences of this species associated with grassland areas of the San José Airport and areas to the east of the airport (Exhibit 5). No burrows were detected on or adjacent to the project site during the field survey, and no suitable habitat is present on or adjacent to the project site. Therefore, it is very unlikely that burrowing owl would be on-site during the breeding season (generally between February 15 and August 31), post-breeding dispersal season (generally between September 1 and November 30), or wintering season (generally between December 1 and February 14).

No fish or other aquatic species are expected to occur on-site because of the lack of suitable water features. Additionally, the lack of vernal pools precludes the presence of vernal pool fairy shrimp (*Branchinecta lynchi*). No suitable habitat exists for amphibian and semi-aquatic species such as California tiger salamander (*Ambystoma californiense*) and western pond turtle (*Emys marmorata*).

5.3.1 - Protected Nesting Birds

The active nests of most bird species are protected by federal and/or State law (MBTA and Fish and Game Code), and protected active nests are therefore considered "special-status" for the purpose of this analysis. Species that are protected pursuant to MBTA are listed by the USFWS.[33] Nests are generally defined as being "active" if they contain eggs or altricial young. The project site contains trees, shrubs, and structures that provide suitable habitat for protected migratory or native resident nesting bird species relatively tolerant of human disturbance.

5.3.2 - Protected Roosting Bats

Trees and/or structures on-site are potentially capable of supporting protected bat roosts (e.g., maternity roosts) of bat species tolerant to urban settings, if structures remain unoccupied and vegetation unmanaged for more than approximately one month before demolition. Protection of bats is defined in the Regulatory Settings section above.

5.4 - Jurisdictional Waters and Wetlands

There are no features that are potentially regulated as jurisdictional waters of the United States or waters of the State, or wetlands.

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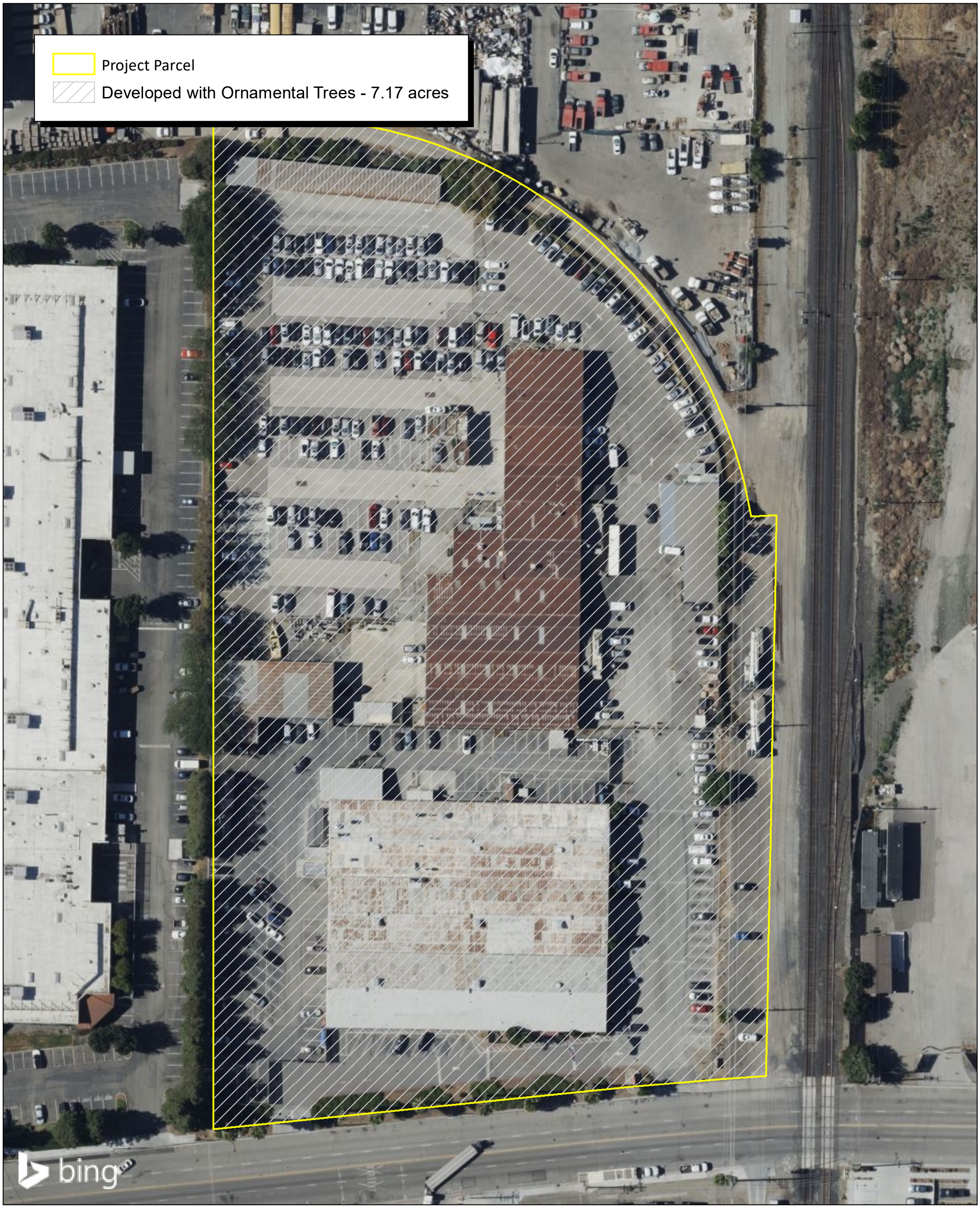
[33] United States Fish and Wildlife Service (USFWS). 2020. Website: https://www.federalregister.gov/documents/2020/04/16/2020-06779/general-provisions-revised-list-of-migratory-birds.

5.5 - Wildlife Movement Corridors

Because of the fully developed status of the project site and surrounding areas, the project site does not provide any value as a wildlife movement corridor.

5.6 - Protected Trees

The Arborist Report for the proposed project (Appendix C) identifies one tree protected under the City of Santa Clara Code of Ordinances, consisting of the Peruvian peppertree (*Schinus molle*), identified as tree number 26 in the Arborist Report, and shown on Exhibit 6 of this report, and shown on Photo 1 in Appendix A.



Source: Bing Aerial Imagery.

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Exhibit 4
Land Cover and Vegetation Types

51880004 • 10/2022 | 4_Landcover Vegetation.mxd

MARTIN AVENUE PROPERTIES
651 MARTIN AVENUE PROJECT
BIOLOGICAL RESOURCES ASSESSMENT

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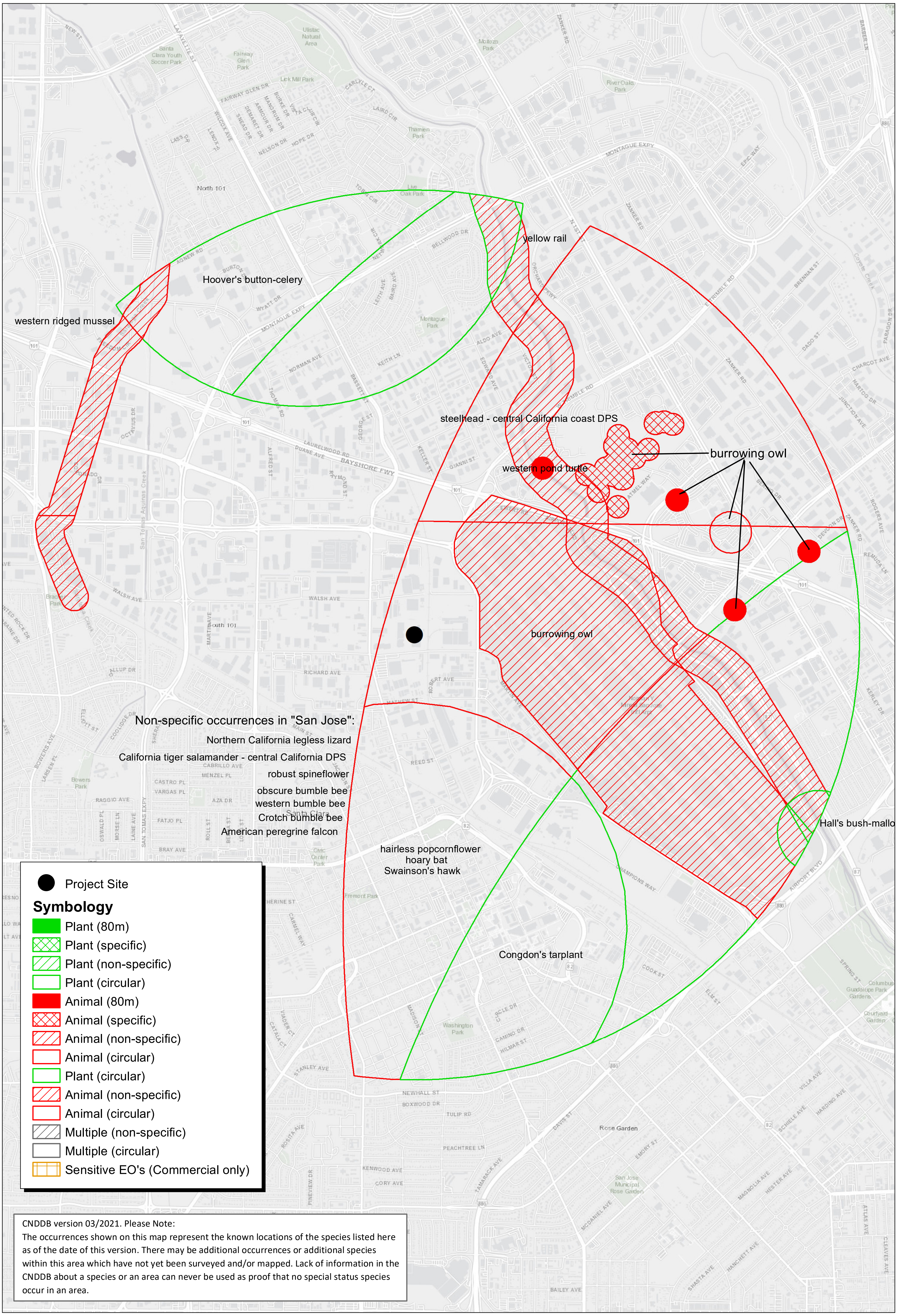

CNDDB version 03/2021. Please Note:
The occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not yet been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area.

Source: California Natural Diversity Database (CNDDB), 2022.

Noot for Publication

Exhibit 5
CNDDB Special-Status Species Occurrences (2-mile radius)

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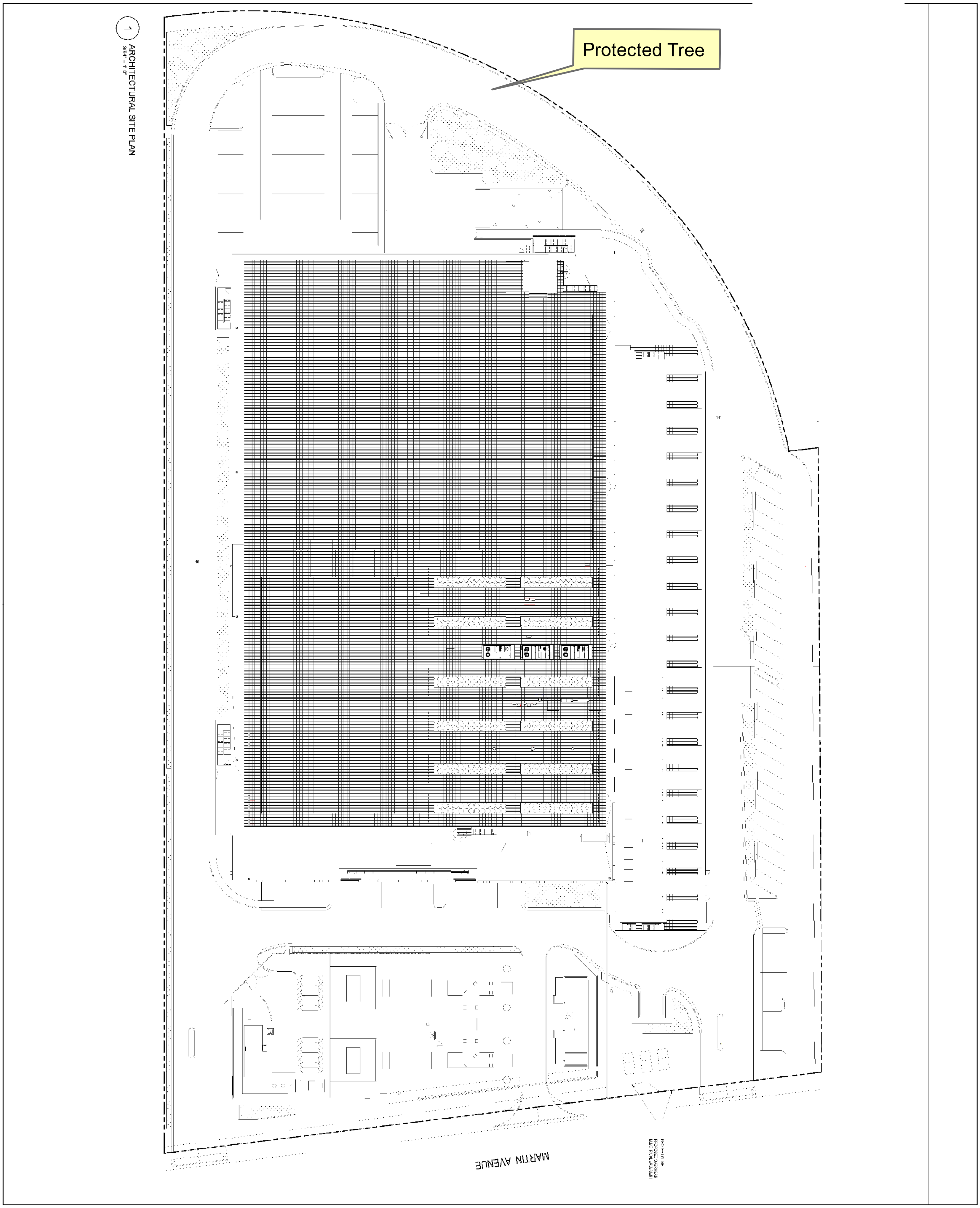

Source: HMH

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80 40 0 80
Feet

Exhibit 6
Proposed Project

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SECTION 6: IMPACT ANALYSIS AND RECOMMENDATIONS

The following discussion addresses potential project-related impacts on sensitive biological resources and recommends measures to avoid and mitigate impacts to a less than significant level under CEQA. No significant impacts would occur on resource categories determined to be absent from the site, including rare plants, sensitive communities, State or federally protected wetlands, wildlife corridors (see Sections 4 and 5).

6.1 - Special-status Wildlife Species

The following section analyzes potential project-related impacts on special-status wildlife species and proposes measures to reduce potential project-related impacts to less than significant levels.

6.1.1 - Protected Nesting Birds

The numerous ornamental trees and shrubs could provide suitable habitat for a variety of species of nesting birds. Construction activities that occur during the avian nesting season (generally January to September) could disturb nesting sites for bird species protected under the Fish and Game Code or MBTA. The removal of trees during the nesting season could result in direct harm to nesting birds, while noise, light, and other indirect disturbances may cause nesting birds to abandon their nests prematurely, resulting in potential death of embryos in eggs or altricial young.

This potential impact can be avoided or minimized by implementation of the following recommended Project Design Measures:

PD BIO-1 **The project shall incorporate the following measures to reduce impacts to nesting birds.**

- If removal of the trees on-site would take place between January and September, a pre-construction survey for protected nesting birds shall be conducted by a qualified Ornithologist to identify active protected bird nests that may be disturbed during project implementation. Between January and April (inclusive) pre-construction surveys shall be conducted no more than 14 days prior to the initiation of construction activities or tree relocation or removal. Between May and August (inclusive), pre-construction surveys shall be conducted no more than 30 days prior to the initiation of these activities. The surveying Ornithologist shall inspect all trees in and immediately adjacent to the construction area to be disturbed by these activities, and the Ornithologist shall, in consultation with the California Department of Fish and Wildlife (CDFW), designate a construction-free buffer zone (typically 250 feet) around the nest until the end of the nesting activity.
- The applicant shall submit a report indicating the results of the survey and any designated buffer zones to the satisfaction of the Director of Planning and Inspection prior to the issuance of a tree removal permit by the City Arborist.

6.1.2 - Roosting Bat Species

If bat roosts are present on the project site or within disturbance distance, demolition activities have the potential to disturb/disrupt protected bat roosts, potentially leading to direct destruction or premature roost abandonment and loss of bats. This potential impact can be avoided or minimized by implementation of the following recommended Project Design Measures:

PD BIO-2 Avoid and Minimize Impacts to Bat Species.

- If suitable roosting habitat for special-status bats will be affected by project construction (e.g., removal or buildings, modification of bridges), a qualified wildlife biologist will conduct surveys for special-status bats during the appropriate time of day to maximize detectability to determine if bat species are roosting near the work area no less than 7 days and no more than 14 days prior to beginning ground disturbance and/or construction. Survey methodology may include visual surveys of bats (e.g., observation of bats during foraging period), inspection for suitable habitat, bat sign (e.g., guano), or use of ultrasonic detectors (e.g., Anabat, etc.). Visual surveys will include trees within 0.25 mile of project construction activities. The type of survey will depend on the condition of the potential roosting habitat. If no bat roosts are found, then no further study is required.
- If evidence of bat use is observed, the number and species of bats using the roost will be determined. Bat detectors may be used to supplement survey efforts.
- If roosts are determined to be present and must be removed, the bats shall be excluded from the roosting site before the facility is removed. A mitigation program addressing compensation, exclusion methods, and roost removal procedures shall be developed prior to implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave, but not reenter), or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young).

6.2 - Protected Trees

The project site contains one tree protected by the City of Santa Clara Municipal Code (see Appendix C, Section 5.6, and Photo Appendix A). The protected tree would need to be removed to accommodate the proposed project. Santa Clara City Code Chapter 12.35.020 states that "no tree, plant or shrub planted or growing in the streets or public places of the City shall be altered or removed without obtaining a written permit from the superintendent of streets. No person without such authorization shall trench around or alongside of any such tree, plant or shrub with the intent of cutting the roots thereof or otherwise damaging the same."[34] With implementation of the

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[34] City of Santa Clara. 2022. Chapter 12.35 Trees and Shrubs. Website: https://www.codepublishing.com/CA/SantaClara/#!/SantaClara12/SantaClara1235.html#12.35.

following Project Design Measures, the proposed project would not be in conflict with the applicable tree ordinance.

PD BIO-3 Tree Removal Permit

The project applicant shall obtain the appropriate tree removal permits from the City of Santa Clara for removal of all healthy mature trees. Acquisition of this permit shall include details of the final mitigation numbers. The City of Santa Clara's landscape ordinance mandates a 2:1 replacement with 24-inch box size trees, or 1:1 replacement with 36-inch box size trees. The CA3DC proposes to mitigate for the loss of 65 trees through a combination of 24-inch box size and 36-inch box size.

PD BIO-4 Trees to Remain: Avoidance and Minimization of Impacts

The project applicant shall follow the Tree Protection Measures for trees that are to remain in place, as stated in the attached arborist report on pages 5-12 (Appendix B). These measures include but are not limited to fencing, erosion control, pruning, root cutting, no compaction tree protection zones, watering/irrigation considerations, etc.

Appendix A:
Site Photographs

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Photograph 1: The protected Peruvian pepper tree on the northern property boundary (10/25/22).

Photograph 2: Looking northwest towards the western site boundary (10/25/22).

Photograph 3: Auto body shop and parking lot on southern portion of project site (10/25/22).

Photograph 4: Narrow strip of landscaped shrubs on southern site boundary (10/25/22).

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Appendix B:
Special-status Species Occurrences

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Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Jose East (3712137) OR San Jose West (3712138) OR Milpitas (3712148) OR Calaveras Reservoir (3712147) OR Santa Teresa Hills (3712127) OR Los Gatos (3712128) OR Mountain View (3712241) OR Castle Rock Ridge (3712221) OR Cupertino (3712231))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)
 AND (Federal Listing Status IS (Endangered OR Threatened OR Candidate) OR State Listing Status IS (Endangered OR Threatened OR Rare OR Candidate Endangered OR Candidate Threatened))
 AND Presence IS (Presumed Extant OR Possibly Extirpated)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
Ambystoma californiense pop. 1 California tiger salamander - central California DPS	AAAAA01181	Threatened	Threatened	G2G3T3	S3	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Euphydryas editha bayensis Bay checkerspot butterfly	IILEPK4055	Threatened	None	G5T1	S1	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S1	FP
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	AFCHA02034	Endangered	Endangered	G5T2Q	S2	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G3T1	S1	FP
Rana boylii pop. 4 foothill yellow-legged frog - central coast DPS	AAABH01054	Proposed Threatened	Endangered	G3T2	S2	
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Sternula antillarum browni California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP

Record Count: 16

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Jose East (3712137) OR San Jose West (3712138) OR Milpitas (3712148) OR Calaveras Reservoir (3712147) OR Santa Teresa Hills (3712127) OR Los Gatos (3712128) OR Mountain View (3712241) OR Castle Rock Ridge (3712221) OR Cupertino (3712231))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)
 AND Other Status Contains (CDFW_FP-Fully Protected OR CDFW_SSC-Species of Special Concern OR WBWG_H-High Priority OR WBWG_MH-Medium-High Priority)
 AND Presence IS (Presumed Extant OR Possibly Extirpated)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
Aneides niger Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
Anniella pulchra Northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Circus hudsonius northern harrier	ABNKC11011	None	None	G5	S3	SSC
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S2	SSC
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G2G3	S2S3	SSC
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S1	FP
Melospiza melodia pusillula Alameda song sparrow	ABPBXA301S	None	None	G5T2T3	S2S3	SSC
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Progne subis purple martin	ABPAU01010	None	None	G5	S3	SSC
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G3T1	S1	FP
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Rynchops niger black skimmer	ABNNM14010	None	None	G5	S2	SSC
Sorex vagrans halicoetes salt-marsh wandering shrew	AMABA01071	None	None	G5T1	S1	SSC
Sternula antillarum browni California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC

Record Count: 28

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Jose East (3712137) OR San Jose West (3712138) OR Milpitas (3712148) OR Mountain View (3712241) OR Calaveras Reservoir (3712147) OR Castle Rock Ridge (3712221) OR Los Gatos (3712128) OR Santa Teresa Hills (3712127) OR Cupertino (3712231))
 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)
 AND CNPS List IS (1B OR 1B.1 OR 1B.2 OR 1B.3 OR 2A OR 2B OR 2B.1 OR 2B.2 OR 2B.3 OR 3 OR 3.1 OR 3.2 OR 3.3 OR 4 OR 4.1 OR 4.2 OR 4.3)

						Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Elev. Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Amsinckia lunaris bent-flowered fiddleneck	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_UCBG-UC Botanical Garden at Berkeley SB_UCSC-UC Santa Cruz	775 775	93 S:1	0	1	0	0	0	0	0	1	1	0	0
Arctostaphylos silvicola Bonny Doon manzanita	G1 S1	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	1,261 1,286	16 S:2	0	0	1	0	0	1	1	1	2	0	0
Astragalus tener var. tener alkali milk-vetch	G2T1 S1	None None	Rare Plant Rank - 1B.2	5 20	65 S:4	0	1	0	0	3	0	4	0	1	2	1
Atriplex depressa brittlescale	G2 S2	None None	Rare Plant Rank - 1B.2	20 20	60 S:1	0	1	0	0	0	0	0	1	1	0	0
Atriplex minuscula lesser saltscale	G2 S2	None None	Rare Plant Rank - 1B.1	2 2	52 S:1	0	0	0	0	0	1	0	1	1	0	0
Balsamorhiza macrolepis big-scale balsamroot	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive USFS_S-Sensitive	300 300	51 S:1	0	0	0	0	0	1	0	1	1	0	0
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	G3G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	2,800 2,800	12 S:1	0	0	0	0	0	1	1	0	1	0	0
Campanula exigua chaparral harebell	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	960 1,560	50 S:2	1	1	0	0	0	0	0	2	2	0	0

				Elev.		Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Centromadia parryi ssp. congdonii Congdon's tarplant	G3T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	5 100	96 S:9	0	3	4	1	1	0	1	8	8	0	1
Chlorogalum pomeridianum var. minus dwarf soaproot	G5T3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden USFS_S-Sensitive		31 S:1	0	0	0	0	0	1	1	0	1	0	0
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	G4?T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	1 5	80 S:3	0	0	0	0	3	0	3	0	0	2	1
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCSC-UC Santa Cruz	600 600	18 S:1	0	0	0	0	0	1	1	0	1	0	0
Chorizanthe robusta var. robusta robust spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	390 390	20 S:2	0	0	0	0	2	0	2	0	0	2	0
Cirsium fontinale var. campylon Mt. Hamilton thistle	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	250 2,800	36 S:13	2	8	0	0	0	3	4	9	13	0	0
Clarkia concinna ssp. automixa Santa Clara red ribbons	G5?T3 S3	None None	Rare Plant Rank - 4.3	300 3,000	20 S:10	0	1	0	0	0	9	10	0	10	0	0
Collinsia multicolor San Francisco collinsia	G2 S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	200 200	36 S:2	0	0	0	0	0	2	2	0	2	0	0
Dirca occidentalis western leatherwood	G2 S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	330 2,570	90 S:7	1	1	0	0	0	5	1	6	7	0	0

				Elev.		Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	G4T2 S2	Endangered None	Rare Plant Rank - 1B.1 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	250 1,700	59 S:30	11	9	3	3	0	4	10	20	30	0	0
Eryngium aristulatum var. hooveri Hoover's button-celery	G5T1 S1	None None	Rare Plant Rank - 1B.1 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	5 15	16 S:5	0	0	1	0	3	1	4	1	2	3	0
Extriplex joaquinana San Joaquin spearscale	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	6 6	127 S:2	0	1	0	0	0	1	1	1	2	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden USFS_S-Sensitive	600 1,000	82 S:5	0	0	3	0	0	2	3	2	5	0	0
Hoita strobilina Loma Prieta hoita	G2? S2?	None None	Rare Plant Rank - 1B.1	470 2,800	37 S:23	6	9	6	0	0	2	1	22	23	0	0
Lasthenia conjugens Contra Costa goldfields	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	10 110	36 S:4	0	2	0	0	2	0	2	2	2	0	2
Lessingia micradenia var. glabrata smooth lessingia	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_BerrySB-Berry Seed Bank SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	300 1,600	44 S:18	5	8	2	0	0	3	2	16	18	0	0
Malacothamnus arcuatus arcuate bush-mallow	G2Q S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	400 1,700	34 S:10	2	0	3	0	1	4	4	6	9	1	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Malacothamnus hallii Hall's bush-mallow	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	10 1,120	46 S:14	0	4	1	1	1	7	4	10	13	1	0
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2	450 3,200	68 S:20	3	9	1	0	1	6	4	16	19	1	0
Navarretia prostrata prostrate vernal pool navarretia	G2 S2	None None	Rare Plant Rank - 1B.2	10 10	61 S:2	0	2	0	0	0	0	0	2	2	0	0
Pedicularis dudleyi Dudley's lousewort	G2 S2	None Rare	Rare Plant Rank - 1B.2 SB_UCSC-UC Santa Cruz USFS_S-Sensitive		7 S:1	0	0	0	0	0	1	1	0	1	0	0
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	G4T2 S2	None None	Rare Plant Rank - 1B.2	3,000 3,000	6 S:1	0	0	0	0	0	1	1	0	1	0	0
Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	680 680	14 S:1	0	0	0	0	1	0	1	0	0	1	0
Piperia candida white-flowered rein orchid	G3? S3	None None	Rare Plant Rank - 1B.2	700 700	222 S:1	0	0	0	0	0	1	1	0	1	0	0
Puccinellia simplex California alkali grass	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	5 5	80 S:1	0	0	0	0	0	1	0	1	1	0	0
Sagittaria sanfordii Sanford's arrowhead	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	854 854	143 S:1	0	0	0	0	0	1	0	1	1	0	0
Sanicula saxatilis rock sanicle	G2 S2	None Rare	Rare Plant Rank - 1B.2	2,800 2,800	9 S:1	1	0	0	0	0	0	0	1	1	0	0
Senecio aphanactis chaparral ragwort	G3 S2	None None	Rare Plant Rank - 2B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden SB_CRES-San Diego Zoo CRES Native Gene Seed Bank		98 S:1	0	0	0	0	0	1	1	0	1	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Sidalcea malachroides maple-leaved checkerbloom	G3 S3	None None	Rare Plant Rank - 4.2	800 800	136 S:1	0	0	0	0	0	1	1	0	1	0	0
Streptanthus albidus ssp. albidus Metcalf Canyon jewelflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley	170 600	13 S:9	0	3	2	2	1	1	2	7	8	0	1
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley USFS_S-Sensitive	400 3,400	103 S:27	3	13	2	1	0	8	9	18	27	0	0
Suaeda californica California seablite	G1 S1	Endangered None	Rare Plant Rank - 1B.1	5 10	18 S:2	0	0	0	0	2	0	2	0	0	2	0
Trifolium buckwestiorum Santa Cruz clover	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden SB_UCSC-UC Santa Cruz SB_USDA-US Dept of Agriculture	800 800	64 S:1	0	0	0	0	0	1	0	1	1	0	0
Trifolium hydrophilum saline clover	G2 S2	None None	Rare Plant Rank - 1B.2	8 8	56 S:3	0	0	0	0	1	2	2	1	2	0	1

Search Results

65 matches found. Click on scientific name for details

Search Criteria: CRPR is one of [**1B:2A:2B:3:4**] Fed List is one of [**FE:FT:FC:FD:None**] **and** State List is one of [**CE:CT:CR:CE:CT:4:None**] , 9-Quad include [**3712128:3712127:3712137:3712138:3712147:3712241:3712221:3712231:3712148**]

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	GLOBAL RANK	STATE RANK	CA RARE PLANT RANK	PHOTO
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	annual herb	Mar-Jun	None	None	G4	S4	4.2	 © 2005 Barry Breckling
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	None	None	G3	S3	1B.2	 © 2011 Neal Kramer
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	None	None	G5? T3T4	S3S4	4.2	 © 2008 Aaron Schusteff
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	None	None	G4	S4	4.3	 © 2011 Neal Kramer
Arctostaphylos silvicola	Bonny Doon manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	None	None	G1	S1	1B.2	No Photo Available
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	None	None	G2T1	S1	1B.2	No Photo Available
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	 © 2009 Zoya Akulova
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	May-Oct	None	None	G2	S2	1B.1	

										 © 2000 Robert E. Preston, Ph.D.
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	None	None	G2	S2	1B.2	 ©1998 Dean Wm. Taylor
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	None	None	G4	S4	4.2	No Photo Available
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	Montiaceae	annual herb	May-Aug	None	None	G3G4T2	S2	1B.1	No Photo Available
Calystegia collina ssp. *venusta*	South Coast Range morning-glory	Convolvulaceae	perennial rhizomatous herb	Apr-Jun	None	None	G4T4	S4	4.3	No Photo Available
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	None	None	G2	S2	1B.2	No Photo Available
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	None	None	G3T2	S2	1B.1	No Photo Available
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	Agavaceae	perennial bulbiferous herb	May-Aug	None	None	G5T3	S3	1B.2	No Photo Available
Chloropyron maritimum ssp. *palustre*	Point Reyes salty bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Oct	None	None	G4?T2	S2	1B.2	 ©2017 John Doyen
Chorizanthe pungens var. *hartwegiana*	Ben Lomond spineflower	Polygonaceae	annual herb	Apr-Jul	FE	None	G2T1	S1	1B.1	No Photo Available
Chorizanthe robusta var. *robusta*	robust spineflower	Polygonaceae	annual herb	Apr-Sep	FE	None	G2T1	S1	1B.1	No Photo Available
Cirsium fontinale var. *campylon*	Mt. Hamilton thistle	Asteraceae	perennial herb	(Feb)Apr-Oct	None	None	G2T2	S2	1B.2	No Photo Available
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	None	None	G4	S4	4.2	No Photo Available
Clarkia concinna ssp. *automixa*	Santa Clara red ribbons	Onagraceae	annual herb	(Apr)May-Jun(Jul)	None	None	G5?T3	S3	4.3	No Photo Available
Clarkia lewisii	Lewis' clarkia	Onagraceae	annual herb	May-Jul	None	None	G4	S4	4.3	No Photo Available
Collinsia	San Francisco	Plantaginaceae	annual herb	(Feb)Mar-	None	None	G2	S2	1B.2	

multicolor	collinsia			May						No Photo Available
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	None	None	G4	S4	4.2	No Photo Available
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	perennial rhizomatous herb	Mar-Aug	None	None	G4	S4	4.2	 © 2013 Scot Loring
Dirca occidentalis	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	None	None	G2	S2	1B.2	 © 2017 Steve Matson
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	Crassulaceae	perennial herb	Apr-Oct	FE	None	G4T2	S2	1B.1	No Photo Available
Eleocharis parvula	small spikerush	Cyperaceae	perennial herb	(Apr)Jun-Aug(Sep)	None	None	G5	S3	4.3	 ©2018 Ron Vanderhoff
Eriogonum argillosum	clay buckwheat	Polygonaceae	annual herb	Mar-Jun	None	None	G3G4	S3S4	4.3	No Photo Available
Eriophyllum jepsonii	Jepson's woolly sunflower	Asteraceae	perennial herb	Apr-Jun	None	None	G3	S3	4.3	No Photo Available
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual/perennial herb	(Jun)Jul(Aug)	None	None	G5T1	S1	1B.1	No Photo Available
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.2	No Photo Available
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	None	None	G2	S2	1B.2	 © 2004 Carol W. Witham
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	Apr-Jul	None	None	G5T3	S3	4.2	 © 2021 Steve Matson
Hoita strobilina	Loma Prieta hoita	Fabaceae	perennial herb	May-Jul(Aug-Oct)	None	None	G2?	S2?	1B.1	

										 © 2004 Janell Hillman
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	Mar-May(Jun)	None	None	G3	S3	4.2	 © 2014 Aaron Schusteff
Isocoma menziesii var. *diabolica*	Satan's goldenbush	Asteraceae	perennial shrub	Aug-Oct	None	None	G3G5T3	S3	4.2	No Photo Available
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	FE	None	G1	S1	1B.1	 © 2013 Neal Kramer
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	annual herb	Mar-Jun	None	None	G4	S4	4.2	 © 2010 Aaron Schusteff
Leptosiphon aureus	bristly leptosiphon	Polemoniaceae	annual herb	Apr-Jul	None	None	G4?	S4?	4.2	 © 2007 Len Blumin
Leptosiphon grandiflorus	large-flowered leptosiphon	Polemoniaceae	annual herb	Apr-Aug	None	None	G3G4	S3S4	4.2	 © 2003 Doreen L. Smith
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	None	None	G2G3	S2S3	3	 © 2015 Aaron Schusteff
Lessingia micradenia var. *glabrata*	smooth lessingia	Asteraceae	annual herb	(Apr-Jun)Jul-Nov	None	None	G2T2	S2	1B.2	 © 2015 Aaron Schusteff
Lessingia tenuis	spring lessingia	Asteraceae	annual herb	May-Jul	None	None	G4	S4	4.3	 © 2020 Keir Morse
Lomatium parvifolium	small-leaved lomatium	Apiaceae	perennial herb	Jan-Jun	None	None	G3	S3	4.2	No Photo Available

Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial deciduous shrub	Apr-Sep	None	None	G2Q	S2	1B.2	 © 2017 Keir Morse
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial deciduous shrub	(Apr)May-Sep(Oct)	None	None	G2	S2	1B.2	 © 2017 Keir Morse
Mielichhoferia elongata	elongate copper moss	Mielichhoferiaceae	moss		None	None	G5	S3S4	4.3	 © 2012 John Game
Monolopia gracilens	woodland woollythreads	Asteraceae	annual herb	(Feb)Mar-Jul	None	None	G3	S3	1B.2	 © 2016 Richard Spellenberg
Navarretia prostrata	prostrate vernal pool navarretia	Polemoniaceae	annual herb	Apr-Jul	None	None	G2	S2	1B.2	No Photo Available
Pedicularis dudleyi	Dudley's lousewort	Orobanchaceae	perennial herb	Apr-Jun	None	CR	G2	S2	1B.2	No Photo Available
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	Plantaginaceae	perennial herb	May-Jun	None	None	G4T2	S2	1B.2	No Photo Available
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	Mar-May	FE	CE	G1	S1	1B.1	No Photo Available
Piperia candida	white-flowered rein orchid	Orchidaceae	perennial herb	(Mar)May-Sep	None	None	G3?	S3	1B.2	 ©2016 Barry Rice
Plagiobothrys chorisianus var. hickmanii	Hickman's popcornflower	Boraginaceae	annual herb	Apr-Jun	None	None	G3T3Q	S3	4.2	No Photo Available
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	None	None	G2	S2	1B.2	No Photo Available

Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	G3	S3	1B.2	 ©2013 Debra L. Cook
Sanicula saxatilis	rock sanicle	Apiaceae	perennial herb	Apr-May	None	CR	G2	S2	1B.2	 © 1998 John Game
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	None	None	G3	S2	2B.2	No Photo Available
Sidalcea malachroides	maple-leaved checkerbloom	Malvaceae	perennial herb	(Mar)Apr-Aug	None	None	G3	S3	4.2	 ©2005 Dean Wm. Taylor
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	Brassicaceae	annual herb	Apr-Jul	FE	None	G2T1	S1	1B.1	Photo of Streptanthus albidus ssp. albidus © 2015 Aaron Schusteff
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	None	None	G2T2	S2	1B.2	 © 1994 Robert E. Preston, Ph.D.
Suaeda californica	California seablite	Chenopodiaceae	perennial evergreen shrub	Jul-Oct	FE	None	G1	S1	1B.1	No Photo Available
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	Apr-Oct	None	None	G2	S2	1B.1	No Photo Available
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	G2	S2	1B.2	No Photo Available

Showing 1 to 65 of 65 entries

Suggested Citation:
California Native Plant Society, Rare Plant Program. 2022. Rare Plant Inventory (online edition, v9-01 1.5). Website https://www.rareplants.cnps.org [accessed 1 November 2022].

Appendix C: Arborist Report

ARBORIST REPORT

September 15, 2022
6012.10

PROJECT
651 Martin Ave.
Santa Clara, CA

PREPARED FOR
Retained Vantage Data Centers, LP

PREPARED BY
HMH
1570 Oakland Road
San Jose, CA 95131
William Sowa
ISA Certified Arborist #WE-12270A

TABLE OF CONTENTS

INTRODUCTION AND OVERVIEW

HMH was contracted to complete a survey, assessment and arborist report for trees located within the limit of work illustrated on Exhibit A. The project site encompasses approximately 7.12 acres. It is a commercial property with much of the land used for parking. There are commercial/industrial parcels to the north, south and west of the site. To the east are Southern Pacific Railroad tracks. Our scope of services includes locating, measuring DBH, assessing, and photographing the condition of all trees within the limit of work. Disposition and health recommendations are based on current site conditions. Site development/design may affect the preservation suitability. In addition, trees located outside the limit of work may be included if they may potentially be impacted by development of the site. These trees will not be measured, nor health assessed due to limited access. Tree locations are approximate, and their exact location should be determined by a licensed land surveyor. It should not be assumed that all trees inventoried are owned by the property owner. Check city and/or county codes for regulations regarding trees in the public right of way, setbacks, and/or easements.

METHODOLOGY

Our tree survey work is a deliberate and systematic methodology for cataloging trees on site:

1. Identify each tree species.
2. Note each tree's location on a site map.
3. Measure each trunk circumference at 4.5' above grade per ISA standards.
4. Evaluate the health and structure of each tree using the following numerical standard:
   __5__ - A healthy, vigorous tree, reasonably free of disease, with good structure and form typical of the species.

   __4__ - A tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.

   __3__ - A tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that may be mitigated with care.

   __2__ - A tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.

   __1__ - A tree in severe decline, dieback of scaffold branches and or trunk, mostly epicormic growth; extensive structural defects that cannot be abated.

   0 - Tree is dead.

SUMMARY OF FINDINGS

HMH conducted a tree inventory of 33 trees located within the limit of work outlined in Exhibit A. One (1) of the trees inventoried is classified as a protected tree under the City of Santa Clara Code of Ordinances.

A protected tree is:

1. Heritage Trees in all zoning districts.
2. All specimen trees with a diameter of twelve (12) inches or more when measured at fifty-four (54) inches above natural grade of the following species on private property:
   a. Aesculus californica (California Buckeye);
   b. Acer macrophyllum (Big Leaf Maple);
   c. Cedrus deodara (Deodar Cedar);
   d. Cedrus atlantica 'Glauca' (Blue Atlas Cedar);
   e. Cinnamomum camphora (Camphor Tree);
   f. Platanus racemosa (Western Sycamore).

   g. Quercus (native oak tree species), including:
      i. Quercus agrifolia (Coast Live Oak);
      ii. Quercus lobata (Valley Oak);
      iii. Quercus kelloggii (Black Oak);
      iv. Quercus douglasii (Blue Oak);
      v. Quercus wislizeni (Interior Live Oak);
   h. Sequoia sempervirens (Coast Redwood); and
   i. Umbellularia californica (Bay Laurel or California Bay);
3. Approved development trees.
4. A private tree which has a trunk with a diameter of thirty-eight (38) inches or more measured at fifty-four (54) inches above natural grade.
5. A multi-branched private tree which has major branches below fifty-four (54) inches above the natural grade with a diameter of thirty-eight (38) inches or more measured just below the first major trunk fork.

The trees on the site were generally not in great condition. There is a row of ash and redwood trees along the west side of the property, on the adjacent property. All the trees along the other sides of the property appear to be volunteer trees, not deliberately planted.

Table 1 - Tree Quantity Summary summarizes tree quantities by both species and size. Each species that was inventoried as part of this scope is included. This is a useful tool for analyzing the mixture of trees as part of the project. The size table is useful when calculating mitigation requirements in the case of tree removal as well as aiding in determining tree maturity.

Table 2 - Tree Evaluation Summary lists each tree number, botanical name, common name, DBH, circumference, ordinance trees, health rating, preservation suitability, general notes and observations and recommendations.

See Exhibit A for Existing Tree Locations
See Table 1 for Tree Quantity Summary by species and size.
See Table 2 for Tree Evaluation Summary for sizes, notes and recommendations regarding each tree.

GENERAL OBSERVATIONS AND RECOMMENDATIONS

Species: *Ailanthus altissima* (Tree of Heaven)
Quantity: 1
Tree Number: 27
Observations / Recommendations:
The Tree of Heaven is growing within the canopy of the Peruvian Peppertree outside the perimeter fence. It is leaning over the fence struggling to get light. *Ailanthus altissima* is classified as an invasive species by the California Invasive Plant Council due to its prolific habit of self-seeding. It can grow to be a large tree with creeping roots. This tree should be removed due to it’s invasive nature.

Species: *Juglans nigra* (Black Walnut)
Quantity: 1
Tree Number: 10

Observations / Recommendations:

There is a Black Walnut growing on the edge of the property that is in moderate shape and health. It is multi trunk with codominant trunks. There is also included bark at the union, which can increase the likelihood of failure. There are also some structural defects as well as exposed heartwood.

Species: *Olea europaea (Olive*)
Quantity: 2
Tree Number: 14 & 28
Observations / Recommendations:

There are 2 multi-trunk Olive trees growing along the perimeter of the property. They are both growing crowded by the perimeter fence. Tree 28 is crowded by a building as well. Similar to all the trees growing around the perimeter, they are not in the best condition and appear to be volunteers. They are conflicting with the perimeter fence.

Species: *Podocarpus gracilior (Fern Pine*)
Quantity: 7
Tree Number: 2, 4, 5, 6, 7, 8 & 9
Observations / Recommendations:

The Fern Pines are in moderate shape and health. They are all growing very close to the existing building and have not developed a proper canopy and are very one-sided because of this. Because of their close proximity to the building, if the existing building is going to be renovated or removed, the Fern Pines would need to be removed.

Species: *Rhamnus californica (Coffeeberry*)
Quantity: 8
Tree Number: 15, 24, 25, 29, 30, 31, 32, & 33
Observations / Recommendations:

There are several Coffeeberries around the perimeter of the property. Trees 24 & 29 are completely dead. The other trees are in fairly poor condition. They appear to be volunteer shrubs that have grown into tree size. They are all crowded along the perimeter fence.

Species: *Schinus molle (Peruvian Peppertree*)
Quantity: 1
Tree Number: 26
Observations / Recommendations:

There is a very large Peruvian Peppertree growing at the back of the property in moderate shape and health. The tree has structural defects and is crowded by the perimeter fence. *Schinus molle* is classified as a mildly invasive species by the California Invasive Plant Council. It is always recommended to remove invasive species, but if the tree is required for preservation, structural pruning is recommended.

Species: *Syagrus romanzoffiana (Queen Palm*)
Quantity: 1
Tree Number: 3
Observations / Recommendations:

There is a Queen Palm in moderate shape and health growing close to the existing building. Similar to the Fern Pines, if the existing building is going to be renovated or removed, the Queen Palm may be difficult to retain.

Species: *Washingtonia filifera (California Fan Palm*)
Quantity: 12
Tree Number: 1, 11, 12, 13, 16, 17, 18, 19, 20, 21, 22, & 23
Observations / Recommendations:
The largest quantity of trees are the California Fan Palms. They are all dead or growing in problematic locations and they are all recommended for removal. Tree 1 is growing very close to the street and underneath powerlines. If it is allowed to continue growing it will eventually conflict with the powerlines. The removal of this tree would need to be coordinated with the city because it is most likely located in the right of way. Trees 11, 12, 13, 16, 17, 19, 20, 22, & 23 are all dead and should be removed. Trees 18 and 21 are recommended for removal because they growing within a cluster of dead trees and are crowded near the perimeter fence and an adjacent building.

RECOMMENDATIONS FOR TREE PROTECTION DURING CONSTRUCTION

Site preparation: All existing trees shall be fenced within or at the drip line (foliar spread) of the tree. Depending on the location of the tree the fencing may not be able to be at the dripline. Examples of this would be public right of way, near property lines or around existing structures to remain. Where complete drip line fencing is not possible, the addition of straw waddles and orange snow fencing wrapping the trunk shall be installed per the tree protection detail. The fence should be a minimum of six feet high, made of galvanized 11-gauge wire mesh with galvanized posts or any material superior in quality. A tree protection zone (TPZ) sign shall be affixed to fencing at appropriate intervals as determined by the arborist on site. See tree protection detail for additional information, including tree protection zone sign. If the fence is within the drip line of the trees, the foliar fringe shall be raised to offset the chance of limb damage from active construction.

Active Construction: All contractors, subcontractors and other personnel shall be warned that encroachment within the fenced area and dripline is prohibited without the consent of the certified arborist on the job. This includes, but is not limited to, storage of lumber and other materials, disposal of paints, solvents or other noxious materials, parked cars, grading equipment or other heavy equipment. If construction activity needs to happen in the TPZ the fence can be moved temporarily for delivery of construction materials. The contractor should make accommodations to off load items such as trusses, timber, plasterboard, wallboard, concrete, gypsum board, flooring, roofing or any other heavy construction material outside the foliar spread of the tree so there is no heavy equipment needed that could cause damage to the canopy of the tree or compact the root zone. The tree protection fencing should be reestablished per the plans and details immediately after any activity through the TPZ. Penalties, based on the cost of remedial repairs and the evaluation guide published by the international society of arboriculture, shall be assessed for damages to the trees.

Grading/excavating: All grading plans that specify grading within the drip line of any tree, or within the distance from the trunk as outlined in the site preparation section above when said distance is outside the drip line, shall first be reviewed by a certified arborist. Provisions for aeration, drainage, pruning, tunneling beneath roots, root pruning or other necessary actions to protect the trees shall be outlined by an arborist. If trenching is necessary within the area as described above, said trenching shall be undertaken by hand labor and dug directly beneath the trunk of the tree. All roots 2 inches or larger shall be tunneled under and other roots shall be cut smoothly to the trunk side of the trench. The trunk side should be draped immediately with two layers of untreated burlap to a depth of 3 feet from the surface. The burlap shall be soaked nightly and left in place until the trench is back filled to the original level. An arborist shall examine the trench prior to back filling to ascertain the number and size of roots cut, so as to suggest the necessary remedial repairs.

Remedial repairs: An arborist shall have the responsibility of observing all ongoing activities that may affect the trees and prescribing necessary remedial work to ensure the health and stability of the trees. This includes, but is not limited to, all arborist activities brought out in the previous sections. In addition, pruning, as outlined in International Society of Arboriculture Best Management Practices: Pruning and ANSI A300 Part 1 Standard Practices: Pruning, shall be prescribed as necessary. Fertilizing, aeration, irrigation, pest control and other activities shall be prescribed according to the tree needs, local site requirements, and state agricultural pest control laws. All specifications shall be in writing. For pest control operations, consult the local county agricultural commissioner's office for individuals licensed as pest control advisors or pest control operators.

Final inspection: Upon completion of the project, the arborist shall review all work undertaken that may impact the existing trees. Special attention shall be given to cuts and fills, compacting, drainage, pruning and future remedial work. An arborist should submit a final report in writing outlining the ongoing remedial care following the final inspection.

MAINTENANCE RECOMMENDATIONS FOR TREES TO REMAIN

Regular maintenance, designed to promote plant health and vigor, ensures longevity of existing trees. Regular inspections and the necessary follow-up care of mulching, fertilizing, and pruning, can detect problems and correct them before they become damaging or fatal.

Tree Inspection: Regular inspections of mature trees at least once a year can prevent or reduce the severity of future disease, insect, and environmental problems. During tree inspection, four characteristics of tree vigor should be examined: new leaves or buds, leaf size, twig growth, and absence of crown dieback (gradual death of the upper part of the tree). A reduction in the extension of shoots (new growing parts), such as buds or new leaves, is a fairly reliable cue that the tree's health has recently changed. Growth of the shoots over the past three years may be compared to determine whether there is a reduction in the tree's typical growth pattern. Further signs of poor tree health are trunk decay, crown dieback, or both. These symptoms often indicate problems that began several years before. Loose bark or deformed growths, such as trunk conks (mushrooms), are common signs of stem decay. Any abnormalities found during these inspections, including insect activity and spotted, deformed, discolored, or dead leaves and twigs, should be noted and observed closely.

Mulching: Mulch, or decomposed organic material, placed over the root zone of a tree reduces environmental stress by providing a root environment that is cooler and contains more moisture than the surrounding soil. Mulch can also prevent mechanical damage by keeping machines such as lawn mowers and string trimmers away from the tree's base. Furthermore, mulch reduces competition from surrounding weeds and turf. To be most effective, mulch should be placed 2 to 4 inches deep and cover the entire root system, which may be as far as 2 or 3 times the diameter of the branch spread of the tree. If the area and activities happening around the tree do not permit the entire area to be mulched, it is recommended that as much of the area under the drip line of the tree is mulched as possible. When placing mulch, care should be taken not to cover the actual trunk of the tree. This mulch-free area, 1 to 2 inches wide at the base, is sufficient to avoid moist bark conditions and prevent trunk decay. An organic mulch layer 2 to 4 inches deep of loosely packed shredded leaves, pine straw, peat moss, or composted wood chips is adequate. Plastic should not be used as it interferes with the exchange of gases between soil and air, which inhibits root growth. Thicker mulch layers, 5 to 6 inches deep or greater, may also inhibit gas exchange.

Fertilization: Trees require certain nutrients (essential elements) to function and grow. Urban landscape trees may be growing in soils that do not contain sufficient available nutrients for satisfactory growth and development. In certain situations, it may be necessary to fertilize to improve plant vigor. Fertilizing a tree can improve growth; however, if fertilizer is not applied wisely, it may not benefit the tree at all and may even adversely affect the tree. Mature trees making satisfactory growth may not require fertilization. When considering supplemental fertilizer, it is important to consider nutrients deficiencies and how and when to amend the deficiencies. Soil conditions, especially pH and organic matter content, vary greatly, making the proper selection and use of fertilizer a somewhat complex process. To that end, it is recommended that the soil be tested for nutrient content. A soil testing laboratory and can give advice on application rates, timing, and the best blend of fertilizer for each tree and other landscape plants on site. Mature trees have expansive root systems that extend from 2 to 3 times the size of the leaf canopy. A major portion of actively growing roots is located outside the tree's drip line. Understanding the actual size and extent of a tree's root system before applying fertilizer is paramount to determine quantity, type and rate at which to best apply fertilizer. Always follow manufacturer recommendations for use and application.

Pruning: Pruning is often desirable or necessary to remove dead, diseased, or insect-infested branches and to improve tree structure, enhance vigor, or maintain safety. Because each cut has the potential to change the growth of (or cause damage to) a tree, no branch should be removed without reason. Removing foliage from a tree has two distinct effects on growth: (1) it reduces photosynthesis and, (2) it may reduce overall growth. Pruning should always be performed sparingly. Caution must be taken not to over-prune as a tree may not be able to gather and process enough sunlight to survive. Pruning mature trees may require special equipment, training, and experience. Licensed and insured tree maintenance companies are equipped to provide a variety of services to assist in performing the job safely and reducing risk of personal injury and property damage and should be consulted for this type of work. *(See also ANSI A300 Part 1 Pruning Standards- https://www.tcia.org).*

Planting and Irrigation: Any new planting and irrigation that is to occur under the drip line of an existing tree should be conducted with care to avoid the root system. Generally installation of an irrigation mainline should be avoided under the dripline of the existing tree. Refer to the Grading/Excavating section for installation of any irrigation lines to be installed under the drip line of an existing tree. Any new planting should match the water use of the existing tree (as defined by WUCOLS). The irrigation hydro zone for the new planting should also match the requirements of the existing tree.

Removal: There are circumstances when removal is necessary. An arborist can help decide whether or not a tree should be removed. Professionally trained arborists have the skills and equipment to safely and efficiently remove trees. Removal is recommended when a tree: (1) is dead, dying, or considered irreparably hazardous; (2) is causing an obstruction or is crowding and causing harm to other trees and the situation is impossible to correct through pruning; (3) is to be replaced by a more suitable specimen, and; (4) should be removed to allow for construction. Pruning or removing trees, especially large trees, can be dangerous work. It should be performed only by those trained and equipped to work safely in trees.

TERMS AND CONDITIONS

The following terms and conditions apply to all oral and written reports and correspondence pertaining to consultations, inspections and activities of HMH.

1. The scope of any report or other correspondence is limited to the trees and conditions specifically mentioned in those reports and correspondence. HMH assumes no liability for the failure of trees or parts of trees, either inspected or otherwise. HMH assumes no responsibility to report on the condition of any tree or landscape feature not specifically requested by the named client.
2. No tree described in this report was climbed, unless otherwise stated. HMH does not take responsibility for any defects, which could have only been discovered by climbing. A full root collar inspection, consisting of excavating the soil around the tree to uncover the root collar and major buttress roots was not performed unless otherwise stated. HMH does not take responsibility for any root defects, which could only have been discovered by such an inspection.
3. HMH shall not be required to provide further documentation, give testimony, be deposed, or attend court by reason of this appraisal or report unless subsequent contractual arrangements are made, including payment of additional fees for such services as described by HMH or in the schedule of fees or contract.
4. HMH guarantees no warrantee, either expressed or implied, as to the suitability of the information contained in the reports for any reason. It is the responsibility of the client to determine applicability to his/her case.
5. Any report and the values, observations and recommendations expressed therein represent the professional opinion of HMH, and the fee for services is in no manner contingent upon the reporting of a specified value nor upon any particular finding to be reported.
6. Any photographs, diagrams, graphs, sketches or other graphic material included in any report, being intended solely as visual aids, are not necessarily to scale and should not be construed as engineering reports or surveys, unless otherwise noted in the report. Any reproductions of graphic material or the work produced by other persons, is intended solely for clarification and ease of reference. Inclusion of said information does not constitute a representation by HMH as to the sufficiency or accuracy of that information.
7. 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 all trees.

Existing Tree Map
Exhibit A

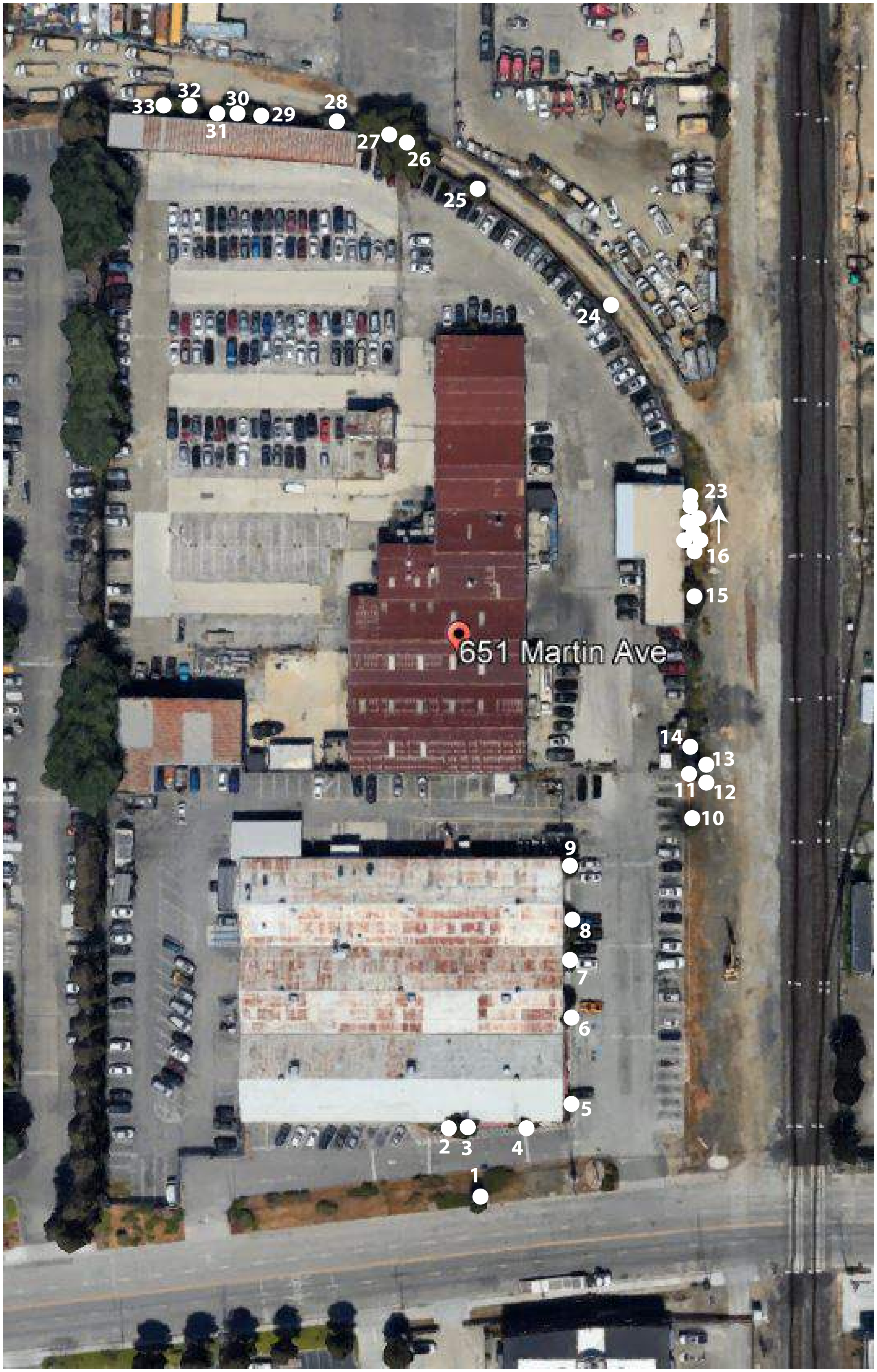


TABLE 1 - TREE QUANTITY SUMMARY

Tree Quantity by Species		
Species	**Quantity**	**% of Site**
Ailanthus altissima	1	3%
Juglans nigra	1	3%
Olea europaea	2	6%
Podocarpus gracilior	7	21%
Rhamnus californica	8	24%
Schinus molle	1	3%
Syagrus romanzoffiana	1	3%
Washingtonia filifera	12	36%
Total Trees	**33**	**100%**

TABLE 2 - TREE EVALUATION SUMMARY

Prepared By: William Sowa ISA Certified Arborist WE-12270A

DBH MEASUREMENT HEIGHT: 54"

Date of Evaluation: 9/12/2022 & 9/14/2022

Suitability for Preservation is based on the following

Good - Trees with good health and structural stability that have the potential for longevity at the site.

Moderate - Trees in somewhat declining health and/or exhibits structural defects that cannot be abated with treatment. Trees will require more intense management and will have a shorter lifespan than those in the 'Good' category.

Poor - Trees in poor health or with significant structural defects that cannot be mitigated. Tree is expected to decline, regardless of treatment.

Health Rating

5	A healthy, vigorous tree, reasonably free of disease, with good structure and form typical of the species.
4	A tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.
3	A tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that may that might be mitigated with care.
2	A tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.
1	A tree in severe decline, dieback of scaffold branches and or trunk, mostly epicormic growth; extensive structural defects that cannot be abated.
0	Tree is dead.

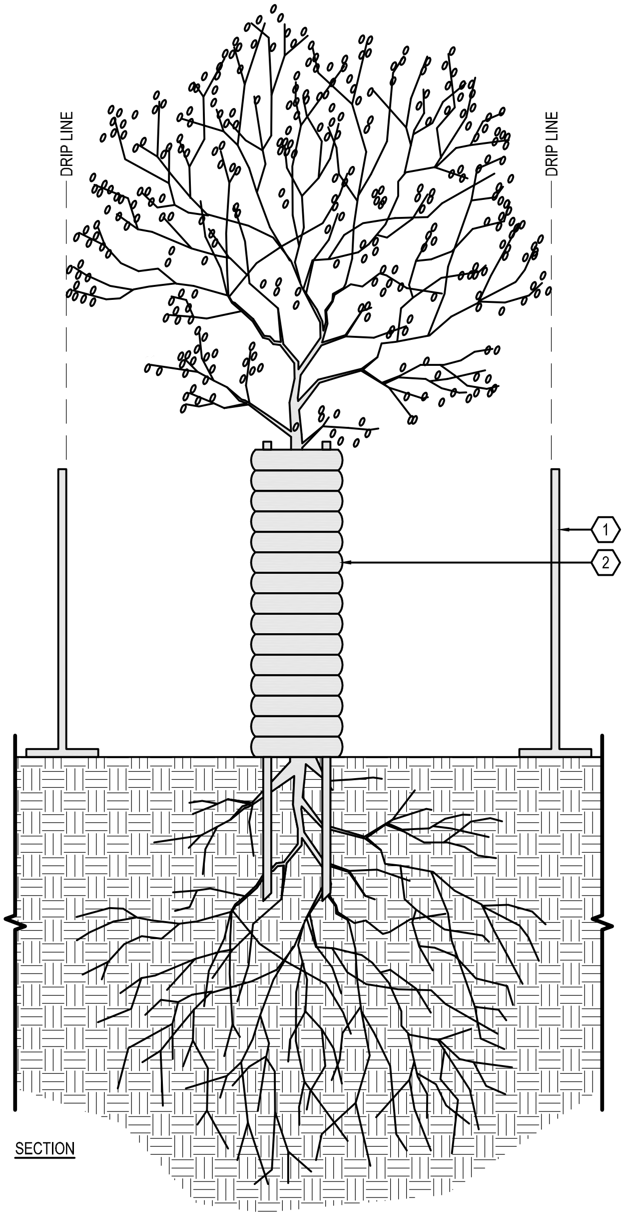
Abbreviations and Definitions

CD	Codominant branches	Forked branches nearly the same size in diameter, arising from a common junction an lacking a normal branch union.
CDB	Dieback in Crown	Condition where branches in the tree crown die from the tips toward the center.
CR	Crowded	Tree is bounded closely by one or more of the following: structure, tree, Etc.
D	Decline	Tree shows obvious signs of decline, which may be indicative of the presence of multiple biotic and abiotic disorders.
DBH	Diameter at Breast Height	Measurement of tree diameter in inches. Measurement height varies by City and is noted above.
EG	Epicormic Growth	Watersprouting on trunk and main leaders. Typically indicative of tree stress.
EH	Exposed Heartwood	Exposure of the tree's heartwood is typically seen as an open wound that leaves a tree more susceptible to pathogens, disease or infection.
H	Hazardous	A tree that in it's current condition, presents a hazard.
HD	Headed	Poor pruning practice of cutting back branches. Often practiced under utility lines to limit tree height.
IB	Included Bark	Structural defect where bark is included between the branch attachment so the wood can't join. Such defect can have a higher probability of failure.
LN	Leaning Tree	Tree leaning, see notes for severity.
MT	Multi Trunk	Multiple central leaders originating below the DBH measurement.
PT	Phototropism	Tree exhibits phototropic growth habits. Reduced trunk taper, misshapen trunk and canopy growth are examples of this growth habit.
S	Suckers	Shoot arising from the roots.
SD	Structural Defects	Naturally or secondary conditions including cavities, poor branch attachments, cracks, or decayed wood in any part of the tree that may contribute to structural failure.
SE	Severe	Indicates the severity of the following term.
SL	Slight	Indicates the mildness of the following term.
SR	Surface Roots	Roots visible at finished grade.
ST	Stress	Environmental factor inhibiting regular tree growth. Includes drought, salty soils, nitrogen and other nutrient deficiencies in the soil.
WU	Weak Union	Weak union or fork in tree branching structure.

	Protected Tree	1. Heritage Trees in all zoning districts. 2. All specimen trees with a diameter of twelve (12) inches or more when measured at fifty-four (54) inches above natural grade of the following species on private property: a.Aesculus californica (California Buckeye); b.Acer macrophyllum (Big Leaf Maple); c.Cedrus deodara (Deodar Cedar); d.Cedrus atlantica 'Glauca' (Blue Atlas Cedar); e.Cinnamomum camphora (Camphor Tree); f.Platanus racemosa (Western Sycamore). g.Quercus (native oak tree species), including: i.Quercus agrifolia (Coast Live Oak); ii.Quercus lobata (Valley Oak); iii.Quercus kelloggii (Black Oak); iv.Quercus douglasii (Blue Oak); v.Quercus wislizeni (Interior Live Oak); h.Sequoia sempervirens (Coast Redwood); and i.Umbellularia californica (Bay Laurel or California Bay); 3. Approved development trees. 4. A private tree which has a trunk with a diameter of thirty-eight (38) inches or more measured at fifty-four (54) inches above natural grade. 5. A multi-branched private tree which has major branches below fifty-four (54) inches above the natural grade with a diameter of thirty-eight (38) inches or more measured just below the first major trunk fork.

TREE #	BOTANICAL NAME	COMMON NAME	DBH (INCHES)	CIRCUMF-ERENCE (INCHES)	PROTECTED TREE	HEALTH	PRESERVATION SUITABILITY	NOTES
1	*Washingtonia filifera*	California Fan Palm	21.8	68	NO	3	Moderate	Volunteer, CR street, CR powerlines
2	*Podocarpus gracilior*	Fern Pine	8.8	28	NO	3	Moderate	CR Building
3	*Syagrus romanzoffiana*	Queen Palm	11.7	37	NO	3	Moderate	CR Building
4	*Podocarpus gracilior*	Fern Pine	9.8	31	NO	3	Moderate	CR Building
5	*Podocarpus gracilior*	Fern Pine	8.0	25	NO	3	Moderate	CR Building
6	*Podocarpus gracilior*	Fern Pine	10.3	32	NO	3	Moderate	CR Building
7	*Podocarpus gracilior*	Fern Pine	7.7	24	NO	3	Moderate	CR Building
8	*Podocarpus gracilior*	Fern Pine	10.1	32	NO	3	Moderate	CR Building
9	*Podocarpus gracilior*	Fern Pine	9.0	28	NO	3	Moderate	CR Building
10	*Juglans nigra*	Black Walnut	17.4	55	NO	3	Moderate	MT, CD, SD, EHW, IB
11	*Washingtonia filifera*	California Fan Palm	19.1	60	NO	0	Poor	Dead, old tag #265
12	*Washingtonia filifera*	California Fan Palm	21.6	68	NO	0	Poor	Dead, old tag #267
13	*Washingtonia filifera*	California Fan Palm	18.7	59	NO	0	Poor	Dead, old tag #266
14	*Olea europaea*	Olive	12.0	38	NO	2	Moderate	MT, CR fence, CR powerlines
15	*Rhamnus californica*	Coffeeberry	13.0	41	NO	2	Moderate	CR fence, CDB
16	*Washingtonia filifera*	California Fan Palm	14.0	44	NO	0	Poor	Dead
17	*Washingtonia filifera*	California Fan Palm	13.5	42	NO	0	Poor	Dead
18	*Washingtonia filifera*	California Fan Palm	15.3	48	NO	1	Poor	CR by dead Washingtonias, CR fence, CR building
19	*Washingtonia filifera*	California Fan Palm	15.5	49	NO	0	Poor	Dead
20	*Washingtonia filifera*	California Fan Palm	15.7	49	NO	0	Poor	Dead
21	*Washingtonia filifera*	California Fan Palm	13.0	41	NO	1	Poor	CR by dead Washingtonias, CR fence, CR building

TREE #	BOTANICAL NAME	COMMON NAME	DBH (INCHES)	CIRCUMF-ERENCE (INCHES)	PROTECTED TREE	HEALTH	PRESERVATION SUITABILITY	NOTES
22	*Washingtonia filifera*	California Fan Palm	12.5	39	NO	0	Poor	Dead
23	*Washingtonia filifera*	California Fan Palm	12.5	39	NO	0	Poor	Dead
24	*Rhamnus californica*	Coffeeberry	13.5	42	NO	0	Poor	Dead
25	*Rhamnus californica*	Coffeeberry	24.0	75	NO	1	Poor	MT, CDB, CR fence
26	*Schinus molle*	Peruvian Peppertree	39.5	124	YES	3	Moderate	SD, CR fence
27	*Ailanthus altissima*	Tree of Heaven	7.7	24	NO	2	Poor	PT, CR by Tree 26, CR by Fence, LN
28	*Olea europaea*	Olive	9.8	31	NO	2	Poor	MT, CR between fence and structure
29	*Rhamnus californica*	Coffeeberry	16.3	51	NO	0	Poor	Dead
30	*Rhamnus californica*	Coffeeberry	12.3	39	NO	2	Poor	CR fence - growing through fence, MT
31	*Rhamnus californica*	Coffeeberry	16.3	51	NO	2	Poor	CR fence and structure
32	*Rhamnus californica*	Coffeeberry	7.2	23	NO	2	Poor	CR fence
33	*Rhamnus californica*	Coffeeberry	8.9	28	NO	1	Poor	D, CR fence



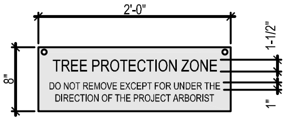
SECTION

NOTES:

1. REFER TO THE TREE PROTECTION NOTES.
2. TREE PROTECTION MEASURES SHALL BE INSTALLED BEFORE GRADING OR EQUIPMENT IS ALLOWED ON SITE.
3. PRIOR TO CONSTRUCTION, SEE THE REMEDIAL REPAIRS SECTION TO DETERMINE FERTILIZING AND WATERING SCHEDULES FOR EXISTING TREES.
4. WHEN CONSTRUCTION IS TO TAKE PLACE WITHIN A TREE'S DRIP LINE, SEE SITE PREPARATION SECTION.
5. NO CONSTRUCTION WASTE, EITHER LIQUID, SOLID, OR ANY OTHER SUBSTANCE WHICH COULD ENTER INTO THE ROOT SYSTEM (OIL, GASOLINE, CHEMICALS, OR OTHER HARMFUL MATERIALS) SHALL BE DEPOSITED, DISPOSED OF, OR STORED WITHIN OR NEAR A TREE'S DRIP LINE.
6. WIRE, SIGNS, ROPES, PULLEYS, ETC., SHALL NOT BE ATTACHED TO ANY TREE.
7. IF TRENCHING WITHIN A TREE'S DRIP LINE IS NECESSARY, SEE GRADING/EXCAVATION SECTION.
8. IF TREE PRUNING IS NECESSARY, SEE REMEDIAL REPAIRS SECTION.
9. INSTALL ONE SIGN TO DRIP LINE FENCING PER AREA.
10. SEE TREE PROTECTION ZONE (TPZ) INSTRUCTIONS UNDER SITE PREPARATION SECTION.

1 6'-0" HIGH TEMPORARY CHAIN LINK FENCE, INSTALLED AT DRIP LINE. SEE TREE PROTECTION PLAN FOR LOCATIONS. PREFERENCE WOULD BE AT DRIP LINE OR FOLLOW LOCAL CODES.

2 INSTALL TRUNK WRAP IF DRIP LINE FENCE IS NOT PRACTICAL, INSTALL FOUR (4) LODGE POLES AROUND EACH TREE, WRAP TRUNK IN STRAW WADDLE, THEN WRAP IN ORANGE SNOW FENCING UP TO BRANCHING STRUCTURE



SIGN
SCALE: 1" = 1'-0"

TREE PROTECTION

SCALE: 1/2" = 1'-0"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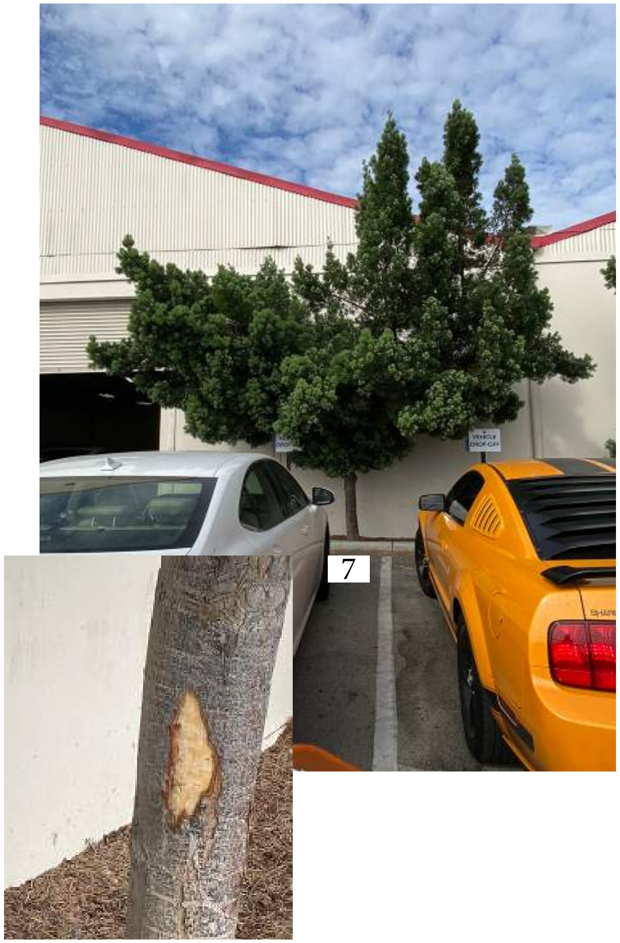

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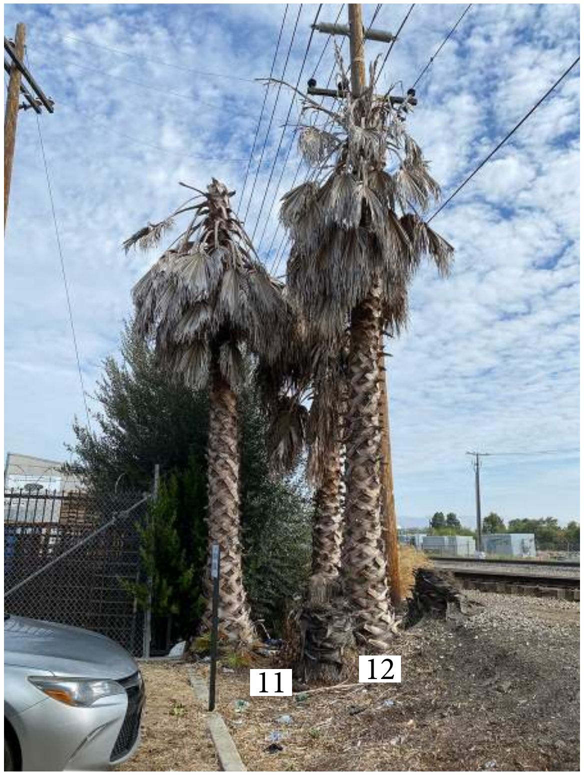
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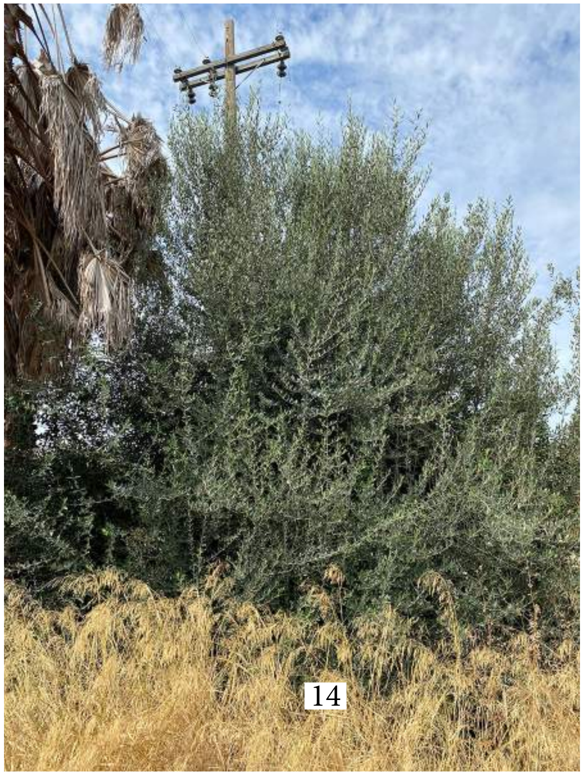
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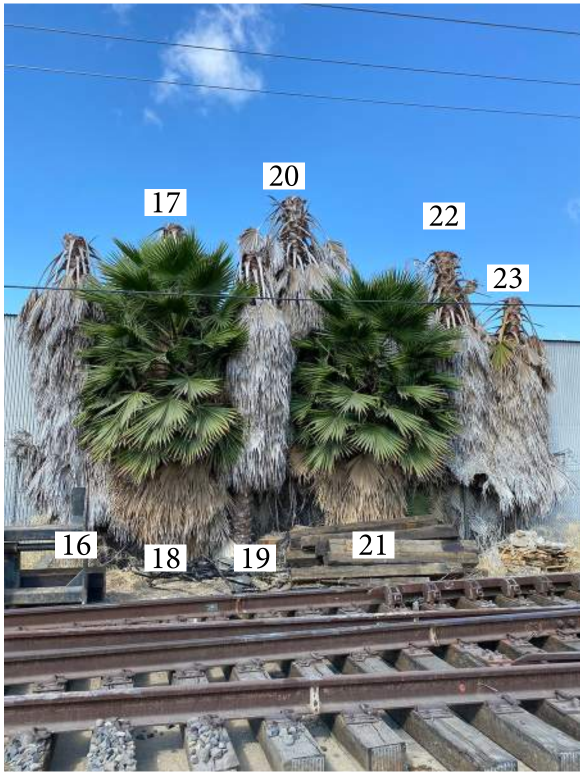
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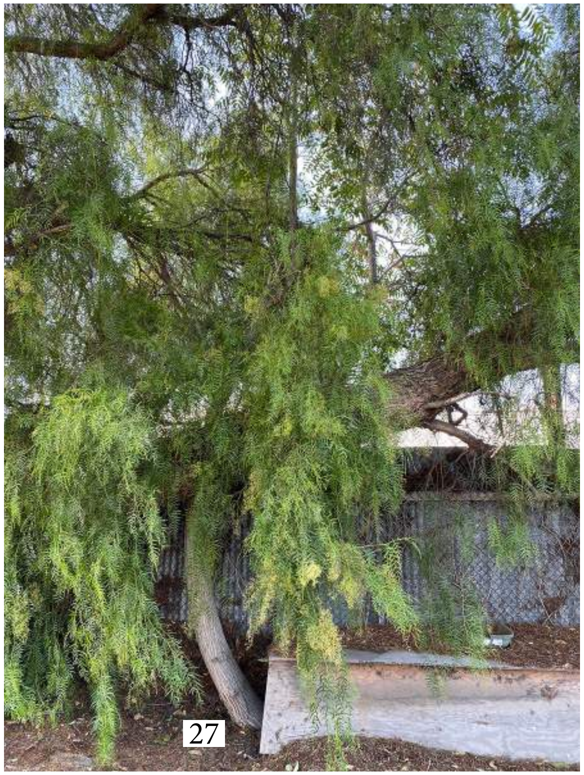
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APPENDIX D

Geotechnical Investigation

CORNERSTONE
EARTH GROUP

TYPE OF SERVICES Geotechnical Investigation

PROJECT NAME 651 Martin Avenue Data Center

LOCATION 651 Martin Avenue
Santa Clara, California

CLIENT Lake Street Ventures

PROJECT NUMBER 1290-2-1

DATE September 24, 2021

GEOTECHNICAL

CORNERSTONE
EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**651 Martin Avenue Data Center**
Location	**651 Martin Avenue** **Santa Clara, California**
Client	**Lake Street Ventures**
Client Address	**800 Oak Grove, #210** **Menlo Park, California**
Project Number	**1290-2-1**
Date	**September 24, 2021**

Prepared by

Stephen C. Ohlsen, P.E.
Project Engineer
Geotechnical Project Manager

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Maura Ruffatto

Maura F. Ruffatto, P.E.
Senior Project Engineer
Quality Assurance Reviewer

TABLE OF CONTENTS

Type of Services	**Geotechnical Investigation**
Project Name	**651 Martin Avenue Data Center**
Location	**651 Martin Avenue Santa Clara, California**

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Lake Street Ventures for the 651 Martin Avenue Data Center project in Santa Clara, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- An unauthored site plan titled “CA-G Option 2,” dated August 19, 2021.

1.1 PROJECT DESCRIPTION

The project site is located at 651 Martin Avenue in Santa Clara, California. We understand that the project is still in the early development and consideration phase but will include redeveloping the approximately 7-acre site for a new data center and substation. Based on our review of the provided site plan and conversations with you, the new data center will likely include a four-story building totaling about 483,000 square feet with a dedicated substation. We understand the building will likely include four levels of data banks. A generator yard will be located along the east side of the proposed building. The substation is currently shown on the southern side of the side along Martin Avenue. Appurtenant parking, utilities, landscaping and other improvements necessary for site development are also planned.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated June 23, 2021 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of eight borings drilled on August 23, 25, 26, and 30, 2021 with truck-mounted, hollow-stem auger drilling equipment and six Cone Penetration Tests (CPTs) advanced on July 20 and 21, 2021. The borings were drilled to depths of about 30 to 81 feet; the CPTs were advanced to depths of 80 to 120 feet. Seismic shear wave velocity measurements were collected from CPT-1 and CPT-6. Four of the borings (Borings EB-1 through EB-4) were advanced adjacent to CPT-1 through CPT-4, respectively, for direct evaluation of physical samples to correlated soil behavior. The borings and CPTs were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, washed sieve analyses, Plasticity Index tests, one-dimensional consolidation tests, and triaxial compression tests. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The site is located within the Santa Clara Valley, which is a broad alluvial plane between the Santa Cruz Mountains to the southwest and west, and the Diablo Range to the northeast. The San Andreas Fault system, including the Monte Vista-Shannon Fault, exists within the Santa Cruz Mountains and the Hayward and Calaveras Fault systems exist within the Diablo Range. Alluvial soil thicknesses in the area of the site is mapped to be greater than 500 feet thick (Rogers & Williams, 1974).

2.2 REGIONAL SEISMICITY

While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated (in 2015) earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3; UCERF3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward Fault.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	**(kilometers)**
Hayward (Southeast Extension)	6.3	10.1
Monte Vista-Shannon	7.6	12.3
Hayward (Total Length)	8.9	14.3
Calaveras	9.4	15.2
San Andreas (1906)	11.4	18.4

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The site is located at 651 Martin Avenue in Santa Clara, California. The site is bounded by industrial development to the north, Caltrain railroad tracks to the east, Martin Avenue to the south, and office development to the west. The site is currently occupied by four single-story high-bay industrial buildings of varying footprints surrounded by at-grade asphalt concrete and Portland cement concrete parking areas, landscaping, and a covered carport along the northern edge of the site. The site appears relatively level but graded towards storm drainage facilities. The landscaping strip along Martin Avenue appears approximately 1 to 2 feet higher than the adjacent street and parking strip.

Surface pavements generally consisted of 4 to 6 inches of asphalt concrete over 2 to 6 inches of aggregate base. Based on visual observations, the existing pavements are in fair to poor condition with areas of alligator cracking and significant transverse and block cracking. Strips of concrete pavement were observed in the back half of the site that is currently used as long term airport parking.

3.2 SUBSURFACE CONDITIONS

Our explorations generally encountered existing undocumented fill underlain by native alluvial soil to the maximum depths explored during this investigation. A more detailed description of the subsurface conditions are presented in the following sections.

3.2.1 Undocumented Fills

Below the surface pavements, our borings generally encountered approximately 1¼ to 2½ feet of undocumented fill. The fills were highly variable and generally consisted of very stiff sandy lean clay, very stiff to hard fat clay with sand, and medium dense clayey sand with gravel.

3.2.2 Alluvial Soils

Below the undocumented fills, our borings generally encountered native alluvial soils consisting of stiff to very stiff fat clay to a depth of about 6 to 9 feet below existing grades. Below the upper fat clay layer, Borings EB-1 to EB-3, EB-5, and EB-7 to EB-8 generally encountered stiff to very stiff lean clay to a depth of about 18 to 26 feet underlain by interbedded layers of medium dense to very dense sands with variable amounts of silt and clay to the terminal boring depths of about 30 to 81 feet. Below the upper fat clay layer, Borings EB-4 and EB-6 generally encountered medium dense to dense sands with variable amounts of silt and clay to a depth of about 21 to 26 feet below existing grades underlain by stiff to very stiff lean clay with interbedded layers of medium dense to dense sands with variable amounts clay to the terminal boring depths of about 60 feet below existing grades. Borings EB-6 and EB-7 also encountered a layer of stiff to very stiff sandy silt between about 42 to 47 feet below existing grades.

Beneath the terminal boring depth of 81 feet, our CPTs generally encountered interbedded layers of very stiff to hard clays with varying amounts of sand and silt and dense to very dense sands with varying amounts of clay and silt fines to the maximum depth explored of 120 feet.

3.2.3 Plasticity/Expansion Potential

We performed one Plasticity Index (PI) test on a representative sample. Test results were used to evaluate expansion potential of surficial soils. The result of the surficial PI test resulted in a PI of 51, indicating very high expansion potential to wetting and drying cycles.

3.2.4 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from about 5 to 16 percent over the estimated laboratory optimum moisture.

3.3 GROUNDWATER

Groundwater was encountered in our exploratory borings at depths ranging from about 10½ to 15 feet below current grades. Groundwater was inferred at depths ranging from approximately 10½ to 11 feet below existing grades in CPT-1 through CPT-4 based on pore pressure dissipation tests. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered. Historic high groundwater levels are mapped at a depth of approximately 5 to 10 feet below current grades (CGS, San Jose West 7.5 Minute Quadrangle, 2002).

We also reviewed groundwater data available online from the website GeoTracker, https://geotracker.waterboards.ca.gov/. Nearby monitoring well data indicates that groundwater has been measured at depths of approximately 6.9 to 8.8 feet at wells located approximately ⅓ mile east at 2495 De La Cruz Boulevard between May 2002 and January 2009.

Based on the above, we recommend a design groundwater depth of 6 feet. Fluctuations in groundwater levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT SURFACE RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone, or a Santa Clara County Fault Hazard Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault surface rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A site modified peak ground acceleration (PGA_M) was determined in accordance with the 2019 California Building Code (CBC) and Section 21.5 of ASCE 7-16. Therefore, we recommend a site-specific MCE_G peak ground acceleration, $PGA_{M,}$ of 0.597g for this project.

4.3 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, Milpitas Quadrangle, 2001) as well as a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2003). Our field and laboratory programs addressed this issue by testing and sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT data, and performing various tests to further classify soil properties.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the “Subsurface” section above, several sand layers were encountered below the design groundwater depth of 6 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil’s estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the “Estimated Ground Shaking” section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil’s CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT “N” values obtained from hollow-stem auger borings were not used in our analyses, as the “N” values obtained are less reliable in sands below groundwater. The tip pressures are corrected for effective overburden stresses, taking into consideration both the groundwater level at the time of exploration and the design groundwater level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_C) to estimate the plasticity of the layers.

The results of our CPT analyses (CPT-1 through CPT-6) are presented on Figures 4A through 4F of this report.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in post-liquefaction total settlement at the ground surface up to about 1 inch based on the Yoshimine (2006) method. As discussed in SP 117A, differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement between independent foundation elements. In our opinion, differential settlements are anticipated to be on the order of ⅔-inch or less over a horizontal distance of 30 to 40 feet.

4.3.4 Ground Deformation and Surficial Cracking Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground deformation or sand boils. For ground deformation to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates that the minimum 12-foot thick layer of non-liquefiable cap is sufficient to prevent ground deformation and significant surficial cracking; therefore, the above total settlement estimates are reasonable.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

There are no open faces within a distance considered susceptible to lateral spreading; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered at the site above the design groundwater depth were predominantly stiff to very stiff clays, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 TSUNAMI/SEICHE

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the mapping of tsunami inundation potential for the San Francisco Bay Area by CGS (conservation.ca.gov/cgs/tsunami/maps), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 7½ miles inland from the San Francisco Bay shoreline and is approximately 43 to 44 feet above mean sea level. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.7 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the majority of the site is located within Zone AO, described as “Areas with base flood depth of 1 foot,” while the western third of the project site appears located within Zone X, described as “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.” We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Potential for significant static settlements
- Potential for liquefaction-induced settlements
- Shallow groundwater
- Presence of very highly expansive soils
- Undocumented fill and re-development considerations

5.1.1 Potential for Significant Static Settlements

As noted above and discussed in the “Foundations” section of this report, we anticipate that the structural loads will exceed 1,700 kips for dead plus live loads. As such, we estimate total static and long-term consolidation settlement over the design life of the structure would be greater than 4 inches at the center of a shallow mat foundation and post-construction differential settlement across the mat on the order of greater than 3 inches between the center and edges of the mat. Based on our engineering judgement, experience with similar projects, and the subsurface conditions, the proposed four-story data center building should be supported on deep foundations, such as auger-cast piles, that derive support from the older alluvial soils. The associated substation may be supported on either drilled piers or a reinforced mat foundation. Detailed foundation recommendations are presented in the “Foundations” section of this report.

5.1.2 Potential for Liquefaction-Induced Settlements

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event. Although the potential for liquefied sands to vent to the ground surface through cracks in the surficial soils is low, our analysis indicates that liquefaction-induced settlement on the order of 1 inch or less could occur, resulting in differential settlement up to ⅔-inch. Foundations should be designed to tolerate the anticipated total and differential settlements. Based on our review of the preliminary foundation loads, it should be feasible to support the proposed buildings on deep foundations; however, the building foundations will need to be designed to tolerate total and differential settlement due to static loads and liquefaction-induced settlement. Detailed foundation recommendations are presented in the “Foundations” section.

5.1.3 Shallow Groundwater

Shallow groundwater was measured at depths ranging from approximately 10½ to 15 feet below the existing ground surface in our exploratory borings and inferred from pore pressure dissipation tests in our CPTs. Historic high groundwater is mapped at a depth of 5 to 10 feet below existing grades. As discussed above, we used a design groundwater depth of 6 feet for our analysis, which we recommend be used for planning purposes.

Our experience with similar sites in the vicinity indicates that shallow ground water could significantly impact grading and underground construction. These impacts typically consist of potentially wet and unstable pavement subgrade, difficulty achieving compaction, and difficult underground utility installation. Dewatering and shoring of utility trenches may be required in some isolated areas of the site, particularly when excavations extend below about 5 to 6 feet below grade. In addition, excavated soils may be wet, and may require drying out prior to reuse as backfill material, or may require replacement with engineered fill. Detailed recommendations addressing this concern are presented in the “Earthwork” section of this report.

5.1.4 Presence of Very Highly Expansive Soils

Very highly expansive surficial soils generally blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned structures, slabs-on-grade should have sufficient reinforcement and be supported on a layer of non-expansive fill; footings should extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Evaluation of potential import sources for the site should consider the acceptable range of plasticity. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas. Detailed grading and foundation recommendations addressing this concern are presented in the following sections.

5.1.5 Undocumented Fill and Re-Development Considerations

The site is currently developed with four commercial buildings, at-grade paved parking, and landscaped areas. Potential issues that are often associated with redeveloping sites include demolition of existing improvements, abandonment of existing utilities, and undocumented fills. As previously discussed, undocumented fill was encountered to a depth of about 1¼ to 2 feet in Borings EB-1 through EB-7 and 2½ feet in Boring EB-8 by the proposed substation. Undocumented fills are expected to vary in thickness, density, and consistency across the site and may be thicker beneath existing structures. Therefore, we recommend all undocumented fill be over-excavated and re-compacted as engineered fill, and existing improvements within future building areas should be abandoned or removed from the site. Additional recommendations are outlined in the “Earthwork” section below.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION

All existing improvements not to be reused for the current development, including all foundations, flatwork, pavements, utilities, and other improvements should be demolished and removed from the site. Recommendations in this section apply to the removal of these improvements, which are currently present on the site, prior to the start of mass grading or the construction of new improvements for the project.

Cornerstone should be notified prior to the start of demolition and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition. Occasionally, other types of buried structures (wells, cisterns, debris pits, etc.) can be found on sites with prior development. If encountered, Cornerstone should be contacted to address these types of structures on a case-by-case basis.

6.1.1 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas.

As an owner value-engineered option, existing slabs, foundations, and pavements that extend into planned flatwork, pavement, or landscape areas may be left in place provided there is at least 3 feet of engineered fill overlying the remaining materials, they are shown not to conflict with new utilities, and that asphalt and concrete more than 10 feet square is broken up to allow subsurface drainage. Future distress and/or higher maintenance may result from leaving these prior improvements in place. A discussion of recycling existing improvements is provided later in this report.

Special care should be taken during the demolition and removal of existing floor slabs, foundations, utilities and pavements to minimize disturbance of the subgrade. Excessive disturbance of the subgrade, which includes either native or previously placed engineered fill, resulting from demolition activities can have serious detrimental effects on planned foundation and paving elements.

Existing foundations are typically mat-slabs, shallow footings, or piers/piles. If slab or shallow footings are encountered, they should be completely removed. If drilled piers are encountered, they should be cut off at an elevation at least 60-inches below proposed footings or the final subgrade elevation, whichever is deeper. The remainder of the drilled pier could remain in place. Foundation elements to remain in place should be surveyed and superimposed on the proposed development plans to determine the potential for conflicts or detrimental impacts to the planned construction. Following review, additional mitigation or planned foundation elements may need to be modified.

6.1.2 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout.

6.2 SITE CLEARING AND PREPARATION

6.2.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 4 to 6 inches below existing grade in vegetated areas.

6.2.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the “Compaction” section of this report.

6.3 MITIGATION OF UNDOCUMENTED FILLS

As previously discussed, we encountered approximately 1¼ to 2 feet of undocumented fill in our Borings EB-1 through EB-7. Boring EB-8, by the proposed substation, encountered approximately 2½ feet of undocumented fill. Due to past site development, we anticipate that there may be other areas onsite that may have deeper depths of undocumented fills, such as beneath existing buildings. All undocumented fills should be completely removed from within building areas and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. Provided the fills meet the “Material for Fill” requirements below, the fills may be reused when backfilling the excavations. Based on review of the samples collected from our borings, it appears that the fill may be reused. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the “Compaction” section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 to 18 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below.

6.4 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 10 feet at the site may be classified as OSHA Soil Type B materials. A Cornerstone representative should be retained to confirm the preliminary site classification.

Excavations performed during site demolition and fill removal should be sloped at 2:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Actual excavation inclinations should be reviewed in the field during construction, as needed. Excavations below building subgrade and excavations in pavement and flatwork areas should be sloped in accordance with OSHA soil classification requirements.

6.5 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the "Compaction" section below.

6.6 WET SOIL STABILIZATION GUIDELINES

Native soil and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the "Subsurface" section in this report, the in-situ moisture contents are up to about 16 percent over the estimated laboratory optimum in the upper 10 feet of the soil profile. The contractor should anticipate drying the soils prior to reusing them as fill. In addition, repetitive rubber-tire loading will likely de-stabilize the soils.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the site conditions.

6.6.1 Scarification and Drying

The subgrade may be scarified to a depth of 6 to 8 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.6.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthetic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.6.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.7 MATERIAL FOR FILL

6.7.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.7.2 Re-Use of On-Site Site Improvements

We anticipate that significant quantities of asphalt concrete (AC) grindings, aggregate base (AB), and Portland Cement Concrete (PCC) will be generated during site demolition. If the AB is separated, it may be reused within the new pavement and flatwork structural sections. AC grindings may not be reused within the habitable building areas. Laboratory testing will be required to confirm the grindings meet project specifications. Due to the exiting alligator cracking of the AC pavements, it is likely that the grinding operation will leave significant oversize chunks and may not meet the Class 2 AB gradation requirements but may meet Caltrans subbase requirements. Depending on the quantities of oversized material, the grindings may still be used within the structural section; however, the pavement design will need to be modified to account for the difference, typically resulting in the addition of about 1 inch to the structural section.

If the site area allows for on-site pulverization of PCC and provided the PCC is pulverized to meet the "Material for Fill" requirements of this report, it may be used as select fill within the building areas, excluding the capillary break layer; as typically pulverized PCC comes close to or meets Class 2 AB specifications, the recycled PCC may likely be used within the pavement structural sections. PCC grindings also make good winter construction access roads, similar to a cement-treated base (CTB) section.

6.7.3 Potential Import Sources

Non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the habitable building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.7.4 Non-Expansive Fill Using Lime Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the high clay content and PI of the on-site soil materials, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. It has been our experience that for high PI clayey soil materials will likely need to be mixed with at least 3 to 4 percent quicklime (CaO) or approved equivalent to adequately reduce the PI of the on-site soils to 15 or less. If this option is considered, additional laboratory tests should be performed during initial site grading to further evaluate the optimum percentage of quicklime required.

6.8 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Wet Soil Stabilization Guidelines" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

Table 2: Compaction Requirements

Description	**Material Description**	**Minimum Relative[1] Compaction (percent)**	**Moisture[2] Content (percent)**
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

6.8.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.9 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

6.10 SITE DRAINAGE

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. However, if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

6.11 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project's drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey and categorized as Hydrologic Soil Group D, and is expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.

- Locally, seasonal high groundwater is mapped at a depth of 5 to 10 feet, and therefore is expected to be within 10 feet of the base of the infiltration measure.

- In our opinion, infiltration locations within 10 feet of the buildings would create a geotechnical hazard.

6.11.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.11.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.

- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.11.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.
- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.
- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.
- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12-inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.
- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.11.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the “Retaining Walls” section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.12 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are very highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation

- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes

- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers

- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: 2019 CBC SEISMIC DESIGN CRITERIA

7.1 SEISMIC DESIGN CRITERIA

We developed site-specific seismic design parameters in accordance with Chapter 16, Chapter 18 and Appendix J of the 2019 California Building Code (CBC) and Chapters 11, 12, 20, and 21 and Supplement No. 1 of ASCE 7-16.

7.1.1 Site Location and Provided Data For 2019 CBC Seismic Design

The project is located at latitude 37.367903° and longitude -121.946467°, which is based on Google Earth (WGS84) coordinates at the approximate center of 651 Martin Avenue in Santa Clara, California. We have assumed that a Seismic Importance Factor (I_e) of 1.00 has been assigned to the structure in accordance with Table 1.5-2 of ASCE 7-16 for structures classified as Risk Category II. The building period has not been provided by the project structural engineer.

7.2 2019 CBC SEISMIC DESIGN CRITERIA

As discussed in the “Subsurface” section above, our CPT and exploratory borings generally encountered medium dense to dense sands and stiff to hard clay deposits to a depth of 120 feet, the maximum depth explored. Shear wave velocity (V_S) measurements were performed while advancing CPT-1 and CPT-6, resulting in a time-averaged shear wave velocity for the top 30 meters (V_{S30}) of 260 and 244 meters per second (853 and 800 feet per second), for the upper 100 feet, respectively.

7.2.1 2019 CBC Seismic Design

As our borings encountered deep alluvial soils with shear wave velocity for the upper 30 meters between 600 and 1,200 feet per second, per section 20.3.2 of ASCE 7-16, , we have classified the site as Soil Classification D, which is described as a “stiff soil” profile. Because we used site specific data from our explorations and laboratory testing, the site class should be considered as “determined” for the purposes of estimating the seismic design parameters from the code. Our site-specific ground motion hazard analysis considered a V_{S30} of 244 m/s (800 ft/s).

In accordance with Section 11.4.8 of ASCE 7-16, we performed a ground motion hazard analysis following Chapter 21, Section 21.2 of ASCE 7-16. We evaluated both Probabilistic MCE_R Ground Motions in accordance with Method 1 and Deterministic MCE_R Ground Motions to generate our recommended design response spectrum for the project, see Figure 6. The recommended design spectral accelerations and associated periods are provided in graphically on Figure 7.

SECTION 8: FOUNDATIONS

8.1 SUMMARY OF RECOMMENDATIONS

Anticipated structural loads were not provided to us at the time this report was prepared; therefore, we assumed an estimated average mat pressure of about 1,530 psf for dead plus live loads, not including the self-weight of the mat.

Based on the above loading and subsurface conditions, we estimate that the total static settlement would be greater than 4 inches at the center of a shallow mat foundation. Post-construction differential settlement across the mat on the order of greater than 3 inches would be anticipated between the center and edges of the mat. In addition to estimated differential static settlements, the mat would need to be designed to accommodate an estimated seismic differential movement of up to ⅔ inch over a horizontal distance of about 50 feet.

In our opinion, the above estimated settlements exceed typical allowable total and differential settlement for the proposed structure and shallow mat foundations. Therefore, we recommend the proposed data center structure be supported on deep foundations, such as auger-cast piles, that derive support from deep alluvial soils. Based on our experience with similar projects with you, we anticipate shallow spread footings over ground improvement may not be feasible from a structural standpoint due to the high anticipated column loads. However, if alternative foundation recommendations are desired please notify us immediately so we can provide additional recommendations.

For the planned substation structure, we recommend either conventional drilled piers or a rigid mat foundation be considered, provided the anticipated loads do not result in significant total and differential settlement. Additional foundation recommendations are presented below.

8.2 AUGERCAST PILES

As discussed, the proposed data center structure can be supported on conventional drilled, cast-in-place augercast (APG) piles. APG piles have been successfully used for projects throughout the Bay Area and California in similar soil conditions. APG piles are constructed by augering and removing the soil column as a hollow-stem auger is advanced, prior to pumping sand-cement grout (4,000 to 6,000 psi) through the hollow-stem as the drill stem is extracted. A benefit of the augercast pile installation process is that augercast piles are a low noise and vibration installation compared to driven piles.

The APG pile load testing program should consist of at least one (1) compression test and one (1) tension test for every 150 to 250 piles to be installed. Static load tests include installing a test pile, which can either be in a production pile location or sacrificial, with four surrounding piles that serve as anchor piles to resist the jacking pressure. During test pile installation, the contractor should allow for monitoring forces in the compression piles at a distance of about 5 feet from the pile tip with the use of a pair of strain gauges. The installation of a strain-gauge pair at depth is beneficial because strain gauges are frequently damaged during installation. This monitoring will allow for observation of the skin friction as it is mobilized, and separation of end-bearing support in the final analysis. A member of our staff should be present during test pile installation and testing. Pile load testing should not proceed without provisions for monitoring forces in the piles recommended above.

8.2.1 Vertical Capacity

The anticipated structural loads may be supported on APG piles. Adjacent pile centers should be spaced at least three diameters apart; otherwise, a reduction for group effects on vertical support may be required. Piles within nine pile diameters of each other should not be installed on the same day. Grade beams should span between piles and/or pile caps in accordance with structural requirements.

As no consistent significantly thick, uniform, dense sand layer was encountered during our investigation that would provide adequate end bearing support at depth, vertical capacity is based on frictional resistance. We evaluated the allowable vertical capacity for 16- and 18-inch diameter APG piles and present the results in Figure 5. As shown on Figure 5, we have assumed that the top of pile/bottom of pile cap occurs approximately 5 feet below the future structure pad grade. Though this elevation is approximate, as the subsurface is relatively consistent, we do not expect the pile capacities to change significantly with small variations in pile cap elevation. The allowable capacities are for dead plus live loads; dead loads should not exceed two-thirds of the allowable dead plus live load capacities. The allowable capacities may be increased by one-third for wind and seismic loads. Seismic tensile capacities should not exceed the allowable downward (compression) capacity for dead plus live loads.

8.2.2 Lateral Capacity

Lateral load resistance is developed by the soil's resistance to pile bending. The magnitude of the shear and bending moment developed within the pile are dependent on the pile stiffness, embedment length, the fixity of the pile into the pile cap (free or fixed-head conditions), the surrounding soil properties, the tolerable lateral deflection, and yield moment capacity of the pile. If APG piles are to be used, we would provide either LPile parameters for your use at that time, or we could perform LPile analysis given the structural properties of the piles, pile head fixity condition, and the allowable lateral deflections. The results of the LPile analysis would generally provide maximum shear, maximum moment, depth to maximum moment and depth to zero moment for the piles.

In general, the calculated lateral capacities are for single piles and may not be representative of piles in groups. Group effects, including the layout of the piles within a group, can significantly reduce the overall lateral capacity. Therefore, the load deflection behavior of pile groups should be modeled by applying a reduction ratio (group efficiency) factor, which is the ratio of the load carried by piles in a group as compared to the same number of isolated piles under similar conditions. Once final pile configurations are available, we could also provide group efficiency factors for each group.

8.2.3 Passive Resistance against Pile Caps and Grade Beams

Passive resistance against pile caps and grade beams poured neat against native or engineered fill may also be considered; however, as the allowable lateral deflections of the piles are limited, full allowable passive pressures will not be developed. The design-build pile contractor should evaluate appropriate allowable passive pressures that maintain strain compatibility between the piles and pile caps, if additional passive resistance is required.

8.2.4 Construction Considerations

The installation of all test and production piles should be observed on a full-time basis by a Cornerstone representative to confirm that the piles are constructed in accordance with our recommendations and project requirements. Since the piles will derive their capacity from skin friction, the production piles should be installed to avoid significant end-bearing and produce a test of the required skin friction. The geotechnical project engineer should provide on-site quality assurance review during installation and should review installation records for conformance. We may recommend additional testing of piles, or additional installations, if any pile installations vary from normal installation practices. Pile contractors should meet all the requirements of the APG pile specification for the project.

We recommend that augercast pile contractors have at least 3 years of installation experience in the Bay Area.

8.3 DRILLED PIERS – SUBSTATION EQUIPMENT

Substation equipment and pertinent structures can be supported on drilled, cast-in-place, straight shaft friction piers. The piers should have a minimum diameter of 18 inches and extend to a depth of at least 10 feet below the lowest adjacent grade. Adjacent pier centers should be spaced at least three diameters apart, otherwise, a reduction for group effects may be required. The vertical capacity of the piers may be designed based on an allowable skin friction of 650 pounds per square foot (psf) for combined dead plus live loads based on a factor of safety of 2.0; dead loads should not exceed two-thirds of the allowable capacities. The allowable skin friction may be increased by one-third for wind and seismic loads. Frictional resistance to uplift loads may be developed along the pier shafts based on an ultimate frictional resistance of 80 percent of the downward capacities; the structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate uplift capacity.

8.3.1 Allowable Lateral Bearing Pressure

To evaluate the piers lateral capacity including deflections, shear forces, and moments in the piers under loading, the design parameters in Table 4 could be used to model the underlying alluvial materials. We recommend a seasonal groundwater level of 6 feet be assumed for vertical and lateral design. Where piers are adjacent to landscape areas without hardscape, the depth of landscaping soil should be neglected when determining passive pressure capacity.

Table 4: Lateral Pile Design Parameters – Generalized Soil Profile

Depth (feet)	Soil Type	Total Unit Weight[1] (pcf)	Friction Angle (degrees)	Soil Modulus Parameter (pci)	Undrained Cohesion (psf)	Strain Factor, E50
0 - 6	Hard Fat Clay	115	--	--	2500	0.004
6 - 19	Very Stiff Clay	121	--	--	1300	0.007
19 - 22	Clayey Sand	125	30	--	--	--
22 - 30	Stiff Clay	125	--	--	800	0.007

[1] For soils below the design groundwater depth of 6 feet, unit weight should be reduced by 62.4 pcf for input as effective unit weight

Piles spaced at distances less than about 5 to 7 pile diameters are likely affected by group effects. Group effects, including the layout of the piles within a group, can significantly reduce the overall lateral capacity. Therefore, the load deflection behavior of pile groups should be modeled by applying a reduction ratio (group efficiency) factor, which is the ratio of the load carried by piles in a group as compared to the same number of isolated piles under similar conditions. Once final pile configurations are available, we could also provide group efficiency factors for each group.

8.3.2 Construction Considerations

The excavation of all drilled shafts should be observed by a Cornerstone representative to confirm the soil profile, verify that the piers extend to the minimum depth into suitable materials, and that the piers are constructed in accordance with our recommendations and project requirements. Contractors should note that shallow groundwater should be anticipated within drilled pier excavations. The drilled shafts should be straight, dry, and relatively free of loose material before reinforcing steel is installed and concrete is placed. If groundwater cannot be removed from the excavations prior to concrete placement, drilling slurry or casing may be required to stabilize the shaft and the concrete should be placed using a tremie pipe, keeping the tremie pipe below the surface of the concrete to avoid entrapment of water or drilling slurry in the concrete. Some medium dense sands and soils with lower fines contents were encountered in our borings. The contractor should plan on encountering medium dense and caving soils that will likely require casing or other stability measures to prevent caving and sloughing into pier foundations. The proposed construction methods and materials should be submitted for approval prior to construction.

8.4 ALTERNATIVE FOUNDATION

As an alternative to augercast piles, the building could potentially be supported on shallow foundations over ground improvement. Based on our experience with similar projects, we understand spread footings over ground improvements may not be feasible from a structural design point due to the high column loads. However, if it is desired to support the structure on either shallow spread footings or a shallow mat foundation over ground improvement, we can provide additional recommendations once building loads are finalized. In addition, as an alternative to drilled piers, the substation may also potentially be supported on a reinforced concrete mat foundation bearing on natural soil or engineered fill prepared in accordance with the “Earthwork” section of this report, and designed in accordance with the 2019 California Building Code. If either option is desired, we should be provided additional information, including mat foundation contact pressures for additional analysis and further evaluation.

SECTION 9: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

9.1 INTERIOR SLABS-ON-GRADE

Due to the very high expansion potential of the surficial soils, the proposed slabs-on-grade should be supported on at least 36 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

9.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 15-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer’s recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1”	100
¾”	90 – 100
No. 4	0 – 10
No. 200	0 – 5

  The capillary break rock may be considered as the upper 4 inches of the non-expansive fill previously recommended.

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer’s requirements prior to installation.

9.3 EXTERIOR FLATWORK

Exterior flatwork, such as pedestrian walkways, patios, driveways, and sidewalks, may experience seasonal movement due to the native expansive soils; therefore, some cracking or vertical movement of conventional slabs should be anticipated where imported fill is not planned in flatwork areas. There are several alternatives for mitigating the impacts of expansive soils beneath concrete flatwork. We are providing recommendations to reduce distress to concrete flatwork that includes moisture conditioning the subgrade soils, using non-expansive fill, and providing adequate construction and control joints to control cracks that do occur. It should be noted that minor slab movement or localized cracking and/or distress could still occur.

- The minimum recommendation for concrete flatwork constructed on very highly expansive soils is to properly prepare the clayey soils prior to placing concrete. This is typically achieved by scarifying, moisture conditioning, and re-compacting the subgrade soil. Subgrade soil should be moisture conditioned to at least 3 percent over the laboratory optimum and compacted using moderate compaction effort to a relative compaction of 87 to 92 percent (ASTM Test Method D1557). Since the near surface soils may have been previously compacted and tested, the subgrade soils could possibly be moisture conditioned by gradually wetting the soil, depending on the time of year slab construction occurs. This should not include flooding or excessively watering the soil, which would likely result in a soft, unstable subgrade condition, and possible delays in the construction while waiting for the soil to dry out. In general, the subgrade should be relatively firm and non-yielding prior to construction.

- Concrete flatwork, excluding pavements that would be subject to wheel loads, should be at least 4 inches thick and underlain by at least 18 inches of non-expansive fill. Non-expansive fill may include aggregate base, crushed rock, lime-treated on-site soil, or imported soil with a PI of 15 or less. Non-expansive fill should be compacted to at least 90 percent relative compaction. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the “Vehicular Pavements” section below.

- We recommend a maximum control joint spacing of about 2 feet in each direction for each inch of concrete thickness and a construction joint spacing of 10 to 12 feet. Construction joints that abut the foundations or garage slabs should include a felt strip, or approved equivalent, that extends the full depth of the exterior slab. This will help to reduce the potential for permanent vertical offset between the slabs due to friction between the concrete edges. We recommend that exterior slabs be isolated from adjacent foundations.

At the owner’s option, if desired to reduce the potential for vertical offset or widening of concrete cracks, consideration should be given to using reinforcing steel, such as No. 3 rebar spaced at 18 inches on center each direction.

SECTION 10: VEHICULAR PAVEMENTS

10.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on engineering judgement considering the variable and expansive soil conditions. The pavement sections provided below include a factor of safety to account for the very highly expansive surficial soils present at the site. Additionally, due to the presence of highly expansive soils, we have also included an option for chemically-treated subgrade soils using an estimated design R-value of 50.

Table 5: Asphalt Concrete Pavement Recommendations

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	8.5	11.0
4.5	2.5	10.5	13.0
5.0	3.0	11.0	14.0
5.5	3.0	13.0	16.0
6.0	3.5	14.0	17.5
6.5	4.0	14.5	18.5

[1] Caltrans Class 2 aggregate base; minimum R-value of 78; subgrade R-value of 5

We have also included pavement structural section alternatives for chemical-treated subgrade soil with an estimated design R-value of 50 for your consideration. If it is desired to chemically-treat, on a preliminary basis, we recommend that the upper 12 inches of subgrade soil be treated. Additional testing will need to be performed to determine the appropriate lime percentage to be mixed in with the subgrade soils.

Table 6: Asphalt Concrete Pavement Recommendations, Chemically-Treated Subgrade

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	4.0	6.5
4.5	2.5	4.0	6.5
5.0	3.0	4.0	7.0
5.5	3.0	4.0	7.0
6.0	3.5	4.0	7.5
6.5	4.0	4.0	8.0

[1] *Caltrans Class 2 aggregate base; minimum R-value of 78; minimum chemical-treated subgrade R-value assumed to be 50.*

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

10.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations outlined below are based on methods presented in American Concrete Institute Committee 330 (ACI, 2001). We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. The following table presents minimum PCC pavement thicknesses for various traffic loading categories and the anticipated maximum Average Daily Truck Traffic (ADTT).

Table 7: PCC Pavement Recommendations, Design R-value = 5

Traffic Category	Minimum PCC Thickness (inches)	Class 2 Aggregate Base (inches)
Maximum ADTT = 10	6.0	6.0
Maximum ADTT = 25	6.5	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supported on at least 9 inches of Class 2 aggregate base compacted as recommended in the "Earthwork" section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

10.2.1 Stress Pads for Trash Enclosures

Pads where trash containers will be stored, and where garbage trucks will park while emptying trash containers, should be constructed on Portland Cement Concrete. We recommend that the trash enclosure pads and stress (landing) pads where garbage trucks will store, pick up, and empty trash be increased to a minimum PCC thickness of 7 inches. The compressive strength, underlayment, and construction details should be consistent with the above recommendations for PCC pavements.

10.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or "Deep-Root Moisture Barriers" that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 11: RETAINING WALLS

11.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 8: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

11.2 SEISMIC LATERAL EARTH PRESSURES

11.2.1 Site Walls

The 2019 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. At this time, we are not aware of any retaining walls for the project. However, minor landscaping walls (i.e. walls 6 feet or less in height) may be proposed. In our opinion, design of these walls for seismic lateral earth pressures in addition to static earth pressures is not warranted.

11.3 WALL DRAINAGE

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer’s connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

11.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

11.5 FOUNDATIONS

In general, conventional at-grade site retaining walls may be supported on a continuous conventional footing. Strip footings should bear on natural, undisturbed soil or entirely on engineered fill, and extend at least 36 inches below the lowest adjacent grade. The deeper footing embedment is due to the presence of very highly expansive soils and is intended to embed the footing below the zone of significant seasonal moisture fluctuation, reducing the potential for differential movement.

Footings constructed to the above dimensions and in accordance with the “Earthwork” recommendations of this report are capable of supporting maximum allowable bearing pressures of 2,000 psf for dead loads, 3,000 psf for combined dead plus live loads, and 4,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below-grade (typically, the full footing depth). Top and bottom of mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

SECTION 12: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Lake Street Ventures specifically to support the design of the 651 Martin Data Center project in Santa Clara, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and ground water conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Lake Street Ventures may have provided Cornerstone with plans, reports and other documents prepared by others. Lake Street Ventures understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be 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 we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 13: REFERENCES

ATC Hazards by Location, Hazards by Location, 2020, https://hazards.atcouncil.org/

American Concrete Pavement Association (ACPA, 2006). *Design of Concrete Pavement for Streets and Roads.*

ASCE 7-16. American Society of Civil Engineers. (2016). *Minimum Design Loads and Associated Criteria for Buildings and Other Structures.*

Boulanger, R.W. and Idriss, I.M., 2004, Evaluating the Potential for Liquefaction or Cyclic Failure of Silts and Clays, Department of Civil & Environmental Engineering, College of Engineering, University of California at Davis.

Boulanger, R.W. and Idriss, I.M., 2014, CPT and SPT Based Liquefaction Triggering Procedures, Department of Civil & Environmental Engineering, College of Engineering, University of California at Davis, Report No. UCD/GCM-14/01, April 2014

California Building Code, 2019, Structural Engineering Design Provisions, Vol. 2.

California Department of Conservation Division of Mines and Geology, 1998, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, International Conference of Building Officials, February, 1998.

California Division of Mines and Geology (2008), “Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A, September.

California Geological Survey, 2002, State of California Seismic Hazard Zones, San Jose West 7.5-Minute Quadrangle, California: Seismic Hazard Zone Report 58.

CGS. (2021). *Earthquake Zones of Required Investigation.* CGS Homepage. https://maps.conservation.ca.gov/cgs/EQZApp/app/

Federal Emergency Management Administration (FEMA), 2009, FIRM City of Santa Clara, California, Community Panel #06085C0227H.

GitHub, *usgs/shakemap-scenarios*, 2020, https://github.com/usgs/shakemap-scenarios/tree/master/rupture_sets/BSSC2014

Idriss, I.M., and Boulanger, R.W., 2008, Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute, Oakland, CA, 237 p.

Ishihara, K., 1985, Stability of Natural Deposits During Earthquakes: Proceedings Eleventh International Conference on Soil Mechanics and Foundation Engineering, San Francisco.

Ishihara, K. and Yoshimine, M., 1992, Evaluation of Settlements in Sand Deposits Following Liquefaction During Earthquakes, Soils and Foundations, 32 (1): 173-188.

Ritter, J.R., and Dupre, W.R., 1972, Map Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California: San Francisco Bay Region Environment and Resources Planning Study, USGS Basic Data Contribution 52, Misc. Field Studies Map MF-480.

Rogers, T.H., and J.W. Williams, 1974 Potential Seismic Hazards in Santa Clara County, California, Special Report No. 107: California Division of Mines and Geology.

Seed, H.B. and I.M. Idriss, 1971, A Simplified Procedure for Evaluation soil Liquefaction Potential: JSMFC, ASCE, Vol. 97, No. SM 9, pp. 1249 – 1274.

Seed, Raymond B., Cetin, K.O., Moss, R.E.S., Kammerer, Ann Marie, Wu, J., Pestana, J.M., Riemer, M.F., Sancio, R.B., Bray, Jonathan D., Kayen, Robert E., and Faris, A., 2003, Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework., University of California, Earthquake Engineering Research Center Report 2003-06.

State of California Department of Transportation, Highway Design Manual, Latest Edition.

Tokimatsu, K., and Seed, H. Bolton, 1987, Evaluation of Settlements in Sands due to Earthquake Shaking, ASCE Journal of Geotechnical Engineering, Vol. 113, August 1987, pp. 861-878.

U.S. Geological Survey, *Unified Hazard Tool*, 2020,
https://earthquake.usgs.gov/hazards/interactive/

U.S. Geological Survey, *Building Seismic Safety Council 2014 Event Set*, ArcGIS Web Application, 2020,
https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=14d2f75c7c4f4619936dac0d14e1e468

U.S. Geological Survey, *USGS Earthquake Hazards Program*, 2020,
https://earthquake.usgs.gov/nshmp-haz-ws/apps/spectra-plot.html

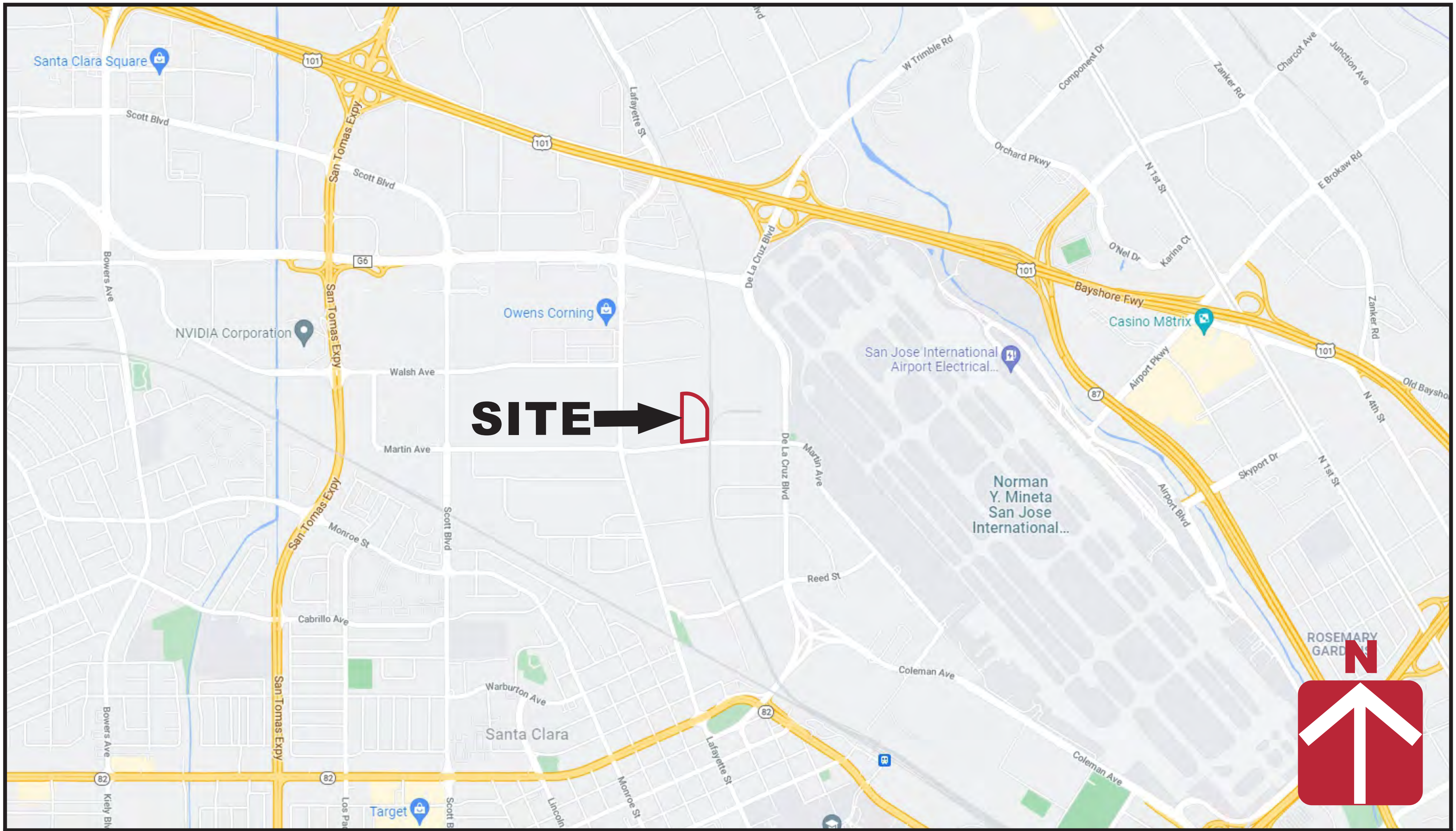
Working Group on California Earthquake Probabilities, 2015, The Third Uniform California Earthquake Rupture Forecast, Version 3 (UCERF), U.S. Geological Survey Open File Report 2013-1165 (CGS Special Report 228)*. KMZ files available at:* www.scec.org/ucerf/images/ucerf3_timedep_30yr_probs.kmz

Youd, T.L. and C.T. Garris, 1995, Liquefaction-Induced Ground-Surface Disruption: Journal of Geotechnical Engineering, Vol. 121, No. 11, pp. 805 - 809.

Youd, T.L. and Idriss, I.M., et al, 1997, Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils: National Center for Earthquake Engineering Research, Technical Report NCEER - 97-0022, January 5, 6, 1996.

Youd et al., 2001, “Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils,” ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vo. 127, No. 10, October, 2001.

Youd, T.L. and Hoose, S.N., 1978, Historic Ground Failures in Northern California Triggered by Earthquakes, United States Geologic Survey Professional Paper 993.



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Vicinity Map

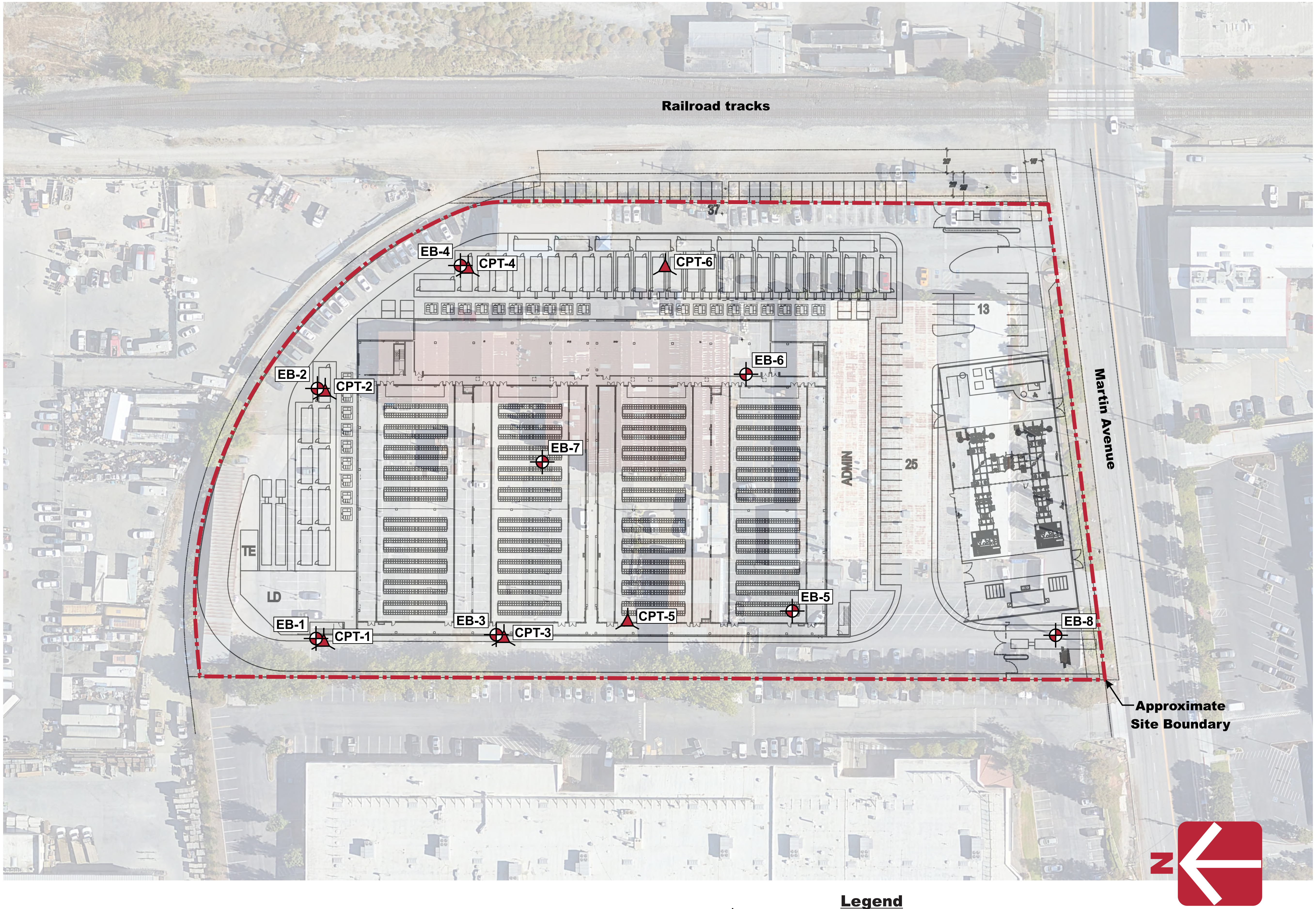
651 Martin Avenue Data Center
Santa Clara, CA

Project Number 1290-2-1

Figure Number Figure 1

Date September 2021

Drawn By RRN



Base by Google Earth, dated 09/04/2020
Overlay: CA-G Opt 2 20210819

Project Number 1290-2-1

Figure Number Figure 2

Drawn By RRN

Date September 2021

Site Plan

651 Martin Avenue Data Center
Santa Clara, CA

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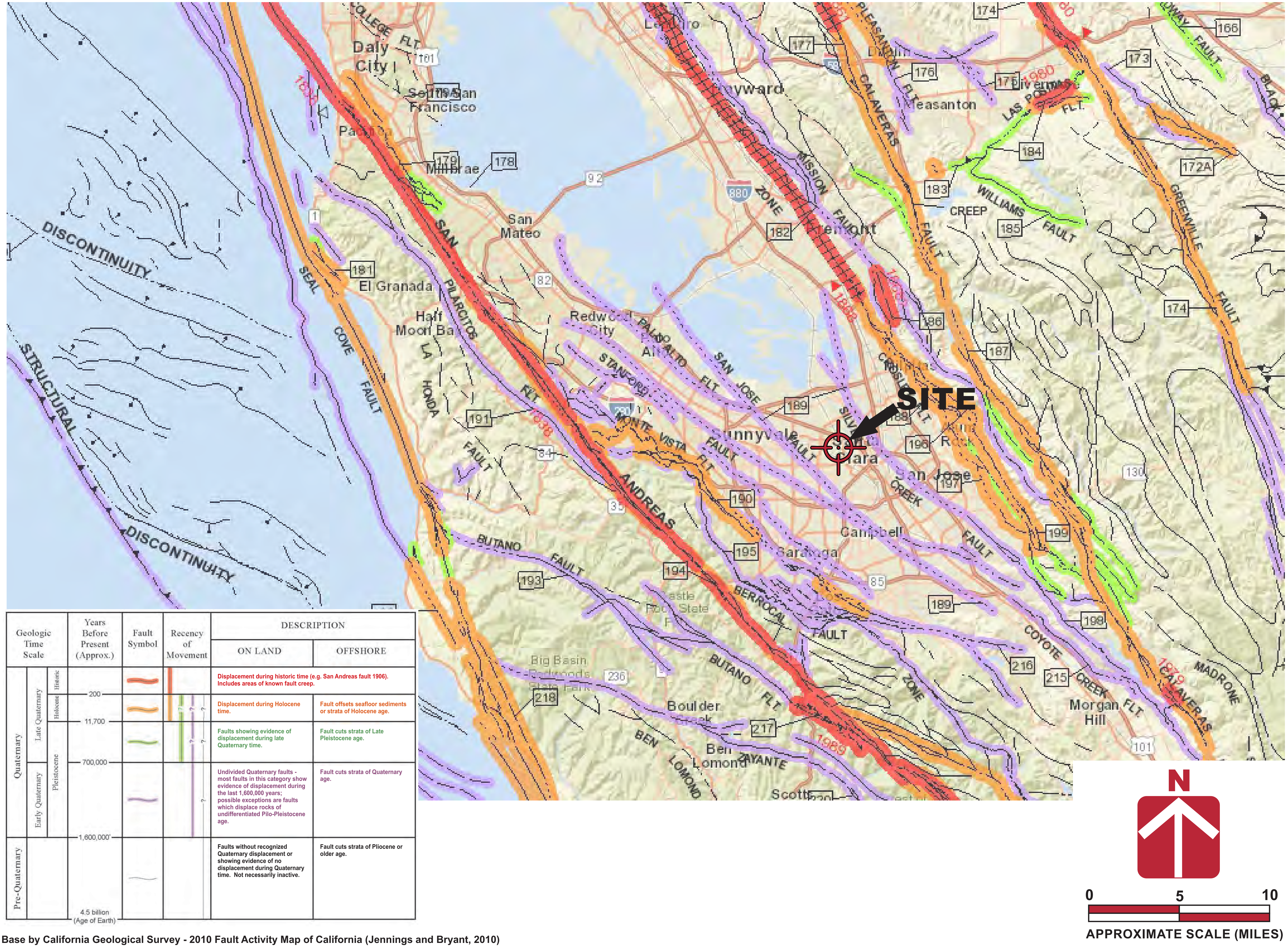

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic		🟥		Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200	🟧	? ? ?	Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	11,700	🟩	? ?	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000	🟪	?	Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pilo-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000 4.5 billion (Age of Earth)	—		Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Regional Fault Map

651 Martin Avenue Data Center
Santa Clara, CA

Project Number 1290-2-1

Figure Number Figure 3

Date September 2021

Drawn By RRN

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FIGURE 4A

CPT NO. 1

PROJECT/CPT DATA

Project Title: **651 Martin Data Center**

Project No.: **1290-2-1**

Project Manager: **SCO**

SEISMIC PARAMETERS

Controlling Fault: **Monte Vista Shannon**

Earthquake Magnitude (Mw): **7.14**

PGA (Amax): **0.597** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet): **10.6**

Design Water Depth (feet): **6**

Ave. Unit Weight Above GW (pcf): **120**

Ave. Unit Weight Below GW (pcf): **122**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**

0.00 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.73 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.7 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI^2 0.16 **L/H** 262.5

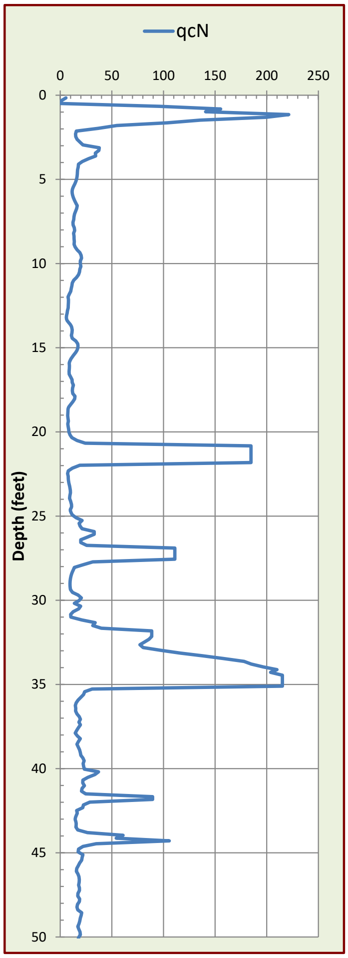
LDI^1$_{\text{Corrected for Distance}}$ 0.01 (4 < L/H < 40)

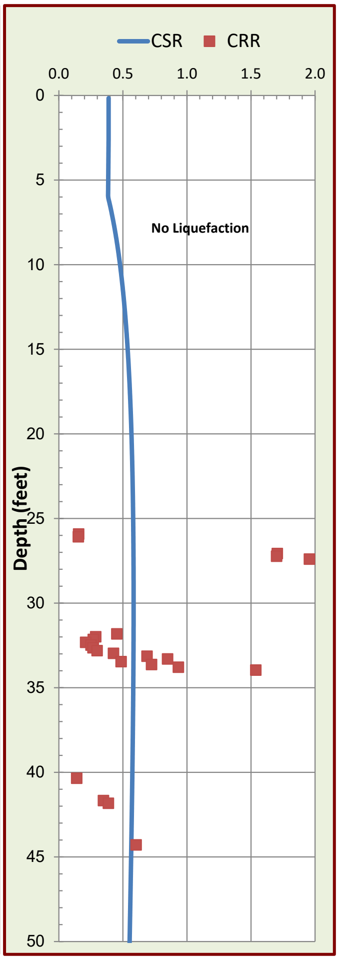
EXPECTED RANGE OF DISPLACEMENT

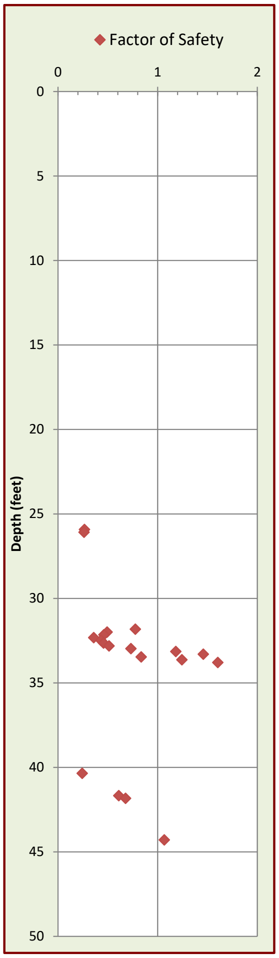
0.0 **to** 0.0 **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







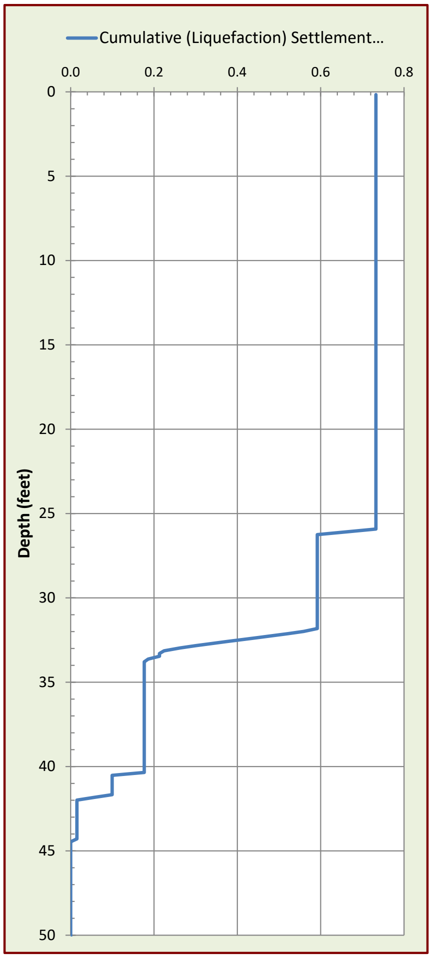


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FIGURE 4B

CPT NO. 2

PROJECT/CPT DATA

Project Title **651 Martin Data Center**
Project No. **1290-2-1**
Project Manager **SCO**

SEISMIC PARAMETERS

Controlling Fault **Monte Vista Shannon**
Earthquake Magnitude (Mw) **7.14**
PGA (Amax) **0.597** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet) **13**
Design Water Depth (feet) **6**
Ave. Unit Weight Above GW (pcf) **120**
Ave. Unit Weight Below GW (pcf) **122**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**
0.00 **(Inches)**
LIQUEFACTION SETTLEMENT FROM 50 **FEET**
0.13 **(Inches)**

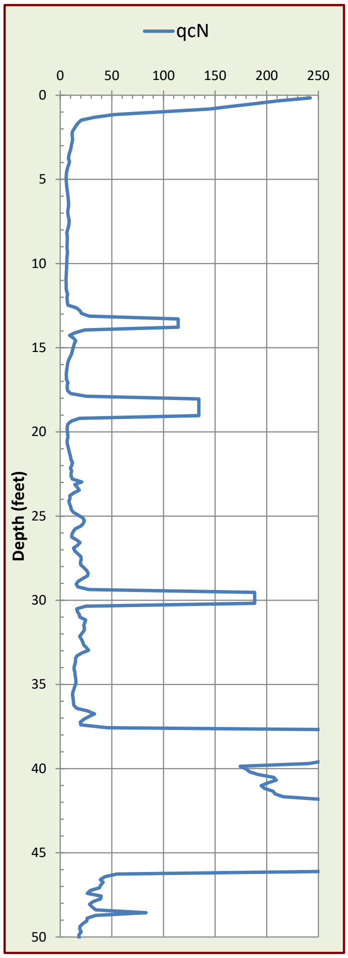
TOTAL SEISMIC SETTLEMENT 0.1 **INCHES**

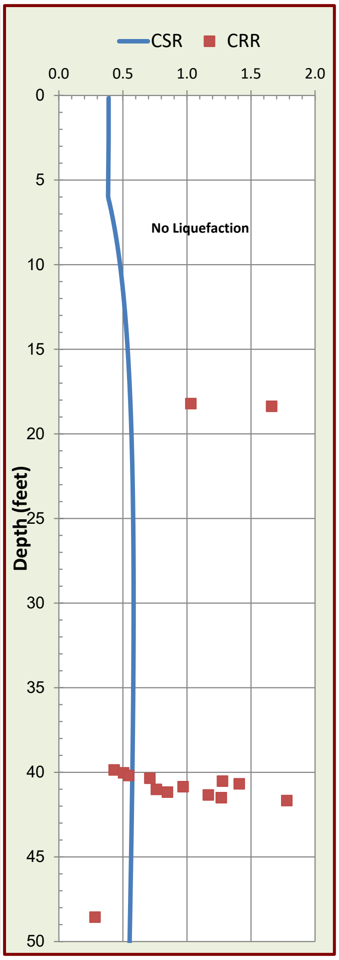
POTENTIAL LATERAL DISPLACEMENT

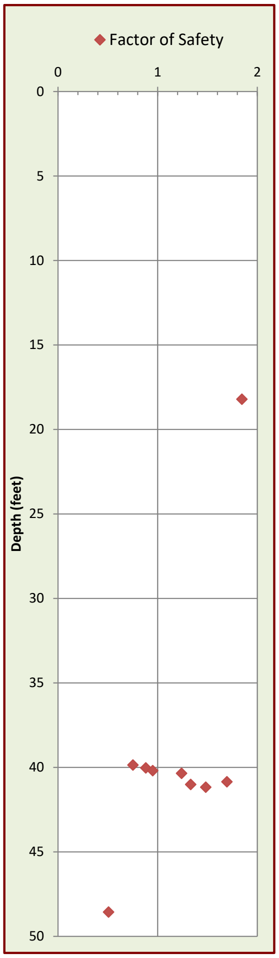
LDI[2] 0.00 **L/H** 262.5
LDI[1] **Corrected for Distance** 0.00 (4 < L/H < 40)

EXPECTED RANGE OF DISPLACEMENT
0.0 **to** **0.0** **feet**

[1] Not Valid for L/H Values < 4 and > 40.
[2] LDI Values Only Summed to 2H Below Grade.







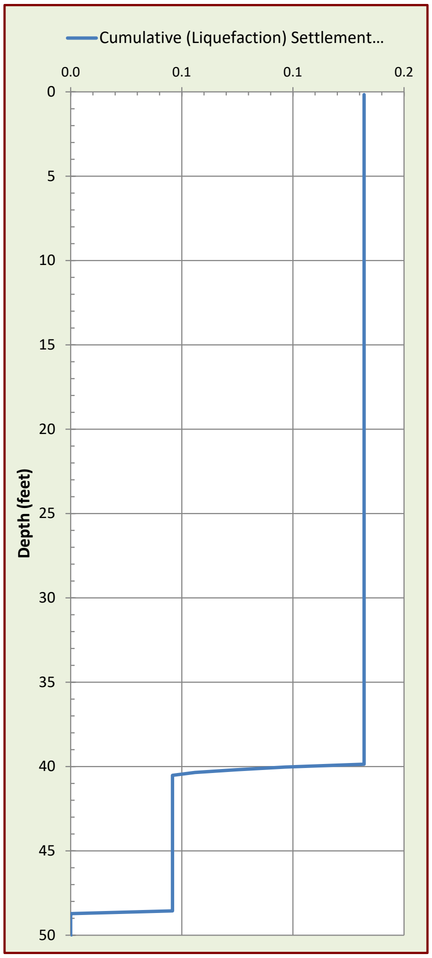


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FIGURE **4C**

CPT NO. **3**

PROJECT/CPT DATA

Project Title **651 Martin Data Center**

Project No. **1290-2-1**

Project Manager **SCO**

SEISMIC PARAMETERS

Controlling Fault **Monte Vista Shannon**

Earthquake Magnitude (Mw) **7.14**

PGA (Amax) **0.597** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet) **10.8**

Design Water Depth (feet) **6**

Ave. Unit Weight Above GW (pcf) **120**

Ave. Unit Weight Below GW (pcf) **122**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**

0.00 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.26 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.3 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.09 **L/H** 262.5

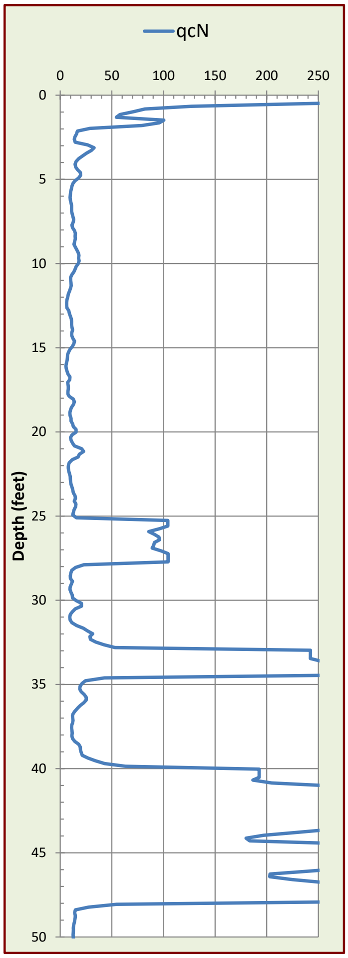
LDI[1]**Corrected for Distance** 0.01 (4 < L/H < 40)

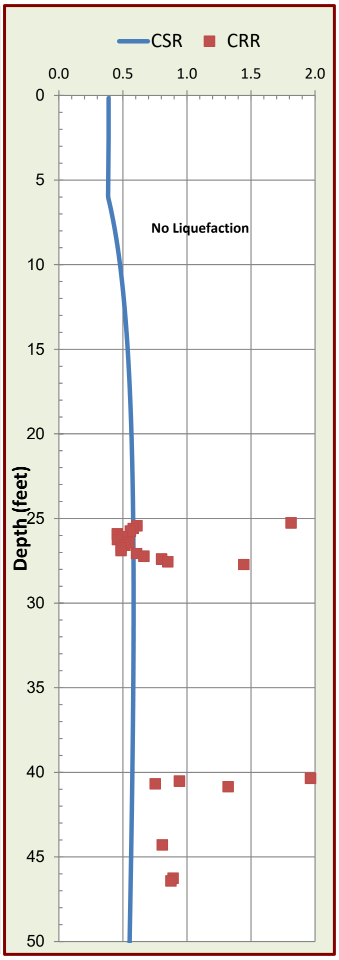
EXPECTED RANGE OF DISPLACEMENT

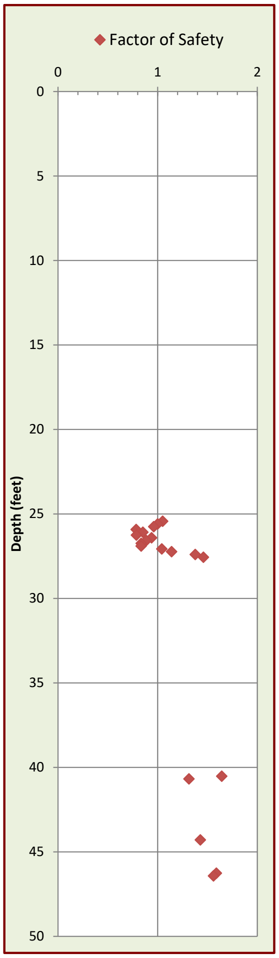
0.0 **to** **0.0** **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







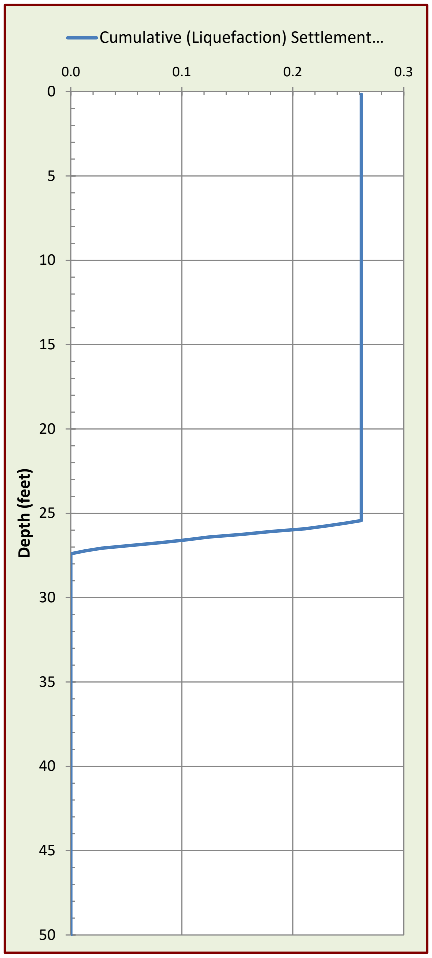


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FIGURE 4D

CPT NO. 4

PROJECT/CPT DATA

Project Title: **651 Martin Data Center**

Project No.: **1290-2-1**

Project Manager: **SCO**

SEISMIC PARAMETERS

Controlling Fault: **Monte Vista Shannon**

Earthquake Magnitude (Mw): **7.14**

PGA (Amax): **0.597** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet): **11.7**

Design Water Depth (feet): **6**

Ave. Unit Weight Above GW (pcf): **120**

Ave. Unit Weight Below GW (pcf): **120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**

0.00 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.94 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.9 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.46 **L/H** 262.5

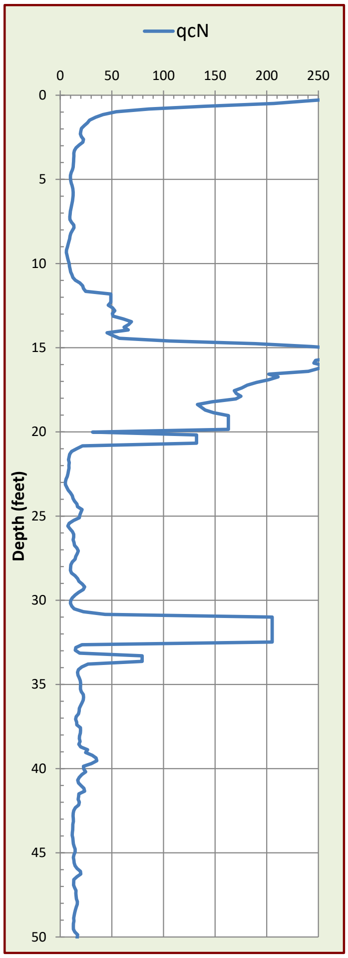
LDI[1] $_{\text{Corrected for Distance}}$ 0.03 (4 < L/H < 40)

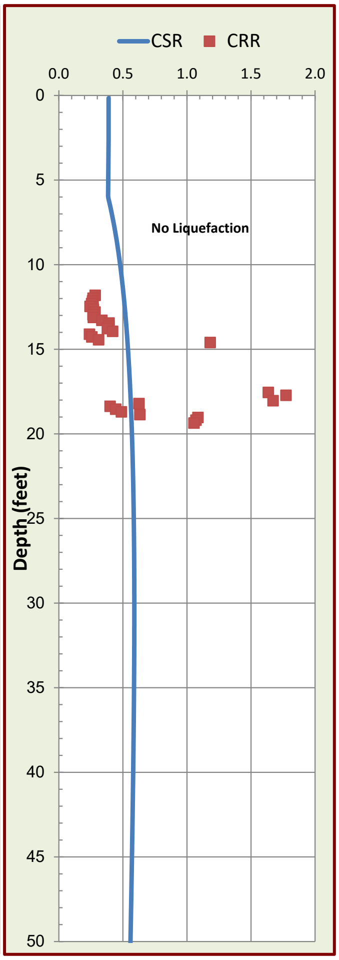
EXPECTED RANGE OF DISPLACEMENT

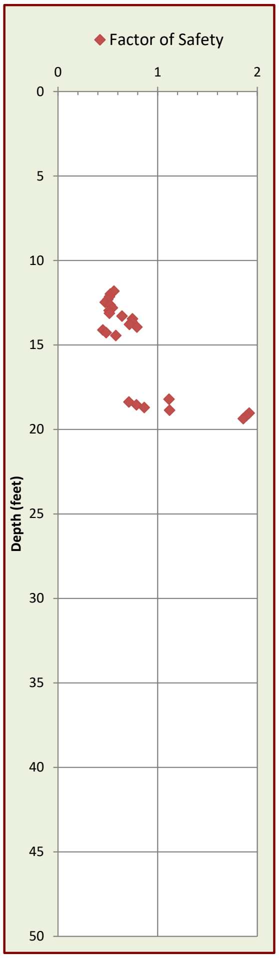
0.0 **to** 0.1 **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







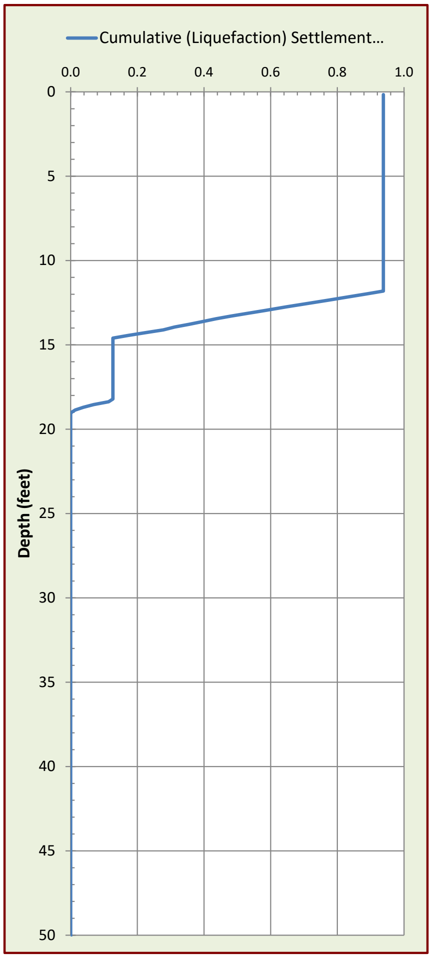


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FIGURE 4E

CPT NO. 5

PROJECT/CPT DATA

Project Title	**651 Martin Data Center**
Project No.	**1290-2-1**
Project Manager	**SCO**

SEISMIC PARAMETERS

Controlling Fault	**Monte Vista Shannon**
Earthquake Magnitude (Mw)	**7.14**
PGA (Amax)	**0.597** (g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	**6.4**
Design Water Depth (feet)	**6**
Ave. Unit Weight Above GW (pcf)	**120**
Ave. Unit Weight Below GW (pcf)	**122**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**

0.00 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.36 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.4 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.21 **L/H** 262.5

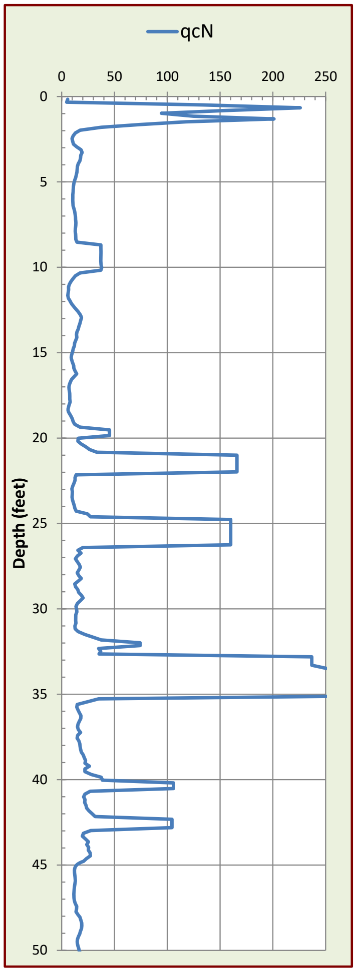
LDI[1]**Corrected for Distance** 0.01 (4 < L/H < 40)

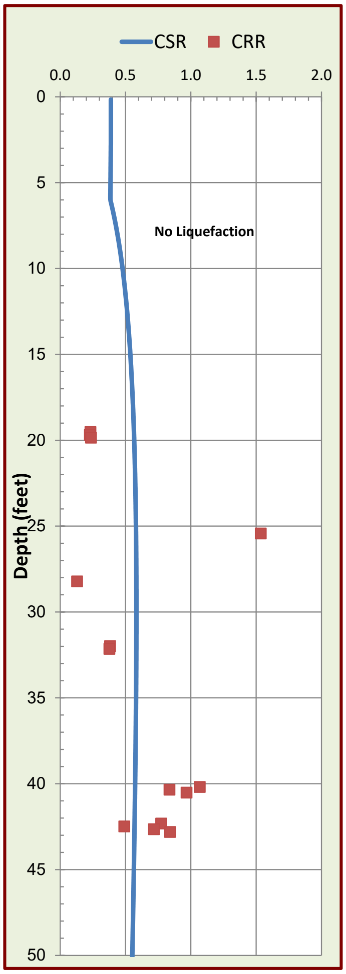
EXPECTED RANGE OF DISPLACEMENT

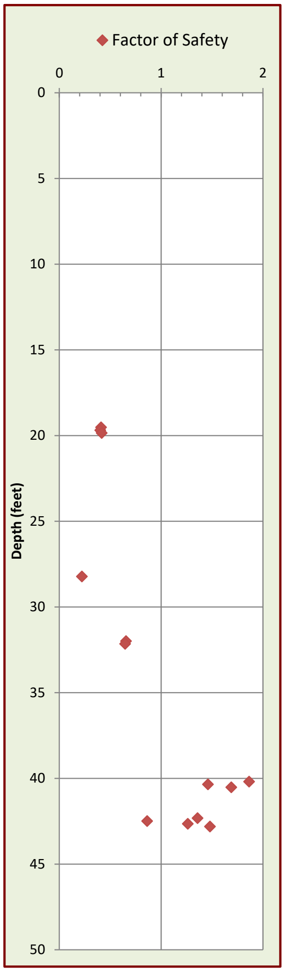
0.0 **to** **0.0** **feet**

[1] Not Valid for L/H Values < 4 and > 40.

[2] LDI Values Only Summed to 2H Below Grade.







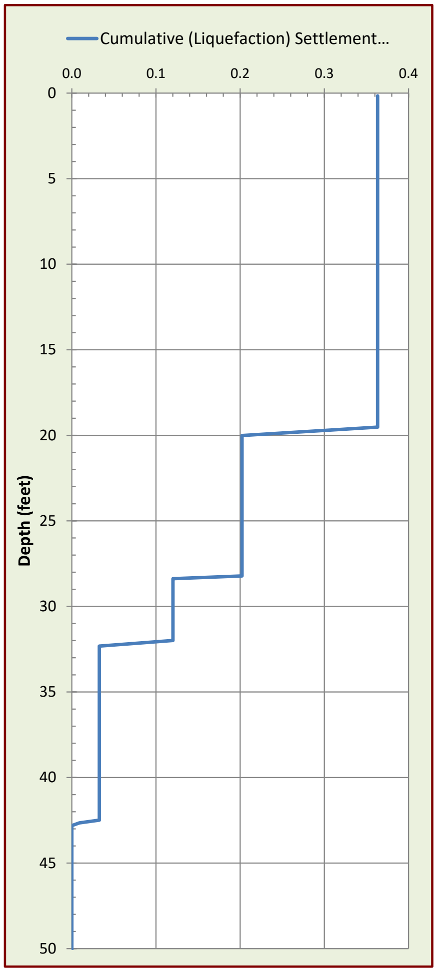


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FIGURE 4F

CPT NO. 6

PROJECT/CPT DATA

Project Title	**651 Martin Data Center**
Project No.	**1290-2-1**
Project Manager	**SCO**

SEISMIC PARAMETERS

Controlling Fault	**Monte Vista Shannon**	
Earthquake Magnitude (Mw)	**7.14**	
PGA (Amax)	**0.597**	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	**3.8**
Design Water Depth (feet)	**6**
Ave. Unit Weight Above GW (pcf)	**120**
Ave. Unit Weight Below GW (pcf)	**122**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM 6 **FEET**

0.00 **(Inches)**

LIQUEFACTION SETTLEMENT FROM 50 **FEET**

0.67 **(Inches)**

TOTAL SEISMIC SETTLEMENT 0.7 **INCHES**

POTENTIAL LATERAL DISPLACEMENT

LDI[2] 0.13 **L/H** 262.5

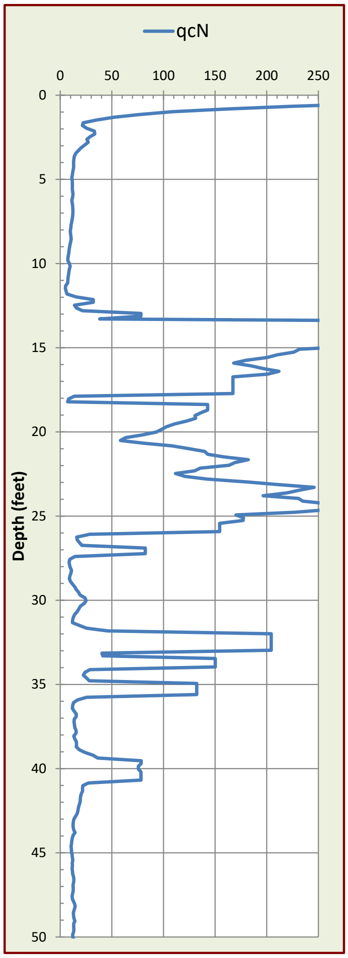
LDI[1] **Corrected for Distance** 0.01 (4 < L/H < 40)

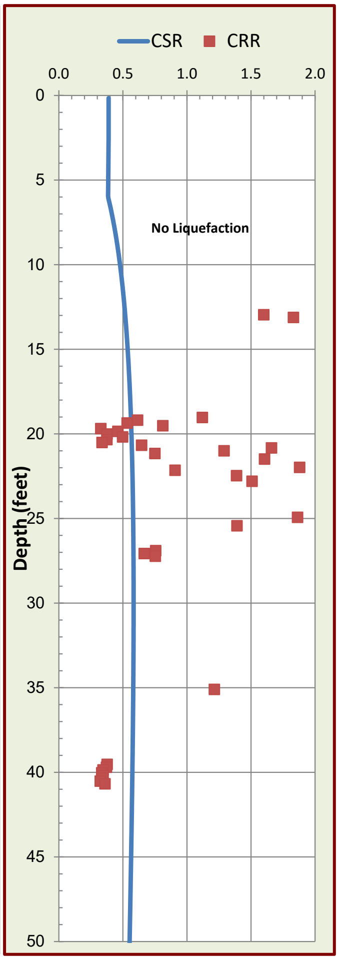
EXPECTED RANGE OF DISPLACEMENT

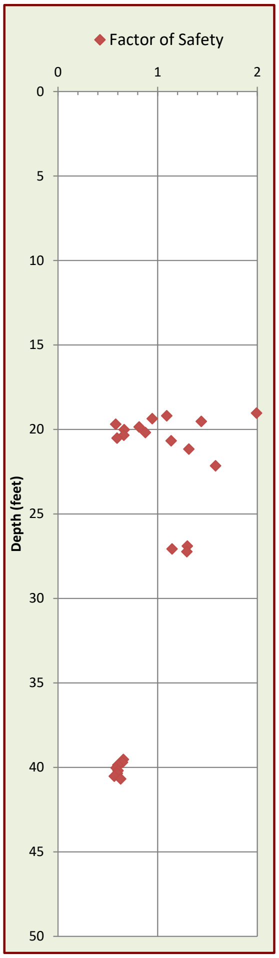
0.0 **to** **0.0** **feet**

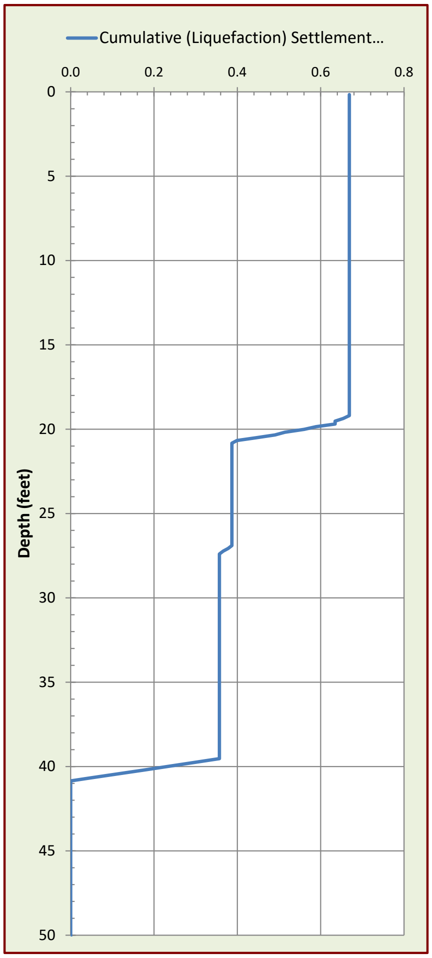
[1] Not Valid for L/H Values < 4 and > 40.

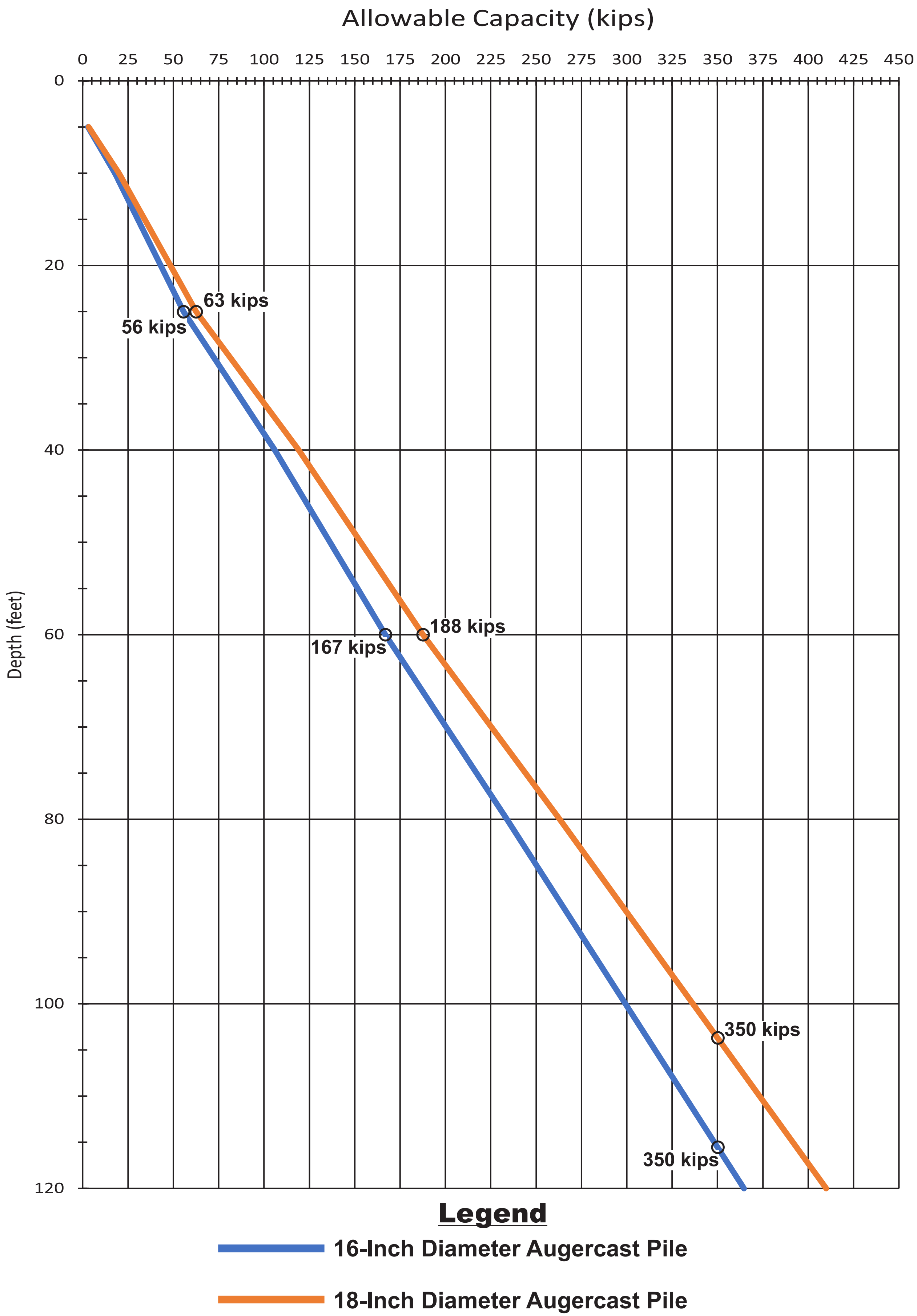
[2] LDI Values Only Summed to 2H Below Grade.











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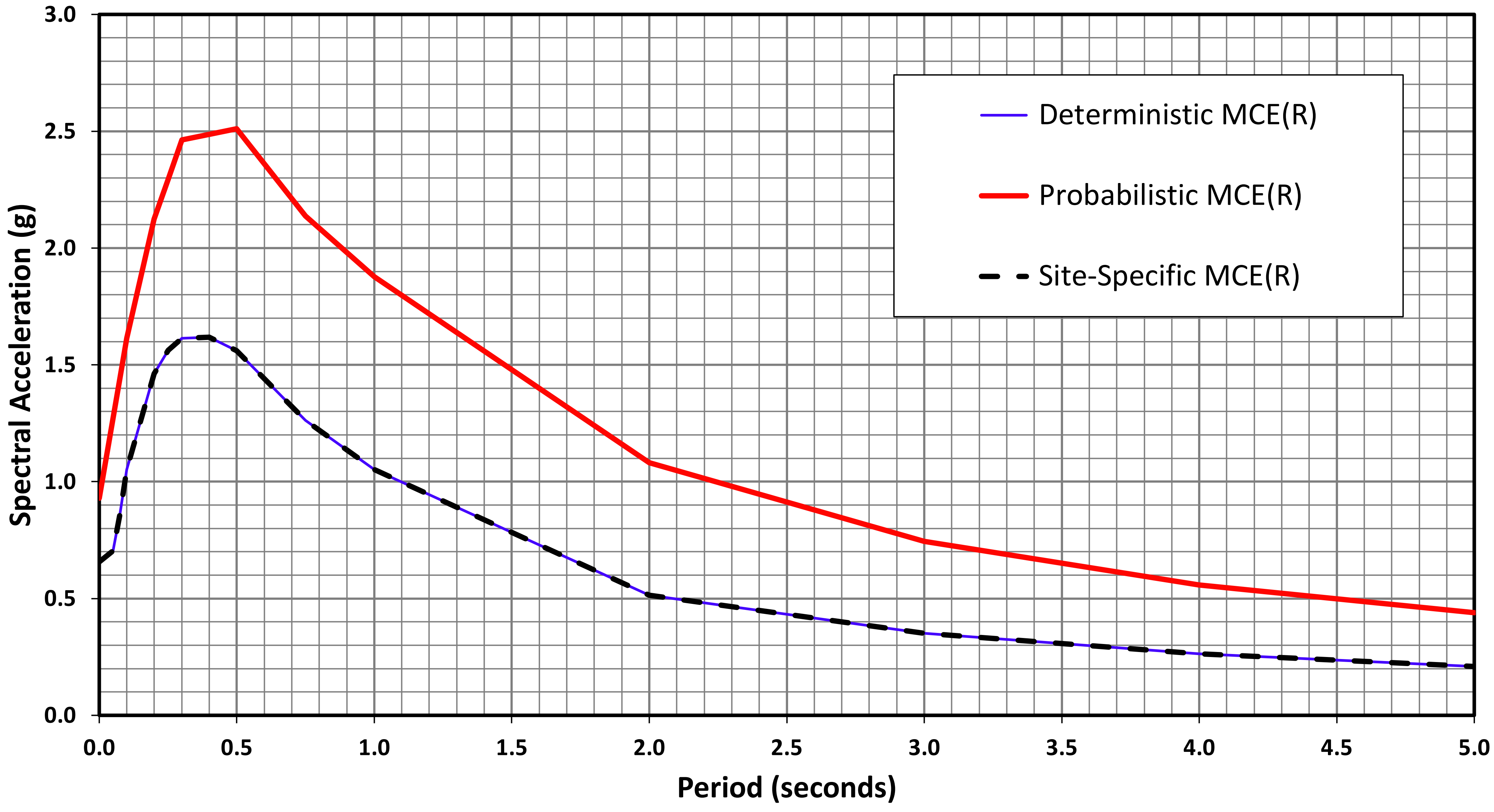
Vertical Pile Capacity

651 Martin Avenue Data Center
Santa Clara, CA

Project Number	1290-2-1
Figure Number	Figure 5
Date	September 2021
Drawn By	RRN



The Site-Specific Maximum Considered Earthquake (MCE_R) is defined as the lesser of the following at all periods:

- Deterministic MCE_R – maximum 84th percentile deterministic, or
- Probabilistic MCE_R – defined as the 2,475–year ground motion.

Site-Specific MCE_R	
Period (Seconds)	Spectral Acceleration (g)
0.00	0.657
0.05	0.705
0.08	0.860
0.10	1.052
0.20	1.461
0.25	1.562
0.30	1.613
0.40	1.618
0.50	1.561
0.75	1.263
1.00	1.052
2.00	0.514
3.00	0.352
4.00	0.263
5.00	0.209

References:

ASCE/SEI 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Strutures with Supplement No. 1.
2019 California Building Code, Title 24, Part 2, Volume 2

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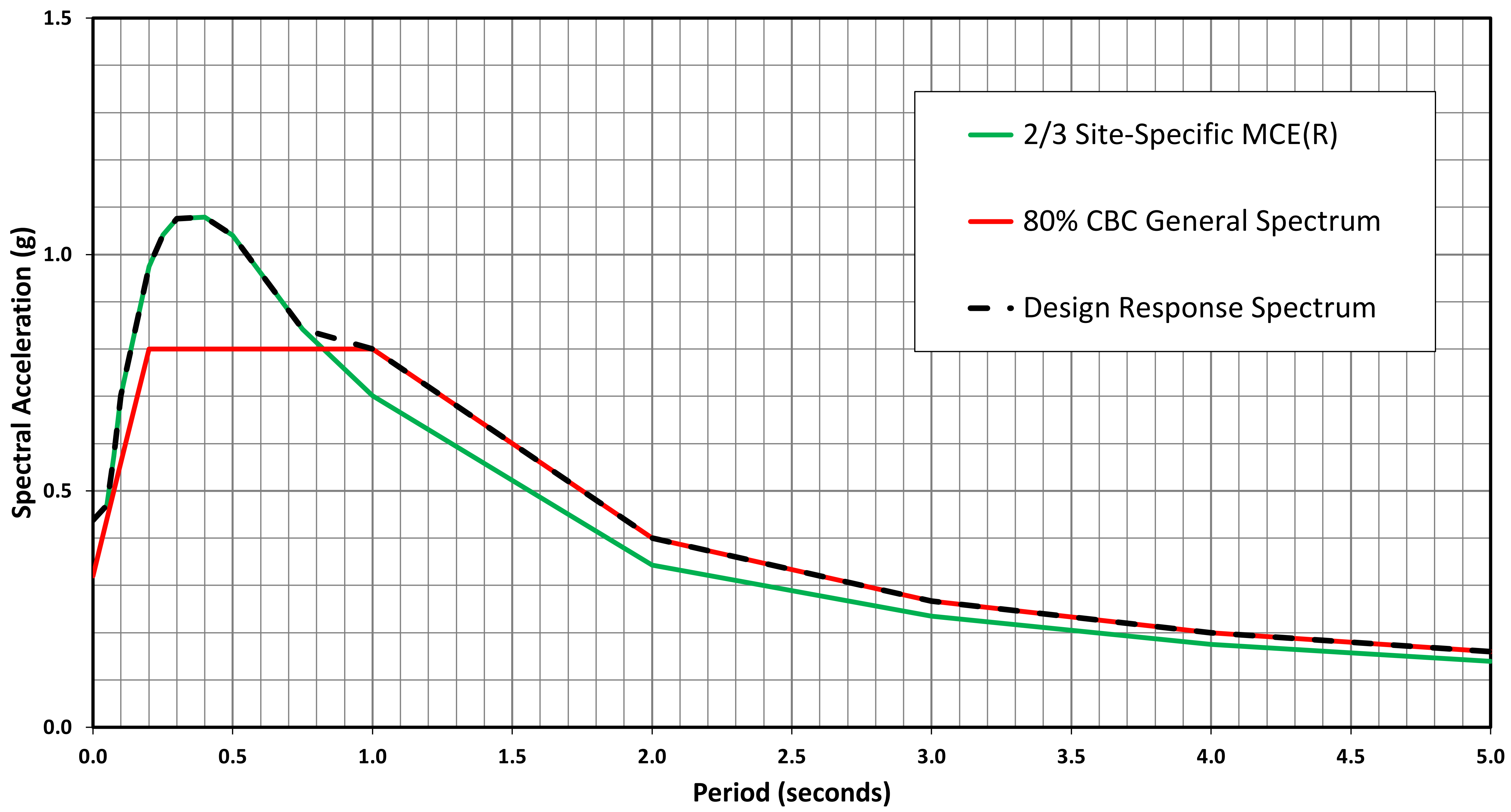
MCE_R RESPONSE SPECTRA

FIGURE 5

651 Martin Data Center
651 Martin Avenue
Santa Clara, CA 95050

PROJECT NO. 1290-2-1

September 20, 2021 | SCO



The Site-Specific Design Response Spectrum per Section 21.2, 21.3 and 21.4 of ASCE 7-16 is defined as the greater of the following at all periods:

- 2/3 of the Site-Specific MCE_R, or
- 80% of the CBC General Spectrum.

Design Response Spectra	
Period (Seconds)	Spectral Acceleration (g)
0.00	0.438
0.05	0.470
0.08	0.573
0.10	0.701
0.20	0.974
0.25	1.041
0.30	1.075
0.40	1.079
0.50	1.041
0.75	0.842
1.00	0.800
2.00	0.400
3.00	0.267
4.00	0.200
5.00	0.160

Site Design	Design Values
Site Class (Per Chapter 20 ASCE 7-16)	D
Shear Wave Velocity, V_{S30} (m/sec)	244
Site Latitude (degrees)	37.367903
Site Longitude (degrees)	-121.946467
Risk Category	II
Building Period (sec)	Unknown
Importance Factor, I_e	1
[1]Site Specific PGA_M (g)	0.597

[1] Lower of Deterministic and Probabilistic, but not less than 80% of mapped value of FM x PGA, determined in accordance with Section 21.5 of ASCE 7-16.

Design Acceleration Parameters[1]	
S_{DS}	0.971
S_{D1}	0.800
S_{MS}	1.457
S_{M1}	1.200

References:

ASCE/SEI 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Strutures with Supplement No. 1.
2019 California Building Code, Title 24, Part 2, Volume 2

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DESIGN RESPONSE SPECTRA

FIGURE 6

651 Martin Data Center
651 Martin Avenue
Santa Clara, CA 95050

PROJECT NO. 1290-2-1

September 20, 2021

SCO

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Eight 8-inch-diameter exploratory borings were drilled on August 23, 25, 26, and 30, 2021 to depths of 30 to 81 feet. Six CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on July 20 and 21, 2021, to depths ranging from 80 to 120 feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries, and other site features as references. Boring and CPT elevations were not determined. The locations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Relatively undisturbed samples were also obtained with 2.875-inch I.D. Shelby Tube sampler which were hydraulically pushed. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL	▨
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL	▨
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	▨
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	▨
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND	▨
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND	▨
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	▨
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	▨
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY	▨
			PI>4 AND PLOTS<"A" LINE	ML	SILT	▥
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT	▤
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY	▨
			PI PLOTS <"A" LINE	MH	ELASTIC SILT	▥
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT	▨
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT	▨

OTHER MATERIAL SYMBOLS

▨	Poorly-Graded Sand with Clay	▨	Sand
▨	Clayey Sand	▥	Silt
▨	Sandy Silt	▨	Well Graded Gravelly Sand
▨	Artificial/Undocumented Fill	▨	Gravelly Silt
▨	Poorly-Graded Gravelly Sand	■	Asphalt
▨	Topsoil	▨	Boulders and Cobble
▨	Well-Graded Gravel with Clay		
▨	Well-Graded Gravel with Silt		

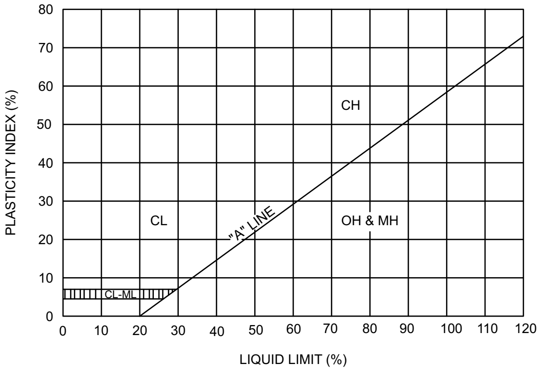
SAMPLER TYPES

☒	SPT	■	Shelby Tube
⧗	Modified California (2.5" I.D.)	○	No Recovery
▯	Rock Core	✋	Grab Sample

ADDITIONAL TESTS

CA	CHEMICAL ANALYSIS (CORROSIVITY)	PI	PLASTICITY INDEX
CD	CONSOLIDATED DRAINED TRIAXIAL	SW	SWELL TEST
CN	CONSOLIDATION	TC	CYCLIC TRIAXIAL
CU	CONSOLIDATED UNDRAINED TRIAXIAL	TV	TORVANE SHEAR
DS	DIRECT SHEAR	UC	UNCONFINED COMPRESSION
PP	POCKET PENETROMETER (TSF)	(1.5)	(WITH SHEAR STRENGTH IN KSF)
(3.0)	(WITH SHEAR STRENGTH IN KSF)		
RV	R-VALUE	UU	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	SIEVE ANALYSIS: % PASSING #200 SIEVE		
▼	WATER LEVEL		

PLASTICITY CHART



PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

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LEGEND TO SOIL DESCRIPTIONS

Figure Number
A-1

CORNERSTONE
EARTH GROUP

BORING NUMBER EB-1

PAGE 1 OF 2

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA
DATE STARTED 8/23/21 **DATE COMPLETED** 8/23/21
GROUND ELEVATION **BORING DEPTH** 50 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.368350° **LONGITUDE** -121.947062°
DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
∇ **AT TIME OF DRILLING** 12 ft.
NOTES
▼ **AT END OF DRILLING** 13 ft.

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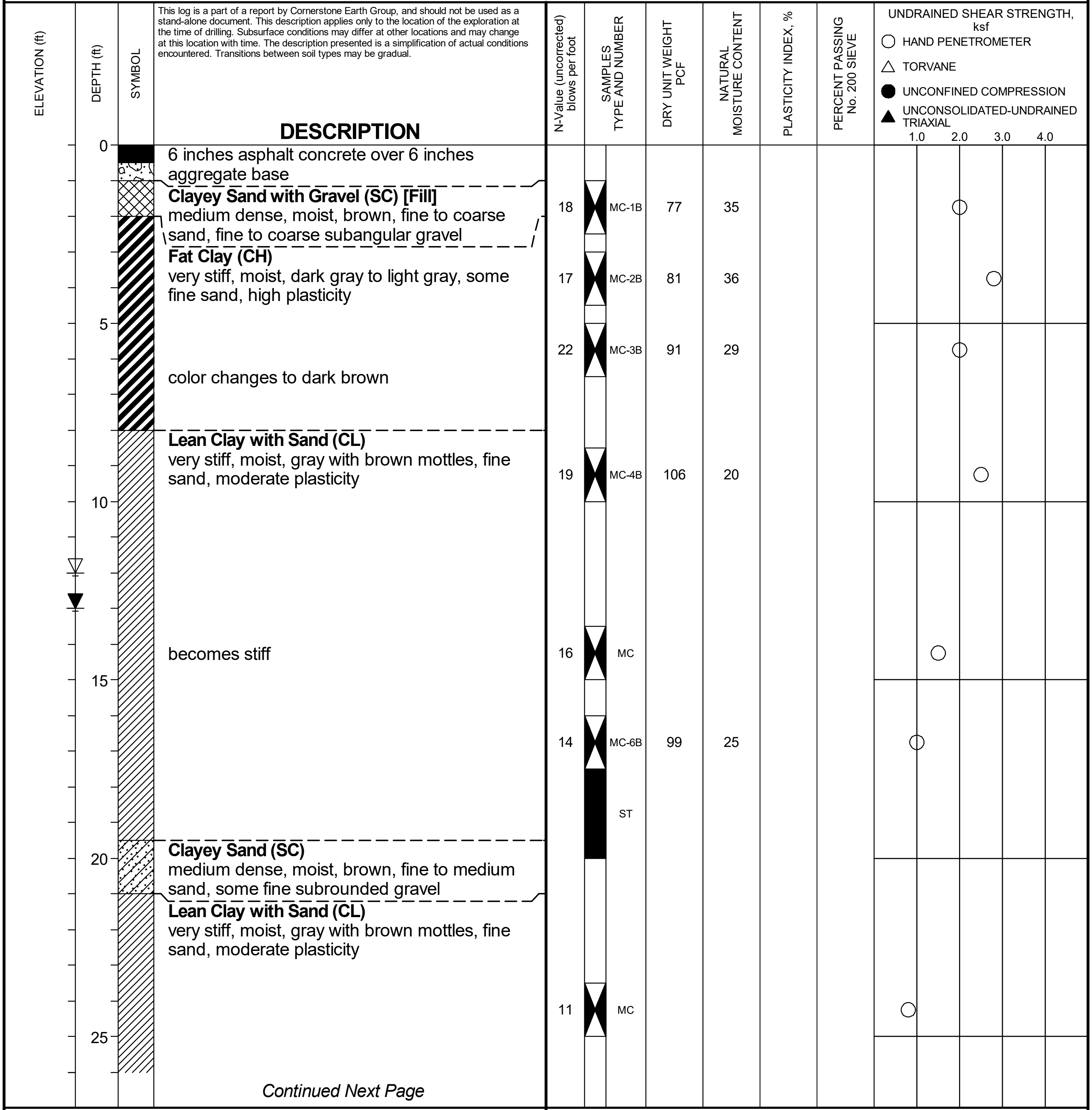

DESCRIPTION

6 inches asphalt concrete over 6 inches aggregate base

Clayey Sand with Gravel (SC) [Fill]
medium dense, moist, brown, fine to coarse sand, fine to coarse subangular gravel

Fat Clay (CH)
very stiff, moist, dark gray to light gray, some fine sand, high plasticity

color changes to dark brown

Lean Clay with Sand (CL)
very stiff, moist, gray with brown mottles, fine sand, moderate plasticity

becomes stiff

Clayey Sand (SC)
medium dense, moist, brown, fine to medium sand, some fine subrounded gravel

Lean Clay with Sand (CL)
very stiff, moist, gray with brown mottles, fine sand, moderate plasticity

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT
18	MC-1B	77	35
17	MC-2B	81	36
22	MC-3B	91	29
19	MC-4B	106	20
16	MC		
14	MC-6B	99	25
	ST		
11	MC		

Continued Next Page

BORING NUMBER EB-1

PAGE 2 OF 2

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA

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UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (1.0 2.0 3.0 4.0)
		▨	**Lean Clay with Sand (CL)** very stiff, moist, gray with brown mottles, fine sand, moderate plasticity							
				12	MC-9B	95	26			○
	30									
			Silty, Clayey Sand (SC-SM) medium desne, moist, gray, fine sand	21	SPT					
			Well Graded Sand with Silt (SW-SM) dense, moist, gray, fine to coarse sand, some fine to coarse subrounded gravel	35	SPT					
	35	▨	**Lean Clay with Sand (CL)** stiff, moist, gray with brown mottles, fine sand, moderate plasticity							
				25	MC-12B	101	25			○
	40									
			Sandy Lean Clay (CL) very stiff, moist, gray, fine sand, low to moderate plasticity							
				20	MC-13B	108	21			○ ▲
	45									
		▨	**Lean Clay with Sand (CL)** stiff, moist, gray with brown mottles, fine sand, moderate plasticity							
				31	MC-14B	106	22			○
	50		Bottom of Boring at 50.0 feet.							
	55									

BORING NUMBER EB-2

PAGE 1 OF 2

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA

DATE STARTED 8/26/21 **DATE COMPLETED** 8/26/21
DRILLING CONTRACTOR Exploration Geoservices Inc.
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
LOGGED BY EA
NOTES

GROUND ELEVATION **BORING DEPTH** 30 ft.
LATITUDE 37.368339° **LONGITUDE** -121.946335°
GROUND WATER LEVELS:
▽ **AT TIME OF DRILLING** 14 ft.
▼ **AT END OF DRILLING** 13 ft.

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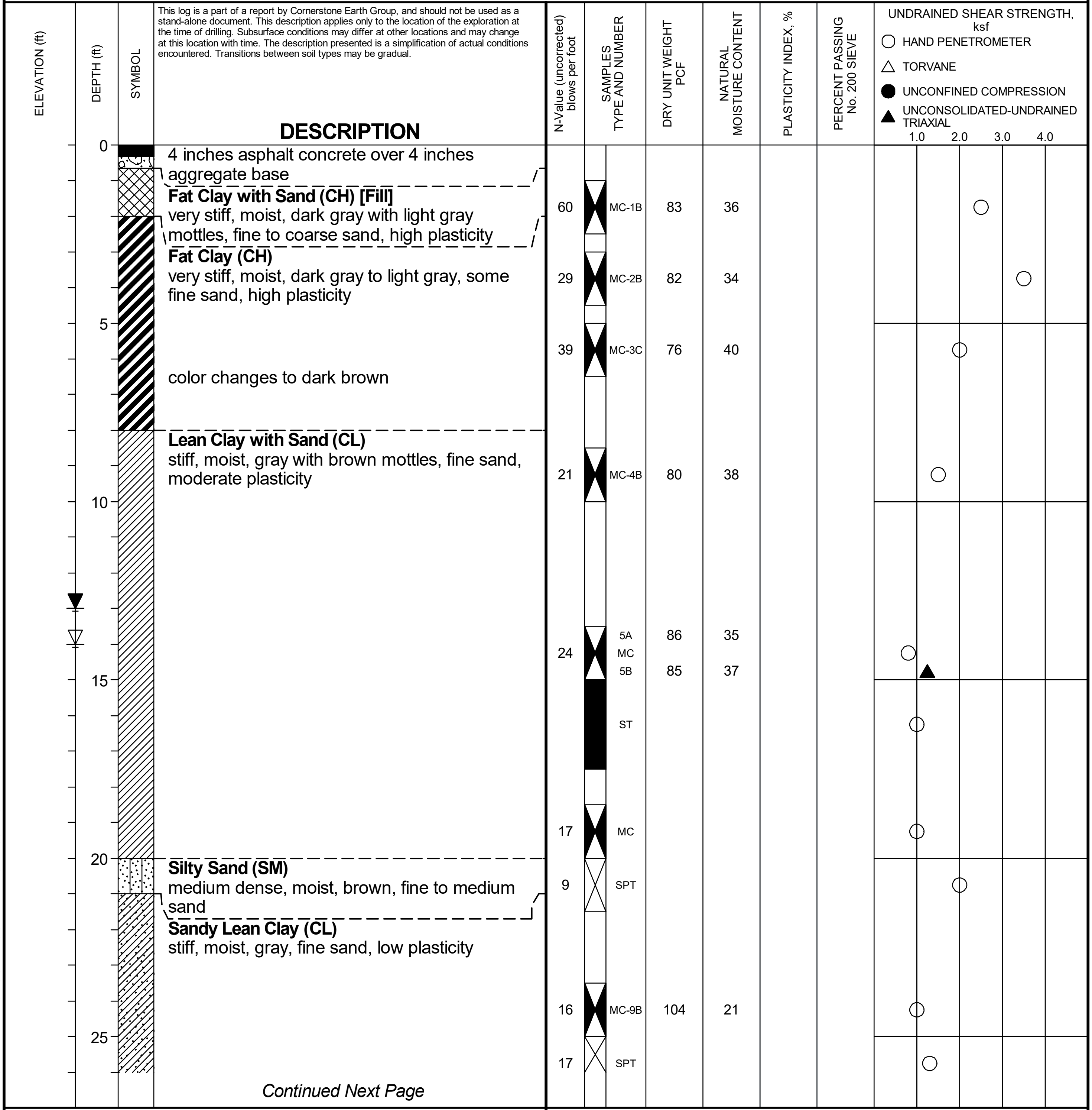

DESCRIPTION

4 inches asphalt concrete over 4 inches aggregate base

Fat Clay with Sand (CH) [Fill]
very stiff, moist, dark gray with light gray mottles, fine to coarse sand, high plasticity

Fat Clay (CH)
very stiff, moist, dark gray to light gray, some fine sand, high plasticity

color changes to dark brown

Lean Clay with Sand (CL)
stiff, moist, gray with brown mottles, fine sand, moderate plasticity

Silty Sand (SM)
medium dense, moist, brown, fine to medium sand

Sandy Lean Clay (CL)
stiff, moist, gray, fine sand, low plasticity

Continued Next Page

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
60	MC-1B	83	36		
29	MC-2B	82	34		
39	MC-3C	76	40		
21	MC-4B	80	38		
24	5A MC 5B	86 85	35 37		
	ST				
17	MC				
9	SPT				
16	MC-9B	104	21		
17	SPT				

BORING NUMBER EB-2

PAGE 2 OF 2

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf 1.0 2.0 3.0 4.0
		▨	**Sandy Lean Clay (CL)** stiff, moist, gray, fine sand, low plasticity	18	SPT					○
	30		Bottom of Boring at 30.0 feet.							
	35									
	40									
	45									
	50									
	55									

BORING NUMBER EB-3

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

DATE STARTED 8/30/21 **DATE COMPLETED** 8/30/21

GROUND ELEVATION **BORING DEPTH** 55 ft.

DRILLING CONTRACTOR Exploration Geoservices Inc.

LATITUDE 37.367910° **LONGITUDE** -121.947046°

DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger

GROUND WATER LEVELS:

LOGGED BY EA

▽ **AT TIME OF DRILLING** 13 ft.

NOTES

▼ **AT END OF DRILLING** 13.5 ft.

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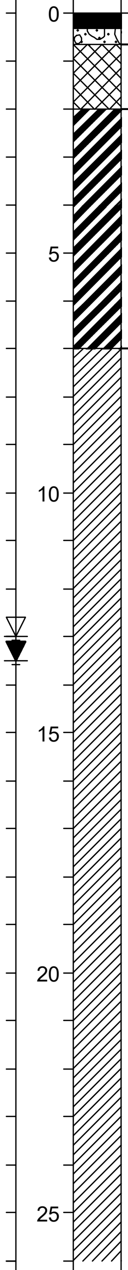


DESCRIPTION

4 inches asphalt concrete over 4 inches aggregate base

Fat Clay with Sand (CH) [Fill]
very stiff, moist, dark gray with brown mottles, fine to coarse sand, some fine gravel, high plasticity

Fat Clay (CH)
very stiff, moist, dark gray to light gray, some fine sand, high plasticity

color changes to dark brown

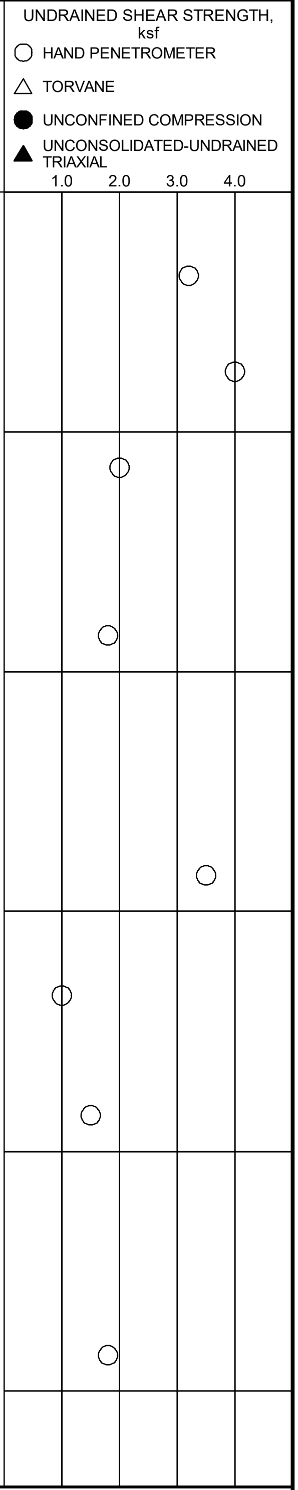
Lean Clay with Sand (CL)
stiff, moist, gray with brown mottles, fine sand, moderate plasticity

becomes very stiff

becomes stiff

Continued Next Page

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
31	MC-1B	78	37		
51	MC-2B	82	35		
32	MC-3B	87	31		
23	MC-4B	96	24		
15	MC-5B	103	21		
17	MC				
23	MC				
30	MC-8B	101	23		



BORING NUMBER EB-3

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CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf ○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0
			Poorly Graded Sand with Silt (SP-SM) dense, moist, gray, fine to medium sand	38	SPT					
	30		**Sandy Lean Clay (CL)** stiff, moist, gray, fine to coarse sand, low plasticity	22	MC					○
	35		**Silty Sand with Gravel (SM)** dense, moist, gray, fine to medium sand, fine subangular to subrounded gravel	50 5"	MC-11B	120	17			
			Lean Clay (CL) stiff, moist, brown, some fine sand, moderate plasticity							
	40		**Clayey Sand (SC)** medium dense, moist, brown, fine to medium sand	29	MC					
			Well Graded Sand with Clay (SW-SC) very dense, wet, gray, fine to coarse sand, fine to coarse subangular to subrounded gravel	50 6"	SPT					
	45			50 5"	SPT-14B		16			
	50		becomes medium dense	38	MC					
	55		**Lean Clay (CL)** stiff, moist, brown, some fine to coarse sand, moderate plasticity	23	SPT-16B		18			○

Bottom of Boring at 55.0 feet.

CORNERSTONE
EARTH GROUP

BORING NUMBER EB-4

PAGE 1 OF 3

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

DATE STARTED 8/23/21 **DATE COMPLETED** 8/23/21

GROUND ELEVATION **BORING DEPTH** 65 ft.

DRILLING CONTRACTOR Exploration Geoservices Inc.

LATITUDE 37.368019° **LONGITUDE** -121.945959°

DRILLING METHOD Mobile B-40, 8 inch Hollow-Stem Auger

GROUND WATER LEVELS:

LOGGED BY EA

▽ **AT TIME OF DRILLING** 10.5 ft.

NOTES

▼ **AT END OF DRILLING** 20.5 ft.

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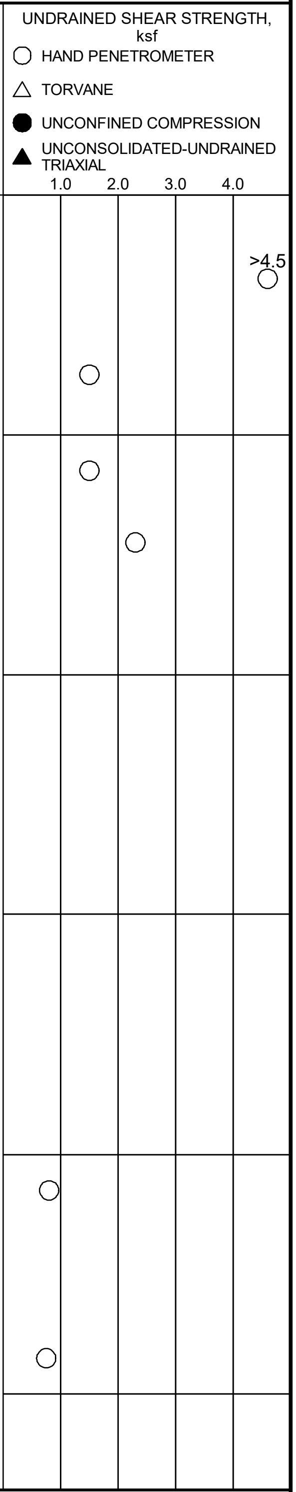
ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
	0	4 inches asphalt concrete over 2 inches aggregate base						
		Fat Clay with Sand (CH) [Fill] hard, moist, dark gray, fine to coarse sand, some fine gravel, high plasticity	23	MC-1B	75	37		
		Fat Clay (CH) stiff, moist, dark gray to light gray, some fine sand, high plasticity	14	MC-2B	85	31		
	5							
		color changes to dark brown	16	MC-3B	83	31		
		Lean Clay with Sand (CL) very stiff, moist, gray with brown mottles, fine sand, moderate plasticity	11	MC-4B	102	22		
				ST				
▽	10	**Silty Sand (SM)** medium dense, moist, gray, fine sand						
			15	NR				
		Poorly Graded Sand with Silt (SP-SM) medium dense, moist, gray, fine to coarse sand	14	SPT				
	15							
			24	SPT-7		10		
			13	SPT				
▼	20		20	SPT-9B		14		
		Sandy Lean Clay (CL) medium stiff, moist, gray, fine to medium sand, low plasticity						
			14	MC				
	25							



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BORING NUMBER EB-4

PAGE 2 OF 3

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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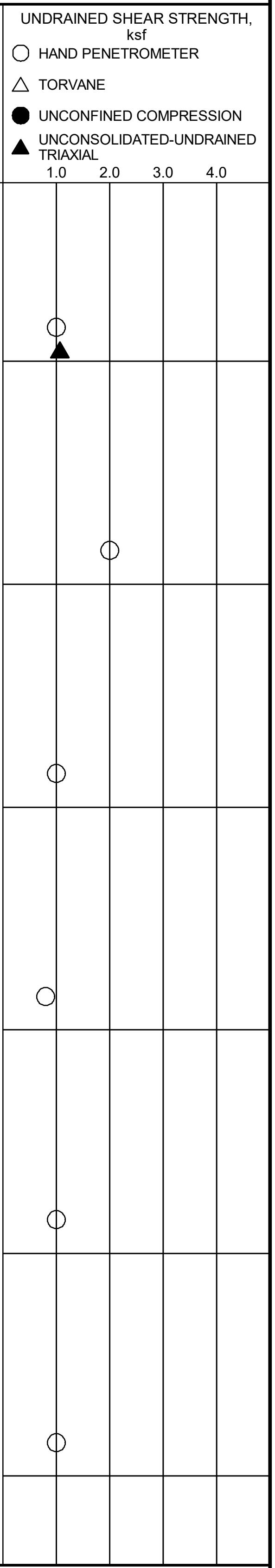
ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
		Sandy Lean Clay (CL) medium stiff, moist, gray, fine to medium sand, low plasticity						
	30		15	11A MC 11B	110 106	19 23		
			13	MC-12A	101	23		
	35	**Silty Sand (SM)** medium dense, moist, gray, fine to medium sand						
		Sandy Lean Clay (CL) stiff, moist, gray, fine sand, low plasticity						
	40		18	MC				
		Lean Clay with Sand (CL) medium stiff, moist, gray, fine sand, low plasticity						
	45		27	MC-14B	110	20		
	50		35	MC				
	55		39	MC-16B	104	22		



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BORING NUMBER EB-4

PAGE 3 OF 3

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
		▨	**Lean Clay with Sand (CL)** stiff, moist, gray, fine sand, low plasticity						
		▨		27	MC				
	60	▨							
		▨		57	MC-18B	107	22		
	65		Bottom of Boring at 65.0 feet.						
	70								
	75								
	80								
	85								

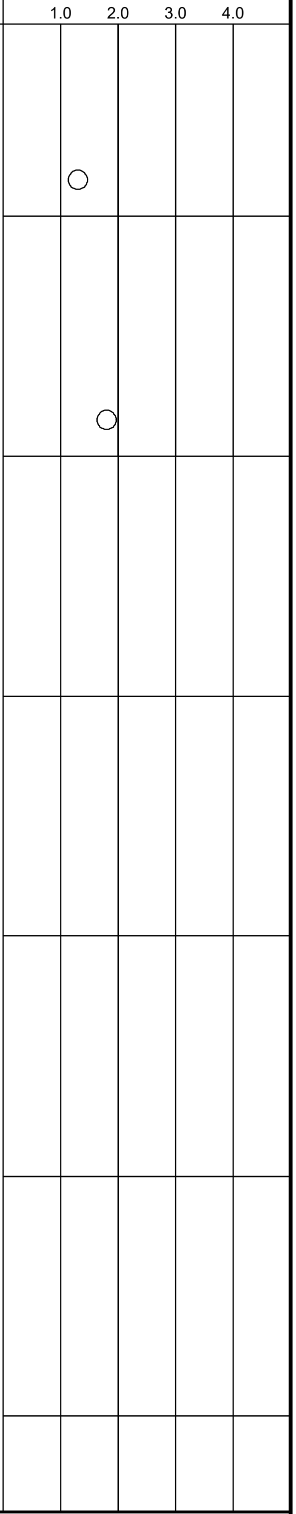
UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL



BORING NUMBER EB-5

PAGE 1 OF 3

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA
DATE STARTED 8/25/21 **DATE COMPLETED** 8/25/21
GROUND ELEVATION **BORING DEPTH** 80.8 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.367231° **LONGITUDE** -121.947003°
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
∇ **AT TIME OF DRILLING** 14 ft.
NOTES
▼ **AT END OF DRILLING** 14 ft.

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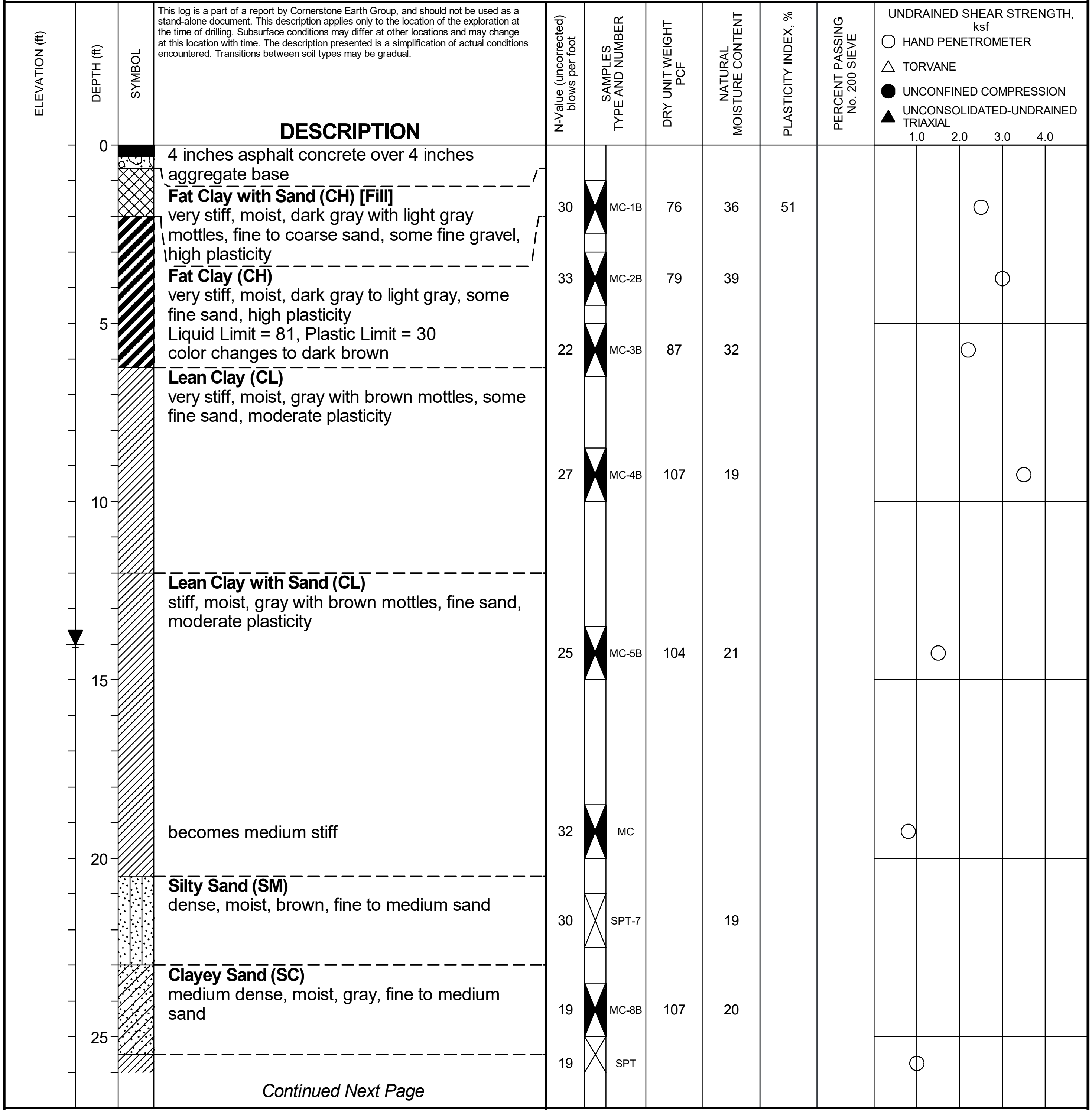

DESCRIPTION

4 inches asphalt concrete over 4 inches aggregate base

Fat Clay with Sand (CH) [Fill]
very stiff, moist, dark gray with light gray mottles, fine to coarse sand, some fine gravel, high plasticity

Fat Clay (CH)
very stiff, moist, dark gray to light gray, some fine sand, high plasticity
Liquid Limit = 81, Plastic Limit = 30
color changes to dark brown

Lean Clay (CL)
very stiff, moist, gray with brown mottles, some fine sand, moderate plasticity

Lean Clay with Sand (CL)
stiff, moist, gray with brown mottles, fine sand, moderate plasticity

becomes medium stiff

Silty Sand (SM)
dense, moist, brown, fine to medium sand

Clayey Sand (SC)
medium dense, moist, gray, fine to medium sand

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
30	MC-1B	76	36	51	
33	MC-2B	79	39		
22	MC-3B	87	32		
27	MC-4B	107	19		
25	MC-5B	104	21		
32	MC				
30	SPT-7		19		
19	MC-8B	107	20		
19	SPT				

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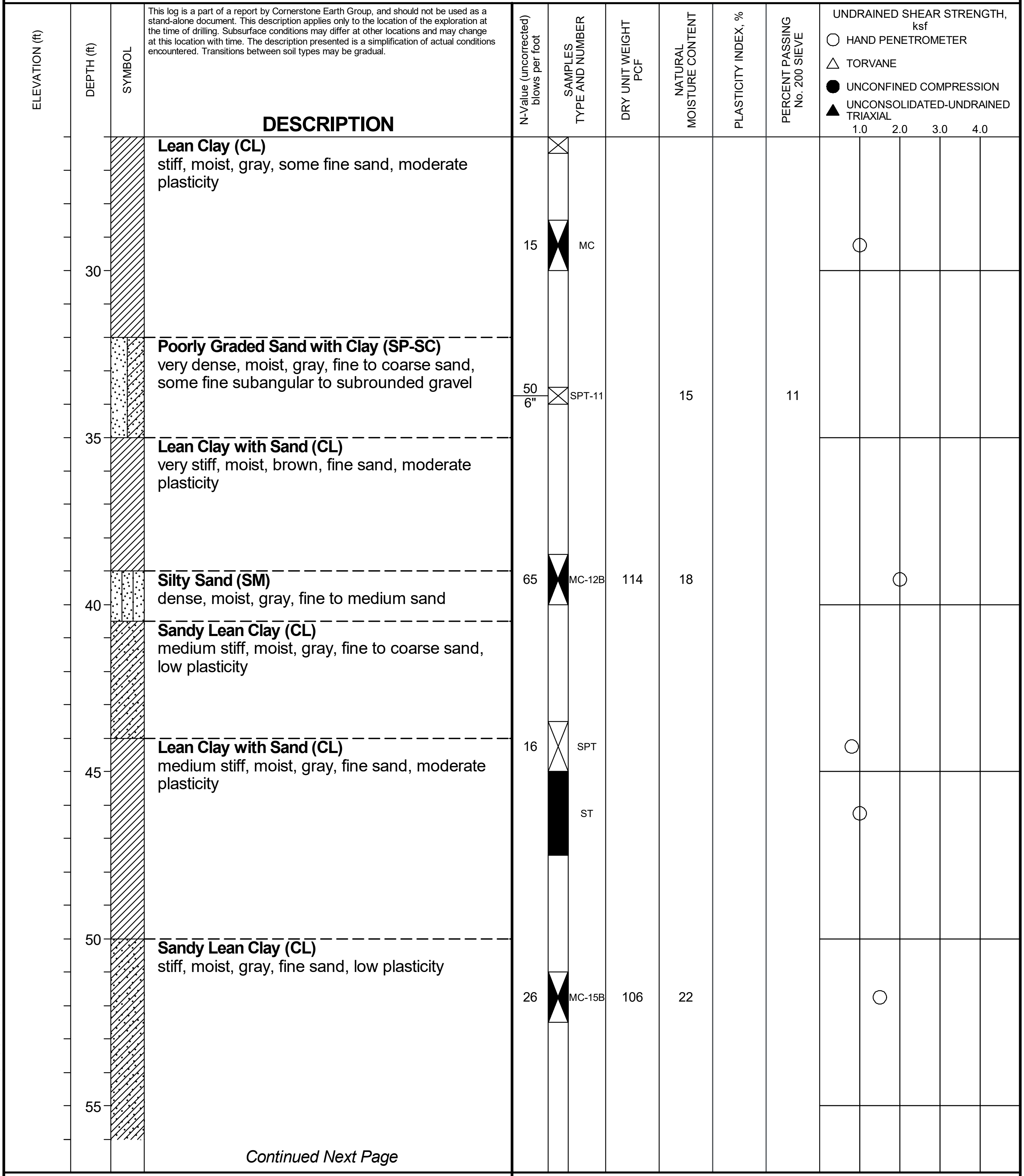
BORING NUMBER EB-5

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA



DESCRIPTION

Lean Clay (CL)
stiff, moist, gray, some fine sand, moderate plasticity

Poorly Graded Sand with Clay (SP-SC)
very dense, moist, gray, fine to coarse sand, some fine subangular to subrounded gravel

Lean Clay with Sand (CL)
very stiff, moist, brown, fine sand, moderate plasticity

Silty Sand (SM)
dense, moist, gray, fine to medium sand

Sandy Lean Clay (CL)
medium stiff, moist, gray, fine to coarse sand, low plasticity

Lean Clay with Sand (CL)
medium stiff, moist, gray, fine sand, moderate plasticity

Sandy Lean Clay (CL)
stiff, moist, gray, fine sand, low plasticity

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
15	MC					○
50 6"	SPT-11		15		11	
65	MC-12B	114	18			○
16	SPT					○
	ST					○
26	MC-15B	106	22			○

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CORNERSTONE
EARTH GROUP

BORING NUMBER EB-5

PAGE 3 OF 3

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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DESCRIPTION

Sandy Lean Clay (CL)
stiff, moist, gray, fine sand, low plasticity

Lean Clay with Sand (CL)
very stiff, moist, gray, fine sand, moderate plasticity

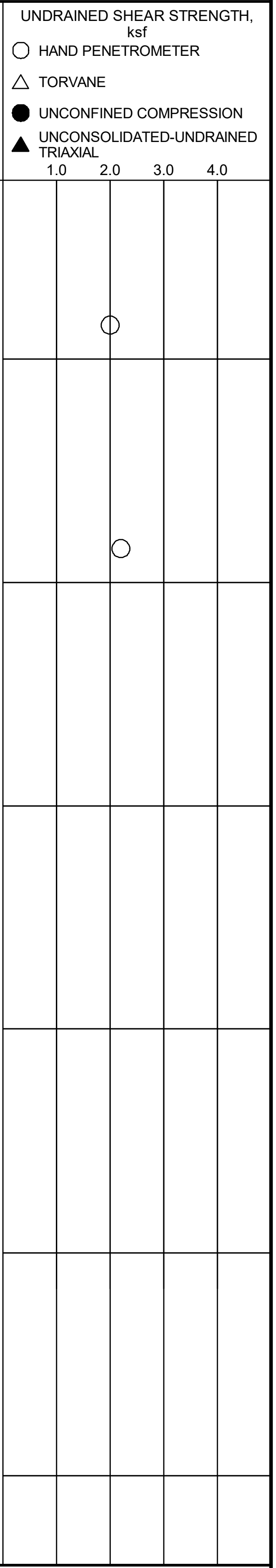
Well Graded Gravel with Clay and Sand (GW-GC)
very dense, wet, gray, fine to coarse gravel, fine to coarse sand

Lean Clay with Sand (CL)
very stiff, moist, brown, fine sand, moderate plasticity

Silty Sand (SM)
very dense, moist, gray, fine to medium sand

Bottom of Boring at 80.8 feet.

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
51	MC				
39	MC-17B	102	21		
50/6"	MC-18C		9		
50/6"	NR				
50/3"	SPT-19		16		



CORNERSTONE EARTH GROUP

BORING NUMBER EB-6

PAGE 1 OF 3

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA
DATE STARTED 8/30/21 **DATE COMPLETED** 8/30/21
GROUND ELEVATION **BORING DEPTH** 60 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.367326° **LONGITUDE** -121.946287°
DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
▽ **AT TIME OF DRILLING** 15 ft.
NOTES
▼ **AT END OF DRILLING** 15 ft.

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
	0	4 inches asphalt concrete over 4 inches aggregate base						
		Fat Clay with Sand (CH) [Fill] very stiff, moist, dark gray, fine to coarse sand, some fine gravel, high plasticity	43	MC-1	76	36		
		Fat Clay (CH) very stiff, moist, dark gray to light gray, some fine sand, high plasticity	36	MC-2B	82	35		
	5		19	MC-3B	83	34		
		color changes to dark brown						
		Lean Clay (CL) stiff to medium stiff, moist, gray with brown mottles, some fine sand, moderate plasticity	23	MC-4C	82	37		
	10							
			23	MC				
	▼ 15	**Poorly Graded Sand with Silt (SP-SM)** very dense, moist, brown, fine to coarse sand	54	SPT				
		becomes dense	52	MC-7B	118	10		
	20							
		becomes very dense	85	SPT				
	25							

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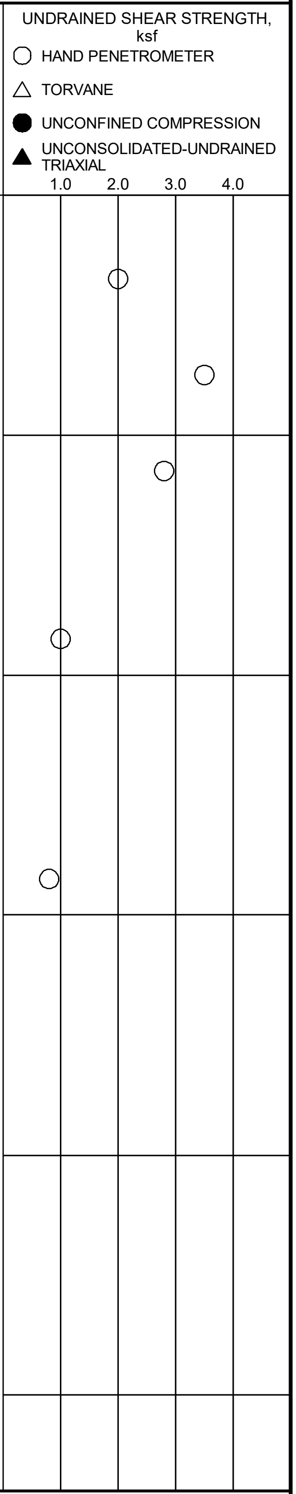

BORING NUMBER EB-6

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CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA

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UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
Lean Clay with Sand (CL) stiff, moist, gray, fine to coarse sand, moderate plasticity	39 24	NR SPT-9		 20			 ○ 1.5
Poorly Graded Sand with Clay (SP-SC) dense, moist, gray, fine to medium sand							
Clayey Sand (SC) dense, moist, gray, fine sand	36	SPT					
Poorly Graded Sand with Clay (SP-SC) medium dense, moist, brown, fine to coarse sand	24	MC-11B	105	18			○ 2.3
Clayey Sand (SC) medium dense, moist, gray with brown mottles, fine sand							
Sandy Silt (ML) stiff, moist, brown with gray mottles, fine sand, low plasticity	30	MC					○ 1.5
Sandy Lean Clay (CL) stiff, moist, brown with gray mottles, fine to coarse sand, low plasticity							
Clayey Sand (SC) dense, moist, brown, fine to coarse sand, some fine subangular gravel	86	MC-13C	124	13			○ 1.0
Lean Clay with Sand (CL) stiff, moist, gray, fine sand, moderate plasticity	50/4"	SPT					○ 1.5

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BORING NUMBER EB-6

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CORNERSTONE
EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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UNDRAINED SHEAR STRENGTH, ksf
- ○ HAND PENETROMETER
- △ TORVANE
- ● UNCONFINED COMPRESSION
- ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

1.0 2.0 3.0 4.0

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
		▨	**Lean Clay with Sand (CL)** stiff, moist, gray, fine sand, moderate plasticity	36	MC-15B	103	23			○ 2.0
	60		Bottom of Boring at 60.0 feet.							
	65									
	70									
	75									
	80									
	85									

BORING NUMBER EB-7

PAGE 1 OF 3

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA
DATE STARTED 8/26/21 **DATE COMPLETED** 8/26/21
GROUND ELEVATION **BORING DEPTH** 80 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.367821° **LONGITUDE** -121.946567°
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
▽ **AT TIME OF DRILLING** 14.5 ft.
NOTES
▼ **AT END OF DRILLING** 12 ft.

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ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
	0	4 inches asphalt concrete over 4 inches aggregate base						
		Clayey Sand (SC) [Fill] moist, brown, fine to coarse sand	62	MC-1B	85	34		
		Fat Clay (CH) hard to very stiff, moist, dark gray to light gray, some fine sand, high plasticity	38	MC-2B	84	35		
	5	color changes to dark brown	37	MC-3	80	37		
		Lean Clay (CL) stiff, moist, gray with brown mottles, some fine sand, moderate plasticity	21	MC-4B	84	37		
	10							
▼								
▽			31	MC-5B	106	21		
	15	**Sandy Lean Clay (CL)** stiff, moist, gray with brown mottles, fine sand, low plasticity						
		Poorly Graded Sand with Clay and Gravel (SP-SC) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	20	MC				
	20		14	SPT				
		Lean Clay with Sand (CL) medium stiff, moist, gray with brown mottles, fine sand, low plasticity						
		Clayey Sand (SC) medium dense, wet, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	27	MC-8B	104	19		
	25							

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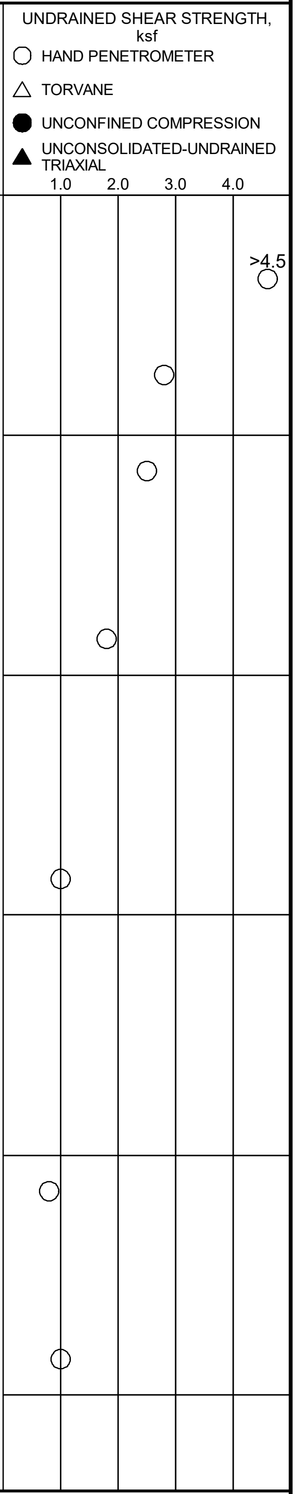

CORNERSTONE EARTH GROUP

BORING NUMBER EB-7

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf ○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0
			Lean Clay with Sand (CL) stiff, moist, gray with brown mottles, fine sand, low plasticity							
				30	MC					
	30									
			Clayey Sand (SC) very dense, moist, brown, fine sand	50 6"	SPT-10B		19			
			Silty Sand (SM) medium dense, moist, brown, fine sand	13	SPT					
	35		**Lean Clay with Sand (CL)** stiff, moist, gray with brown mottles, fine sand, moderate plasticity							
				30	MC-12	109	18			○
	40									
			Sandy Silt (ML) very stiff, moist, gray with brown mottles, fine sand, low plasticity							
				29	MC-13A	99	24			○
	45									
			Well Graded Sand with Clay and Gravel (SW-SC) very dense, wet, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50 6"	NR					○
			Sandy Lean Clay (CL) very stiff to stiff, moist, gray with brown mottles, fine sand, low plasticity							
	50									
				27	MC-15B	101	21			○
	55									

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PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

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DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
Sandy Lean Clay (CL) very stiff to stiff, moist, gray with brown mottles, fine sand, low plasticity						
Lean Clay with Sand (CL) stiff, moist, gray with brown mottles, fine sand, moderate plasticity	32	MC				
Well Graded Sand with Clay and Gravel (SW-SC) very dense, wet, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50 3"	MC-17		9		
Lean Clay with Sand (CL) very stiff, moist, gray with brown mottles, fine sand, moderate plasticity	32	SPT-18		25		
Poorly Graded Sand with Clay and Gravel (SP-SC) dense, wet, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	64	MC-19		15		
Lean Clay with Sand (CL) very stiff, moist, gray with brown mottles, fine to coarse sand, moderate plasticity	38	SPT-20		22		
Bottom of Boring at 80.0 feet.						

ELEVATION (ft)

DEPTH (ft): 60, 65, 70, 75, 80, 85

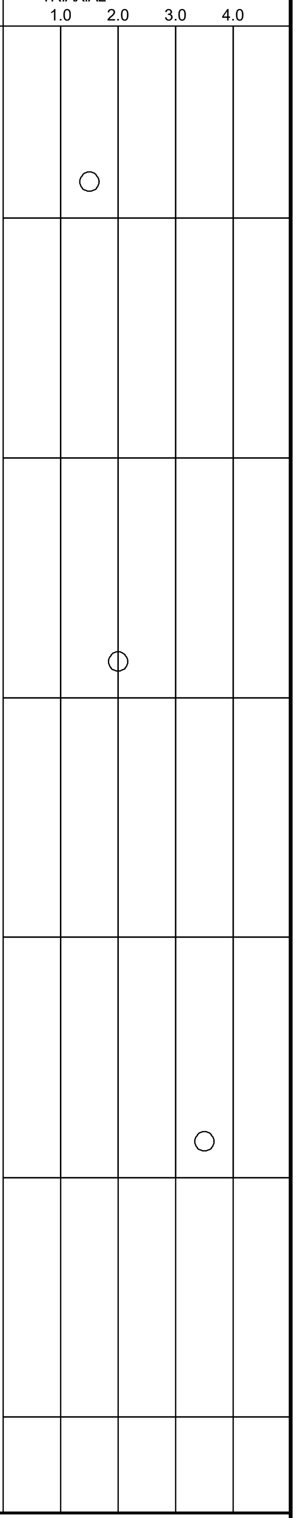
UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL



BORING NUMBER EB-8

CORNERSTONE EARTH GROUP

PROJECT NAME 651 Martin Avenue Data Center
PROJECT NUMBER 1290-2-1
PROJECT LOCATION Santa Clara, CA
DATE STARTED 8/25/21 **DATE COMPLETED** 8/25/21
GROUND ELEVATION **BORING DEPTH** 30 ft.
DRILLING CONTRACTOR Exploration Geoservices Inc.
LATITUDE 37.366594° **LONGITUDE** -121.947076°
DRILLING METHOD Mobile B-56, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY EA
▽ **AT TIME OF DRILLING** 14.5 ft.
NOTES
▼ **AT END OF DRILLING** 14 ft.

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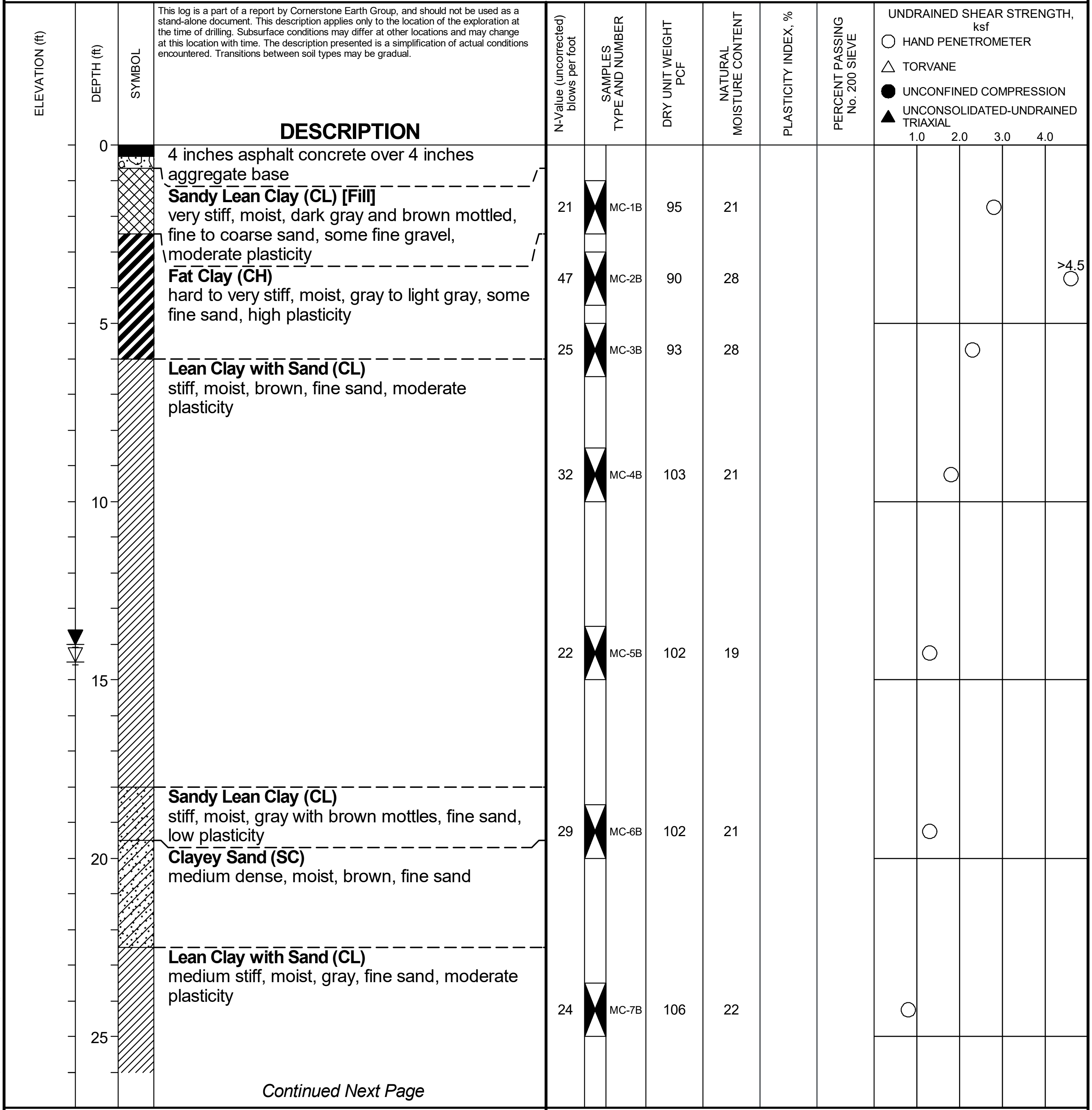

DESCRIPTION

4 inches asphalt concrete over 4 inches aggregate base

Sandy Lean Clay (CL) [Fill]
very stiff, moist, dark gray and brown mottled, fine to coarse sand, some fine gravel, moderate plasticity

Fat Clay (CH)
hard to very stiff, moist, gray to light gray, some fine sand, high plasticity

Lean Clay with Sand (CL)
stiff, moist, brown, fine sand, moderate plasticity

Sandy Lean Clay (CL)
stiff, moist, gray with brown mottles, fine sand, low plasticity

Clayey Sand (SC)
medium dense, moist, brown, fine sand

Lean Clay with Sand (CL)
medium stiff, moist, gray, fine sand, moderate plasticity

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
21	MC-1B	95	21		
47	MC-2B	90	28		
25	MC-3B	93	28		
32	MC-4B	103	21		
22	MC-5B	102	19		
29	MC-6B	102	21		
24	MC-7B	106	22		

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BORING NUMBER EB-8

PAGE 2 OF 2

PROJECT NAME 651 Martin Avenue Data Center

PROJECT NUMBER 1290-2-1

PROJECT LOCATION Santa Clara, CA

This log is a part of a report by Cornerstone Earth Group, 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

○ HAND PENETROMETER

△ TORVANE

● UNCONFINED COMPRESSION

▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (1.0 2.0 3.0 4.0)
		▨	**Lean Clay with Sand (CL)** medium stiff, moist, gray, fine sand, moderate plasticity	34	MC-8		23			○
	30		Bottom of Boring at 30.0 feet.							
	35									
	40									
	45									
	50									
	55									

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 81 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 66 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on one sample of the subsurface soils to aid in the classification of these soils. Result of this test is shown on the boring logs at the appropriate sample depth.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on three relatively undisturbed sample(s) by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of this test are included as part of this appendix.

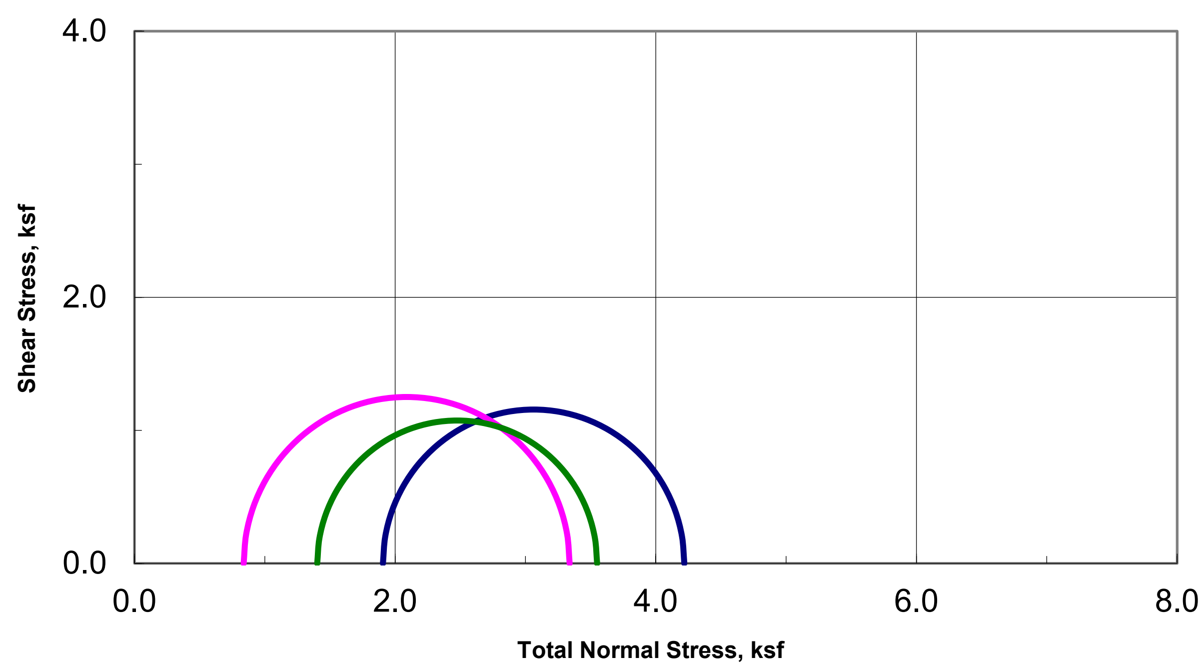
Consolidation: One consolidation test (ASTM D2435) was performed on a relatively undisturbed sample of the subsurface clayey soils to assist in evaluating the compressibility property of this soil. Results of the consolidation test are presented graphically in this appendix.

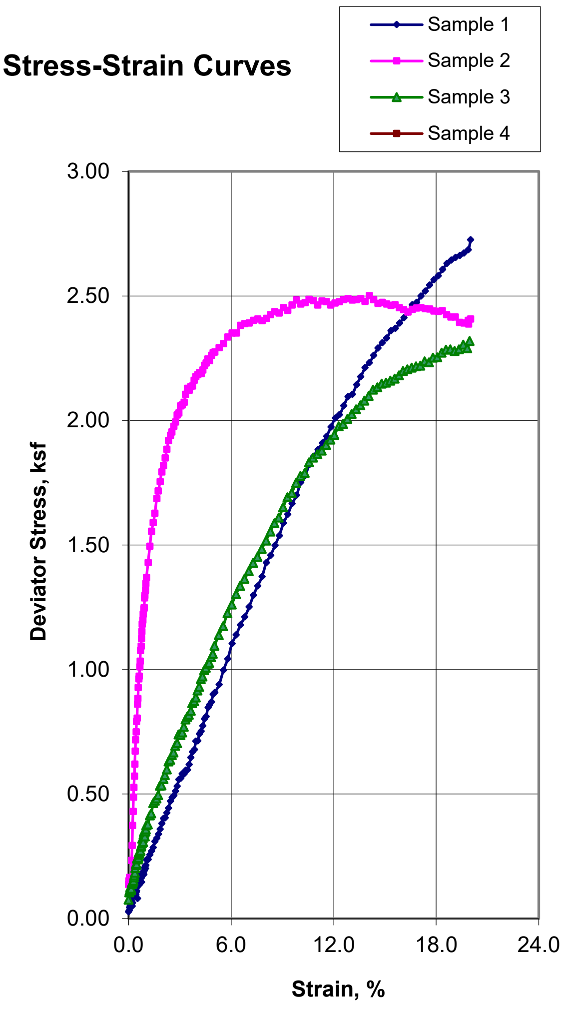
Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

COOPER
TESTING LABORATORY

Unconsolidated-Undrained Triaxial Test

ASTM D2850





Sample Data

	1	2	3	4
Moisture %	20.7	36.5	22.8	
Dry Den,pcf	107.9	84.6	105.5	
Void Ratio	0.562	0.993	0.628	
Saturation %	99.5	99.2	99.9	
Height in	5.00	4.98	4.98	
Diameter in	2.41	2.41	2.41	
Cell psi	13.2	5.8	9.7	
Strain %	15.00	14.09	15.00	
Deviator, ksf	2.312	2.501	2.147	
Rate %/min	1.00	1.00	0.99	
in/min	0.050	0.050	0.050	
Job No.:	**640-1483**			
Client:	**Cornerstone Earth Group**			
Project:	**1290-2-1**			
Boring:	EB-1	EB-2	EB-4	
Sample:	13B	5B	11B	
Depth ft:	44.5	14.5	29.5	

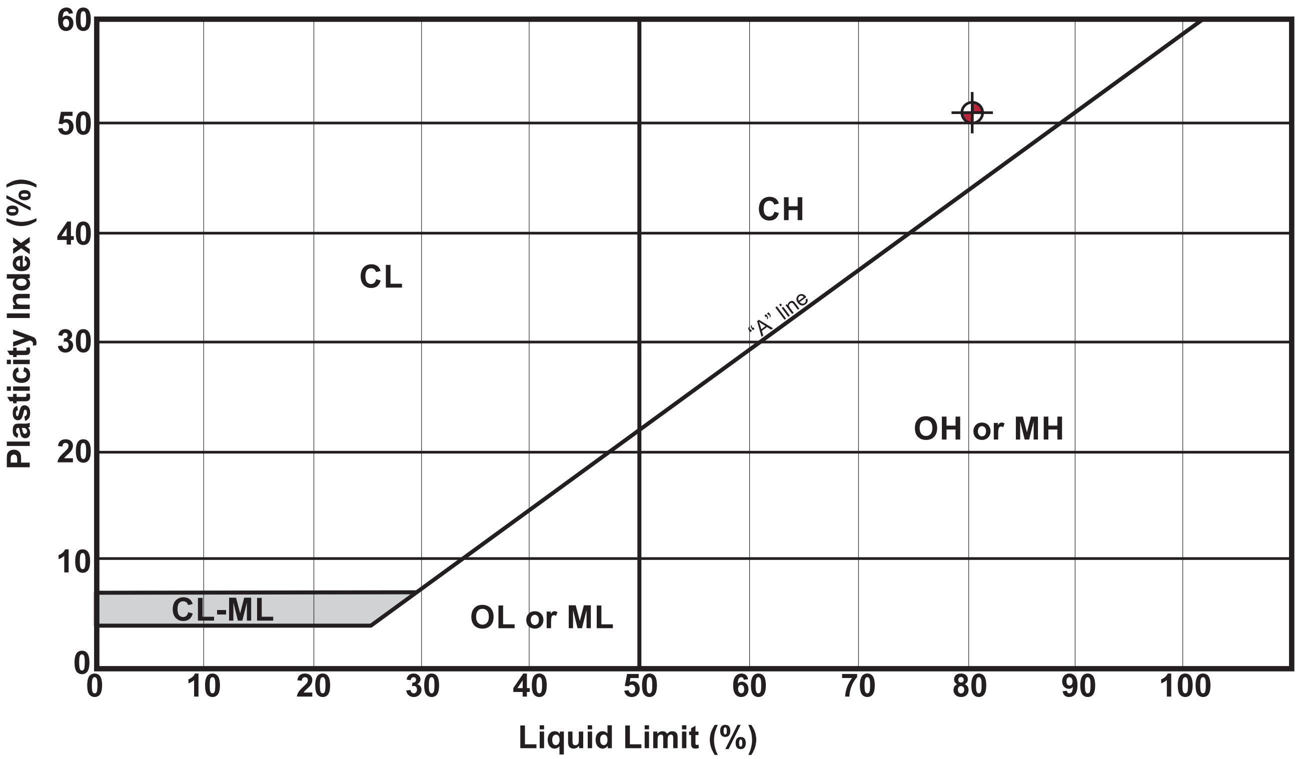
Visual Soil Description

Sample #	
1	Olive Brown Silty SAND
2	Olive Gray CLAY w/ Sand
3	Gray Sandy CLAY
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-5	2.0	36	81	30	51	—	Fat Clay (CH)

Samples prepared in accordance with ASTM D421

CORNERSTONE
EARTH GROUP

Plasticity Index Testing Summary

651 Martin Avenue Data Center
Santa Clara, CA

Project Number	1290-2-1
Figure Number	Figure B1
Date	September 2021
Drawn By	FLL