DOCKETED	
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Project Title:	Sequoia Data Center
TN #:	229419-3
Document Title:	Appendices A-N - part 2
Description:	N/A
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APPENDIX B
BAAQMD STATIONARY SOURCE INQUIRY FORM

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD

This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

Click here for guidance on coducting risk & hazard screening, including roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Click here for District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requester Contact Information

Date of Request	**6/24/2019**
Contact Name	Lewis Kunik
Affiliation	Ramboll US Corp
Phone	(415) 4265023
Email	lkunik@ramboll.com
Project Name	Cyrus One Santa Clara Data Center
Address	2600 De La Cruz Blvd, Santa Clara, CA 95050
City	Santa Clara
County	Santa Clara
Type (residential, commercial, mixed use, industrial, etc.)	Industrial
Project Size (# of units or building square feet)	1000000 sqft

Comments: 1. Distance from Receptor in Col. A is given as distance from facility boundary (we will calculate risk at MEI later on). 2. If the information is available, we request emissions breakdown information from airport sources in rows 57 and 58, including airplane emissions, ground operations equipment, etc. as this is a large airport facility which will likely impact receptors nearby this project.

For Air District assistance, the following steps must be completed:

1. Complete all the contact and project information requested in **Table A**. Incomplete forms will not be processed. Please include a project site map.

2. Download and install the free program Google Earth, **http://www.google.com/earth/download/ge/,** and then download the county specific Google Earth stationary source application files from the District's website, **http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.** The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

3. Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

4. Identify stationary sources within at least a 1000ft radius of project site. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm the source's address location. Please report any mapping errors to the District.

5. List the stationary source information in **Table B** blue section only.

6. Note that a small percentage of the statio[illegible]ave Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

7. Email this completed form to District staff. District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Areana Flores at 415-749-4616, or aflores@baaqmd.gov

this project.

Table B: Google Earth data

Distance from Receptor (feet) or MEI[1]	Facility Name	Address	Plant No.	Cancer Risk[2]	Hazard Risk[2]	$PM_{2.5}$[2]	Source No.[3]	Type of Source[4]	Fuel Code[5]	Status/Comments	Coordinate System	UTM X	UTM Y
380.98	Graphic Packaging International, Inc	2600 De La Cruz Blvd, Santa Clara, CA 95050	19441				Multiple	Multiple		Emissions file attached. Use Health Risk Tool to retrieve associated risks.	U10	593641.1659	4136239.46
502.73	Barefoot Coffee Roasters	2475 De La Cruz Blvd, Santa Clara, CA 95050	22227				S1, S2	Coffee Roaster (2)		Emissions file attached.	U10	593845	4136250
1095.74	Unocal #255290	2495 De la Cruz Blvd, Santa Clara, CA 95050	111966				S1	GDF		Max permitted throughput 2018: 2.42 million gallons/year	U10	593758.8321	4136013.49
1822.24	Vargas Gardening Service	495 Robert Ave, Santa Clara, CA 95050	108575				S1	GDF		Max permitted throughput 2018: 197,000 gallons/year	U10	593504.1125	4135895.49
196.1	Alamo Rental (US) Inc	2752 De la Cruz Blvd, Santa Clara, CA 95050	112224				S1	GDF		Max permitted throughput 2018: 400,000 gallons/year	U10	593726.9487	4136323.35
1782.03	German Auto Body Shop	418 Robert Ave, Santa Clara, CA 95050	11418				S2	Coating operation		Emissions file attached	U10	593672.8924	4135849
1848.28	The Way Auto Care	444 ROBERT AVE, Santa Clara, CA 95050	21449				S2	Coating operation		Emissions file attached	U10	593599.7985	4135847.78
1869.37	Premier Body Shop LLC	380 MARTIN AVE STE 1, Santa Clara, CA 95050	21508				S2	Coating operation		Emissions file attached	U10	593850.435	4135842.03
1976.48	Service King Paint & Body	631 Martin Ave, Santa Clara, CA 95050	22712				S6	Coating operation		Emissions file attached.	U10	593308.103	4136042.27
3940	San Jose International Airport	1701 Airport Blvd, San Jose CA 95112	13367				Multiple	Multiple		Emissions file attached.	U10	594848	4136464
5808	Delta Air Lines Inc	SJ Int'l Airport, Santa Clara, CA 95120	13617				Multiple	Multiple		Emissions file attached	U10	595398	4135901

Footnotes:

1. Maximally exposed individual
2. These Cancer Risk, Hazard Index, and PM2.5 columns represent the values in the Google Earth Plant Information Table.
3. Each plant may have multiple permits and sources.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. Fuel codes: 98 = diesel, 189 = Natural Gas.
6. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
7. The date that the HRSA was completed.
8. Engineer who completed the HRSA. For District purposes only.
9. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
10. The HRSA "Chronic Health" number represents the Hazard Index.
11. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.

f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
g. This spray booth is considered to be insignificant.

Date last updated:
03/13/2018

APPENDIX G: AIR DISPERSION MODELING REPORT

Intended for
California Energy Commission

Date
August 2019

CYRUSONE SEQUOIA BACKUP GENERATING FACILITY:
AIR DISPERSION MODELING REPORT

RAMBOLL

CONTENTS

TABLES

ATTACHMENT

Attachment A: Figures
- 1: Project Location and Facility Layout
- 2: Modeled Receptor Locations

Attachment B: Tables
- B-1: Generator Information Modeling Protocol
- B-2: Point Source Parameters
- B-3: Modeled NOx Emission Rates
- B-4: Modeled Buildings
- B-5: 1-Hour NO2 NAAQS Results
- B-6: 1-Hour NO2 CAAQS Results
- B-7: 1-Hour and 8-Hour CO Modeled Concentrations

Attachment C: Manufacturer Performance Data Sheets

1. INTRODUCTION

CyrusOne, Inc. (the applicant) is proposing to develop a data center in Santa Clara, California termed "Sequoia Data Center" (SDC) and Sequoia Backup Generating Facility (SBGF). The data center will install up to fifty-four (54) 2.25-megawatts (MW) backup emergency diesel generators.

The applicant is submitting this air dispersion modeling report to the California Energy Commission (CEC) in support of its application for a Small Power Plant Exemption (SPPE). This modeling is for the SBGF. The SPPE application provides a detailed facility description, the quantification of emissions from facility sources, a review of applicability of federal and state air regulations, and the manufacturer's specification sheets for the proposed emergency generators. There are no stationary combustion sources at the facility other than the emergency standby generators.

A list of generator models at the facility and the generator ID numbers for the proposed generators at the applicant's facility are included in **Attachment B, Table B-1**.

2. AIR QUALITY ANALYSIS APPROACH

An air dispersion modeling analysis was completed to reflect the normal operating conditions of the SBGF and analyze potential air quality impacts in relation to the following standards:

- The 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (NAAQS) and the California Ambient Air Quality Standard (CAAQS).
- The 1-hour and 8-hour carbon monoxide (CO) NAAQS and CAAQS.

The analyses were conducted consistent with the following federal and state guidance documents:

- U.S. EPA's Guideline on Air Quality Models 40 CFR 51, Appendix W (Revised, January 17, 2017), herein referred to as Appendix W;
- U.S. EPA's AERMOD Implementation Guide (Revised, August 3, 2015); and
- California Air Pollution Control Officers Association (CAPCOA) Guidance Document "Modeling Compliance of the Federal 1-Hour NO2 NAAQS" (Dated October 27, 2011).

The applicable values for the NAAQS and CAAQS are provided in **Table 1**.

Table 1. Applicable NAAQS and CAAQS

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_2	1-Hour	188 [(a)]	339 [(b)]
CO	1-Hour	40,000	23,000
CO	8-Hour	10,000	10,000

Notes:
(a) Standard of 100 ppb converted to $\mu g/m^3$. 98th percentile of 1-hour daily maximum concentrations, averaged over five years.
(b) Standard of 180 ppb converted to $\mu g/m^3$. Maximum 1-hour.

2.1 NAAQS and CAAQS Analysis

The NAAQS and CAAQS modeling evaluation incorporates all proposed sources at the SBGF site (all 54 generators).

For the NO_2 modelling analysis, a seasonal-by-hour representative background concentration from concurrent historical NO_2 monitoring data near the site was added to the modeled concentrations on an hour-by-hour basis for comparison against the applicable NAAQS concentration to represent the contribution of sources not explicitly modeled. For the CAAQS analysis, the maximum 1-hour NO_2 concentration from the 5 years of monitoring data were added to the maximum modelled concentration and compared to the standard.

Because CO concentration is anticipated to be well below the threshold, a more conservative analysis that over estimates concentrations was performed to estimate CO concentrations. For the CO analysis, the maximum 1-hour and 8-hour CO concentration from the 5 years of

monitoring data was added to the maximum modelled concentration and compared to the standard.

The model outputs that were used for assessing compliance with the NAAQS and CAAQS are summarized in **Table 2**.

Table 2. Modeling Output for NAAQS & CAAQS Compliance Demonstration

Pollutant and Averaging Period	Model Output
1-Hour NAAQS NO_2	Daily maximum 1-hour average of the 8th high across 5 years, on a receptor-by-receptor basis
1-Hour CAAQS NO_2	Single maximum 1-hour concentration across 5 years on a receptor-by-receptor basis
1-Hour NAAQS CO	Single maximum 1-hour concentration across 5 years on a receptor-by-receptor basis
8-Hour NAAQS CO	Single maximum 8-hour concentration across 5 years on a receptor-by-receptor basis
1-Hour CAAQS CO	Single maximum 1-hour concentration across 5 years on a receptor-by-receptor basis
8-Hour CAAQS CO	Single maximum 8-hour concentration across 5 years on a receptor-by-receptor basis

2.1.1 Background Concentrations

NO_2 background data for the 1-hour NO_2 NAAQS and CAAQS analyses were obtained from the AQS Monitoring Station in San Jose (Jackson, 06-085-0005), the nearest station to the facility. These data, spanning the period from January 2013 through December 2017. Missing values for one or two consecutive hours were replaced by the larger value of the preceding or following hour. When 3 or more consecutive hours were missing, the monthly-by-hour maximum for the 5-year period was used to substitute for the missing hours. For the NAAQS analysis, these data were then used to calculate the seasonal-by-hour background using the five-year average of the 3rd highest value of the available monitoring data, determined by accounting for both season and hour-of-day. The 3rd, 2nd, or 1st highest season by hour-of-day value for each year was used to average over the five years depending on the completeness of the seasonal data for that year (3rd highest with more than 60 valid days per season, 2nd highest with between 30 and 60 days, and 1st highest with more than 15 days).

For the CAAQS NO_2 analysis and CO analysis, the 5-year dataset was used to determine the maximum hourly concentration over the period.

3. MODELING METHODOLOGY, SETTINGS, AND INPUTS

This section outlines the technical approach used in the modeling evaluations. Figures of the project layout are provided in **Attachment A** and tables supporting this modeling evaluation and outlining the model inputs are provided in **Attachment B**. Manufacturer performance data sheets are included in **Attachment C**.

3.1 Model Selection and Settings

To estimate off-property ambient concentrations, version (18081) of the AERMOD modeling system was used. AERMOD is U.S. EPA'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, except for the NO_2/NO_X in stack ratio (discussed in Section 3.1.1) for the NO_2 analysis.

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.

3.1.1 NO_2 Modeling Approach

Tier 3 Plume Volume Molar Ratio Method (PVMRM) was used for the NO_2 Significance Analyses and to demonstrate compliance with the NO_2 NAAQS and PSD Increment standards. As part of the recent Appendix W updates, U.S. EPA incorporated the PVMRM as a regulatory default method for NO_2 modeling.

An NO_2/NO_X in stack ratio of 0.10 for the facility's proposed backup emergency generators was used. This value was selected based on data from onsite generators of the same make and model as the proposed generators, and from U.S. EPA's In-Stack Ratio Database for diesel/kerosene-fired reciprocating internal combustion engines (RICE).[1] The U.S. EPA database has data for 57 diesel-fired RICE that indicate a median, mean, and even a second-high value, that are less than a 0.10 NO_2/NO_X ratio.

Hourly ozone data from the San Jose AQS Monitoring Station was used (Jackson, 06-085-0005) 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, those values were replaced by the maximum values of the month-by-hour data set (i.e., the highest monitored value of the five years of data categorized by month of year and hour of day).

3.2 Modeled Sources and Release Parameters

The NAAQS and CAAQS analyses included cumulative assessments of the NO_2 impacts from the applicant's facility sources and the impacts from nearby NO_2-emitting sources (background). The following sections describe the release parameters that were used in the model.

[1] https://www3.epa.gov/scram001/no2_isr_database.htm

3.2.1 Proposed Facility Sources

The site's emission sources were modeled as point sources using manufacturer-provided stack parameters (**Attachment B, Table B-2and Table B-3**).

Emission rate, flow rate and temperature vary at different loads. To capture the maximum impact for comparison with the short-term NAAQS and CAAQS, all loads were analyzed and modeled assuming operation in each load for one full hour.

A detailed derivation of the modeled hourly NO_X and CO emission rates used in the models is provided in **Attachment B, Table B-3**.

Source locations are shown in **Attachment B, Figure 1.**

3.3 Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions that was used as inputs was 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.

Onsite and nearby offsite buildings were evaluated for downwash effects on each modeled point source. Each generator is located inside its own weather-proof enclosure, with the generator stack extending from the top of the enclosure. Each generator enclosure was included as a building in the model. A single onsite building with three tiers (modelled as separate buildings) and one adjacent offsite building-was included. The modeled parameters for the buildings and the weather-proof enclosures for the generators is provided in **Attachment B, Table B-4** and shown in **Attachment B, Figure 1**.

3.4 Good Engineering Practice Stack Height Analysis

U.S. EPA 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.

3.5 Terrain Data and Land Use

Per U.S. EPA guidance, terrain elevations were incorporated into the model using of AERMAP (version 18081), 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 Consortium (MRLC).[2] AERMAP was configured to assign elevations for the sources, buildings, property line receptors, and discrete gridded receptors in the modeling domain.

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

[2] http://www.mrlc.gov

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 (1,664,496, from the 2010 US Census).

3.6 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 adjacent to 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 2013 through December 2017 were processed using AERMINUTE (version 15272) and AERMET (version 18081). 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.

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 surface characteristic preprocessor, AERSURFACE (18081), and the USGS 1992 National Land Cover (NLCD92) land use data set. The NLCD92 data set used in the analysis has a 30-meter resolution and 21 land use categories. Monthly surface parameters were determined using AERSURFACE according to U.S. EPA's guidance.

Monthly albedo and Bowen ratio values were based on averaging over a 10-km by 10-km region centered on the San Jose Airport meteorological site. Monthly surface roughness values were calculated for twelve 30-degree sectors within 1 km of the San Jose Airport meteorological station.

3.7 Receptor Grid

Ground-level concentrations were calculated at receptors placed along the facility fence line and on a circular, Cartesian grid. For this analysis, receptors extending up to 1 km from the fence line, as needed, were modeled using the following resolutions:

- 10-meter resolution for fence line receptors;
- 20-meter resolution extending from the fence line to 1,000 meters.

Attachment B, Figure 2 shows the modeled receptor locations.

4. SUMMARY OF MODELING RESULTS

The following sections summarize the results of the NO_2 dispersion modeling analyses and demonstrate that the SBGF will not cause or contribute to a violation of the NAAQS or CAAQS.

4.1 NO_2 NAAQS and CAAQS Analyses

Modeling was conducted to demonstrate compliance with the 1-hour NO_2 NAAQS and CAAQS. The results of these analyses are presented in **Table 3** and demonstrate that there are no predicted violations of the NO_2 NAAQS or CAAQS.

Table 3. NO2 NAAQS and CAAQS Results

Standard	Year	UTM East (m)	UTM North (m)	Total Ambient Conc.[a,b] (µg/m³)	Threshold (µg/m³)	Above Threshold?
1-Hour NAAQS	5Y AVG	593,433	4,136,221	184.98	188	No
1-Hour CAAQS	H1H	593,433	4,136,221	325.40	339	No

Notes:

(a) The value shown is the maximum from any of the emergency generators being tested for 1-hour at any load analyzed. Generators will not be tested simultaneously.

(b) Total ambient concentration represents the modeled concentration plus the background concentration. An hour-by-hour background file, concurrent with the meteorological data, was included in the CAAQS model so the model output represents the total ambient concentration at each receptor. Season-by-hour background were used for the NAAQS model, so this model output also represents the total ambient concentration at each receptor.

The modeled 1-hour NO_2 concentrations shown in **Table 3** are representative of the maximum value from all of the modeled generators. A full summary of the model results for the 1-hour NO_2 NAAQS and CAAQS analyses are provided in **Attachment B, Table B-5 and B-6,** respectively.

4.2 CO NAAQS and CAAQS Analyses

Modeling was conducted to demonstrate compliance with the 1-hour and 8-hour CO NAAQS and CAAQS. The results of these analyses are presented in **Table 4** and demonstrate that there are no predicted violations of the CO NAAQS or CAAQS. Because the CAAQS is more a strict standard, only the CAAQS is presented below.

Table 4. CO NAAQS and CAAQS Results

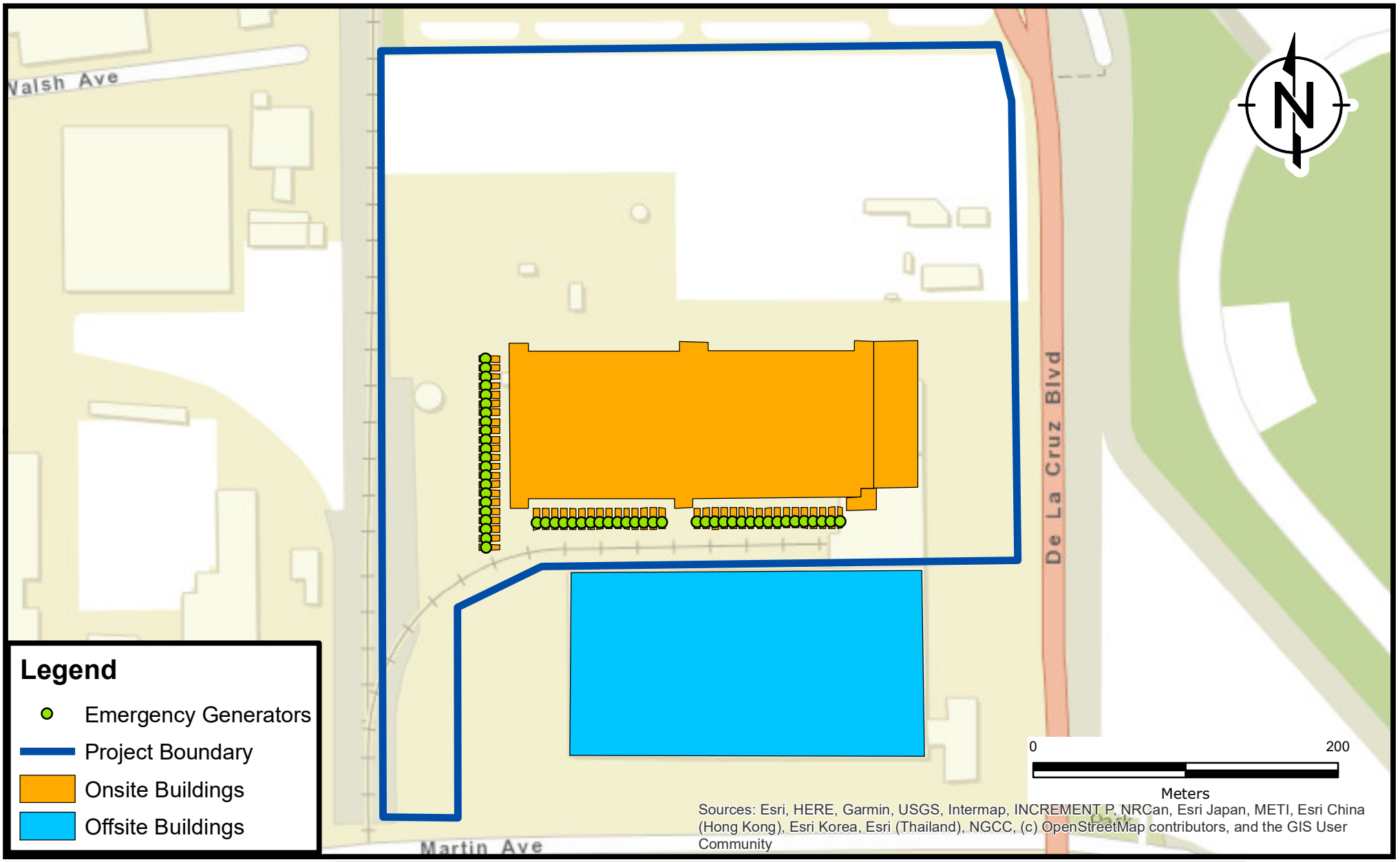
Standard	UTM East (m)	UTM North (m)	Total Ambient Conc.[a] (ppm)	Limiting Threshold (ppm)	Above Threshold?
1-Hour	593,709	4,136,304	5.08	20	No
8-Hour	593,680	4,136,160	3.52	9	No

Notes:

(a) The value shown is the maximum assuming all generators are tested at the same time for 1-hour at any analyzed load. This is a conservative estimate because generators will only be tested one at a time, consistent with the NO_2 analysis.

The modeled 1-hour and 8-hour CO concentrations shown in **Table 4** are representative of the maximum value from all of the modeled generators. A full summary of the model results for the 1-hour and 8-hour CO NAAQS and CAAQS analyses are provided in **Attachment B, Table B-7**.

ATTACHMENT A
FIGURES



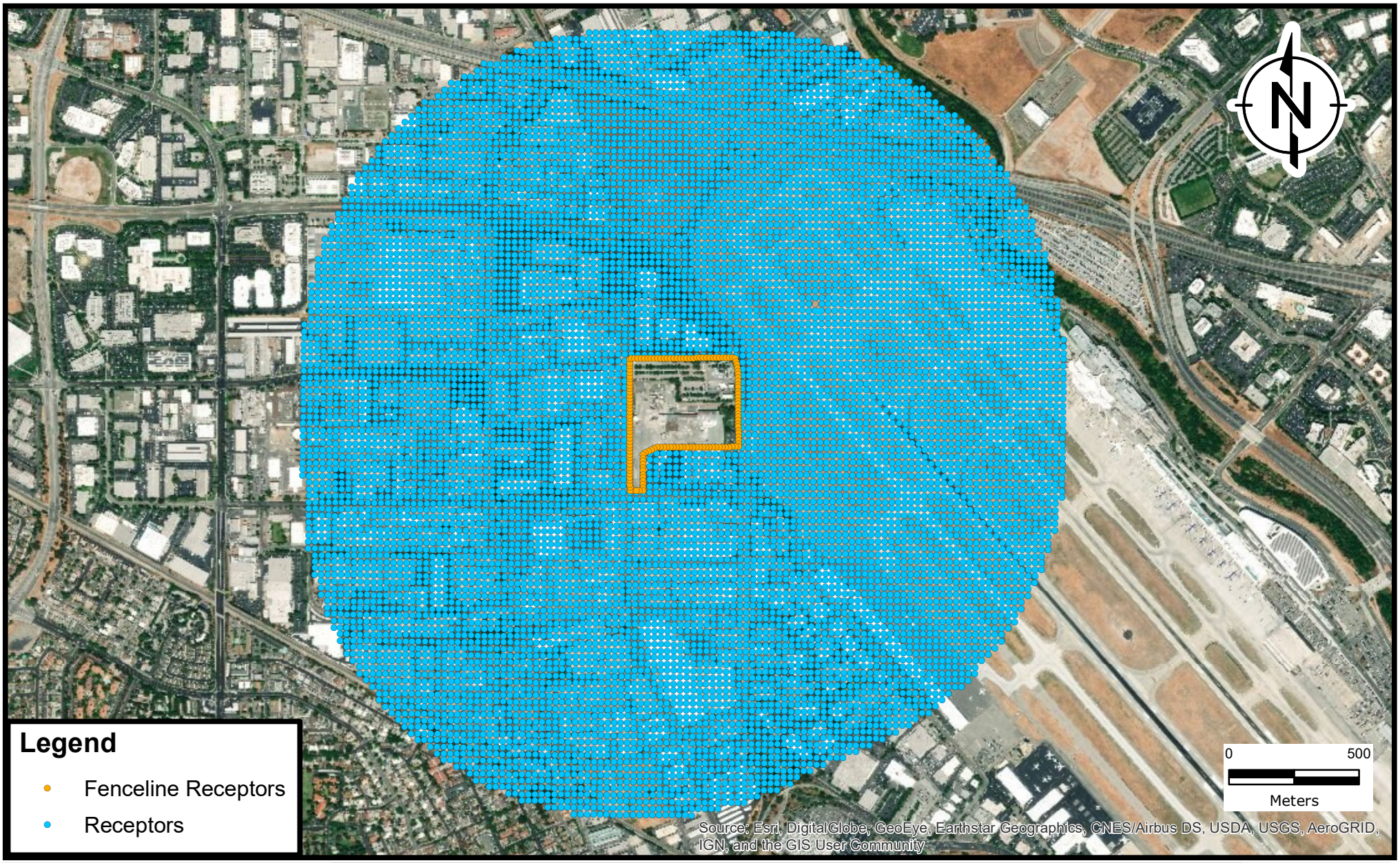
RAMBOLL

DRAFTED BY: SB | DATE: 7/29/2019

Project Location and Facility Layout
CyrusOne Project
CyrusOne Data Center
Santa Clara, California

FIGURE
1

PROJECT: 1690013366



RAMBOLL

DRAFTED BY: SB | DATE: 7/29/2019

Modelled Receptor Locations
CyrusOne Project
CyrusOne Data Center
Santa Clara, California

FIGURE
2

PROJECT: 1690013366

ATTACHMENT B
TABLES

Table B-1. Generator Information
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Generator Description	Specifications				
	Make	Model	USEPA Tier	Rated Power Output (kW)	Rated Power Output (HP)
2.25 MW MTU 16V4000G84S Generator	MTU	16V4000G84S	2	2,250	3,017

Table B-2. Point Source Parameters
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Generator Description	Generator Groups	Number of Generators	Elevation (m)	Stack Height (m)	Stack Diameter (m)
2.25 MW MTU 16V4000G84S Generator	West	22	12.29	11.81	0.51
2.25 MW MTU 16V4000G84S Generator	South	32	12.29	7.54	0.51

Table B-3. Modeled NOx Emission Rates
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Load (%)	Load-Specific Emission Rate[1,2] (g/kWh)		Load-Specific Power (kW)	Hourly Emissions per Generator[3,4] (g/s)		Load-Specific Stack Temperature (K)	Load-Specific Stack Velocity (m/s)[5]
	NO_X	CO		NO_X	CO		
100	8.50	1.70	2,498	5.90	1.18	774.15	42.94
75	7.40	1.40	1,872	3.85	0.73	697.15	34.98
50	5.70	1.40	1,250	1.98	0.49	646.15	27.96
25	4.50	2.60	624	0.78	0.45	608.15	19.85
10	8.30	4.20	250	0.58	0.29	513.15	11.05

Notes:

1. From Engine Specification (16V4000G84S) - Not to exceed Values.
2. 10% Load emission factors from raw emission data.
3. Hourly NOx emission rates for the NAAQS analysis for the MTU gens assumed the generators are operating at one load for the full hour.
4. Generators are tested one at a time.
5. Velocity calculations scaled based on density of exhaust at varying temperatures (https://www.dieselnet.com/tech/diesel_exh.php), and mass flow rate from generator spec sheet.

Table B-4. Modeled Buildings
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Height (m)	Elevation (m)
		X	Y		
EAST	Onsite Data Center Building	593645.73	4136278.82	24.99	12.29
MAIN	Onsite Data Center Building	593538.73	4136272.48	25.91	12.29
PEAK	Onsite Data Center Building	593629.59	4136233.58	32.00	12.29
SOUTH_OS	Offsite Building	593569.41	4136148.20	9.75	12.50
C1SEGE01	Generator Enclosure	593542.84	4136223.62	5.71	12.29
C1SEGE02	Generator Enclosure	593547.50	4136223.69	5.71	12.29
C1SEGE03	Generator Enclosure	593552.17	4136223.76	5.71	12.29
C1SEGE04	Generator Enclosure	593556.83	4136223.84	5.71	12.29
C1SEGE05	Generator Enclosure	593561.50	4136223.91	5.71	12.29
C1SEGE06	Generator Enclosure	593566.16	4136223.98	5.71	12.29
C1SEGE07	Generator Enclosure	593570.82	4136224.06	5.71	12.29
C1SEGE08	Generator Enclosure	593575.49	4136224.13	5.71	12.29
C1SEGE09	Generator Enclosure	593580.15	4136224.20	5.71	12.29
C1SEGE10	Generator Enclosure	593584.82	4136224.28	5.71	12.29
C1SEGE11	Generator Enclosure	593589.48	4136224.35	5.71	12.29
C1SEGE12	Generator Enclosure	593594.15	4136224.42	5.71	12.29
C1SEGE13	Generator Enclosure	593598.81	4136224.50	5.71	12.29
C1SEGE14	Generator Enclosure	593603.47	4136224.57	5.71	12.29
C1SEGE15	Generator Enclosure	593608.14	4136224.64	5.71	12.29
C1SEGE16	Generator Enclosure	593612.80	4136224.71	5.71	12.29
C1SEGE17	Generator Enclosure	593617.47	4136224.78	5.71	12.29
C1SWGE01	Generator Enclosure	593459.32	4136222.31	5.71	12.29
C1SWGE02	Generator Enclosure	593463.98	4136222.38	5.71	12.29
C1SWGE03	Generator Enclosure	593468.64	4136222.46	5.71	12.29
C1SWGE04	Generator Enclosure	593473.31	4136222.53	5.71	12.29
C1SWGE05	Generator Enclosure	593477.97	4136222.60	5.71	12.29
C1SWGE06	Generator Enclosure	593482.64	4136222.68	5.71	12.29
C1SWGE07	Generator Enclosure	593487.30	4136222.75	5.71	12.29
C1SWGE08	Generator Enclosure	593491.97	4136222.82	5.71	12.29
C1SWGE09	Generator Enclosure	593496.63	4136222.90	5.71	12.29
C1SWGE10	Generator Enclosure	593501.29	4136222.97	5.71	12.29
C1SWGE11	Generator Enclosure	593505.96	4136223.04	5.71	12.29
C1SWGE12	Generator Enclosure	593510.62	4136223.11	5.71	12.29

Table B-4. Modeled Buildings
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Model ID	Description	UTM Zone 10 Coordinates (m)		Height (m)	Elevation (m)
		X	Y		
C1SWGE13	Generator Enclosure	593515.29	4136223.19	5.71	12.29
C1SWGE14	Generator Enclosure	593519.95	4136223.26	5.71	12.29
C1SWGE15	Generator Enclosure	593524.62	4136223.33	5.71	12.29
C1WGE001	Generator Enclosure	593433.43	4136305.30	5.71	12.29
C1WGE002	Generator Enclosure	593433.49	4136300.63	5.71	12.29
C1WGE003	Generator Enclosure	593433.56	4136295.97	5.71	12.29
C1WGE004	Generator Enclosure	593433.62	4136291.30	5.71	12.29
C1WGE005	Generator Enclosure	593433.69	4136286.64	5.71	12.29
C1WGE006	Generator Enclosure	593433.75	4136281.98	5.71	12.29
C1WGE007	Generator Enclosure	593433.82	4136277.31	5.71	12.29
C1WGE008	Generator Enclosure	593433.88	4136272.65	5.71	12.29
C1WGE009	Generator Enclosure	593433.95	4136267.98	5.71	12.29
C1WGE010	Generator Enclosure	593434.01	4136263.32	5.71	12.29
C1WGE011	Generator Enclosure	593434.08	4136258.65	5.71	12.29
C1WGE012	Generator Enclosure	593434.14	4136253.99	5.71	12.29
C1WGE013	Generator Enclosure	593434.21	4136249.32	5.71	12.29
C1WGE014	Generator Enclosure	593434.27	4136244.66	5.71	12.29
C1WGE015	Generator Enclosure	593434.34	4136240.00	5.71	12.29
C1WGE016	Generator Enclosure	593434.40	4136235.33	5.71	12.29
C1WGE017	Generator Enclosure	593434.46	4136230.67	5.71	12.29
C1WGE018	Generator Enclosure	593434.53	4136226.00	5.71	12.29
C1WGE019	Generator Enclosure	593434.59	4136221.34	5.71	12.29
C1WGE020	Generator Enclosure	593434.66	4136216.67	5.71	12.29
C1WGE021	Generator Enclosure	593434.72	4136212.01	5.71	12.29
C1WGE022	Generator Enclosure	593434.79	4136207.35	5.71	12.29

Table B-5. 1-Hour NO2 NAAQS Results
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Average H8H Modeled Conc. at each Load (%) (µg/m^3)					NAAQS (µg/m^3)	Above NAAQS?
		X	Y	100	75	50	25	10		
1-Hour	C1SEEG01	593542.86	4136221.77	154.48	156.91	141.50	133.54	144.41	188	No
	C1SEEG02	593547.53	4136221.85	156.27	158.69	143.57	133.05	143.95		No
	C1SEEG03	593552.19	4136221.92	157.63	160.58	145.07	132.24	143.11		No
	C1SEEG04	593556.85	4136221.99	159.50	161.88	145.63	131.48	141.99		No
	C1SEEG05	593561.52	4136222.07	161.28	163.91	146.70	129.99	142.89		No
	C1SEEG06	593566.18	4136222.14	163.25	166.04	150.09	128.84	143.52		No
	C1SEEG07	593570.85	4136222.21	165.20	167.83	151.86	129.91	144.13		No
	C1SEEG08	593575.51	4136222.29	167.27	169.21	152.97	130.81	145.52		No
	C1SEEG09	593580.18	4136222.36	169.08	170.98	153.47	131.78	145.92		No
	C1SEEG10	593584.84	4136222.43	170.36	172.39	154.67	132.91	147.57		No
	C1SEEG11	593589.50	4136222.51	171.91	173.66	155.88	133.99	148.44		No
	C1SEEG12	593594.17	4136222.58	173.65	174.83	156.16	135.18	148.67		No
	C1SEEG13	593598.83	4136222.65	175.14	175.81	157.39	136.33	148.75		No
	C1SEEG14	593603.50	4136222.73	176.61	176.59	158.02	137.32	149.35		No
	C1SEEG15	593608.16	4136222.80	177.88	177.44	158.78	138.66	149.15		No
	C1SEEG16	593612.83	4136222.87	178.29	177.91	159.09	139.95	149.18		No
	C1SEEG17	593617.49	4136222.94	177.94	178.15	158.85	140.98	148.41		No
	C1SWEG01	593459.34	4136220.46	182.66	178.33	171.13	156.27	158.64		No
	C1SWEG02	593464.00	4136220.54	177.90	177.46	162.25	150.54	155.16		No
	C1SWEG03	593468.67	4136220.61	177.23	175.39	154.59	148.41	155.07		No
	C1SWEG04	593473.33	4136220.68	176.70	174.72	153.32	146.79	154.64		No
	C1SWEG05	593478.00	4136220.76	176.42	173.34	152.95	145.03	153.33		No
	C1SWEG06	593482.66	4136220.83	174.98	172.65	151.66	142.77	152.31		No
	C1SWEG07	593487.32	4136220.90	173.56	171.26	150.69	141.25	152.10		No
	C1SWEG08	593491.99	4136220.98	172.62	169.60	149.60	140.12	152.49		No
	C1SWEG09	593496.65	4136221.05	171.47	168.43	148.73	138.71	151.44		No
	C1SWEG10	593501.32	4136221.12	169.00	167.22	147.67	137.91	151.14		No
	C1SWEG11	593505.98	4136221.20	167.11	165.66	147.00	137.40	151.14		No
	C1SWEG12	593510.65	4136221.27	165.55	164.35	146.00	137.66	151.04		No
	C1SWEG13	593515.31	4136221.34	164.13	162.72	144.81	136.99	150.12		No
	C1SWEG14	593519.97	4136221.42	162.58	161.31	143.92	136.42	149.30		No
	C1SWEG15	593524.64	4136221.49	161.11	159.86	142.74	135.81	148.47		No
	C1WEG001	593431.58	4136305.27	164.30	159.59	153.32	160.58	154.53		No
	C1WEG002	593431.65	4136300.61	163.12	159.14	152.53	162.23	156.56		No
	C1WEG003	593431.71	4136295.95	161.07	157.37	150.74	161.54	157.01		No
	C1WEG004	593431.78	4136291.28	159.21	155.64	149.29	159.26	155.86		No
	C1WEG005	593431.84	4136286.62	159.14	154.40	148.26	157.86	153.84		No

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Table B-5. 1-Hour NO2 NAAQS Results
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Average H8H Modeled Conc. at each Load (%) ($\mu g/m^3$)					NAAQS ($\mu g/m^3$)	Above NAAQS?
		X	Y	100	75	50	25	10		
	C1WEG006	593431.91	4136281.95	159.46	154.72	148.56	156.40	154.33		No
	C1WEG007	593431.97	4136277.29	159.05	154.29	147.98	155.33	154.66		No
	C1WEG008	593432.04	4136272.62	158.48	153.61	147.34	155.04	154.08		No
	C1WEG009	593432.10	4136267.96	156.88	153.70	147.31	153.87	153.28		No
	C1WEG010	593432.17	4136263.30	154.86	154.55	147.16	152.12	151.84		No
	C1WEG011	593432.23	4136258.63	154.22	155.71	147.23	147.77	148.29		No
	C1WEG012	593432.30	4136253.97	155.38	156.50	147.72	146.74	148.80		No
	C1WEG013	593432.36	4136249.30	156.49	157.63	147.50	146.93	149.43		No
	C1WEG014	593432.43	4136244.64	157.88	159.11	147.14	147.53	150.19		No
	C1WEG015	593432.50	4136239.97	159.20	160.20	148.27	147.92	150.51		No
	C1WEG016	593432.56	4136235.31	160.88	161.28	148.56	149.56	149.72		No
	C1WEG017	593432.62	4136230.64	162.37	162.38	149.81	150.50	150.17		No
	C1WEG018	593432.68	4136225.98	170.55	166.75	158.13	150.03	157.16		No
	C1WEG019	593432.75	4136221.32	184.98	180.71	169.21	155.78	164.23		No
	C1WEG020	593432.81	4136216.65	164.19	163.01	150.63	147.17	147.41		No
	C1WEG021	593432.88	4136211.99	163.83	162.89	152.29	147.59	145.57		No
	C1WEG022	593432.94	4136207.32	163.71	162.39	152.07	147.32	144.73		No
	Maximum NAAQS	593432.75	4136221.32	184.98	--	--	--	--		No

Table B-6. 1-Hour NO2 CAAQS Results
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Single Maximum H1H Modeled Conc. at each Load (%) (µg/m³)[1]					CAAQS (µg/m³)	Above CAAQS?
		X	Y	100	75	50	25	10		
1-Hour	C1SEEG01	593542.86	4136221.77	284.17	286.59	273.76	264.27	275.74	339	No
	C1SEEG02	593547.53	4136221.85	285.25	288.82	273.95	263.42	274.21		No
	C1SEEG03	593552.19	4136221.92	286.46	291.95	274.73	262.20	272.14		No
	C1SEEG04	593556.85	4136221.99	289.31	293.76	276.95	262.55	270.59		No
	C1SEEG05	593561.52	4136222.07	290.57	294.46	278.97	261.00	271.83		No
	C1SEEG06	593566.18	4136222.14	293.41	297.84	282.45	258.05	271.65		No
	C1SEEG07	593570.85	4136222.21	295.30	301.03	283.71	258.81	272.67		No
	C1SEEG08	593575.51	4136222.29	299.49	300.40	285.07	259.91	274.44		No
	C1SEEG09	593580.18	4136222.36	301.37	303.69	286.05	261.09	275.28		No
	C1SEEG10	593584.84	4136222.43	301.67	304.13	285.66	262.43	279.01		No
	C1SEEG11	593589.50	4136222.51	301.86	307.23	284.32	263.86	277.37		No
	C1SEEG12	593594.17	4136222.58	304.40	308.87	284.40	265.17	278.38		No
	C1SEEG13	593598.83	4136222.65	304.93	310.22	287.57	265.47	279.46		No
	C1SEEG14	593603.50	4136222.73	306.23	306.07	290.82	265.81	281.01		No
	C1SEEG15	593608.16	4136222.80	307.63	311.87	291.24	267.47	280.03		No
	C1SEEG16	593612.83	4136222.87	308.53	307.73	292.70	268.68	279.34		No
	C1SEEG17	593617.49	4136222.94	308.52	308.10	292.38	270.68	277.69		No
	C1SWEG01	593459.34	4136220.46	322.34	318.64	314.19	294.46	293.89		No
	C1SWEG02	593464.00	4136220.54	309.38	307.70	300.02	280.66	285.35		No
	C1SWEG03	593468.67	4136220.61	306.74	304.27	292.34	278.02	285.66		No
	C1SWEG04	593473.33	4136220.68	308.42	305.69	283.49	277.20	284.93		No
	C1SWEG05	593478.00	4136220.76	308.89	304.12	281.61	275.43	283.06		No
	C1SWEG06	593482.66	4136220.83	306.07	304.60	280.54	270.91	282.02		No
	C1SWEG07	593487.32	4136220.90	305.88	299.94	278.80	270.29	282.02		No
	C1SWEG08	593491.99	4136220.98	302.19	296.97	277.40	270.04	282.03		No
	C1SWEG09	593496.65	4136221.05	301.05	296.69	276.68	266.92	282.33		No
	C1SWEG10	593501.32	4136221.12	299.88	296.91	277.91	266.57	283.39		No
	C1SWEG11	593505.98	4136221.20	298.25	297.14	277.04	265.87	279.79		No
	C1SWEG12	593510.65	4136221.27	297.68	292.83	275.22	267.31	280.36		No
	C1SWEG13	593515.31	4136221.34	297.17	291.54	274.02	267.22	280.53		No
	C1SWEG14	593519.97	4136221.42	295.33	290.06	272.41	266.61	279.34		No
	C1SWEG15	593524.64	4136221.49	293.69	288.78	274.72	266.68	279.87		No
	C1WEG001	593431.58	4136305.27	293.71	290.63	284.93	290.35	283.59		No
	C1WEG002	593431.65	4136300.61	293.35	289.45	283.90	290.71	285.71		No
	C1WEG003	593431.71	4136295.95	290.50	287.41	281.21	289.83	284.90		No
	C1WEG004	593431.78	4136291.28	287.82	284.36	279.03	287.70	283.57		No
	C1WEG005	593431.84	4136286.62	289.73	284.99	277.41	290.81	281.81		No

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Table B-6. 1-Hour NO2 CAAQS Results
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Averaging Period	Source ID	UTM Zone 10 Coordinates (m)		5Y Single Maximum H1H Modeled Conc. at each Load (%) (µg/m³)[1]					CAAQS (µg/m³)	Above CAAQS?
		X	Y	100	75	50	25	10		
	C1WEG006	593431.91	4136281.95	289.75	285.33	278.29	289.08	286.47		No
	C1WEG007	593431.97	4136277.29	289.57	284.82	277.95	285.16	286.70		No
	C1WEG008	593432.04	4136272.62	289.15	284.14	276.20	284.67	285.72		No
	C1WEG009	593432.10	4136267.96	287.23	286.36	277.02	284.04	284.59		No
	C1WEG010	593432.17	4136263.30	284.84	285.31	276.91	281.52	283.27		No
	C1WEG011	593432.23	4136258.63	282.60	286.86	278.93	277.68	279.22		No
	C1WEG012	593432.30	4136253.97	285.89	287.13	278.86	277.84	278.99		No
	C1WEG013	593432.36	4136249.30	287.11	290.00	278.68	278.31	279.60		No
	C1WEG014	593432.43	4136244.64	289.01	291.37	276.44	277.03	281.02		No
	C1WEG015	593432.50	4136239.97	290.96	292.83	277.26	277.03	280.75		No
	C1WEG016	593432.56	4136235.31	290.68	293.50	277.60	278.34	279.55		No
	C1WEG017	593432.62	4136230.64	293.07	291.68	279.89	280.20	281.03		No
	C1WEG018	593432.68	4136225.98	312.24	306.88	290.19	281.59	287.24		No
	C1WEG019	593432.75	4136221.32	325.40	321.15	301.56	284.39	293.33		No
	C1WEG020	593432.81	4136216.65	295.26	294.06	281.48	276.80	280.58		No
	C1WEG021	593432.88	4136211.99	294.89	293.89	283.00	277.81	278.01		No
	C1WEG022	593432.94	4136207.32	293.13	294.05	283.72	276.36	272.98		No
	Maximum CAAQS	593432.75	4136221.32	325.40	--	--	--	--		No

Notes:
[1.] A background NO2 value of 126.9 µg/m3 (or 67.5 ppb) is added to all modeled concentrations.

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Table B-7. 1-Hour and 8-Hour CO Modeled Concentrations
Model Report Tables
Sequoia Back-up Power Facility
CyrusOne - Santa Clara, California

Averaging Period	Load (%)	CO Emission Rate (g/s) per generator	UTM Zone 10 Coordinates (m)		Dispersion Factors ($\mu g/m^3$)/(g/s)	Modeled Concentrations (ppm)[2]	Background Concentrations[3] (ppm)	Total Concentrations (ppm)	Limiting Standard (ppm)
			X	Y					
1-Hour	100	1.18	593,709	4,136,304	2,602	2.68	2.4	5.08	20
	75	0.73	593,709	4,136,304	2,915	1.85		4.25	
	50	0.49	593,709	4,136,304	3,300	1.40		3.80	
	25	0.45	593,709	4,136,304	4,086	1.61		4.01	
	10	0.29	593,709	4,136,304	5,878	1.50		3.90	
8-Hour	100	1.18	593,680	4,136,160	1,665	1.72	1.8	3.52	9
	75	0.73	593,680	4,136,160	1,878	1.19		2.99	
	50	0.49	593,680	4,136,160	2,117	0.90		2.70	
	25	0.45	593,680	4,136,160	2,649	1.04		2.84	
	10	0.29	593,680	4,136,160	3,573	0.91		2.71	

Notes:

1. CO emissions were modeled using unit emission rates, such that the model estimates dispersion factors were based on an emission rate of 1 g/s. The dispersion factor is the combined impact from all generators operating at once, which is a conservative assumption. As discussed in the NO_2 analysis, only one generator will be operated at a time.
2. Estimated CO emissions were multiplied by the dispersion factors to obtain concentrations and converted to ppm for comparison to standard.
3. Background values were collected from Monitor Site ID 060850005 located at 158B Jackson Street in San Jose, California, as reported by EPA.

ATTACHMENT C
MANUFACTUER PERFORMANCE DATA SHEETS

DIESEL GENERATOR SET
MTU 16V4000 DS2250

2250 kWe / 60 Hz / Standby
380 - 13.8kV

Reference MTU 16V4000 DS2250 (2045 kWe) for Prime Rating Technical Data

SYSTEM RATINGS

Standby

Voltage (L-L)	380V	480V*	600V	4160V	12470V	13200V	13800V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2250	2250	2250	2250	2250	2250	2250
kVA	2812	2812	2812	2812	2812	2812	2812
Amps	4273	3383	2706	390	130	123	117
skVA@30% Voltage Dip	3625	8400	3900	5000	4120	4120	4900
Generator Model	1020FDL1102	744RSL4058	1020FDS1120	744FSM4376	1020FDH1246	1020FDH1244	1020FDH1246
Temp Rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	4 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* UL 2200 Offered

CERTIFICATIONS AND STANDARDS

// **Emissions –** EPA Tier 2 Certified

// **Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004**

// **Seismic Certification – Optional**
- IBC Certification
- OSHPD Pre-Approval

// **UL 2200 Listed – Optional**

// **Performance Assurance Certification (PAC)**
- Generator Set Tested to ISO 8528-5 for Transient Response
- Verified product design, quality and performance integrity
- All engine systems are prototype and factory tested

// **Power Rating**
- Accepts Rated Load in One Step Per NFPA 110
- Permissible average power output during 24 hours of operation is approved up to 85%.

STANDARD FEATURES*

// MTU Onsite Energy is a single source supplier
// Global Product Support
// 2 Year Standard Warranty
// 16V4000 Diesel Engine
- 76.3 Liter Displacement
- Common Rail Fuel Injection
- 4-Cycle

// Complete Range of Accessories
// Generator
- Brushless, Rotating Field Generator
- 2/3 Pitch Windings
- PMG (Permanent Magnet Generator) supply to regulator
- 300% Short Circuit Capability

// Digital Control Panel(s)
- UL Recognized, CSA Certified, NFPA 110
- Complete System Metering
- LCD Display

// Cooling System
- Integral Set-Mounted
- Engine-Driven Fan

STANDARD EQUIPMENT*

// Engine

Air Cleaners
Oil Pump
Oil Drain Extension and S/O Valve
Full Flow Oil Filter
Closed Crankcase Ventilation
Jacket Water Pump
Inter Cooler Water Pump
Thermostats
Blower Fan and Fan Drive
Radiator - Unit Mounted
Electric Starting Motor - 24V
Governor – Electronic Isochronous
Base - Structural Steel
SAE Flywheel and Bell Housing
Charging Alternator - 24V
Battery Box and Cables
Flexible Fuel Connectors
Flexible Exhaust Connection
EPA Certified Engine

// Generator

NEMA MG1, IEEE and ANSI standards compliance for temperature rise and motor starting
Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
Self-Ventilated and Drip-Proof
Superior Voltage Waveform
Digital, Solid State, Volts-per-Hertz Regulator
No Load to Full Load Regulation
Brushless Alternator with Brushless Pilot Exciter
4 Pole, Rotating Field
130 °C Max. Standby Temperature Rise
1 Bearing, Sealed
Flexible Coupling
Full Amortisseur Windings
125% Rotor Balancing
3-Phase Voltage Sensing
±0.25% Voltage Regulation
100% of Rated Load - One Step
5% Max. Total Harmonic Distortion

// Digital Control Panel(s)

Digital Metering
Engine Parameters
Generator Protection Functions
Engine Protection
CANBus ECU Communications
Windows®-Based Software
Multilingual Capability
Remote Communications to RDP-110 Remote Annunciator
Programmable Input and Output Contacts
UL Recognized, CSA Certified, CE Approved
Event Recording
IP 54 Front Panel Rating with Integrated Gasket
NFPA110 Compatible

* Represents standard product only. Consult Factory/MTU Onsite Energy Distributor for additional configurations.

APPLICATION DATA

// Engine

Manufacturer	MTU
Model	16V4000G84S
Type	4-Cycle
Arrangement	16-V
Displacement: L (in^3)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression Ratio	16.5:1
Rated RPM	1,800
Engine Governor	Electronic Isochronous (ADEC)
Max. Power: kWm (bhp)	2,500 (3,353)
Speed Regulation	±0.25%
Air Cleaner	Dry

// Liquid Capacity (Lubrication)

Total Oil System: L (gal)	300 (79.3)
Engine Jacket Water Capacity: L (gal)	175 (46.2)
After Cooler Water Capacity: L (gal)	50 (13.2)
System Coolant Capacity: L (gal)	547 (145)

// Electrical

Electric Volts DC	24
Cold Cranking Amps Under -17.8 °C (0 °F)	2,800

// Fuel System

Fuel Supply Connection Size	-16 JIC 37° Female 1" NPT Adapter Provided
Fuel Return Connection Size	-16 JIC 37° Female 1" NPT Adapter Provided
Max. Fuel Lift: m (ft)	1 (3)
Recommended Fuel	Diesel #2
Total Fuel Flow: L/hr (gal/hr)	1,200 (317)

// Fuel Consumption

At 100% of Power Rating: L/hr (gal/hr)	617 (163)
At 75% of Power Rating: L/hr (gal/hr)	467 (123)
At 50% of Power Rating: L/hr (gal/hr)	325 (86)

// Cooling - Radiator System

Ambient Capacity of Radiator: °C (°F)	40 (104)
Max. Restriction of Cooling Air: Intake and Discharge Side of Rad.: kPa (in. H_20)	0.12 (0.5)
Water Pump Capacity: L/min (gpm)	1,350 (357)
After Cooler Pump Capacity: L/min (gpm)	583 (154)
Heat Rejection to Coolant: kW (BTUM)	930 (52,888)
Heat Rejection to After Cooler: kW (BTUM)	680 (38,671)
Heat Radiated to Ambient: kW (BTUM)	206 (11,711)
Fan Power: kW (hp)	95.4 (128)

// Air Requirements

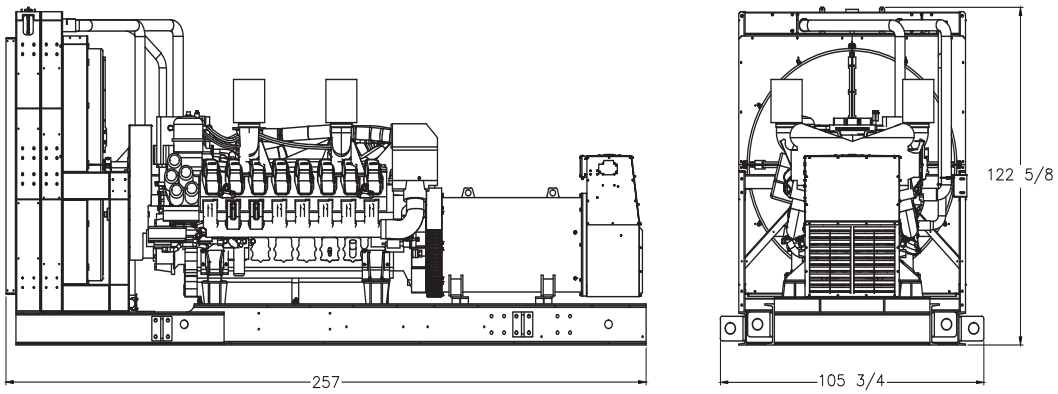
Aspirating: *m^3/min (SCFM)	192 (6,780)
Air Flow Required for Rad. Cooled Unit: *m^3/min (SCFM)	2,053 (72,500)
Remote Cooled Applications; Air Flow Required for Dissipation of Radiated Generator Set Heat for a Max. of 25 °F Rise: *m^3/min (SCFM)	752 (26,412)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

// Exhaust System

Gas Temp. (Stack): °C (°F)	505 (941)
Gas Volume at Stack Temp: m^3/min (CFM)	504 (17,799)
Max. Allowable Back Pressure: kPa (in. H_20)	8.5 (34.1)

WEIGHTS AND DIMENSIONS



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight (less tank)
Open Power Unit (OPU)	6,528 x 2,686 x 3,115 mm (257 x 105.7 x 122.6 in)	16,429 kg (36,220 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

SOUND DATA

Unit Type	Standby Full Load
Level 0: Open Power Unit dB(A)	98.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

EMISSIONS DATA

NO_x + NMHC	CO	PM
5.07	0.52	0.04

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

RATING DEFINITIONS AND CONDITIONS

// Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.

// Deration Factor:
Altitude: Consult your local MTU Onsite Energy Power Generation Distributor for altitude derations.
Temperature: Consult your local MTU Onsite Energy Power Generation Distributor for temperature derations.

C/F = Consult Factory/MTU Onsite Energy Distributor
N/A = Not Available

Inhaltsverzeichnis
Contents

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G84S				
Rated power [kW]	2500				
Rated speed [rpm]	1800				
Application group	3D				
Emission Stage/Optimisation	EPA Stationary EMERG T2 (40CFR60)				
Test cycle	D2				
Data Set No.	XZ59554101095				
Data Set Basis	EPA Stationary EMERG T2 (40CFR60)				
Fuel sulphur content [ppm]	8,1				

Unterschriftenweg	EDS erstellt	TETC Teamleiter	TET Leiter Org.-Einheit	Baureihen - Teamleiter	Baureihen Leiter Org.-Einheit	Freigabe im Windchill
Datum	07.06.2018	-	-	07.06.2018	07.06.2018	07.06.2018
Org.-Einheit	TETE	-	-	TKFV1	TKF	TKM
Name	T.Lenhof	-	-	Dr. Kneifel	Dr. Baumgarten	Link

Aenderungsbeschreibung/Description of Revision	Kommt vor/Frequency
Freigabe	

Buchst./Rev. Ltr.	Aenderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle
-.3	PR030109	Freigegeben

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Gepr. Checked	14.06.2018 11:06:11	baumgarten

Motortyp / Engine Type
16V4000G84S

Projekt-/Auftrags-Nr. Project/Order No.
Verwendbar f.Typ Applicable to Model
Format/Size **A3**

Material-Nr./Material No.
EDS 4000 1234

Benennung/ Title
EMISSIONSDATENBLATT
EMISSION DATA SHEET

Zeichnungs-Nr./Drawing No. **ZNG00013267**

Beschreibung/Description

Blatt/ Sheet **1** von/of **3**

Revision *Change index*					

Motordaten

engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	16V4000G84S				
Application group	3D				
Emission Stage/Optimisation	EPA Stationary EMERG T2 (40CFR60)				
Test cycle	D2				
fuel sulphur content [ppm]	8,1				
mg/mN³ values base on residual oxygen value of [%]	measured				

Motor Rohemissionen*

*Engine raw emissions**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/Pcycle)	[-]	1	0,75	0,50	0,25	0,10			
Power	[kW]	2498	1872	1250	624	250			
Speed (n/nN)	[-]	1	1	1	1	1			
Speed	[rpm]	1800	1800	1801	1801	1801			
Exhaust temperature after turbine	[°C]	501	424	373	335	240			
Exhaust massflow	[kg/h]	14327	13109	11239	8380	5530			
Exhaust back pressure (static)	[mbar]	88	69	48	26	11			
NOx	[g/kWh]	6,5	5,7	4,4	3,0	8,3			
	[mg/mN³]	1533	1076	639	286	483			
CO	[g/kWh]	1,0	0,8	0,7	1,3	4,2			
	[mg/mN³]	244	168	113	131	257			
HC	[g/kWh]	0,17	0,26	0,39	0,80	1,63			
	[mg/mN³]	42	53	61	82	101			
O2	[%]	10,1	12,4	14,1	15,9	17,7			
Particulate measured	[g/kWh]	0,06	0,12	0,12	0,32	0,76			
	[mg/mN³]	15	24	19	33	47			
Particulate calculated	[g/kWh]	-	-	-	-	-			
	[mg/mN³]	-	-	-	-	-			
Dust (only TA-Luft)	[mg/mN³]	-	-	-	-	-			
FSN	[-]	0,6	0,7	0,3	0,7	0,4			
NO/NO2**	[-]	-	-	-	-	-			
CO2	[g/kWh]	659,6	665,6	713,0	854,0	1044,0			
	[mg/mN³]	164166	133820	110475	87696	64408			
SO2	[g/kWh]	0,003	0,003	0,004	0,004	0,005			
	[mg/mN³]	0,8	0,7	0,6	0,5	0,3			
CH2O	[g/kWh]	-	-	-	-	-			
	[mg/mN³]	-	-	-	-	-			

* Emission data measurement procedures are consistent with the respective emission evaluation process. Noncertified engines are measured to sales data (TVU/TEN) standard conditions.
These boundary conditions might not be representative for detailed dimensioning of exhaust gas aftertreatment, in this case it is recommended to contact the responsible department for more information.
Measurements are subject to variation. The nominal emission data shown is subject to instrumentation, measurement, facility, and engine-to-engine variations.
All data applies to an engine in new condition and were measured after combined exhaust streams. Over extended operating time deterioration may occur which might have an impact on emission. Exhaust temperature depends on engine ambient conditions.

** No standard test. To be measured on demand.

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Motortyp / Engine Type: **16V4000G84S**

Projekt-/Auftrags-Nr. Project/Order No.
Verwendbar f.Typ Applicable to Model
Format/Size: **A3**

Material-Nr./Material No.: **EDS 4000 1234**

Benennung/ Title:
EMISSIONSDATENBLATT
EMISSION DATA SHEET

Zeichnungs-Nr./Drawing No.: **ZNG00013267**

Blatt/ Sheet: **2** von/of **3**

Beschreibung/Description

Aenderungsbeschreibung/Description of Revision: Freigabe
Kommt vor/Frequency

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-.3	PR030109	Freigegeben

Revision *Change index*					

Motordaten

engine data

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Application	X				
Engine model	16V4000G84S				
Application group	3D				
Emission Stage/Optimisation	EPA Stationary EMERG T2 (40CFR60)				
Test cycle	D2				
fuel sulphur content [ppm]	8,1				
mg/mN³ values base on residual oxygen value of [%]	measured				

Not to exceed Werte*

*not to exceed values**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/Pcycle)	[-]	1	0,75	0,50	0,25				
Power	[kW]	2498	1872	1250	624				
Speed (n/nN)	[-]	1	1	1	1				
Speed	[rpm]	1800	1800	1801	1801				
Exhaust back pressure (static)	[mbar]	88	69	48	26				
NOx	[g/kWh]	8,5	7,4	5,7	4,5				
	[mg/mN³]	1993	1399	831	429				
CO	[g/kWh]	1,7	1,4	1,4	2,6				
	[mg/mN³]	415	286	215	262				
HC	[g/kWh]	0,29	0,45	0,74	1,60				
	[mg/mN³]	71	90	116	164				
O2	[%]	10,1	12,4	14,1	15,9				
Particulate measured	[g/kWh]	0,09	0,19	0,18	0,48				
	[mg/mN³]	23	39	28	50				
CH2O	[g/kWh]	-	-	-	-				
	[mg/mN³]	-	-	-	-				

* Calculated values are not proven by tests and therefore the accuracy cannot be guaranteed.
Emissions data measurement procedures are consistent with those described in the applicable rules and standards.
The NOx, CO, HC and PM emission data tabulated here were taken from a single new engine under the test conditions shown above and are valid for the following conditions:

- Ambient air pressure 1 bar
- Air intake temperature approx. 25°C
- Rel. Humidity 30%-60%
- New Engine
- New standard- air filter
- Exhaust gas back pressure according the given value in this EDS
- Fuel according to EN 590 or US EPA 40CFR89
- Coolant and Lubricants according MTU Fuels and Lubricants Specification
- measured after combined exhaust streams.

The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on single operating points and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle. Emissions data may vary depending on the type of exhaust gas aftertreatment that may be installed on the engine, therefore it is suggested that the engine manufacturer be contacted directly for further information.
Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures, and instrumentation. Over time deterioration may occur which may have an impact on emission levels. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.
MTU Friedrichshafen GmbH has made efforts to ensure that the information in this data sheet is accurate, but reserves the right to amend specifications and information without notice and without obligation or liability. No liability for any errors, facts or opinions is accepted. Customers must satisfy themselves as to the suitability of this product for their application. No responsibility for any loss as a result of any person placing reliance on any material contained in this data sheet will be accepted.

GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII FOR MEASURING HC, CO, PM, AND NOX.					
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max. Limit G/(kW -HR)**	
				T2	T3
U.S. (INCL CALIF)	EPA	Stationary	Emergency Stationary Tier 2 (>560kW) Tier 3 (<560kW)	NOx+ NMHC: CO: PM:	 6,4 3,5 0,20	 4,0 3,5 0,20

** No standard test. To be measured on demand.

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EMISSIONSDATENBLATT
EMISSION DATA SHEET

Zeichnungs-Nr./Drawing No. **ZNG00013267**

Blatt/ Sheet **3** von/of **3**

Beschreibung/Description

APPENDIX H: ARBORIST REPORT

December 21, 2018

2600 De La Cruz Boulevard
Tree Inventory

2600 De La Cruz Boulevard
Santa Clara, California

Prepared for:
Nterra Group
1295 East Dunne Avenue
Morgan Hill, California 95037

Prepared by:
Sam Oakley
ISA Board Certified Master Arborist WE-9474B
ASCA Registered Consulting Arborist #556

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soakley@arborwell.com

Introduction

Arborwell was retained to inventory all trees on the 2600 De LA Cruz Boulevard property in Santa Clara, CA. The property will be undergoing planned renovations in the near future. The inventory was performed in December 2018. Included in this report is the inventory map (Exhibit 1) and inventory matrix (Exhibit 2).

Assignment & Scope

This report intends to record the state of the trees on the aforementioned property as observed on the dates of the inventory. Data collected per individual tree for the inventory are as follows:

- Tag number;
- Common name;
- Species;
- Diameter in inches at fifty-four (54) inches above grade;
- Height;
- Canopy spread;
- Condition;
- Observational notes that pertain to each individual.

Of the data collected in the field, health and structure were combined to give each tree a condition rating. The health of the tree is determined by its current size, canopy density, coloration, the appearance of any abnormalities or deficiencies and the overall health of the trunk, crown, and visible roots. The structure of the tree was evaluated based on the tree's natural, expected growth habit and form versus current growth habit, as well as the tree's inherent and exhibited structural integrity and deficiencies. Health and condition are subjective and species-dependent.

All information generated in this report are as a result of the observed on-site conditions. Note that the recommendations in this report are based on visual inspection on the above-ground parts of the tree at the time of the site visit. No soil was removed for below-grade inspection and no aerial inspection was performed. Information collected on deciduous individuals pertain to seasonal leaf-off conditions. Information in this letter may warrant further investigation as site conditions change over time.

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Method

The specific tasks performed are as follows:

- Identify the trees on the property.
- Tag and record the tag number on the identified trees.
- Measure the diameter of the individual at fifty-four (54) inches above grade (unless noted).
- Observe the assessment data for each tree. Determine the tree's health and structural integrity, assign a current condition rating ranging from poor to excellent:

  Excellent – Exemplary health and structure for species; a healthy tree with limited signs or symptoms of disease;
  Good - Some minor deficiencies noted in health and/or structure, with potential for corrective measures to be performed to improve upon condition (including but not limited to fertilizer, pruning, and chemical applications);
  Moderate - Higher level and/or incidence of deficiencies noted in health and/or structure, including possible hazardous conditions signs and symptoms observed, with higher corrective measures and input required to improve condition and, where applicable, mitigate hazard risk;
  Fair - Significant deficiencies noted in health and/or structure, some irreversible, and may include hazardous condition signs and symptoms observed requiring corrective action; some individuals may require removal;
  Poor - Includes any of or combination of the following: very low canopy density, major disease signs and symptoms, dying or dead trees, imminent, irreversible hazardous condition present.

- Record the approximate height of each individual and canopy spread, recorded in feet.
- Record comments and observations regarding the health and structure, noting any significant defects, health issues, or other observational notes of trees to be removed.
- Prepare a written report that presents findings and submit the report via email as a PDF document.

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Arborwell
professional tree management

Tree Count and Composition

During the inventory, a total of seventy-two (72) trees were quantified on-site. The 72 individuals are comprised of fourteen (14) species. The 14 species are in the following table, including counts and condition.

Common Name	Species	Count	Condition = Poor	Condition = Fair	Condition = Good	Condition = Excellent
African Sumac	Rhus lancea	19	19	0	0	0
Brazillian Pepper	Schinus terebinthifolius	8	0	8	0	0
Canary Island Pine	Pinus canariensis	5	1	0	4	0
Chinese Pistache	Pistacia chinensis	4	3	1	0	0
Eucalyptus	Eucalyptus spp.	5	2	3	0	0
European Olive	Olea europaea	2	2	0	0	0
Evergreen Ash	Fraxinus uhdei	2	2	0	0	0
Fremont Cottonwood	Populus fremontii	3	3	0	0	0
Holly Oak	Quercus ilex	8	0	7	1	0
Holly wood Juniper	Juniperus chinensis	3	1	2	0	0
Koelreuteria bipinnata	Chinese Flame Tree	5	3	2	0	0
Mexican Fan Palm	Washintonia robusta	1	0	0	1	0
Strawberry Tree	Arbutus unedo	5	0	3	2	0
Tanoak	Notholithocarpus densiflorus	2	2	0	0	0
Total	14	72	38	26	8	0

No individuals on the property are likely protected as defined by the City of Santa Clara's City Code, Chapter 12.35.020, "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." The precise boundary of the public right-of-way should be determined to establish the exact number of protected trees. However, some individuals that are to be removed may require a permit from the Planning Department prior to their removal.

Discussion

The project site was an unoccupied commercial property in Santa Clara. The property was flat with no undulations.

There were twenty-one (21) individuals off-site the were growing into or overhanging the property. There appeared to be supplemental watering supplied to the trees through evidence of existing irrigation lines and lush vegetation for most of the property. The perimeter trees did not receive supplemental watering but did not exhibit water stress. There are few high-value trees and there is decline as a result of the prior use of reclaimed water and water-stress.

There are several high-value oaks on the property frontage that are recommended to be preserved due to their over-all contribution to the site.

Several high-value strawberry trees are located on the property frontage and are prime candidates for transplanting in the event they are proposed to be removed.

The row of African sumac along the perimeter, and the group of volunteer Brazilian peppers, should be removed immediately due to excessively poor structure.

Several of the trees exhibited mechanical wounding in the past. All tree wounds are serious when it comes to tree health. No matter what size the wound is, the damage done is irreversible. The tree must devote a great deal of energy and many resources into trying to seal off the damaged area to prevent further complications. The wounded area is an opening for wood-rotting organisms and decay fungi to enter and cause further damage. These often attack the injured bark and invade adjacent healthy tissue, greatly enlarging the wound and extending the damage.

Some trees along the property frontage may be retained, determined at a later date. If there are any trees desired to be retained that are identified as suitable for preservation in Exhibit 1, care should be implemented in accordance with the tree protection measures in the following section during the project as they will contribute to the value of the site over the long-term. Though it may not be possible due project constraints, due care should be taken to preserve these individuals if their preservation is the desired outcome.

Tree Removals

There was a total of thirty-seven (37) on-site trees recommended for removal on the property based on condition. These trees were:

102, 103, 105, 106, 107, 109, 111, 113 through 119, 125 though 131, 143 through 154, 156, 167, 168, 169

There was a total of nineteen (19) off-site trees recommended for removal on the property based on condition. These trees were:

132 through 140, 155, 157 though 165

There was a total of sixteen (16) on-site and off-site (noted with '*') trees recommended for preservation. These trees were:

101*, 104, 108, 110, 112, 120 through 124, 141*, 142, 166, 170, 171, 172

The trees recommended for preservation will require adequate tree protection during construction activities and may require pruning, supplemental irrigation or pruning if preservation is the desired outcome. Tree protection measures are provided in the following section. Each recommendation for individual trees is shown in Exhibit 2.

Tree Protection Guidelines

The following sections are to be referred to for Tree Protection Guidelines (TPG).

Prior to Construction

All of the following measures shall be implemented prior to any work to eliminate undesirable consequences that may result from uninformed or careless acts, and preserve both trees and property values.

The following measures shall be implemented along with the TPG:

1. All Plan Sheets with work near any tree to be persevered, detailing any work near a tree, or where work occurs within the Tree Protection Zone (TPZ) will make reference to this document in bold so that it is clearly visible.

2. All Plan Sheets are to show accurate driplines in their entirety on all sheets where improvements and work is to occur in the TPZ

3. The General Notes sheet needs to make reference to the Tree Protection Guidelines sheet.

4. The Project Arborist (PA) is to attend the preconstruction meeting.

5. The PA or contractor shall verify, in writing, that all preconstruction conditions have been met (tree protection fencing, erosion control, pruning, etc.)

6. The demolition, grading and underground contractors, subcontractors, construction superintendent and other pertinent personnel are required to meet with the PA at the site prior to beginning specific work in a TPZ to review procedures, tree protection measures, and to establish appropriate

haul routes, staging, areas, contacts, watering, etc. to maintain tree preservation.

7. Prior to any grading or construction, the PA shall assist in the setup of the TPZ.

8. Fenced enclosures shall be erected around trees to be protected to achieve three primary goals:

   a. To keep the foliage crowns and branching structure of the trees to be preserved clear from contact by equipment, materials and activities;

   b. Preserve roots intact and maintain proper soil conditions in a non-compacted state and;

   c. To identify the TPZ in which no soil disturbance is permitted and activities are restricted.

Tree Protection Zone

All of the trees to be preserved will incur significant impacts from grading, utilities, storm drains, bio-retention basins, curb and gutters, pathways, and landscaping.

Generally, a TPZ is established for each tree based on species tolerance, condition, and age. In many instances, this is an area less than the dripline of the tree. The improvements required for this project will not allow for what would be considered an adequate TPZ. Therefore, the TPZ will be the dripline (or curbface for the area of dripline extending over a hardscape surface) for all of the trees on this site.

Each tree to be preserved shall have a designated TPZ identifying the area sufficiently large enough to protect the tree and roots from disturbance. The recommended TPZ area can be determined by the canopy footprint. All work that occurs in the dripline falls under the category of the TPZ. This means that work that is performed within this zone will require direct involvement of the PA. Direct involvement requires the PA to be on site for all work in the dripline to provide direction when tree roots are encountered. Improvements or activities such as paving, utility, and irrigation trenching and other ancillary activities shall occur outside the TPZ, unless authorized by the PA. Unless otherwise specified, the protective fencing shall serve as the TPZ boundaries. At no time shall tree protection be encroached without the directive of the PA or City Arborist (CA).

Any tree that will have numerous improvements very close to the trunks and well within the driplines will require all work in the TPZ to utilize boring (for utilities and storm drains), pneumatic or hydraulic tools, as described in latter sections. This is necessary in order to preserve the health and structural integrity of the trees.

Improvements will be as far from any tree trunk as possible. Plans will show how the layout will help mitigate the severity of these impacts. There will be not landscape planting and the installation of underground piping and wiring inside any TPZ. Landscaping on the edges of a TPZ is acceptable utilizing the TPG for mitigating impacts under direction of the PA.

Activities prohibited within the TPZ include:

- Storage or parking vehicles, building materials, refuse, excavated spoils or dumping of poisonous materials on or around trees and roots. Poisonous materials include, but are not limited to, paint, petroleum products, concrete or stucco mix, dirty water or any other material which may be deleterious to tree health.

- The use of tree trunks as a winch support, anchorage, as a temporary power pole, sign posts or other similar function.

- Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches and other miscellaneous excavation without prior approval of the PA.

- Soil disturbance or grade/drainage changes

- Materials must not be stored, stockpiled, dumped, or buried inside the dripline of trees.

- Excavated soil must not be piled or dumped, even temporarily, inside the TPZ of protected trees.

Activities permitted or required within the TPZ include:

- Mulching: During construction, wood chips shall be spread within the TPZ to a six (6) inch depth, leaving the trunk clear of mulch to help inadvertent compaction and moisture loss from occurring. The mulch may be removed if improvements or other landscaping is required. Mulch material shall comply with ISA specifications. Mulching may be applied at a depth of three (3) inches prior to construction under trees where there is no landscaping or paving (landscaping shall not be installed underneath a mature tree).

- Root Buffer: When areas under the tree canopy cannot be fenced, a temporary buffer is required and shall cover the root zone and remain in place at the specified thickness until final grading stage.

- Irrigation, aeration, or other beneficial practices that have been specifically approved for use within the TPZ.

Size, Type, and Duration of Fence

All trees to be preserved shall be protected with six (6) foot high fences. Fencing is to be mounted on two-inch diameter galvanized iron posts, driven into the ground to a depth of at least two (2) feet at no more than ten (10) foot spacing. For trees located directly adjacent to hardscape, instead of driving the posts into the ground they can be mounted to portable stanchions. The stanchions shall be held down with rebar staples in order to avoid easy movement by equipment and construction personnel. A closeable 36-inch entry section for servicing the TPZ shall be provided. In addition, the trunks of the trees to be preserved are to be wrapped with brightly colored snow fencing, which will provide a visual reminder to workers that the trees are protected.

Types of Tree Protection for Project

Tree protection type will be determined by the PA other than specifications noted above. Note that a tree may be in one type of TPZ for a part of the project, and then modified to another type depending on the location and proximity to construction and approved design plans. This will need to be determined by the PA throughout the project on a case by case basis.

TPZ for these trees will be difficult as the project moves forward. Initial installation of the TPZ will require the following dimensions:

The fences shall enclose the entire area under the **canopy dripline or designated TPZ** of the tree(s) to be saved throughout the life of the project, or until final improvement work within the area is required, typically near the end of the project.

For trees situated directly adjacent to a **curb edge**, along said curb edge and around the dripline shall be enclosed with the required chain link protective fencing in order to keep the street open for public use.

Final Improvements: If the fencing must be relocated on paving or sidewalk for final improvements, the posts may be supported by an appropriate stanchion.

Duration of Tree Protection Fencing

Tree fencing shall be erected prior to demolition, grading or construction and remain in place until final inspection. Tree Protection Fencing shall be field verified by the PA before any work can begin, including grubbing, demolition, and grading. TPZ cannot be moved without the prior approval of the PA. The PA is required to notify the CA in advance if movement of the TPZ is requested and adequate reasoning behind said request.

TPZs are to remain throughout the entirety of the project.

"Warning" Signage

Warning signs a minimum of 8.5x11-inches shall be prominently displayed on each fence. The sign shall clearly state:

This is a Tree Protection Zone
Movement of this fence requires the prior authorization of the Project Arborist & City Arborist
Any violation of the TPZ will result in a "Stop Work Order"
(List contact information for contractor and project arborist)

Pruning, Surgery and Removal

Prior to construction, trees will require that branches be pruned clear from structures, activities, building encroachment or will need to be strengthened by means of mechanical support (cabling) or surgery. This should be performed under the direction of the PA. Such pruning, surgery or the removal of trees shall adhere to the following standards:

1. Pruning limitations:

    a. Minimum Pruning: If the PA recommends that trees be pruned, and the type of pruning is left unspecified, the standard pruning shall consist of 'crown cleaning' as defined by ISA Pruning Guidelines. Trees shall be pruned to reduce hazards and develop a strong, safe framework. Prune any desiccated material from the crown.

    b. Maximum Pruning: Maximum pruning should only occur in the rarest situation approved by the PA. No more than one-fourth (1/4) of the functioning leaf and stem area may be removed within one (1) calendar year of any tree, or removal of foliage so as to cause the unbalancing of the tree. It must be recognized that

trees are individual in form and structure, and that pruning needs may not always fit strict rules. The PA shall assume all responsibility for special pruning practices that vary from the standards outlined in this document.

c. Tree Workers: Pruning shall not be attempted by construction or contractor personnel, but shall be performed by a qualified tree care specialist or certified tree worker under the direction of a certified arborist.

Activities During Construction and Demolition Near Trees

Soil disturbance or other injurious and detrimental activity within the TPZ is prohibited unless approved by the PA. If an injurious event inadvertently occurs, or soil disturbance has been specifically conditioned for project approval, then the following mitigation is required:

1. Soil Compaction: If compaction of the soil occurs, it shall be mitigated as outlined in Mitigating Soil Compaction.

2. Grading Limitations within the Tree Protection Zone:

    a. Grade changes outside of the TPZ shall not significantly alter drainage to the tree.

    b. Grade changes within the TPZ are not permitted.

    c. Grade changes under specifically approved circumstances shall not allow more than six (6) inches of fill soil added or allow more than four (4) inches of existing soil to be removed from natural grade unless mitigated immediately.

    d. In some cases, excavation will be necessary to accommodate the base thickness for paving, walls, footings, roads, paved plazas, etc. underneath some existing trees' driplines. This type of excavation will be removed with the assistance of an airspade and assisting hand tool, trenching at 400 to 600 PSI. An air spade will blow soil away from root systems with minimal damage.

Mitigating Soil Compaction

Compaction, inadvertent or intentional, is not allowed within the existing dripline of any protected tree without consent of the PA. If compaction is required in the dripline of any tree, the use of Geocell® or equal shall be used in conjunction with structural soils and permeable paving materials where indicated on plan sheets.

Geocell®, a sub-base confinement system designed for the protection of tree roots where the construction of compacted soils is required in the vicinity of trees, allows the continued passage and circulation of air, water, and nutrients to tree roots to sustain a healthy growing environment while allowing for the required compaction. Call US Fabrics for locating a representative in the United States

1. Do not install impervious materials such as roads and walkways where they will impact more than 25% of drip line area (unless existing conditions are already present) and unless reviewed and approved by the PA.

2. When installing walkways within the drip line, use pervious materials wherever possible. Refer to Landscape Construction Plans for pervious paving and/or Geocell sub-base locations and details.

3. Make sure that the tree requirements are fully recognized during design, construction installation and maintenance of landscape.

Trenching, Excavation and Equipment Use

Excavation or boring activity within the TPZ is restricted to the following activities, conditions and requirements if approved by the PA:

1. Notification. Contractor shall notify the PA a minimum of twenty-four (24) hours in advance of the activity in the TPZ.

2. Root Severance. Roots that are encountered shall be cut to sound wood and repaired. No roots of two (20-inch diameter and larger shall be cut without the prior approval of the PA. Approval is based on the distance of the root from the tree trunk and whether or not there are sufficient roots in the area to compensate for their removal.

3. Excavation. Any approved excavation, demolition or extraction of material shall be performed with equipment sitting outside the TPZ. Methods permitted are by hand digging, hydraulic or pneumatic air excavation technology. Avoid excavation within the TPZ during hot, dry weather.

    a. If excavation or trenching for drainage, utilities, irrigation lines, etc., it is the duty of the contractor to tunnel under any roots two (2) inches in diameter and greater.

    b. Prior to excavation for foundation/footings/walls, grading or trenching within the TPZ, roots shall first be severed cleanly one (1) foot outside the TPZ and to the depth of the future excavation. The trench must

then be hand dug and roots pruned with a saw or other approved root pruning equipment by the PA.

4. Heavy Equipment. Use of backhoes, steel tread tractors or any heavy vehicles within the TPZ is prohibited

Root Severance

Cutting and removal of roots smaller than two (2) inches in diameter shall be done by chain saw or hand saw to provide a flat and smooth cut and cause the least damage possible to the root and tree's health. Cutting roots by means of tractor-type equipment or other than chain saws and hand saws is prohibited.

Proper pruning technique shall encourage callusing of the roots. Root cutting and removal shall not exceed thirty-five (35) percent of total root surface.

The Contractor shall remove any wood chips or debris that may be left over from root removal that may affect the construction of improvements.

If any roots over two (2) inches in diameter are severed during any excavation, the following procedure shall be followed:

1. The roots shall be shaded by immediately covering the entire trench with plywood, or by covering the sides of the trench with burlap sheeting that is kept moist by watering twice per day.

2. When ready to backfill, each root shall be severed cleanly with a handsaw. Where practical, they should be cut back to a side root. Immediately, a plastic bag shall be placed over the fresh cut, and secured with a rubber band or electrical tape. Shading should immediately be placed until backfilling occurs.

3. Plastic bags shall be removed prior to backfilling.

4. Backfill shall be clean, native material free of debris, gravel or wood chips.

If roots three (3) inches in diameter, or larger, are encountered during excavation, Contractor shall contact the PA immediately and request a field inspection, and obtain instruction as to how the roots should be treated. No roots three (3) inches in diameter, or larger, shall be cut and removed without prior approval from the PA. Excavation will be performed with an airspade when greater than 4” of soil is required to be removed from a dripline. Roots will be pruned according to recommendations by the PA.

Root Barrier Installation

Where paved surfaces are to be installed adjacent to tree root zones, Biobarrier® root control fabric or equal shall be used to limit the spread of future roots and control future hardscape damage. The root control fabric uses the controlled release of trifluralin, a root-inhibition herbicide that prevents the growth of roots outside of the desired root zone. To install the root control fabric:

1. Dig a minimum 3-foot trench along the area you want to protect.

2. Prune tree roots.

3. Place the root control fabric in the trench, making sure it is between the area to be protected and all roots.

4. Secure the fabric near the surface so roots do not grow over it and against the wall of the trench opposite the root source.

5. Backfill the trench and tamp it to ensure there are no gaps in the soil.

6. Always follow the detailed installation instructions that are included with the root control fabric.

Irrigation Program

To help compensate for the root loss, deep-root irrigate all trees during the dry months (any month receiving less than 1 inch of rainfall) for a minimum of one (1) year after the project is complete.

1. Irrigation is to begin immediately for all existing trees to remain.
2. An application of growth regulator (paclobutryzol) prior to construction activities will aid in the development of fine-root growth and will help counter the effects of any root damage. This should be applied immediately for all trees that are to be protected in place. This application of growth regulator shall be applied yearly for a minimum of one (1) year after the project is complete. This is to be performed by a certified tree care specialist.
3. In addition, all trees are to have roots inoculated with endo/ectomycorrhizal fungal inoculum.
4. Irrigate a minimum of ten (10) gallons for each inch of trunk diameter every month. A soaker hose or a drip line is preferred for this purpose. The first year's irrigation should be applied at the full rate. The first six (6) months of the second year, half of the rate shall be applied. The last six (6) months of the second year a quarter of the original rate will be applied. All rate adjustments will be monitored by the PA. Extra controller wires and stub

outs for additional valves shall be installed for the permanent irrigation system and be available in the event that any individual tree begins to decline from water-stress after the project is complete.

5. Irrigation must also be applied during the trees' recovery period, which will be longer than the construction process. Irrigation will be beneficial to new root formation and must be performed for one (1) year after construction is complete. Refer to irrigation plans.
6. Any new irrigation for existing trees must not be designed to strike the trunks of trees, because of potential high risk of disease infection. Bubbler irrigation is preferred.
7. If any irrigation lines, drain lines, sewer lines, or any other underground features inside the existing dripline of protected trees that are to be abandoned, they should be cut off approximately at soil grade and left in the ground.
8. Where necessary, irrigation should be installed using at least two bubblers.
9. The foliage of tree shall be kept dust-free with monthly washings, or more frequent as determined by the PA.

Transplanting

Within this project, the following scopes of work are to be performed by a licensed and insured certified arborist:

- Transplantability, Timing, and Site Selection
- Tree Transplants & Boxing
- Maintenance of Boxed Trees

Transplantability, Timing, & Site Selection

Transplanted trees will need similar site conditions to where they are being transplanted. This means that they cannot have more than four (4) hours per day of full sun. They also do best with moist and very well-drained soils; ensure the new site is prepared for this before transplanting.

1. Choose a day when the soil is moist so that soil clings to the roots. Transplant the trees when they are in their dormant/slow growth stage, between late October and early March.
2. Before the project begins, a soil analysis shall be performed by the contracted arborist at the original site and transfer site to facilitate soil amendments and minimize soil differences.
3. Treat the transfer location and hole, using the correct soil amendments, to match the original site's soil characteristics.

Transplant Excavation

Prior to beginning the transplant stages of the project:

i. Activate a USA call in which all nearby underground utilities will be marked on-site.
ii. Use a mechanical trenching device to provide a minimum 48-inch box-size for the root ball.
iii. All locations in which utilities are present around trees to be transplanted will be dug with the airspade to avoid damaging utility lines.

Use a minimum of a 48-inch size box to be built around the root ball, to be determined by the actual tree's size.

1. The box will be used during transport and storage.
2. The trenches should be excavated vertically down and at least ten (10) inches wide on each side to allow for working space.
3. Once the four sides have been dug, hand-excavate the trench at approximately a 15-degree.
4. When roots are encountered, prune the roots using hand pruners. Hand pruning the roots will minimize damage to the root system and promote new root growth.
5. Wrap the sides of the root ball with burlap tarps.
6. Attach the box's vertical sides to each other, securing the root ball inside the structure.
7. A winch or mechanical advantage will be used to help lift the tree, with four (4) vertical sides in place, using a high-tension vinyl strap secured around the structure.
8. As the structure is lifted, hand-prune any roots beneath the root ball to detach the tree from its current growing location.
9. Burlap tarps will be pulled beneath the tree in order to lift it into horizontal bottom of the box structure.
10. Attach the horizontal bottom to the box structure.

In this structure, the tree can be stored for no more than one (1) week. Plant as soon as possible and apply TPZ and appropriate treatments. Where necessary, a crane shall be used to assist the crews in lifting and transporting the trees to the storage location. Care should be taken at all times to avoid damage to the trunk and canopy of the tree.

Transplanting Maintenance

Once moved to the new location:

1. The trees shall be staked or guyed (the most appropriate technique will be determined by site set-up, location, and conditions).
2. A TPZ will be set up at the new location.

3. Bi-weekly watering will begin immediately for trees to be transplanted and will resume to the site irrigation schedule once the PA has determined the trees have established.
4. At the first watering, modified plant growth regulators will be applied by a licensed and insured certified arborist in the form of trunk injections to help compensate for fine root loss and to encourage active mycorrihizal production within the rooting zone. Notify the PA at least 72 hours in advance.
5. The watering rates and amounts will be adjusted according to tree response post-transplant.

Damage to Trees - Reporting

Any damage or injury to trees shall be reported within six (6) hours to the PA and job superintendent or CA so that mitigation can take place. All mechanical or chemical injury to branches, trunk or to roots over two (2) inches in diameter shall be reported in the biweekly inspection report. In the event of injury, the following mitigation and damage control measures shall apply and implemented by a Certified Arborist:

a. Root injury: If trenches are cut and tree roots two (2) inches or larger are encountered they must be cleanly cut. The end of the root shall be covered with either a plastic bag and secured with tape or rubber band. All exposed root areas within the TPZ shall be backfilled or covered within one (1) hour. Exposed roots may be kept from drying out by temporarily covering the roots and draping layered burlap or carpeting over the upper three (3) feet of trench walls. The materials must be kept wet until backfilled to reduce evaporation from the trench walls. All the above activities shall be performed by a Certified Arborist.

b. Bark or trunk wounding: Current bark tracing and treatment methods shall be performed by a Certified Arborist within two (2) days.

c. Scaffold branch or leaf canopy injury: A Certified Arborist will remove broken or torn branches back to an appropriate branch capable of resuming terminal growth within five (5) days. If leaves are heat scorched from equipment exhaust pipes, consult the PA within six (6) hours.

Inspection Schedule

The PA retained by the applicant shall conduct the following required inspections of the construction site:

1. Inspections shall verify that the type of tree protection and/or plantings re consistent with the standards outlined within this document. For each required inspection or meeting, a written summary of the changing tree

related conditions, actions taken, and condition of trees shall be provided to the contactor.

a. Inspection of Protective Tree Fencing.

b. Pre-Construction Meeting. Prior to commencement of construction, the contractor shall conduct a pre-construction meeting to discuss tree protection with the job site superintendent, grading equipment operators, and the PA.

c. Inspection of Rough Grading. The PA shall perform an inspection during the course of rough grading adjacent to the TPZ to ensure trees will not be injured by compaction, cut or fill, drainage and trenching, and if required, inspect aeration systems, tree wells, drains and special paving. The contractor shall provide the PA at least forty-eight (48) hours advance notice of such activity.

d. The PA shall perform inspections every two weeks during the demolition and mass grading to monitor changing conditions and tree health. Upon completion of demolition and mass grading, the CA will determine if monthly inspections will be required in lieu of inspections every two weeks. The CA shall be in receipt of an inspection summary during the first week of each calendar month or, immediately if there are any changes to the approved plans or protection measures.

e. Any special activity within the Tree Protection Zone. Work in this area (TPZ) requires the direct on-site supervision of the PA.

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Assumptions and Limiting Conditions

The following are limitations to this report:

- All information presented herein covers only the trees examined at the area of inspection, and reflects the condition observed of said trees at the time of inspection.
- Observations were performed visually without probing, dissecting, coring, or excavation, unless noted above, and in no way shall the observer be held responsible for any defects that could have only been discovered by performing said services in specific area(s) where a defect was located.
- No guarantee or warranty is made, expressed or implied, that defects of the trees inspected may not arise in the future.
- No assurance can be offered that if the recommendation and precautionary measures are accepted and followed, that the desired results may be attained.
- No responsibility is assumed for the methods used by any person or company executing the recommendations provided in this report.
- The information provided herein represents an opinion, and in no way is the reporting of a specified finding, conclusion, or value based on the retainer.
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- Should any part of this report be altered, damaged, corrupted, or lost, the entire evaluation shall be invalid.

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Exhibit 1
2600 De La Cruz Boulevard
Santa Clara, California
Tree Inventory

Species

- African Sumac
- Brazillian Pepper
- Canary Island Pine
- Chinese Pistache
- Eucalyptus
- European Olive
- Evergreen Ash
- Fremont Cottonwood
- Holly Oak
- Holly wood Juniper
- Koelreuteria bipinnata
- Mexican Fan Palm
- Strawberry Tree
- Tanoak

Prepared by Arborwell

0 137.5 275
Feet

Exhibit 2 - Inventory Matrix

2600 De La Cruz Boulevard, Santa Clara, California

@ denotes measurement was taken at the base of the trunk due to an abundance of stems; height and spread are approximate

ID	Common Name	Species	DBH (inches)	Height (feet)	Spread (feet)	Condition	Recommended Action	Notes
101	Holly Oak	Quercus ilex	24	30	30	Fair	Preserve	On Neighboring Property But Overhanging Subject Property
102	Chinese Pistache	Pistacia chinensis	11	15	20	Poor	Remove	Unbalanced Crown; Significant Trunk Wound
103	European Olive	Olea europaea	6	10	10	Poor	Remove	Massive Cavity Of Decay; Suppressed Form
104	Strawberry Tree	Arbutus unedo	5, 4, 4, 4, 4	10	10	Good	Preserve	Multiple Trunks; Good Health
105	European Olive	Olea europaea	28	15	15	Poor	Remove	Massive Cavity Of Decay; Unbalanced Form
106	Strawberry Tree	Arbutus unedo	6, 5, 5, 4	10	10	Fair	Remove	Supressed Form
107	Strawberry Tree	Arbutus unedo	9, 9, 8	10	10	Fair	Remove	Supressed Form
108	Holly Oak	Quercus ilex	28, 16	35	40	Good	Preserve	Lateral Extending From Base; Foliar End Weight
109	Chinese Pistache	Pistacia chinensis	12	20	20	Poor	Remove	Massive Decay Column; Damaged Form From Limb Breakage
110	Brazillian Pepper	Schinus terebinthifolius	32	35	40	Fair	Preserve	Significant Lean; Excessive End Weight
111	Eucalyptus	Eucalyptus spp.	14	35	20	Poor	Remove	Codominant Structure; Minimal Supporting Foliage
112	Strawberry Tree	Arbutus unedo	12, 12, 11	20	20	Good	Preserve	Multiple Trunks; Good Health
113	Holly wood Juniper	Juniperus chinensis	8, 8, 8	10	15	Fair	Remove	Significant Lean
114	Holly wood Juniper	Juniperus chinensis	6	10	10	Poor	Remove	Significant Lean; Supressed Form
115	Holly wood Juniper	Juniperus chinensis	11, 11, 5	20	20	Fair	Remove	Significant Lean
116	Holly Oak	Quercus ilex	7, 7	20	15	Fair	Remove	Poor Structure; Foliage In Good Health
117	Holly Oak	Quercus ilex	9	20	15	Fair	Remove	Poor Structure; Foliage In Good Health
118	Evergreen Ash	Fraxinus uhdei	34	60	40	Poor	Remove	Poor Health
119	Evergreen Ash	Fraxinus uhdei	34	60	40	Poor	Remove	Poor Health
120	Holly Oak	Quercus ilex	28	35	35	Fair	Preserve	Codominant Structure But Good Health
121	Canary Island Pine	Pinus canariensis	18	40	30	Good	Preserve	
122	Canary Island Pine	Pinus canariensis	18	40	30	Good	Preserve	
123	Canary Island Pine	Pinus canariensis	18	40	30	Good	Preserve	
124	Strawberry Tree	Arbutus unedo	10, 7, 5	30	30	Fair	Preserve	Multiple Trunks; Good Health
125	Koelreuteria bipinnata	Chinese Flame Tree	12	20	30	Fair	Remove	Perimeter Tree; Overgrown

ID	Common Name	Species	DBH (inches)	Height (feet)	Spread (feet)	Condition	Recommended Action	Notes
126	Koelreuteria bipinnata	Chinese Flame Tree	9	20	30	Fair	Remove	Perimeter Tree; Overgrown
127	Koelreuteria bipinnata	Chinese Flame Tree	12, 9, 3	20	30	Poor	Remove	Poor Structure; Perimeter Tree; Overgrown
128	Koelreuteria bipinnata	Chinese Flame Tree	6, 6	20	15	Poor	Remove	Poor Structure; Perimeter Tree; Supressed Form
129	Koelreuteria bipinnata	Chinese Flame Tree	6, 7	20	15	Poor	Remove	Poor Structure; Perimeter Tree; Supressed Form
130	Canary Island Pine	Pinus canariensis	11	30	15	Poor	Remove	Poor Structure; Perimeter Tree; Supressed Form
131	Chinese Pistache	Pistacia chinensis	6	20	15	Fair	Remove	Poor Structure; Perimeter Tree; Supressed Form
132	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
133	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
134	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
135	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
136	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
137	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
138	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
139	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
140	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
141	Canary Island Pine	Pinus canariensis	14	60	30	Good	Preserve	On Neighboring Property But Overhanging Subject Property
142	Brazillian Pepper	Schinus terebinthifolius	36	45	45	Fair	Preserve	Excessive Foliar End Weight
143	Eucalyptus	Eucalyptus spp.	9	20	20	Poor	Remove	Poor Structure
144	Tanoak	Notholithocarpus densiflorus	9, 10	20	15	Poor	Remove	Poor Structure
145	Eucalyptus	Eucalyptus spp.	28	50	40	Fair	Remove	Excessive Foliar End Weight
146	Tanoak	Notholithocarpus densiflorus	9, 10	20	15	Poor	Remove	Poor Structure
147	Eucalyptus	Eucalyptus spp.	9, 9, 9	30	30	Fair	Remove	Poor Structure
148	Brazillian Pepper	Schinus terebinthifolius	25	45	45	Fair	Remove	Codominant Main Branches; Included Bark Tissue
149	Brazillian Pepper	Schinus terebinthifolius	11	30	15	Fair	Remove	Bowed Trunk
150	Brazillian Pepper	Schinus terebinthifolius	34	45	45	Fair	Remove	Poor Structure
151	Brazillian Pepper	Schinus terebinthifolius	32	45	45	Fair	Remove	Poor Structure

ID	Common Name	Species	DBH (inches)	Height (feet)	Spread (feet)	Condition	Recommended Action	Notes
152	Brazillian Pepper	Schinus terebinthifolius	36	45	45	Fair	Remove	Poor Structure
153	Eucalyptus	Eucalyptus spp.	12, 12, 12	30	30	Fair	Remove	Poor Structure
154	Brazillian Pepper	Schinus terebinthifolius	28	45	45	Fair	Remove	Poor Structure
155	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
156	Chinese Pistache	Pistacia chinensis	6	15	10	Poor	Remove	Poor Structure and Health
157	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
158	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
159	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
160	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
161	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
162	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
163	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
164	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
165	African Sumac	Rhus lancea	NA	10	20	Poor	Remove	On Neighboring Property But Overhanging Subject Property; Unbalanced; Overgrown
166	Mexican Fan Palm	Washintonia robusta	24	30	5	Good	Preserve	Excessive Dead Fronds; On Neighboring Property
167	Fremont Cottonwood	Populus fremontii	NA	10	15	Poor	Remove	Group Of Cottonwood Suckers
168	Fremont Cottonwood	Populus fremontii	NA	10	15	Poor	Remove	Group Of Cottonwood Suckers
169	Fremont Cottonwood	Populus fremontii	NA	10	15	Poor	Remove	Group Of Cottonwood Suckers
170	Holly Oak	Quercus ilex	12	15	15	Fair	Preserve	
171	Holly Oak	Quercus ilex	12	15	15	Fair	Preserve	
172	Holly Oak	Quercus ilex	12	15	15	Fair	Preserve	

APPENDIX I: CHRIS SEARCH RESULTS

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

July 10, 2019 NWIC File No.: 19-0032

Arun Bird
Circlepoint
200 Webster Street, Suite 200
Oakland, CA 94607

Re: Record search results for the proposed Data Center Project at 2600 De La Cruz Boulevard (APN 230-03-099), Santa Clara, CA.

Dear Arun Bird:

Per your request received by our office on July 2, 2019, a rapid response records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for Santa Clara County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates that there has been one cultural resource study that covered approximately 15% of the Data Center project area (Cartier 1993: S-15935). This project area contains no recorded archaeological resources. The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) lists no recorded buildings or structures within or adjacent to the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within the proposed project area.

At the time of Euroamerican contact the Native Americans that lived in the area were speakers of the Tamyen language, part of the Costanoan language family (Levy 1978:485). There are Native American resources in the surrounding areas of the proposed project area referenced in the ethnographic literature [villages of the Tamien (Milliken 1994:256)].

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of Santa Clara County have been found in areas marginal to San Francisco Bay, and inland near intermittent and perennial watercourses, such as the Guadalupe River. The Data Center project area contains alluvial valley lands located approximately one half mile west of the Guadalupe River. This area is also known for buried archaeological resources. Given the similarity of one or more of these environmental factors and the ethnographic sensitivity of the area, there is a high potential for unrecorded Native American resources in the proposed Data Center project area.

Review of historical literature and maps indicated the possibility of historic-period activity within the Data Center project area. Although no buildings are indicated on historic-period maps, the 1876 Santa Clara County Atlas indicated the project area was located within the lands of "Heirs of P. Donahue, Laurel Wood Farm" (p.36). Historic Spots in California also mentions the Laurelwood Farm and surrounding areas known for Laurel wood noted as early as 1777 by the founders of the local Mission Santa Clara de Asis (Hoover et al 1990:399). With this in mind, there is a moderately high potential for unrecorded historic-period archaeological resources in the proposed Data Center project area.

The 1961 San Jose USGS 15-minute topographic quadrangle fails to depict any buildings or structures within the Data Center project area; therefore, there is a low possibility of identifying any buildings or structures 45 years or older within the project area.

RECOMMENDATIONS:

1) Our office has record of one previous survey that included approximately 15% of the project area (Cartier 1993: S-15935). The recommendations from Cartier's report are: "in light of the close proximity to the archaeologicially sensitive area of the San Jose airport lands, it is recommended that the project be monitored by a qualified archaeologist" (1993:2). Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

2) There is a high potential of identifying Native American archaeological resources and a moderately high potential of identifying historic-period archaeological resources in the project area. Due to the passage of time since the previous survey (Cartier 1993) and the changes in archaeological theory and method since that time, we recommend a qualified archaeologist conduct further archival and field study for the entire project area to

identify cultural resources. We recommend a qualified archaeologist conduct further archival and field study to identify cultural resources. Field study may include, but is not limited to, pedestrian survey, hand auger sampling, shovel test units, or geoarchaeological analyses as well as other common methods used to identify the presence of archaeological resources. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

3) We recommend the lead agency contact the local Native American tribe(s) regarding traditional, cultural, and religious heritage values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/373-3710.

4) If the proposed project area contains buildings or structures that meet the minimum age requirement, prior to commencement of project activities, it is recommended that this resource be assessed by a professional familiar with the architecture and history of Santa Clara County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

5) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

6) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

7) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the California Historical Resources Information System (CHRIS)

Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,

Jillian Guldenbrein
Researcher

LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:

Allen, Rebecca and Mark Hylkema
2002 *Life Along the Guadalupe River- an Archaeological and Historical Journey.* Friends of Guadalupe River Park and Gardens, San Jose, CA.

Bowman, J.N.
1951 *Adobe Houses in the San Francisco Bay Region*. Geologic Guidebook of the San Francisco Bay Counties, Bulletin 154. California Division of Mines, Ferry Building, San Francisco.

Butler, Phyllis Filiberti
1981 *The Valley of Santa Clara: Historic Buildings, 1792-1920*. Second Edition. Presidio Press, Novato, CA.

Cartier, Robert (Archaeological Resource Management)
1993 *Cultural Resource Evaluation of the De La Cruz Boulevard Project in the City of Santa Clara, County of Santa Clara.* **NWIC Report S-015935**

Fickewirth, Alvin A.
1992 *California Railroads*. Golden West Books, San Marino, CA.

Helley, E.J., K.R. Lajoie, W.E. Spangle, and M.L. Blair
1979 *Flatland Deposits of the San Francisco Bay Region - Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning*. Geological Survey Professional Paper 943. United States Geological Survey and Department of Housing and Urban Development.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, revised by William N. Abeloe
1966 *Historic Spots in California*. Third Edition. Stanford University Press, Stanford, CA.

Hoover, Mildred Brooke, Hero Eugene Rensch, and Ethel Rensch, William N. Abeloe, revised by Douglas E. Kyle
1990 *Historic Spots in California*. Fourth Edition. Stanford University Press, Stanford, CA.

Kroeber, A.L.
1925 *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78, Smithsonian Institution, Washington, D.C. (Reprint by Dover Publications, Inc., New York, 1976).

Levy, Richard
1978 Costanoan. In *California*, edited by Robert F. Heizer, pp. 485-495. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Milliken, Randall
1995 *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810*. Ballena Press Anthropological Papers No. 43, Menlo Park, CA.

Myers, William A. (editor)
1977 *Historic Civil Engineering Landmarks of San Francisco and Northern California*. Prepared by The History and Heritage Committee, San Francisco Section, American Society of Civil Engineers. Pacific Gas and Electric Company, San Francisco, CA.

Nichols, Donald R., and Nancy A. Wright
1971 Preliminary Map of Historic Margins of Marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map. U.S. Department of the Interior, Geological Survey in cooperation with the U.S. Department of Housing and Urban Development, Washington, D.C.

Santa Clara County Historical Heritage Commission
1979 Heritage Resource Inventory: Santa Clara County. Santa Clara County Planning Department, San Jose, CA. (Reprint 1999).

State of California Department of Parks and Recreation
1976 *California Inventory of Historic Resources*. State of California Department of Parks and Recreation, Sacramento.

State of California Department of Parks and Recreation and Office of Historic Preservation
1988 *Five Views: An Ethnic Sites Survey for California*. State of California Department of Parks and Recreation and Office of Historic Preservation, Sacramento.

State of California Office of Historic Preservation **
2012 *Historic Properties Directory*. Listing by City (through April 2012). State of California Office of Historic Preservation, Sacramento.

Thompson & West
1876 Historical Atlas Map of Santa Clara County, California. Thompson & West, San Francisco, CA. (Reprint by Smith & McKay Printing Company, San Jose, CA 1973).

Works Progress Administration
1984 *The WPA Guide to California*. Reprint by Pantheon Books, New York. (Originally published as California: A Guide to the Golden State in 1939 by Books, Inc., distributed by Hastings House Publishers, New York.)

**Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

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APPENDIX J: NAHC SACRED LANDS SEARCH RESULTS

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

June 21, 2019

Brianna Bohonok
Circlepoint

VIA Email to: b.bohonok@circlepoint.com

RE: **Santa Clara SV1 Data Center Project**, City of Santa Clara; San Jose West USGS Quadrangle, Santa Clara County, California.

Dear Ms. Bohonok:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. The absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information. If you have any questions or need additional information, please contact me at my email address: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, B.S., M.A., Ph.D.
Associate Governmental Program Analyst

Attachment

APPENDIX K: ENERGY STUDY

CyrusOne Santa Clara 1 Data Center

Energy Study

prepared for

Circlepoint
46 South 1st Street
San Jose, California 95113

prepared by

Rincon Consultants, Inc.
449 15th Street, Suite 303
Oakland, California 94612

August 2019

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

Table of Contents

Tables

Figures

Appendices

1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential energy impacts of the CyrusOne Santa Clara 1 Data Center (SC1DC) Project (herein referred to as "proposed project" or "project") in Santa Clara, California. Rincon Consultants, Inc. (Rincon) prepared this study for Circlepoint, for use in support of environmental documentation being prepared for the project pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the project's energy impacts related to both temporary construction activity and long-term operation of the project.

1.2 Project Summary

Project Location

The approximately 15-acre project site is located at 2600 De La Cruz Boulevard in the City of Santa Clara in Santa Clara County (Assessor Parcel Number 230-03-99). The project site is located at the northwest corner of De La Cruz Boulevard and Martin Avenue and is bound by De La Cruz Boulevard to the east, Marin Avenue to the south, railroad tracks to the west, and commercial development to the north. The Norman Y. Mineta San Jose International Airport is located east of the project site across De La Cruz Boulevard. The project site has a land use designation and zoning of Heavy Industrial. The project site also contains a surface parking lot that is accessible via De La Cruz Boulevard. Figure 1 shows the project site's regional location, and Figure 2 shows an aerial view of the project site and surrounding area.

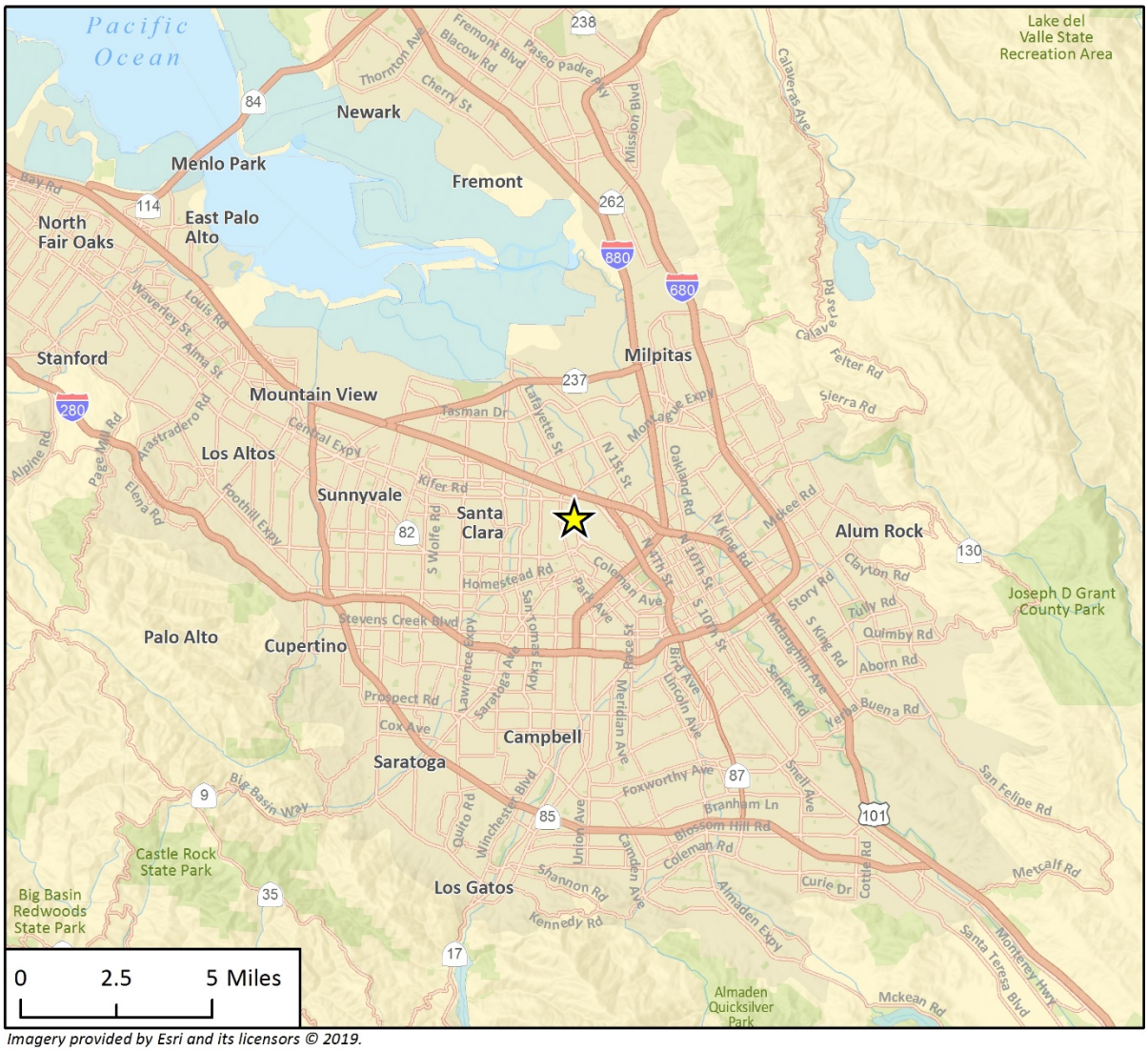
Project Description

The project would involve construction of a four-story data center building that would house computer servers for private clients in a secure and environmentally controlled structure. The data center would be designed to provide up to 67.5 megawatts (MW) of critical information technology (IT) load. The project would have a peak load of 96.5 MW, which includes electricity to power the computer servers; associated heating, ventilation, and air conditioning (HVAC) equipment; exterior and interior lighting; and indoor appliances and fixtures. However, during average operating conditions, the project would have a demand of 58 MW and an expected critical IT load of 47 MW.

Equipment Specifications

The primary project components would include computer servers and associated HVAC equipment that would prevent overheating of servers within the data center building. HVAC equipment would include 52 air cooled chillers (YORK Model YVFA R134a), a cooling tower (Model AXS 12-22022), exhaust ventilators (Cook Model ACE-D), and air handling units (various AAON models).

Figure 1 Regional Location



Imagery provided by Esri and its licensors © 2019.

Project Location

N

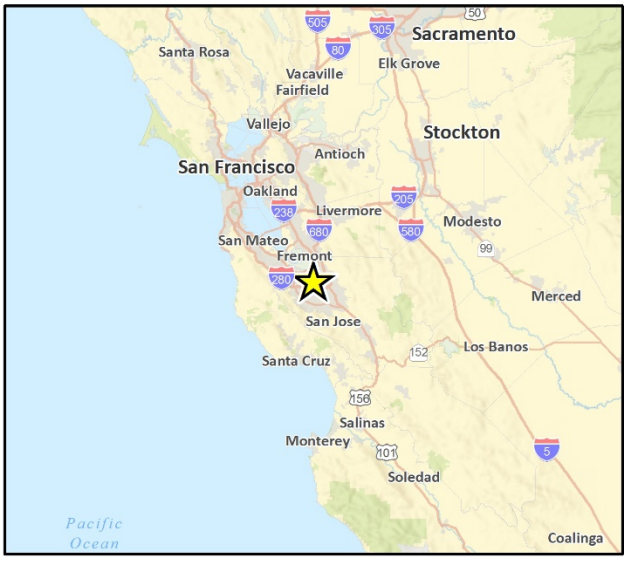


Figure 2 Project Site Location

Imagery provided by Microsoft Bing and its licensors © 2019.

Fig 2 Project Location

To serve the data center in the event of a power outage, the project would include the CyrusOne Santa Clara 1 Backup Generating Facility (SC1BGF), which would consist of a total of 54 diesel fired generators (MTU Model 16V400 DS2250) that would be used to provide backup power generation to continue supplying steady power to the servers and other equipment. The generators would be located in a single generation yard located on the west and south sides of the proposed data center building.

Building Design

The proposed project would be constructed with high-efficiency building materials to maximize energy efficiency and insulation. The envelope concrete walls, stud walls, and glazing would have U-factors of 0.08, 0.055, and 0.41, respectively, which would exceed the 2019 Title 24 requirements.[1] In addition, the roofing materials would have a solar reflective index of 90 and would be cool roof-certified, which would also exceed the 2019 Title 24 requirements.[2] The project would also include high-efficiency plumbing fixtures. Furthermore, the project would include nine parking spaces with electric vehicle charging stations, five bicycle parking spaces, and nine bicycle lockers for use by employees.

Operation and Maintenance

The project would employ approximately 25 full-time employees, including 24-hour security personnel. Operation and maintenance activities would include routine testing and inspection of each backup generator. Each generator would be tested for no more than 50 hours annually, per the Bay Area Air Quality Management District's Authority to Construct. Approximately 367,200 gallons of diesel fuel would be stored on-site in individual fuel tanks to supply the backup generators. The on-site fuel supply would be periodically re-filled on an as-needed basis by a compartmentalized tanker truck with a maximum capacity of 8,500 gallons.

Electricity to power the proposed data center would be provided by Silicon Valley Power (SVP). SVP would supply power to the proposed project through a new distribution substation that would be constructed on the project site, which would be owned and operated by CyrusOne. The project would not require natural gas supply. Gasoline and diesel fuels to power employee and delivery vehicles would be supplied by local gas stations and diesel fuel suppliers.

Construction

Construction activities are anticipated to occur over approximately 17 months from February 2020 through March 2021. It is anticipated that the construction period for the project would require approximately three months for site preparation, grading, and paving, four months for installation of utilities, and approximately 12 months for building construction.[3] The project would require cut of approximately 12,500 cubic yards (CY) of soil and fill of approximately 11,300 CY of soil.

---

[1] The U-factor is the rate of heat loss of a structural component and is measured in terms of British thermal units/(height * square feet). A lower U-factor indicates a greater resistance to heat flow and improved insulation.

[2] The solar reflective index is a measure of a surface's ability to reject solar hear by reflecting solar radiation and emitting thermal radiation. A higher solar reflective index value indicates a greater ability to reflect solar radiation and remain cool in the sunlight. The solar reflective index values range from 0 to 100.

[3] Grading, site preparation, paving, and installation of utilities would overlap from October 2019 to February 2020.

2 Background

2.1 Overview of Energy

California is one of the lowest per capita energy users in the United States, ranked 48th in the nation, due to its energy efficiency programs and mild climate. California consumed 281,180 gigawatt-hours (GWh) of electricity and 12,638 million therms of natural gas in 2018 (California Energy Commission [CEC] 2019a). In addition, Californians consume approximately 18.9 billion gallons of motor vehicle fuels per year (Federal Highway Administration 2019). The single largest end-use sector for energy consumption in California is transportation (40 percent), followed by industry (24 percent), commercial (19 percent), and residential (18 percent) (United States Energy Information System [U.S. EIA] 2018a). Most of California's electricity is generated in-state with approximately 30 percent imported from the Northwest and Southwest in 2017. In addition, approximately 30 percent of California's electricity supply comes from renewable energy sources, such as wind, solar photovoltaic, geothermal, and biomass (CEC 2018a).

To reduce statewide vehicle emissions, California requires that all motorists use California Reformulated Gasoline, which is sourced almost exclusively from in-state refineries. Gasoline is the most used transportation fuel in California with 15.5 billion gallons sold in 2018 and is used by light-duty cars, pickup trucks, and sport utility vehicles (CEC 2019a). Diesel is the second most-used fuel in California with 1.8 billion gallons sold in 2018 and is used primarily by heavy duty-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm equipment, and heavy-duty construction and military vehicles (CEC 2019a). Both gasoline and diesel are primarily petroleum-based, and their consumption releases greenhouse gas (GHG) emissions, including CO_2 and N_2O. The transportation sector is the single largest source of GHG emissions in California, accounting for 41 percent of all inventoried emissions in 2016 (California Air Resources Board [CARB] 2018).

Data centers are a highly energy-intensive land use that consumes approximately 2 percent of total electricity usage in the U.S. due to the substantial amount of energy required to power computer servers and operate the associated HVAC equipment to prevent servers from overheating. On average, data centers consume approximately 10 to 50 times more energy per square foot than typical commercial office buildings (United States Department of Energy [U.S. DOE] 2019). As a result, energy efficiency is often a key concern in the design and operation of data centers.

2.2 Regional and Local Energy Setting

Energy use relates directly to environmental quality, because energy use can adversely affect air quality and can generate GHG emissions that contribute to climate change. Fossil fuels are burned to create electricity that powers residences, heats and cools buildings, and powers vehicles. Transportation energy use corresponds to the fuel efficiency of cars, trucks, and public transportation; the different travel modes such as single-passenger automobile, carpool, and public transit; and the miles traveled using these modes.

a. Energy Supply

Petroleum

California is one of the top producers of petroleum in the nation with drilling operations occurring throughout the state but concentrated primarily in Kern and Los Angeles counties. A network of crude oil pipelines connects production areas to oil refineries in the Los Angeles area, the San Francisco Bay area, and the Central Valley. California oil refineries also process Alaskan and foreign crude oil received at ports in Los Angeles, Long Beach, and the San Francisco Bay area. Crude oil production in California and Alaska is in decline, and California refineries depend increasingly on foreign imports (CEC 2018b). According to the U.S. EIA, California's field production of crude oil totaled 174.1 million barrels in 2017 (U.S. EIA 2018b).

City of Santa Clara Petroleum Infrastructure

In general, individual users, such as residents and employees, purchase petroleum fuels. There are approximately seven gasoline stations but no petroleum refineries in Santa Clara (U.S. EIA 2018c, GasBuddy 2019). According to the California Department of Conservation (DOC) Division of Oil, Gas, and Geothermal Resources (DOGGR), there are no oil and gas wells are in Santa Clara (DOGGR 2018a).

Alternative Fuels

A variety of alternative fuels are used to reduce petroleum-based fuel demand. Their use is encouraged through various statewide regulations and plans, such as the Low Carbon Fuel Standard and Senate Bill (SB) 32. Conventional gasoline and diesel may be replaced, depending on the capability of the vehicle, with alternative fuels such as hydrogen, biodiesel, and electricity. Currently, 35 hydrogen and 10 biodiesel refueling stations are located in California, but none are located in Santa Clara. Dozens of vehicle charging stations exist in Santa Clara (U.S. DOE 2018).

Electricity

In 2018, California's in-state electricity generation totaled 80,304 MW (CEC 2019b). Primary fuel sources for the state's electricity generation in 2018 included the following:

- Natural gas (51.7 percent)
- Large hydroelectric (15.3 percent)
- Solar photovoltaic (13.3 percent)
- Nuclear (3.0 percent)
- Wind (7.5 percent)
- Geothermal (3.4 percent)
- Small hydroelectric (2.2 percent)
- Biomass (1.6 percent)
- Solar thermal (1.6 percent)
- Coal (<1 percent)
- Petroleum coke (<1 percent)
- Waste heat (<1 percent)
- Oil (<1 percent)

According to the 2018 Integrated Energy Policy Report, California's electric grid relies increasingly on clean sources of energy such as solar, wind, geothermal, hydroelectricity, and biomass (CEC 2018c). As this transition advances, the grid is also expanding to serve new sectors including electric vehicles, rail, and space and water heating. California has installed more renewable energy than any other state in the United States with 22,250 MW of utility-scale systems operational (CEC 2018c).

Silicon Valley Power

SVP would supply electricity to the project site. SVP is a local utility provider owned and operated by the City of Santa Clara. SVP serves approximately 55,394 customers and maintains 7,076 miles of electric distribution lines (SVP 2018a). In 2017 (the most recent year for which data is available), SVP's power mix consisted of 38 percent renewable resources (wind, geothermal, biomass, solar, and small hydroelectric), 9 percent coal, 16 percent natural gas, 34 percent large hydroelectric, and 3 percent unspecified power that is not traceable to sources (SVP 2018b). However, as of January 1, 2018, all power provided by SVP customers is coal-free (SVP 2019).

SVP's 2018 Integrated Resource Plan (IRP) serves as an assessment of future electric energy needs of SVP customers through 2038 and details the preferred plan for supplying electricity in a "safe, reliable, cost-effective, and environmentally responsible manner" (SVP 2018c). SVP anticipates meeting a 2038 energy load demand of approximately 5,718 GWh, an increase of approximately 1,679 GWh over forecast 2019 demand. The preferred plan outlined in the 2018 IRP meets and exceeds the 2030 renewable energy target set forth by SB 100, which is discussed further in Section 2.3, *Regulatory Setting* (SVP 2018c).

City of Santa Clara Electric Power Infrastructure

There are four petroleum power plants and four natural gas power plans in Santa Clara (U.S. EIA 2018c).

b. Energy Demand

Petroleum

State

In 2017, transportation accounted for 40 percent of California's total energy demand, amounting to approximately 3,175 trillion British thermal units (Btu) in 2017 (U.S. EIA 2019a). California's transportation sector, including rail and aviation, consumed roughly 585 million barrels of petroleum fuels in 2017 (EIA 2019b). In 2017, petroleum-based fuels were used for approximately 98.4 percent of the state's total transportation activity (EIA 2019b). According to the CEC, California's 2018 fuel sales totaled 15.5 billion gallons of gasoline and 1.8 billion gallons of diesel (CEC 2019a).

Santa Clara County

Santa Clara County fuel sales are compared to statewide sales herein to provide regional and statewide context for fuel consumption. As shown in Table 1, Santa Clara County consumed an estimated 643 million gallons of gasoline and 48 million gallons of diesel fuel in 2018, which was approximately 4.2 percent of statewide gasoline consumption and approximately 2.7 percent of statewide diesel fuel consumption (CEC 2019a).

Table 1 2018 Annual Gasoline and Diesel Consumption

Fuel Type	Santa Clara County (gallons)	California (gallons)	Proportion of Statewide Consumption
Gasoline	643,000,000	15,471,000,000	4.2%
Diesel	48,000,000	1,777,000,000	2.7%

Source: CEC 2019a

Electricity

State

California consumed approximately 281,180 GWh in 2018. Residential electricity demand accounted for approximately 33 percent of California's electricity consumption in 2018, and non-residential demand account for approximately 67 percent (CEC 2019c).

Santa Clara County

Electricity consumption in Santa Clara County is compared to statewide consumption herein to provide regional and statewide context. As shown in Table 2, Santa Clara County consumed approximately 16,668 GWh in 2018 (CEC 2018), which was approximately 20 percent of the combined electricity consumption by Pacific Gas & Electric (PG&E) and SVP (the two major electricity providers in Santa Clara County) and approximately 5.9 percent of statewide electricity consumption (CEC 2019c).

Table 2 2018 Electricity Consumption

Energy Type	Santa Clara County (GWh)	PG&E and SVP (GWh)	California (GWh)	Proportion of PG&E and SVP Consumption	Proportion of Statewide Consumption
Electricity	16,668	83,389	281,180	20%	5.9%

Source: CEC 2019c

2.3 Regulatory Setting

Federal

Energy Independence and Security Act of 2007

The Energy Independence and Security Act, enacted by Congress in 2007, is designed to improve vehicle fuel economy and help reduce the United States' dependence on foreign oil. It expands the production of renewable fuels, reducing dependence on oil, and confronting climate change. Specifically, it does the following:

- Increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard, requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels
- Reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon (mpg) by 2020 – an increase in fuel economy standards of 40 percent

The Energy Independence and Security Act of 2007 also set energy efficiency standards for lighting (specifically light bulbs) and appliances. Development would also be required to install photosensors and energy-efficient lighting fixtures consistent with the requirements of 42 USC Section 17001 et seq.

Energy Policy and Conservation Act

Enacted in 1975, the Energy Policy and Conservation Act established fuel economy standards for new light-duty vehicles sold in the United States. The law placed responsibility on the National Highway Traffic and Safety Administration (NHTSA), a part of the United States Department of Transportation (U.S. DOT), for establishing and regularly updating vehicle standards. The United States Environmental Protection Agency (U.S. EPA) administers the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards.

Corporate Average Fuel Economy Standards

The CAFE standards are federal rules established by the NHTSA that set fuel economy and GHG emissions standards for all new passenger cars and light trucks sold in the United States. The CAFE standards generally become more stringent with time, reaching an estimated 38.3 miles per gallon for the combined industry-wide fleet for model year 2020 (77 Federal Register 62624 et seq. [October 15, 2012 Table I-1). It is, however, legally infeasible for individual municipalities to adopt more stringent fuel efficiency standards. The CAA (42 United States Code [USC] Section 7543[a]) states that "no state or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part." In August 2016, the U.S. EPA and NHTSA announced the adoption of the phase two programs related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi- trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT of CO_2 and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program (NHSTA 2019).

As of September 2018, NHSTA and U.S. EPA were undergoing the rulemaking process to establish the Safer Affordable Fuel Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). The SAFE Vehicles Rule would amend the existing CAFE standards such that the requirements for model years 2021 through 2026 are lowered to the 2020 standards of 43.7 miles per gallon (mpg) and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light duty trucks (U.S. EPA 2018). The SAFE Vehicles Rule had not been finalized at the time this analysis was prepared and was undergoing review by the Science Advisory Board for the U.S. EPA.

Construction Equipment Fuel Efficiency Standard

The U.S. EPA sets emission standards for construction equipment. The first federal standards (Tier 1) were adopted in 1994 for all off-road engines over 50 horsepower (hp) and were phased in by 2000. A new standard was adopted in 1998 that introduced Tier 1 for all equipment below 50 hp and established the Tier 2 and Tier 3 standards. The Tier 2 and Tier 3 standards were phased in by 2008 for all equipment. The current iteration of emissions standards for construction equipment are the Tier 4 efficiency requirements are contained in 40 Code of Federal Regulations Parts 1039, 1065, and 1068 (originally adopted in 69 Federal Register 38958 [June 29, 2004], and most recently updated in 2014 [79 Federal Register 46356]). Emissions requirements for new off-road Tier 4 vehicles were to be completely phased in by the end of 2015.

Energy Star Program

In 1992, the U.S.EPA introduced Energy Star as a voluntary labeling program designed to identify and promote energy-efficient products to reduce GHG emissions. The program applies to major household appliances, lighting, computers, and building components such as windows, doors, roofs, and heating and cooling systems. Under this program, appliances that meet specification for maximum energy use established under the program are certified to display the Energy Star label. In 1996, the U.S. EPA joined with the U.S. DOE to expand the program, which now also includes qualifying commercial and industrial buildings, as well as homes (Energy Star 2019).

State

California Energy Plan

The CEC is responsible for preparing the California Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The 2008 California Energy Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies several strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs, as well as encouragement of urban designs that reduce vehicle miles travelled and accommodate pedestrian and bicycle access.

Reducing California's Petroleum Dependence (Assembly Bill 2076)

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), the CEC and CARB prepared and adopted a joint-agency report, *Reducing California's Petroleum Dependence,* in 2003. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicle miles travelled. One of the performance-based goals of AB 2076 is to reduce petroleum demand to 15 percent below 2003 demand. Furthermore, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, the Governor directed the CEC to take the lead in developing a long-term plan to increase alternative fuel use.

Integrated Energy Policy Report

Senate Bill 1389 (Chapter 568, Statutes of 2002) required the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC uses these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. The most recent assessment, the *2018 Integrated Energy Policy Report*, contains two volumes. Volume I highlights the implementation of California's innovative policies and the role they have played in establishing a clean energy economy. Volume II, adopted February 20, 2019, provides more detail on several key energy policies, including decarbonizing buildings, increasing energy efficiency savings, and integrating more renewable energy into the electricity system (CEC 2018c and 2019d).

California Renewable Portfolio Standard and Senate Bill 100

Established in 2002 under SB 1078, and accelerated by SB 107 (2006), SB X 1-2 (2011), and SB 100 (2018), California's Renewable Portfolio Standard (RPS) obligates investor-owned utilities, energy service providers, and community choice aggregators to procure 33 percent total retail sales of electricity from renewable energy sources by 2020, 60 percent by 2030, and 100 percent by 2045. SB 100 also states "that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045." The California Public Utilities Commission and the CEC are jointly responsible for implementing the program.

Pavley Standards (Assembly Bill 1493)

AB 1493 (Chapter 200, Statutes of 2002), known as the Pavley bill, amended Health and Safety Code sections 42823 and 43018.5, thereby requiring CARB to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California.

Implementation of new regulations prescribed by AB 1493 required that the state apply for a waiver under the federal Clean Air Act. Although the U.S. EPA initially denied the waiver in 2008, the U.S. EPA approved a waiver in June 2009, and in September 2009, CARB approved amendments to its initially adopted regulations to apply the Pavley standards that reduce GHG emissions to new passenger vehicles in model years 2009 through 2016. According to CARB, implementation of the Pavley regulations is expected to reduce fuel consumption while also reducing GHG emissions.

Energy Action Plan

In the October 2005, the CEC and California Public Utilities Commission updated their energy policy vision by adding some important dimensions to the policy areas included in the original Energy Action Plan, such as the emerging importance of climate change, transportation-related energy issues. and research and development activities. The CEC adopted an update to the Energy Action Plan II in February 2008 that supplements the earlier energy action plans and examines the state's ongoing actions in the context of global climate change.

State Alternative Fuels Plan (Assembly Bill 1007)

AB 1007 (Chapter 371, Statutes of 2005) required the CEC to prepare a plan to increase the use of alternative fuels in California. The CEC prepared the State Alternative Fuels Plan in partnership with CARB and in consultation with other federal, state, and local agencies. The Alternative Fuels Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The Alternative Fuels Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Bioenergy Action Plan (Executive Order S-06-06)

Executive Order (EO) S-06-06 establishes targets for the use and production of biofuels and biopower and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following targets to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels in California by 2010, 40 percent by 2020, and 75 percent by 2050. EO S-06-06 also calls for the state to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the state can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updated the 2011 Plan and provided a more detailed action plan to achieve the following goals:

- Increase environmentally and economically sustainable energy production from organic waste
- Encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications
- Create jobs and stimulate economic development, especially in rural regions of the state
- Reduce fire danger, improve air and water quality, and reduce waste

Title 24, California Code of Regulations

Updated every three years through a rigorous stakeholder process, Title 24 of the California Code of Regulations requires California homes and businesses to meet strong energy efficiency measures, thereby lowering their energy use. Title 24 contains numerous subparts, including Part 1 (Administrative Code), Part 2 (Building Code), Part 3 (Electrical Code), Part 4 (Mechanical Code), Part 5 (Plumbing Code), Part 6 (Energy Code), Part 8 (Historical Building Code), Part 9 (Fire Code), Part 10 (Existing Building Code), Part 11 (Green Building Standards Code), Part 12 (Referenced Standards Code).

PART 6 (BUILDING ENERGY EFFICIENCY STANDARDS)

Part 6 of Title 24 contains the 2016 Building Energy Efficiency Standards for new residential and non-residential buildings, which went into effect on January 1, 2017. Part 6 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2016 Standards improve upon the previous 2013 Standards for new construction of and additions and alterations to residential and nonresidential buildings. Under the 2016 Standards,

nonresidential buildings are generally five percent more energy efficient than the 2013 Standards as a result of better windows, insulation, lighting, ventilation systems, and other features (CEC 2015). Part 6 also provides for the installation of cool roofs in Sections 140.3(a)(1), 141.0(b)(2)(B), and 141.0(b)(3).

The 2019 Building Energy Efficiency Standards, adopted on May 9, 2018, will become effective on January 1, 2020. The 2019 Standards focus on four key areas: 1) smart residential photovoltaic systems; 2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); 3) residential and nonresidential ventilation requirements; 4) and nonresidential lighting requirements (CEC 2018d). Under the 2019 Standards, nonresidential buildings will be 30 percent more energy-efficient compared to the 2016 Standards (CEC 2018e).

PART 11 (CALGREEN)

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR, Part 11, known as "CALGreen") was adopted as part of the California Building Standards Code. CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants. The mandatory provisions of the CALGreen became effective January 1, 2011 and were updated in 2016. The 2016 Standards, which became effective on January 1, 2017, establish green building criteria for residential and nonresidential projects. The CEC adopted updates to the 2016 Standards in 2019 that will take effect on January 1, 2020.

Local

City of Santa Clara General Plan

The City of Santa Clara General Plan (2010) contains goals and policies that are designed to encourage reduced energy use. The following goals and policies that would apply to the project:

Goal 5.10.3-G1. Energy supply and distribution maximizes the use of renewable resources.

Policy 5.10.3-P1. Promote the use of renewable energy resources, conservation and recycling programs.

Goal 5.10.3-G2. Implementation of energy conservation measures to reduce consumption.

Policy 5.10.3-P4. Encourage new development to incorporate sustainable building design, site planning and construction, including encouraging solar opportunities.

Policy 5.10.3-P5. Reduce energy consumption through sustainable construction practices, materials and recycling.

Policy 5.10.3-P6. Promote sustainable buildings and land planning for all new development, including programs that reduce energy and water consumption in new development.

City of Santa Clara Climate Action Plan

The City of Santa Clara Climate Action Plan (2013) contains goals and policies that are designed to encourage reduced energy use. The following goals and policies that would apply to the project:

Focus Area 2: Energy Efficiency Programs

Goal: Maximize the efficient use of energy throughout the community.

2.3. Encourage new data centers with an average rack power rating of 15 kW or more to identify and implement cost-effective and energy-efficient practices.

City of Santa Clara Municipal Code

The City's energy code is codified in Chapter 15.36, *Adoption of the Energy Code,* of the Santa Clara Municipal Code (SCMC). Chapter 15.36 adopts the 2016 California Energy Code, published and copyrighted by the International Code Council, Inc., and the California Building Standards Commission in Part 6 of Title 24 of the California Code of Regulations.

3 Impact Analysis

3.1 Methodology

Energy consumption is analyzed herein in terms of construction and operational energy use. Construction energy demand accounts for anticipated energy consumption during project construction, such as fuel consumed by construction equipment and construction workers' vehicles traveling to and from the project site. Operational energy demand accounts for the anticipated energy consumption during project operation, such as electricity consumed for operation of computer servers, associated HVAC equipment, and building power needs as well as fuel consumed by employee and delivery vehicle trips to and from the project site and by maintenance and operation of backup generators.

Construction

Construction-related energy demand was estimated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2 based on project data provided by the applicant, locally-appropriate industry-standard assumptions, and CalEEMod default values for projects in Santa Clara County when project specifics were not known. Modeling was completed as part of the Air Quality and Greenhouse Gas Technical Report prepared for the project by Ramboll in August 2019 (Ramboll 2019). See Appendix B for energy calculation sheets.

Project construction would also use building materials that contain embodied energy (i.e., energy used during the manufacturing and/or procurement of that material); however, as Section 15126.2(b) of the CEQA Guidelines states, "This [energy] analysis is subject to the rule of reason and shall focus on energy use that is caused by the project." In addition, it is reasonable to assume that manufacturers of building materials such as concrete, steel, and lumber would employ energy conservation practices in the interest of minimizing the cost of doing business. It also is reasonable to assume that non-custom building materials, such as drywall and standard-shaped structural elements, would have been manufactured regardless of the proposed project and, if not used for the project, would be used in a different project. Therefore, energy consumption required for the manufacturing and/or procurement of each building and construction material is not within the scope of this analysis.

Operation

Operational energy demand was estimated primarily based on project data provided by the applicant, including the anticipated maximum load, equipment specifications, and number of employees. Energy demand for the treatment and transport of water and wastewater was calculated using the estimated water demand from the CalEEMod output files contained in the Air Quality and Greenhouse Gas Technical Report (Ramboll 2019).

Electricity used to treat and convey water and wastewater for the proposed project was calculated in accordance with the methodology used for the air pollutant and GHG emission modelling in CalEEMod (California Air Pollution Control Officers Association [CAPCOA] 2017). Table 3 shows the water and wastewater electricity intensity factors for Santa Clara County that were used to calculate electricity consumption from supplying, treating, and distributing water as well as from treating wastewater. The estimated amount of water consumed annually by the proposed project was

multiplied by the water and wastewater electricity intensity factors to determine the total annual amount of electricity required for water and wastewater treatment and conveyance. It is conservatively assumed that all water consumed would be discharged to the wastewater treatment system.

Table 3 Water and Wastewater Electricity Intensity Factors for Santa Clara County

Process	Electricity Intensity Factor (kWh/million gallons)
Supply Water	2,117
Treat Water	111
Distribute Water	1,272
Treat Wastewater	1,911

kWh = kilowatt-hours

Source: CAPCOA 2017, Appendix D, Table 9.2

Fuel consumption by vehicle trips to and from the project site was estimated using the vehicle miles travelled and vehicle fleet mix provided in the CalEEMod output files contained in the Air Quality and Greenhouse Gas Technical Report (Ramboll 2019). See Appendix B for energy calculation sheets.

3.2 Significance Thresholds

To determine whether a project would have a significant energy impact, Appendix G to the *CEQA Guidelines* requires consideration of whether a project would:

1. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Wasteful, Inefficient, and Unnecessary Consumption of Energy

There are no formally adopted criteria signifying the relative efficiency of a project during its construction phase. Therefore, this analysis takes into consideration the equipment and processes employed during project construction to qualitatively determine whether energy consumed during construction would be wasteful, inefficient, or unnecessary.

The analysis of operational energy demand uses both quantitative and qualitative approaches to determine whether energy consumed during operation would be wasteful, inefficient, or unnecessary. The efficiency of the proposed data center operations is evaluated using the Power Usage Effectiveness (PUE) factor, which is a measure used by the data center industry to estimate the efficiency of data centers. The PUE is calculated by dividing the total demand of the data center by the critical IT load. The closer the PUE is to a value of 1, the more efficient data center operations are. Table 4 summarizes the range and relative efficiency level associated with different PUE factors. As shown therein, a PUE between 1.5 and 2.0 is considered “efficient” while a PUE between 1.2 to 1.5 is considered “very efficient.” The PUE factor is used herein as an applicable criterion for determining whether operational energy consumption would be wasteful, inefficient, or

unnecessary. If the project's PUE exceeds 2.0, energy consumption resulting from project operation would be considered wasteful, inefficient, and unnecessary.

Table 4 Power Usage Effectiveness Factors and Efficiency Levels

Power Usage Effectiveness Factor	Level of Efficiency
3.0	Very Inefficient
2.5	Inefficient
2.0	Average
1.5	Efficient
1.2	Very Efficient

Source: 42U 2019

Operational energy demand is also quantitatively evaluated based on a comparison of project design features and the 2019 Title 24 standards. Furthermore, the analysis qualitatively considers the potential for inefficient, wasteful, or unnecessary energy consumption by the treatment and conveyance of water and wastewater and vehicle trips associated with project operation.

Consistency with Renewable Energy and Energy Efficiency Plans

The project's consistency with state and local plans for renewable energy and energy efficiency is evaluated qualitatively. A project is considered consistent with the provisions of these documents if it meets the general intent in advancing energy efficiency and increasing renewable energy in order to facilitate the achievement of City- and state-adopted goals and does not impede attainment of those goals. A given project need not be in perfect conformity with each and every planning policy or goals to be consistent. A project would be consistent if it would further the objectives and not obstruct their attainment. The following plans for renewable energy and energy efficiency would be applicable to the proposed project:

- Santa Clara General Plan, which includes goals and policies relevant to maximizing the use of renewable resources and implementing energy conservation measures.
- Santa Clara Climate Action Plan, which includes a goal and policy related to maximizing energy efficiency specifically with regard to the operation of new data centers.

3.3 Impact Analysis

Threshold 1:	Would the proposed project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Construction

Project construction would require energy resources primarily in the form of fuel consumption to operate heavy equipment, light-duty vehicles, machinery, and generators. Temporary power may also be provided for construction trailers and electric construction equipment. Table 5 summarizes the anticipated energy consumption from construction equipment and vehicles, including construction worker trips to and from the project site.

Table 5 Proposed Project Construction Energy Usage

	Fuel Consumption (Gallons)	
Source	**Gasoline**	**Diesel**
Construction Equipment & Hauling Trips	–	57,421
Construction Worker Vehicle Trips	44,262	–

See Appendix B for energy calculation sheets. Construction schedule and equipment parameters were based on CalEEMod output files provided in the Air Quality and Greenhouse Gas Technical Report (Ramboll 2019).

As shown in Table 5, project construction would require approximately 44,262 gallons of gasoline and 57,421 gallons of diesel fuel. Energy use during construction would be temporary in nature, and construction equipment used would be typical of similar-sized construction projects in the region. In addition, construction contractors would be required to comply with the provisions of California Code of Regulations Title 13 Sections 2449 and 2485, which prohibit diesel-fueled commercial motor vehicles and off-road diesel vehicles from idling for more than five minutes and would minimize unnecessary fuel consumption. Construction equipment would be subject to the U.S. EPA Construction Equipment Fuel Efficiency Standard (i.e. Tier 4 efficiency requirements, discussed in detail in Section 2.3, *Regulatory Setting*), which would also minimize inefficient, wasteful, or unnecessary fuel consumption.

Electrical power would be consumed to construct the project, and the demand, to the extent required, would be supplied from existing electrical infrastructure in the area. However, construction activities would require minimal electricity consumption and would not be expected to have any adverse impact on available electricity supplies or infrastructure. In addition, per applicable regulatory requirements such as 2019 CALGreen, the project would comply with construction waste management practices to divert a minimum of 65 percent of construction and demolition debris. These practices would result in efficient use of energy necessary to construct the project. Furthermore, in the interest of cost-efficiency, construction contractors would not utilize fuel in a manner that is wasteful or unnecessary. Therefore, project construction would not result in potentially significant environmental effects due to the wasteful, inefficient, or unnecessary consumption of energy, and impacts would be less than significant.

Operation

Energy demand from project operation would include electricity consumed by computer servers, HVAC equipment, and building operations as well as gasoline fuel consumed by employee vehicle trips and diesel fuel intermittently consumed by backup generators and diesel delivery tank trucks. Energy consumption is analyzed by fuel type in the following subsections.

Electricity Consumption

The proposed project would have a maximum load of 96.5 MW. Assuming continuous operation of the project for 24 hours per day for 365 days per year, the project would consume up to approximately 845,340 MWh of electricity annually.[4] This estimate of electricity usage includes electricity to power the computer servers; air cooled chillers; the cooling tower; exhaust ventilators; air handling units; other associated heating, ventilation, and air conditioning equipment; exterior and interior lighting; and indoor appliances. Electricity would be provided by SVP, which has issued a will-serve letter for the proposed project stating that SVP can provide 27 MW of electricity to the project site immediately and an additional 72 MW of electricity upon completion of the proposed on-site substation (see Appendix C for the will-serve letter). SVP has a renewable energy procurement portfolio of 38 percent, which would reduce the amount of nonrenewable fuels consumed to supply electricity to the project site (SVP 2018b). At peak operating capacity, the PUE for the proposed project would be 1.43;[5] however, the average annualized PUE for the proposed project would be 1.23.[6] As discussed in Section 3.2, *Significance Thresholds*, a PUE between 1.2 and 1.5 is considered "very efficient." Therefore, under both peak and average conditions, the project would operate at a "very efficient" level. As such, project operations would not result in the wasteful, inefficient, or unnecessary consumption of electricity.

The proposed project would be subject to the latest iteration of the Title 24 standards, which are designed to conserve energy use and maximum energy efficiency. However, as summarized in Table 6, certain elements of the proposed project would exceed the 2019 Title 24 standards, which would further reduce the potential for inefficient, wasteful, or unnecessary energy consumption during project operation. The envelope concrete walls and stud walls would exceed the 2019 Title 24 prescriptive envelope criteria by 813 percent and 113 percent, respectively. Furthermore, the roof materials would exceed the 2019 Title 24 solar reflective index requirement by 120 percent and would be "cool roof" certified.[7] Additionally, window glazing would exceed the 2019 Title 24 fenestration product standard by 193 percent. Therefore, building design and construction would further minimize the potential for the wasteful, inefficient, or unnecessary consumption of energy during project operation. Operation-related energy impacts from electricity consumption of the data servers and building itself would be less than significant.

[4] Calculation: 96.5 MW times 24 hours per day times 365 days per year = 845,340 MWh

[5] Peak demand of 96.5 MW divided by peak critical IT load of 67.5 MW

[6] Average demand of 58 MW divided by expected critical IT load of 47 MW

[7] Cool roofs are certified by ENERGY STAR, a U.S. EPA program, and must meet minimum initial and aged solar reflectance values.

Table 6 Operational Energy Efficiency Features

Structural Component	Metric	2019 Title 24 Requirement	Proposed Project Design Standard	Percentage Improvement above Title 24
Envelope Concrete Wall	U-Factor[1]	0.65[2]	0.08	813
Stud Wall	U-Factor[1]	0.062[2]	0.055	113
Roof Materials	Solar Reflective Index[3]	75	90	120
Glazing	U-Factor[1]	0.79[5]	0.41	193

[1] The U-factor is the rate of heat loss of a structural component and is measured in terms of British thermal units/(height * square feet). A lower U-factor indicates a greater resistance to heat flow and improved insulation.

[2] Table 140.3-B of the 2019 Building Energy Efficiency Standards

[3] The solar reflective index is a measure of a surface's ability to reject solar hear by reflecting solar radiation and emitting thermal radiation. A higher solar reflective index value indicates a greater ability to reflect solar radiation and remain cool in the sunlight. The solar reflective index values range from 0 to 100.

[4] Section 140.3(a)(1)(A)(i)(a)(2) of the 2019 Building Energy Efficiency Standards

[5] Table 110.6-A of the 2019 Building Energy Efficiency Standards

Day-to-day project operation would consume electricity to treat and transport water and wastewater to and from the project site. According to the CalEEMod output files contained in the Air Quality and Greenhouse Gas Technical Report (Ramboll 2019), the project would require approximately 2.252 million gallons of water per year, which would consume approximately 12.18 MWh per year for treatment and transport to and from the project site (see Table 7 for electricity calculations). All plumbing fixtures used in the proposed building would be high-efficiency fixtures, which would minimize the potential the inefficient or wasteful consumption of energy related to water and wastewater. Furthermore, HVAC equipment would include air cooled chillers that only require a one-time fill of water for operation, which would further reduce wasteful and unnecessary water consumption as compared to traditional evaporative cooling systems.

Table 7 Electricity Consumption related to Water and Wastewater Treatment and Conveyance

Process	Annual Electricity Consumption (MWh)[1]
Supply Water	4.77
Treat Water	0.25
Distribute Water	2.86
Wastewater Treatment	4.30
Total	**12.18**

MWh = megawatt-hours

[1] Annual electricity consumption was calculated by multiplying the project's estimated water demand by the electricity intensity factors shown in Table 3.

Gasoline and Diesel Fuel Consumption

BACKUP GENERATORS

The project would include 54, 2.25-MW diesel-fired backup generators, nine of which would be redundant, with a combined diesel fuel storage capacity of 367,200 gallons. In the event of a power outage, the project would rely on these backup generators to provide electricity. The generators would be designed to provide up to 24 hours of emergency generation at full demand. Testing of the generators would occur no more than 50 hours annually, per the Bay Area Air Quality Management District's Authority to Construct. Assuming that approximately 159.6 gallons of diesel fuel are required per hour to test generators at full load, backup generator testing would require approximately 7,980 gallons of diesel fuel per generator annually for a total of approximately 430,920 gallons annually (Diesel Service & Supply 2019).[8, 9] Maintenance and emergency use of the backup generators would not result in the wasteful, inefficient, or unnecessary consumption of energy because routine maintenance would be conducted periodically based on the minimum requirements to ensure reliability and operation would only occur during infrequent extended power outage events.

VEHICLE TRIPS

Project operation would result in the consumption of gasoline and diesel fuels by employee vehicle trips and diesel delivery trucks. The project would employ approximately 25 full-time employees per day who would travel to and from the project site on a daily basis. In addition, project operation would also require periodic trips by a diesel-fueled compartmentalized tanker truck to supply diesel fuel for the generators on an as-needed basis. Employee and delivery trips would consume approximately 68,039 gallons of gasoline per year and approximately 12,041 gallons of diesel fuel annually (see Appendix B for energy calculation sheets). However, this conservative estimate does not account for the nine clean air parking spaces with electric vehicle charging stations included in the project, which would encourage the use of electric vehicles and reduce gasoline fuel consumption by employee vehicle trips. This conservative estimate also does not account for the five bicycle parking spaces and nine bicycle lockers included in the project, which would encourage employees to use bicycles as a means of transportation, thereby also reducing gasoline fuel consumption. In addition, because use of the backup generators would be limited to routine maintenance and extended power outages, deliveries to re-supply diesel fuel stored on-site would be infrequent and only on an as-needed basis. Therefore, fuel consumption by employee and delivery vehicle trips would not be wasteful, inefficient, or unnecessary.

Overall Operational Energy Usage

As discussed in the preceding subsections, project operation would consume electricity as well as gasoline and diesel fuels. However, because of project design features that would maximize energy efficiency and conservation, overall project operation would not result in the wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, operational energy impacts would be less than significant.

[8] Calculation: 159.6 gallons per hour * 50 hours = 7,980 gallons

[9] Calculation: 7,980 gallons * 54 generators = 430,920 gallons

Threshold 2:	Would the proposed project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

As discussed in Section 2.3, *Regulatory Setting*, the City's General Plan and Climate Action Plan include several goals and policies related to renewable energy and energy efficiency. The project's consistency with these goals and policies is evaluated in Table 8. As shown therein, the proposed project would be consistent with renewable energy and energy efficiency plans. Therefore, potential impacts associated with renewable energy and energy efficiency would be less than significant.

Table 8 Project Consistency with Plans for Renewable Energy and Energy Efficiency

Energy Efficiency Goal or Policy	Project Consistency
Santa Clara General Plan	
Goal 5.10.3-G1. Energy supply and distribution maximizes the use of renewable resources. ▪ **Policy 5.10.3-P1.** Promote the use of renewable energy resources, conservation and recycling programs.	**Consistent.** The proposed project would source its electricity from SVP, which has a renewable energy procurement portfolio of 38 percent renewable resources. SVP would be subject to the provisions of SB 100, which requires utility providers to increase their renewable energy procurement portfolios to 60 percent by 2030 and 100 percent by 2045. Therefore, the project would be consistent with Goal 5.10.3-G1.
Goal 5.10.3-G2. Implementation of energy conservation measures to reduce consumption. ▪ **Policy 5.10.3-P4.** Encourage new development to incorporate sustainable building design, site planning and construction, including encouraging solar opportunities. ▪ **Policy 5.10.3-P5.** Reduce energy consumption through sustainable construction practices, materials and recycling. ▪ **Policy 5.10.3-P6.** Promote sustainable buildings and land planning for all new development, including programs that reduce energy and water consumption in new development.	**Consistent.** As discussed under Threshold 1, the proposed building would include structural components that exceed the requirements of the 2019 Title 24 standards, thereby increasing the energy conservation achieved by building design. The project would also be required to comply with the requirements of 2019 CALGreen, which mandate a minimum diversion rate of 65 percent for construction and demolition waste. Furthermore, the project would include high-efficiency plumbing fixtures, which would reduce water consumption and associated energy use. Therefore, the project would be consistent with Goal 5.10.3-G3, Policy 5.10.3-P4, Policy 5.10.3-P5, and Policy 5.10.3-P6.
Santa Clara Climate Action Plan	
Focus Area 2: Energy Efficiency Programs **Goal**: Maximize the efficient use of energy throughout the community. ▪ **2.3.** Encourage new data centers with an average rack power rating of 15 kW or more to identify and implement cost-effective and energy-efficient practices.	**Consistent**. As discussed under Threshold 1, the project would have a PUE for 1.43 at peak operating capacity and an average annualized PUE of 1.23. A PUE between 1.2 and 1.5 is considered "very efficient" (42U 2019). Therefore, the project would implement energy-efficient practices that maximize the efficient use of energy and would be consistent with Policy 2.3.

Sources: City of Santa Clara 2010 and 2013

4 Conclusions and Recommendations

As discussed in Section 3.3, *Impact Analysis,* of this report, the proposed project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources. Furthermore, the project would not conflict with plans for renewable energy and energy efficiency. Therefore, for the purposes of CEQA, the project's energy impacts would be less than significant, and no mitigation measures would be required.

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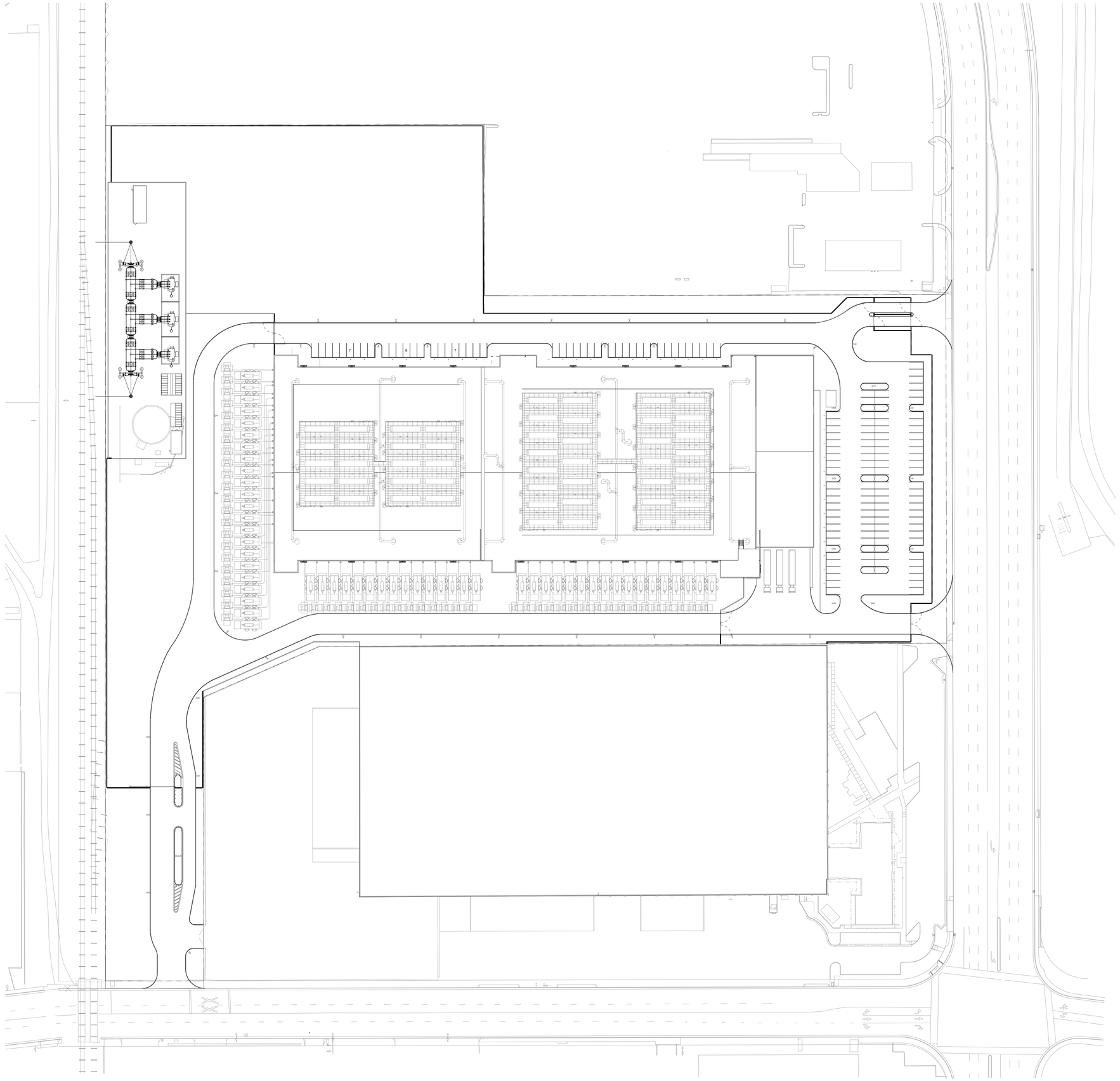
Appendix A

Project Site Plan



1 SITE PLAN
1" = 50'-0"

PLAN N

PARKING COUNT

Type	Count
Parking Parametric - 9' x 18'	1
Parking Parametric - 9' x 18'	1
Parking Parametric - 9' x 18'	1
Parking Parametric - 9' x 18'	1
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Parking Parametric - 9' x 18'	1

CORGAN

CORGAN
401 N. Houston St
Dallas, TX 75202
T: 214-748-2000 F: 214-653-8281

kW Mission Critical Engineering, d.p.c.
433 River Street, Suite 7002, Troy, NY 12180

Bennt & Pless Inc.
47 Perimeter Central East,
Suite 500 Atlanta, GA 30346

KIER+WRIGHT
2850 Collier Canyon Rd.
Livermore, CA 94551

Design Consulting LLC
103 E Haning St. Howe TX 75459

	ISSUES
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	REVISIONS

This Document was produced by or under the authority of Registered Architect:

JEFF GYZEN

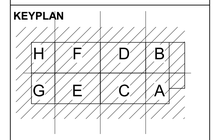
This document is incomplete and may not be used for regulatory approval, permit or construction.

Date of issue:
05/22/2019

SANTA CLARA
2600 De La Cruz Blvd
Santa Clara, CA 95050

CyrusOne

KEYPLAN



OVERALL SITE PLAN

PROJECT NUMBER 18256.0000

DATE

SHEET NUMBER

A01-01

5/22/2019 9:21:07 AM A01-01 OVERALL SITE PLAN

Appendix B

Energy Calculation Sheets

CyrusOne Data Center

Last Updated: July 26, 2019

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT

Construction Equipment	#	Hours per Day	Horsepower	Load Factor	Construction Phase	Fuel Used (gallons)
Concrete/Industrial Saws	1	8	81	0.73	Demo	555.96
Excavators	3	8	158	0.38	Demo	1,523.35
Rubber Tired Dozer	2	8	247	0.40	Demo	1,671.19
Rubber Tired Dozer	3	8	247	0.40	Site Prep	1,253.39
Tractors/Loaders/Backhoes	4	8	97	0.37	Site Prep	674.90
Excavators	2	8	158	0.38	Grading	1,523.35
Graders	1	8	187	0.41	Grading	972.65
Rubber Tired Dozer	1	8	247	0.40	Grading	1,253.39
Scrapers	2	8	367	0.48	Grading	4,469.59
Tractors/Loaders/Backhoes	2	8	97	0.37	Grading	1,012.34
Cranes	1	7	231	0.29	Building	7,436.15
Forklifts	3	8	89	0.20	Building	7,531.22
Generator Sets	1	8	84	0.74	Building	8,766.68
Tractors/Loaders/Backhoes	3	7	97	0.37	Building	13,287.00
Welders	1	8	46	0.45	Building	2,919.41
Air Compressors	1	6	78	0.48	Arch Coating	264.02
Pavers	2	8	130	0.42	Paving	923.55
Paving Equipment	2	8	132	0.36	Paving	803.80
Rollers	2	8	80	0.38	Paving	571.66
					Total Fuel Used	**57,413.60 (Gallons)**

Construction Phase	Days of Operation
Demolition Phase	20
Site Preparation Phase	10
Grading Phase	30
Building Construction Phase	300
Paving Phase	20
Architectural Coating Phase	20
Total Days	400

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition	24.0	15	10.8	135.00
Site Prep Phase	24.0	18	10.8	81.00
Grading Phase	24.0	20	10.8	270.00
Building Phase	24.0	319	10.8	43065.00
Paving Phase	24.0	15	10.8	135.00
Architectural Coating Phase	24.0	64	10.8	576.00
			Total	**44,262.00**

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Demolition	7.4	0	20.0	0.00
Site Prep Phase	7.4	0	20.0	0.00
Grading Phase	7.4	0	20.0	0.00
Building Phase	7.4	0	20.0	0.00
Paving Phase	7.4	0	20.0	0.00
Architectural Coating Phase	7.4	0	20.0	0.00
			Total	**-**
VENDOR TRIPS				
Demolition	7.4	0	7.3	0.00
Site Prep Phase	7.4	0	7.3	0.00
Grading Phase	7.4	0	7.3	0.00
Building Phase	7.4	124	7.3	36697.30
Paving Phase	7.4	0	7.3	0.00
Architectural Coating Phase	7.4	0	7.3	0.00
			Total	**8.00**

Total Gasoline Consumption (gallons)	**44,262.00**
Total Diesel Consumption (gallons)	**57,421.60**

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* . July 2018. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2018. *National Transportation Statistics 2018* . Available at: https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/national-transportation-statistics/223001/ntsentire2018q4.pdf.

CyrusOne Data Center

Last Updated: July 26, 2019

Populate one of the following tables (Leave the other blank):

Annual VMT		OR	Daily Vehicle Trips	
Annual VMT:	1,534,435		Daily Vehicle Trips:	
			Average Trip Distance:	

Fleet Class	Fleet Mix
Light Duty Auto (LDA)	0.607897
Light Duty Truck 1 (LDT1)	0.037434
Light Duty Truck 2 (LDT2)	0.184004
Medium Duty Vehicle (MDV)	0.107261
Light Heavy Duty 1 (LHD1)	0.014919
Light Heavy Duty 2 (LHD2)	0.004991
Medium Heavy Duty (MHD)	0.012447
Heavy Heavy Duty (HHD)	0.020659
Other Bus (OBUS)	0.002115
Urban Bus (UBUS)	0.001554
School Bus (SBUS)	0.000623
Motorhome (MH)	0.000761
Motorcycle (MCY)	0.005334

Fuel Economy (MPG)	
Passenger Vehicles	24.0
Light-Med Duty Trucks	17.4
Heavy Trucks/Other	7.4
Motorcycles	43.9

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	*60.79%*	*Gasoline*	932778	0.00	38865.77
Light-Medium Duty Trucks	*32.87%*	*Gasoline*	504367	0.00	28986.62
Heavy Trucks/Other	*5.81%*	*Diesel*	89103	0.00	12040.96
Motorcycle	*0.53%*	*Gasoline*	8185	0.00	186.44

Total Gasoline Consumption (gallons)	**68038.83**
Total Diesel Consumption (gallons)	**12040.96**

Appendix C

Silicon Valley Power Will-Serve Letter

July 22, 2019

SILICON VALLEY POWER
CITY OF SANTA CLARA

Powering The Center of What's Possible

CyrusOne
Todd Masters, Energy Manager
2101 Cedar Springs Road
Suite 900
Dallas, TX 75201

SUBJECT: ***CyrusOne Sequoia Data Center***
2600 De La Cruz

Dear Mr. Masters,

The City of Santa Clara's Electric Department, Silicon Valley Power (SVP), is the electric utility for this project. Electric service to the above mentioned address will be provided in accordance with the Rules and Regulations for the utility as approved by Santa Clara City Council. The terms in this letter expire one year from the date of this letter or are superseded by the execution of an Electric Service and Substation Agreement between the City of Santa Clara and C1-Santa Clara LLC.

SVP can provide 27 MW of electricity to the project site immediately and another 72 MW upon the completion of an onsite substation by CyrusOne. The total capacity that will be provided to the project will not exceed 99 MW.

Thank you,

Kevin Keating
Electric Division Manager

APPENDIX L: PHASE I ESA

PHASE I ENVIRONMENTAL SITE ASSESSMENT

GRAPHIC PACKAGING INTERNATIONAL, LLC
2600 DE LA CRUZ BOULEVARD
SANTA CLARA, CALIFORNIA

Prepared for:
Graphic Packaging International, LLC
Atlanta, Georgia

Prepared By:
Ramboll US Corporation
Emeryville, California

Date
February 1, 2018

Project Number
1690001664-001

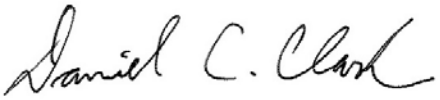
RAMBOLL

ENVIRONMENT
& HEALTH

SIGNATURE AND ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.



_____

Dan Clark, PG
Senior Consultant

_____

Nick Walchuk, PG
Principal

Ramboll US Corporation
2200 Powell Street, Suite 700
Emeryville, CA
(510) 655-7400

CONTENTS

FIGURES

APPENDICES

1. SUMMARY OF CONCLUSIONS

The Environment & Health group of Ramboll US Corporation (Ramboll)[1] was retained by Graphic Packaging International, LLC (GPI, the "Company", or "the client", formerly known as Graphic Packaging International, Inc.) to perform a Phase I Environmental Site Assessment (ESA) of its property located at 2600 De La Cruz Boulevard in Santa Clara, California (herein referred to as the "facility" or the "site"). Ramboll's assessment was conducted in connection with the closure and sale of the site. The objective of the Phase I ESA, which was conducted in conformance with the scope and limitations of ASTM International's *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* E1527-13 (the "ASTM Standard"), was to identify Recognized Environmental Conditions (RECs), as defined in the ASTM Standard (see Section 2.1).

1.1 Site Summary

GPI owns and previously operated a recycled paperboard mill in Santa Clara, California. As of early December 2017, the facility closed and ceased all commercial mill operations. The site, an approximately 15.23 acre parcel improved with an approximately 109,000-square-foot building, is undergoing facility closure activities under the oversight of the City of Santa Clara Fire Department.

The site was used for agricultural purposes by at least the late 1930s, and was subsequently undeveloped land until construction of the current facility in 1956, as part of a larger parcel of land encompassing the adjoining property to the south (2500 De La Cruz Boulevard). The site was continuously operated as a paper mill from the late 1950s to 2017, expanding in 1985 to include the operation of an on-site cogeneration plant.

1.2 Recognized Environmental Conditions

Ramboll performed a Phase I ESA of the site at 2600 De La Cruz Boulevard in Santa Clara, California in conformance with the scope and limitations of the ASTM Standard. Any exceptions to, or deletions from, this practice are described in Section 6.2 of this report. This assessment has revealed no RECs in connection with the site.

Controlled RECs (CRECs) are described below, and a discussion of other findings, *de minimis* conditions, and non-scope considerations is presented in Section 6.1 of this report.

1.3 Controlled RECs

Ramboll identified the following CRECs, as defined by the ASTM Standard.

- **On-Site Groundwater Contamination with VOCs Related to Off-Site Sources.** The site is located within a region where groundwater is impacted with chlorinated volatile organic compounds (VOCs), without a primary identified source. As part of on-site subsurface investigations for UST leaks from the early 1980s to 2000, low concentrations of chlorinated VOCs (relative to regional detections) were detected in groundwater, including 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE) and their breakdown products. Based on review of the information available for the adjoining or nearby properties as well as soil vapor and groundwater investigation performed by Ramboll at the site concurrent to this assessment (see details in the next bullet), residual concentrations of these and related constituents of approximately the same

[1] Ramboll was previously known as Ramboll Environ US Corporation (Ramboll Environ) and ENVIRON International Corporation (ENVIRON).

order of magnitude have been detected in groundwater at properties to the south and southeast (up gradient) and north/northwest (cross gradient) of the facility. In evaluating the on site chlorinated VOC concentrations, Ramboll has observed the following: a) concentrations of these VOCs are approximately at, below, or of the same order of magnitude as applicable human health screening criteria; b) concentrations have been observed to generally attenuate over time; and c) the UST leak cases on site were granted low threat case closure (see Appendix D) in 2000 by the Santa Clara Valley Water District (SCVWD), with concurrence from the San Francisco Bay Regional Water Quality Control Board (SFRWQCB), with known residual VOC concentrations at that time.

Given the fact that the low concentrations of chlorinated VOCs detected in site groundwater were reviewed and documented in the 2000 case closure, the absence of an identified on-site source for the chlorinated impacts, and the existence of regional chlorinated VOC groundwater impacts, Ramboll believes this matter is unlikely to be the subject of further regulatory scrutiny.

- **Residual Soil and Groundwater Contamination from UST Releases.** Information reviewed by Ramboll indicates that 12 USTs were formerly located on site, and were removed in the 1980s and 1990s under regulatory oversight, with the exception of a gasoline UST that was abandoned in place under regulatory closure oversight. The USTs were located at the southern edge of the courtyard to the south and west of the mill building, including a 2,000-gallon gasoline tank, a 2,000-gallon diesel fuel tank, and a solvent tank farm with eight tanks ranging in size from 1,000 to 3,000 gallons that were all installed in 1965 (see Figure 2). The solvent tanks contained solutions of isopropyl acetate, ethyl alcohol, mixed hexanes, toluene, reclaimed solvents and waste solvents, and wastewater. The remaining two USTs were 25,000-gallon fuel oil tanks that were installed at the site in approximately 1954 just south of the historical western boilers. Investigations, remediation and monitoring were conducted at the site from the 1980s until 2000, when the SCVWD (with concurrence from the SFRWQCB) issued case regulatory closure for the releases at the mill site, based on the agency's conclusion that the remaining contamination did not represent a significant threat to groundwater due to the stable or decreasing trends and distribution of petroleum hydrocarbon concentrations in groundwater. The UST Closure Letter is provided in Appendix D. Because the site was granted UST case closure with residual concentrations above residential screening criteria, Ramboll considers this matter to represent a CREC. Ramboll does not consider the presence of a CREC to represent an ongoing contamination concern to the site with its existing industrial/commercial land use designation.

  A limited subsurface investigation was conducted by Ramboll in December 2017, including nine (9) groundwater sampling locations and five (5) soil vapor samples at the site, to evaluate current subsurface conditions at prior UST investigation locations and other areas. The results of the investigation included detections of petroleum hydrocarbons and fuel-related VOCs in groundwater, generally localized to former UST areas and mill areas, at concentrations that are predominantly below those measured at the time of the UST closure in 2000. A groundwater sample collected adjacent to the empty 126,000-gallon fuel oil AST did not identify impacts to groundwater. Soil vapor detections included fuel-related VOCs, chlorinated solvents (tetrachloroethene [PCE] and TCE), and several other VOCs, however all of the detections were below the most stringent (i.e., residential land use) screening criteria published by USEPA and California Environmental Protection Agency (Cal/EPA) for evaluation of vapor intrusion risks.

Details regarding sample locations and investigation procedures are provided in a report (the "2018 Soil Vapor and Groundwater Report") prepared by Ramboll under separate cover.[2]

[2] 2018. Soil Vapor and Groundwater Investigation Report, Graphic Packaging International, LLC, 2600 De La Cruz Boulevard, Santa Clara, California. February 1.

2. INTRODUCTION

2.1 Purpose

Ramboll was retained by the client to conduct a Phase I ESA of the GPI property located in Santa Clara, California. Ramboll's assessment was conducted in connection with the closure and sale of the facility. The purpose of the assessment was to identify RECs, which are defined in the ASTM Standard as:

> "The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not recognized environmental conditions."

2.2 Scope of the Assessment

Ramboll completed the following tasks, consistent with the ASTM Standard, during its Phase I ESA of the property:

- A visit to the site by Mr. Ian Utz of Ramboll on December 12, 13, and 21, 2017 to observe the exterior and interior features of the site and to identify the uses and conditions specified in the ASTM Standard. In addition, Ramboll observed the adjoining properties from the site or adjacent public thoroughfares. Photographs taken during the site visit are presented in Appendix A.
- An interview during the site visit with the following individual (year of initial hire at the site indicated in parentheses): Mr. Rick Horne, Environmental Manager/Human Resources Manager (1986). The aforementioned individual is referred to herein as "facility personnel." The facility personnel interviewed by Ramboll were identified by the Company as having good knowledge of the uses and physical characteristics of the site.
- A review of information contained in federal and state environmental databases, as obtained from the sources noted below:
  - A radius report prepared by EDR, Inc. (EDR, see Appendix B), which presents the results of searches of federal and state databases for the subject site, as well as properties near the subject site. The radius searched for each database, as well as the databases themselves, was selected in accordance with the ASTM Standard.
  - The United States Environmental Protection Agency's (USEPA's) Envirofacts database, which provides site information contained in multiple USEPA regulatory databases.
  - The State of California State Water Resources Control Board (SWRCB) GeoTracker, Department of Toxic Substances Control (DTSC) EnviroStor, and Department of Conservation, Division of Oil, Gas, and Geothermal resources (DOGGR) online databases.
- A review of standard historical sources (included as Appendix C) and local agency inquiries, as defined in the ASTM Standard. The following resources were reviewed:
  - Readily available historical sources, including (where available) historical topographic maps and aerial photographs, city directories, and Sanborn Maps, to develop a history of the previous uses of the site and surrounding area.

  - Historical and site-specific information obtained from the following local agencies: the City of Santa Clara (City) Building Department (Building Department); the City Planning Department (Planning Department); the City Fire Department (Fire Department); the Santa Clara County (County) Assessor's Office (County Assessor); and the SCVWD.
  - Ramboll also requested information from the San Francisco Regional Water Quality Control Board (SFRWQCB), the Santa Clara County Department of Environmental Health (SCCDEH), and the DOGGR online database, but these agencies and/or personnel from these agencies reported having no information pertaining to the site.
  - Ramboll also requested information from the California Office of Emergency Services (Cal/OES), but did not receive a response at the time of report writing.
  - An interview with Ms. Tamra Francis of the Fire Department, Ms. Melinda Wong of the SFRWQCB, and Ms. Melissa Belloso of the SCCDEH regarding the presence or absence of contamination at the site.
- A review of physical setting sources, as defined in the ASTM Standard, including:
  - The current United States Geological Survey (USGS) 7.5-minute topographic map that shows the area on which the site is located.
  - Geologic, hydrogeologic, or hydrologic sources as provided in the environmental database report and in the previous environmental reports.
- A review of documents provided to Ramboll by facility personnel, including environmental permits, correspondence with regulatory agencies, facility-prepared plans and procedures, and chemical use information. In addition, Ramboll was provided with the following previous environmental assessment report:
  - "Phase I ESA of Graphic Packing International, Inc. Santa Clara Folding Plant (2500 De La Cruz Boulevard)," prepared by ENVIRON, dated July 2010 (the "2010 Phase I Report")

This assessment was conducted in accordance with the methodology specified in ASTM Standard E1527-13, as agreed upon by Ramboll and the client in December 2017.

2.3 Reliance and General Limitations

This report has been prepared for the exclusive use of the client and may not be relied upon by any other person or entity without Ramboll's prior express written permission.

Under the ASTM Standard, this report is considered current only for a period of 180 days from the date of the site inspection. The conclusions presented in this report represent Ramboll's best professional judgment based upon the information available and conditions existing as of the date of this report. In performing its assignment, Ramboll must rely upon publicly available information, information provided by the client, and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. Ramboll makes no representations or warranties, expressed or implied, about the conditions of the site.

Ramboll's scope of work for this assignment did not include collecting samples of any environmental media. As such, this review cannot rule out the existence of latent conditions including contamination not identified and defined by the data and information available for Ramboll's review; however, this

report is intended, consistent with normal standards of practice and care, to assist the client in identifying the risks of such latent conditions.

The scope of work for this assessment did not include an asbestos survey or inspection. According to federal OSHA regulations (29 CFR §1910.1001) and the Model Accreditation Plan (MAP; 40 CFR Part 763, Subpart E, Appendix C), the inspection, testing, evaluation, and/or sampling of suspect asbestos-containing materials must be conducted by an accredited inspector; these activities were not performed as part of this environmental review. Comments in this report regarding the condition of building materials at the site, including presumed or suspect ACM, represent only Ramboll's observations at the time of the site visit and are not intended to be consistent with definitions regarding ACM condition in the Asbestos Hazard Emergency Response Act (AHERA) or in other federal or state asbestos regulations or industry standards.

Other issues considered outside the scope of the ASTM Standard and this review include radon, lead-based paint, lead in drinking water, wetlands, PCBs in building materials, cultural and historic resources, ecological resources, endangered species, and high voltage power lines.

3. SITE DESCRIPTION

3.1 Site Setting

GPI owns and previously operated a recycled paperboard mill in the City of Santa Clara, County of Santa Clara, California (the "site" or the "facility"; Figure 1). As of early December 2017, the facility closed and ceased all commercial mill operations. The site, an approximately 15.23 acre parcel to the west of the City of San Jose and the San Jose International Airport, is undergoing facility closure activities under Fire Department oversight.

According to the Assessor's Office, the assessor's parcel number (APN) for the site is 230-03-105.

The site is developed with an approximately 109,000-square-foot building, which is east-centrally located on the site. The manufacturing building houses paper production, storage, and office operations (Figure 2). Other structures on site include a northern cogeneration plant for energy generation (including turbine, switchyard and substation, boilers, and former fuel tank), western process water tank and maintenance sheds (for air compressors and forklifts), and southwestern truck scale house.

The site is accessed from De La Cruz Boulevard along the eastern site boundary, and Martin Avenue along the southern site boundary. The facility includes an eastern asphalt-paved public parking area, as well as northern, southern, western, and central private asphalt-paved parking storage areas enclosed by chain link fence.

A rail spur extends from the southwestern corner of the site (from the western adjoining off-site railroad tracks) northeasterly to the southern extent of the central courtyard area. The areas east of the building are landscaped with grass and other vegetation, interspersed throughout the public parking area. There are no on-site surface water bodies.

Table 1 provides an overview of physical setting and utility information for the site.

Table 1: Physical Setting and Utility Information

Conditions	Source	Description
Topography		
Elevation (above mean sea level)	USGS topographic map; Google Earth	Ranges from approximately 39 feet along the eastern extent, to approximately 43 feet along the western extent.
Topographic Gradient	USGS topographic map; visual observations	Relatively flat on site, with a gentle downward slope to the northeast. Regional topography slopes gently downward to the northeast toward the Guadalupe River.

Table 1: Physical Setting and Utility Information

Conditions	Source	Description
Hydrology		
Surface Water Runoff	Visual observations; Facility personnel; Storm Water Pollution Prevention Plan (SWPPP)	Percolates into the ground surface at unpaved areas or enters catch basins that discharge to the municipal storm sewer system. See Section 5.2.9 for more information.
Nearest Surface Water Body to the Site	USGS topographic map; Visual observations	Guadalupe River, located approximately 0.6 miles to the northeast at its nearest point, which drains northerly to ultimately discharge to Alviso Slough (San Francisco Bay).
Flood Plain	FEMA*; Facility personnel; Planning Department GIS portal	Facility personnel reported no known occurrences of flooding at the site. The site is located within a 500-year flood zone (0.2% probability, or "Zone X") with reduced risk of flooding due to the existence of a levee.
Wetlands	NWI*; Visual observations	There are no federally-designated wetlands on site, although remnant wetlands areas are present near Guadalupe River approximately one half-mile northeast of the site. Ramboll did not identify any obvious suspected wetlands at the site during the site visit.
Geology and Hydrogeology		
Presumed Direction of Shallow Groundwater Flow	USGS topographic map; 2010 Phase I Report	Based on the topographic gradient, the northerly flow direction of the Guadalupe River, and information included in prior investigation reports related to the site and surrounding properties, shallow groundwater flows to the north and northeast.
Depth to Groundwater	2010 Phase I Report; Prior investigation reports	During prior investigations, shallow groundwater was generally encountered beginning at 7 to 15 feet below ground surface (bgs).
On-site Wells	Facility personnel; Visual observations; SCVWD	One water production well (unknown depth) used for non-potable process purposes is located along the west-central portion of the site. No monitoring, injection, or oil/gas wells are currently located at the site.
Nearest Off-Site Groundwater Supply Wells	Database report	One federally registered well is present within one mile of the site, specifically between one-half mile and one mile south/southeast of the site; none are registered as public supply wells. Nine private or municipal wells that may be used for water supply are located between one-quarter mile and one mile of the site, five of which are reported to be in the downgradient position (northeast) between 0.5 and 1 mile from the site.

Table 1: Physical Setting and Utility Information

Conditions	Source	Description
Geologic Conditions	Prior investigation reports	Soil sampling at the site has generally indicated that the site is underlain by silty to sandy clays and gravel to a depth of at least 12.5 feet bgs.
Site Utility Information		
Heating and Cooling Equipment	Facility personnel	Steam and electric heating units supply building heat. The mill building office areas are cooled with approximately 10 roof-mounted air conditioning units that each contain fewer than 50 pounds of refrigerant. The refrigerant was an unspecified Freon compound.
Electricity Supplier	Facility personnel	Self-generated on-site at natural-gas fired cogeneration plant, with backup power provided by Silicon Valley Power.
Natural Gas Supplier	Facility personnel	PG&E
Use of Fuel Oil for Building Heat	Facility personnel; SWPPP	No current or former reported use of fuel oil for building heat. However, one approximately 126,000 gallon aboveground storage tank (AST), located along the northern edge of the site within an earthen bermed area with 136,000 gallon capacity, was formerly utilized for storage of fuel oil associated with an on-site cogeneration plant (constructed 1985). The tank was utilized for a brief period (i.e., fewer than five years) and was eventually rendered inactive and emptied of remaining contents following conversion to only natural-gas feedstock.
Water Supplier	Facility personnel; City personnel	City of Santa Clara Water Utility, which obtains its water from both local wells and imported surface water.
Sanitary Sewer	Facility personnel	City of Santa Clara Sewer Utility, for treatment at the San Jose/Santa Clara Water Pollution Control Plant
Septic Systems	Facility personnel	No current or former septic systems reported.

Notes:
FEMA = Federal Emergency Management Agency; NWI = National Wetlands Inventory
* - Source was provided in the environmental database report.

3.2 Current Use of Site

3.2.1 Current Operations (as of December 2017)

The facility ceased manufacturing operations in early December 2017, and at the time of this report is being decommissioned. Primary operations on site at the time of site reconnaissance were limited to administrative office use. Operations between the late 1950s and 2017 are described below.

3.2.2 Previous Operations (Circa 1956 to December 2017)[3]

Until December 2017, primary operations on site included exterior storage of baled raw paperboard materials; mechanical paper pulping, blending, and filtering; layout and pressing of paper product on a wet-manufacturing paper machine; drying of paper in a series of steam feed dryers; mixing and application of a mineral-based pigment coating; and preparation and storage of finished rolls of product.

Generally, historical manufacturing operations took place inside the manufacturing facility along a single paper machine and associated interior satellite areas. However, since the late 1980s and into the late 2010s, the facility periodically expanded to include some mechanical operations along the southern exterior. Manufacturing operations took two general forms: wet and dry processing, with two approximately 20 foot deep basements below the wet and dry processing areas, connected by a sub-grade crawlspace for piping and conduits. Wet processing involved the input of well water which is extracted, stored, treated, and then heated by steam heat exchangers on site and conveyed and recirculated to relevant areas of the paper machine and satellite regions. Dry processing involved the drying and application of substrate coatings to the surfaces of nearly-finished paper products.

- **Receiving**. The mill utilized 100% recycled paper fiber as raw material for its manufacturing operations. Stock paper utilized as feedstock for fiber generation included used corrugated, office, box cut, and newspaper paper products, which were transported by truck (or historically, by rail car along southern rail spur) to the courtyard in bales. The bales were sorted and stored throughout the courtyard and western storage yard on paved surfaces, prior to mechanical stock preparation

- **Pulping.** Used paperboard bales were hauled via diesel -powered forklifts to machines to be mechanically separated from solid impurities (e.g., coatings, films, solid objects) in a series of batch (and one continuous) processes collectively known as “pulping.” Pulping involved the removal and collection of usable organic paper fibers from raw material for use at the processing line. Equipment used for these operations included a pulper (a self-contained metal vessel with bottom rotor and associated motor), adjacent process tanks of heated water and paper pulp, and HydroFloat™ separators that filtered fibers from process water. Three of the four on-site pulpers are located along the southwestern corner of the manufacturing warehouse, with the vessel bottoms below-grade within a large approximately 20-foot deep basement. In addition, a series of pumps and agitators for process water and paper pulp conveyance, and closed concrete reservoirs (chests) for process water and paper pulp storage, were in the pulping area. Pulpers each had associated gear boxes with oil (< 150 gallons) along tank bottoms. Five flammable materials storage cabinets were located throughout the basement area for storage of virgin gear oil. The fourth (“wet strength”) pulper, located outside the southwestern corner of the facility, operated within a sub-grade bermed area with associated sump. Caustic chemicals (e.g., sodium hydroxide) were utilized during wet strength pulping to separate fibers from impurities. Rejected materials were sent to a compactor/extruder to remove water, which was then reused on site. Solid waste materials were disposed at landfills as general trash. All pulping process water (known as “white

[3] Sources utilized to describe on-site operations included interviews with facility personnel, facility-provided documents (e.g., a Storm Water Pollution Prevention Plan [SWPPP] prepared by Natural Resource Technology in August 2017; Spill Prevention, Control, and Countermeasures [SPCC] plan prepared by BenTyler Enterprises, Inc. in April 2016), and publicly-accessible online resources.

water") was treated and recycled throughout the facility. Fibers were then conveyed to the southwestern fiber treatment area (a series of additional, smaller aboveground machinery) for further mechanical stripping of impurities, then to the "wet end" of the processing line.

- **Forming and Pressing.** Following isolation of usable fibers, the fiber slurry was transported to the western end of the northern processing line to remove moisture. The largely self-contained processing line included application of biocides, felt washing chemicals (acids, caustics, and solvents), and a defoamer. All recirculated process water, which was used throughout the facility (e.g., wet end of processing line, pulping area) included some quantity of these treatment chemicals. In addition, one aboveground storage tank (AST) (1,500 gallons and referred to as the Bowser) was utilized to store lubricating oil for the wet and dry end machinery and was located within the western basement area. The AST was not within secondary containment, but had not had reported leaks.

- **Drying and Coating.** Steam generated at the on-site cogeneration plant was utilized to heat the dry (eastern) end of the paper machine, where much of the residual fiber moisture content was removed. After being dried, the paper was sealed with a starch-based mixture and covered with latex- and titanium dioxide-based pigment coatings. The coatings were mixed in one of approximately ten aboveground vats in the adjacent southeastern mixing room. Following application of two layers of coating, coating was then dried using infrared dryers. One AST (150 gallons) supporting the dry end of the paper machine was located in the eastern basement and was utilized as a reservoir for lubrication of dry end machinery. The AST was not within secondary containment, but had not had reported leaks.

Ancillary Processes. The facility performed packaging, shipping and administrative operations, none of which involve the use of significant quantities of chemicals. In addition, the Company conducted the following activities in support of the major operations:

- **Product Preparation.** Resulting paperboard was rolled, wound, and slit at the dry end of the paper machine, then stock rolls were stored in the southeastern warehouse prior to shipment to customers in trucks.

- **Well Water Extraction, Storage and Treatment.** One on-site well, which could be typically pumped at approximately 300 gallons per minute [gpm] utilized deep groundwater to fill a large concrete pad-mounted water AST located along the west-central portion of the site. Approximately one third of the stored water was utilized for process water; the remaining water was intended for fire suppression. Located along the southern side of the water AST is a 300 gallon diesel AST utilized for an emergency fire water pump. The process water was treated prior to use with hardness and biocide chemicals.

- **Cogeneration Plant Operation**. A natural-gas powered cogeneration plant, constructed in 1985, was previously operated along the northern portion of the site and designed for up to 25 megawatts (MW) of electricity generation. The cogeneration plant was originally intended to both generate electricity for on-site use (and excess sale to the public electrical grid) as well as to generate steam r for manufacturing operations (e.g., in pulping or in heating dryer components). At the time of its construction, the plant installed a 126,000 gallon, concrete pad-mounted bulk fuel oil AST, as well as an underground pipeline and fuel oil loading areas, at the northeastern corner of the site. The AST functioned as a fuel reserve during natural gas

curtailments, but was only used for testing . Its contents were subsequently drained and resold in approximately 2002. The tank has since remained empty, within an earthen basin with sump. The existing cogeneration plant operated from 1985 to 2017 with a single turbine engine, as well as a switchgear and control building, an electrical substation and associated switch yard (partially owned by Silicon Valley Power, transformers, a heat recovery steam generator (HRSG) unit, and a reverse osmosis (RO) deionized (DI) water system. The HRSG unit, in concert with an energy recovery system, utilized cogeneration excess heat as energy to generate steam and heat process water. Prior to installation of the cogeneration plant, two boilers formerly located southwest of the mill building (outside the area currently occupied by the cogeneration plant) were utilized to generate steam . The two associated diesel underground storage tanks were part of historical subsurface investigation, remediation and monitoring efforts on site, which received regulatory closure in 2000.

- **Mill Maintenance**. A shop room located in the south central region of the mill building houses several facility maintenance activities, including welding and machining areas. Maintenance activities involves the use of small quantities of petroleum products (oils/lubricants) as well as two self-contained parts washing units (with <60 gallons of non-chlorinated solvent total). Facility personnel indicated that chlorinated solvents are no longer utilized on site, and that parts cleaning solvents were “silicon based”. Hazardous waste generation included oil/grease spoiled rags, spent aerosol cans, and used oils, which were collected in the courtyard hazardous waste area.

- **Air Compressor Building.** An air compressor room located west of the main plant houses several track-mounted air compressors with drip basins below each and a containment trench. The compressors function to support the interior mill paper machine.

- **Truck Scales.** Use of a sub-grade truck scale and scale house at the southwest corner of the site for delivery trucks.

- **Process Water Support Equipment.** Operation of a chiller and a cooling tower for noncontact process cooling water, a heat recovery steam generator and backup boiler for steam generation, and a deionizing system for cogeneration plant process water.

- **General Maintenance.** General building and machinery/equipment maintenance, including a maintenance room equipped with grinders, lathes, cutting machines, and welding machines with acetylene and oxygen gases.

- **Forklift and Clamp Truck Maintenance**. Transfer of raw materials and finished products using several propane-and diesel-powered forklifts and other vehicles; the units were serviced on site in a designated forklift maintenance area. Outside the maintenance area is a wash pad with underground oil-water separator and diesel fueling station (a 1,000-gallon double-walled AST).

The primary raw materials utilized at the site include recycled paperboard stock, process water generated on site, water and stock treatment chemicals (including polymers and biocides), coating chemicals (including latex, titanium dioxide, pigment, sealant, other additives), and support chemicals (including caustics to break up fibers). In addition, the Company uses maintenance-related materials, such as fuels, oils, lubricants, greases, non-chlorinated degreasers, welding gases, boiler/cooling tower/wastewater treatment chemicals, refrigerant chemicals, and sanitizers.

According to facility personnel, major changes in facility operations since the Company or its predecessors first developed and occupied the site in 1956, included the use of chlorine in the treatment of process water and the use of bulk quantities of dyes in the manufacture of paper product (1950s to 1970s). Other changes have included alterations to coating additives , as well as the brief operation of mechanical de-inking equipment at the southwestern exterior corner of the mill (mid-1990s to early 2000s) to remove unwanted coatings from stock material, and the addition of mechanical pulping equipment in the courtyard.

According to facility personnel, a "chlorine room", exists along the northern portion of the mill for storage. Similarly, a "dye room" was previously utilized at the southwest corner of mill and is now utilized as a storage room. Facility personnel were not able to identify the chemical makeup of dyes or the quantities of chlorine utilized on site.

In addition to changes in manufacturing operations, the facility shifted from utility-provided power to on-site generation following the construction of a cogeneration plant (circa 1985) along the northern portion of the site. The cogeneration plant briefly utilized a 126,000 gallon bulk diesel fuel AST for emergency feedstock, shifting by the early 2000s to natural-gas only feedstock. Additionally, the generation of process steam for the drying process and heating of water was shifted from use of diesel-fired boilers to cogeneration steam boilers in the mid-1980s.

According to facility personnel, no chlorinated solvents are currently used at the facility, and the use of such chemicals would generally not be expected to occur at appreciable quantities based on the nature of current site operations. However, prior to the late 1990s, chlorinated solvents (for example, Safety-Kleen products) were reportedly utilized on site for general parts cleaning. Halogenated solvents were reportedly replaced with silicon-based ones when environmental regulations necessitated replacement in the 1990s.

3.3 Current Uses of Adjoining Properties

The property is located in a mixed industrial/commercial land use area. The nearest residential area is located approximately 0.8 miles southwest of the site. Based on discussions with facility personnel, Ramboll's visual observations from the property boundary and public rights-of-way, and a limited review of publicly available information, a general determination of the current use of adjacent properties was developed, as described Table 2.

Table 2: Current Use of Adjacent Properties

Direction	Property/Land Use	Ramboll's Observations
North	Enterprise Rent-A-Car and Associated Automotive Maintenance Areas (2750 De La Cruz Boulevard)	No apparent exterior manufacturing or chemical storage operations were observed, with the exception of a fueling/car maintenance island and car wash structure located approximately 100 feet to the north of the site. No major concerns were noted.
East	De La Cruz Boulevard, beyond which is Mineta San Jose International Airport (1701 Airport Boulevard) and Memorial Cross Park (412 Martin Avenue)	No apparent exterior manufacturing or chemical storage operations were observed. No concerns were noted.

Table 2: Current Use of Adjacent Properties

Direction	Property/Land Use	Ramboll's Observations
South	One Workplace (2500 De La Cruz Boulevard) furniture/design/technology warehouse and offices; and Martin Avenue followed by vacant commercial warehouse (590 Martin Avenue)	
West	Rail Line followed by several commercial businesses, including: Service King Collision Repair of Santa Clara (631 Martin Avenue), Lee Industrial Catering (651 Martin Avenue – inaccessible), multi-tenant building occupied by Bay to Bay New & Used Furniture/Leslie's Commercial Service Center (650 Walsh Avenue), and multi-tenant building occupied by SISCO, Inc. Circuit Breakers, Power, and Electrical Equipment (614 Walsh Avenue)	

Notes:

During the site visit, Ramboll walked or drove by the borders of these properties that are adjacent to the subject site. Ramboll did not enter the neighboring properties.

4. REVIEW OF PUBLIC RECORDS AND OTHER INFORMATION SOURCES

4.1 Environmental Regulatory Database Review

Ramboll contracted with EDR in September 2017 to prepare of summary of listings in federal and state agency databases for the site and facilities within applicable radii of the property, as specified by the ASTM standard.[4] A copy of the environmental database search report is presented in Appendix B.

4.1.1 Database Review for Site

Ramboll reviewed the results of the state and federal environmental database searches performed by the third-party database provider (see Appendix B) and also reviewed information available in the California GeoTracker and EnviroStor databases. The site is listed on several environmental databases, as discussed in Table 3.

Table 3: Summary of Environmental Database Listings for the Site

Listing Name	Summary of Information Contained in Database	Ramboll's Comments
Container Corporation (2600 De La Cruz Boulevard)	Listed on the RGA Leaking Underground Storage Tank (LUST) database from 1992 to 1998, and separately again from 2000 to 2002.	See Section 4.4
	Listed on the California LUST (CA LUST) and Historical LUST (CA HIST LUST) (ID#06S1W35F01), California Historical UST (CA HIST UST), California Historical CORTESE (CA HIST CORTESE), and California National Pollutant Discharge Elimination System (NPDES) databases. The site is reported as having two historical 25,000 gallon fuel USTs (installed 1956), as well as a 2,000 gallon diesel UST (also installed 1956). The site is also registered with an NPDES permit, certified in 2015. According to the information provided by EDR, the site was the subject of a LUST investigation from 1982 to 2000, reportedly involving 1983 excavation, subsequent pump and treatment of groundwater, quarterly monitoring, notice of responsibility in 1989, and case closure on September 27, 2000. This case was overseen by the County Local Oversight Program (LOP).	
	Listed on the Facility Index System (FINDS) database (ID# 110065911188) for the LUST listing associated with the GeoTracker case T0608500459.	

[4] EDR uses the term "radii" to refer to the ASTM terminology "approximate minimum search distance" in the environmental database report.

Table 3: Summary of Environmental Database Listings for the Site

Listing Name	Summary of Information Contained in Database	Ramboll's Comments
	Listed on the Statewide Environmental Evaluation and Planning System (SWEEPS) UST database for having two 25,000 gallon oil USTs.	
	The site is also listed on the California Hazardous Material Incident Report System (CHMIRS) for an unspecified incident that was resolved by April 1989 (ID# 905644). According to EDR, no more than two substances were involved in the incident. Ramboll submitted a public records request to Cal/OES but has not yet received a response as of the time of report writing. Facility personnel could not identify on-site documentation of this incident; however, a brief description was provided during site reconnaissance.	According to facility personnel, solution containing 15% aqueous ammonia, historically utilized for pH adjustment of coatings, was spilled on the asphalt surfaces of the courtyard resulting from an accidental pump leak. Apparently, the ammonia AST, pump and associated aboveground piping were not within secondary containment, and following the pump failure, the pump fluid leaked from the northeastern courtyard loading dock area (near coating ASTs) to the southwest across the courtyard, with approximately one gallon discharged to sanitary sewer. Following cleanup (the details of which personnel could not recall), the AST and pump were briefly transferred to the inside of the facility, and were retired in 1990 when coating treatment was altered. Because the incident was granted closed status and the release does not appear to have been to soil or groundwater, Ramboll does not consider this matter to represent a contamination concern to the site.
Jefferson Smurfit Corporation (2600 De La Cruz Boulevard)	Listed on the Emissions Inventory for permitted air emissions with the BAAQMD from 1987 to 2005, including total organic hydrocarbon, reactive organic gases, carbon monoxide, nitrogen oxides (NOx), sulfur oxides (SOx), particulate matter (PM) and PM <10 micrometers (PM-10).	Ramboll does not consider this matter to represent a contamination concern to the site.
	Listed on the FINDS database (ID# 110028035436) for cross listings that indicate: historical submission of a Risk Management Plans (RMPs), California Environmental Reporting System (CERS) submissions, listings on electricity generator databases, air emissions of hazardous air pollutants.	

Table 3: Summary of Environmental Database Listings for the Site

Listing Name	Summary of Information Contained in Database	Ramboll's Comments
	Listed on the Emergency Response Notification System (ERNS) for release of 320 gallons of biocide (food packaging disinfectant) in March 1996. According to the information provided by EDR, the release to paved surfaces resulted from an aboveground storage tank spill (cause unknown). This issue was subsequently closed. Facility personnel could not identify on-site documentation of this incident; however, a brief description was provided during site reconnaissance.	According to facility personnel, a tote containing biocide for use in process water experienced a sight glass failure. The tote sight glass came loose and fell over, dripping biocide liquid onto the surrounding asphalt pavement. Representatives of the chemical manufacturer (Nalco) were dispatched to the site to absorb and properly dispose of the material per its Safety Data Sheet (SDS) e.g., with diluent or absorbent. The quantity spilled was less than 320 gallons (an estimate of the tote volume). Because the incident was granted closed status and the release does not appear to have been to soil or groundwater, Ramboll does not consider this matter to represent a contamination concern to the site.
Smurfit Stone Container Enterprises, Inc. / Graphic Packaging International, Inc. DBA Santa Clara Mill (2600 De La Cruz Boulevard)	Listed on the hazardous waste tracking system (HAZNET/HWTS) database from 1993 to 2016 for various hazardous waste generation.	Ramboll does not consider this matter to represent a contamination concern to the site. See Table 6 for additional information regarding this listing.
Graphic Packaging International, Inc. (2600 De La Cruz Boulevard)	Listed on the Toxic Chemical Release Inventory System (TRIS) for generating emissions of lead containing compounds. The facility was estimated in the 2014 reporting year to emit up to 1.1 pounds per year of such compounds. Listed on the Emissions Inventory (EMI) database for permitted air emissions with the BAAQMD from 2006 to 2015, including total organic hydrocarbon, reactive organic gases, carbon monoxide, NOx, SOx, PM, and PM-10.	Ramboll does not consider this matter to represent a contamination concern to the site. According to facility personnel, lead is considered an "impurity" associated with the paper feedstock / natural gas usage. Air emissions are not considered to be a contamination concern to the site.

Table 3: Summary of Environmental Database Listings for the Site

Listing Name	Summary of Information Contained in Database	Ramboll's Comments
	Listed as a Resource Conservation and Recovery Act (RCRA) Small Quantity Generator (RCRA-SQG) and Large Quantity Generator (RCRA-LQG) of hazardous wastes from at least 1980 to 1996. The facility is reported as having one historical violation in 1994, with no additional information.	See above.
	Listed on the database for having undergone a preliminary assessment in 1987 which concluded that the site did not qualify for National Priority List (NPL) status and was subsequently listed with a "No Further Action Planned" (NFRAP) status.	
	Listed on the Aboveground Storage Tank (AST) database for having a 127,000 gallon AST (determined to be associated with former fuel oil feedstock for cogeneration plant).	This listing does not suggest a contamination concern to the site. ASTs are further discussed in Section 5.2.3.
	The Company is listed in the Superfund Enterprise Management System (SEMS) Archive database as being subject to the discovery process by the USEPA in 1986. A preliminary assessment (PA) was performed in 1987. The site was granted No Further Remedial Action Planned (NFRAP) status in 1987 and was archived from the CERCLA program.	Facility personnel had no information on this matter, and no records were available on-site. NFRAP status indicates that the USEPA's assessment at a property has been completed and the USEPA has determined that no further steps will be taken to list this property on the NPL, but does not necessarily mean that there are no hazards associated with a given property. This matter is further discussed in Section 4.4.
	Listed on the CA LUST database (ID#06S1W35F01f) for a leak case with preliminary assessment beginning in 1982.	See Section 4.4
Graphic Packaging / Bluegrass Mills (2600 De La Cruz Boulevard)	The site is listed on the Integrated Compliance Information System (ICIS) database for administrative notices of violation (NOVs) related to the Clean Air Act, with no other information provided.	Ramboll does not consider this matter to represent a contamination concern to the site.
	The site is also listed on the historical Air Facility Sub-System (AFS) in the 1990s to 2010s for various compliance matters that do not appear to have involved an unauthorized release, particularly those related to Title V permitting.	

Table 3: Summary of Environmental Database Listings for the Site

Listing Name	Summary of Information Contained in Database	Ramboll's Comments
Notes: * Ramboll notes that while the site is also listed on databases related to regulatory compliance (e.g., Toxics Release Inventory System (TRIS) and Facility Index System/Facility Registration System (FINDS)), listings on these databases, by themselves, are not necessarily indicative of contamination.		

As detailed above, the site is listed on certain databases for which the ASTM Standard specifies that a review of pertinent files or regulatory records be conducted. Certain of these listings (i.e., RCRA, FINDS, EMI, HAZNET, NPDES, HIST AST, ICIS) are not indicative of a release or contamination concern, and Ramboll reviewed related records that were provided by facility personnel. Based on the available information, these listings are not indicative of a release or contamination concern. For other listings (i.e., LUST and HIST LUST, CORTESE, ERNS, SEMS-ARCHIVE), facility personnel had information related to these listings, and pertinent records were available on-site and online. This matter is further discussed in Section 4.4 of this report.

4.1.2 Database Review for Surrounding Properties

There are several listings in the database report for off-site facilities within applicable ASTM search radii. Several of these listings (i.e., RCRA hazardous waste generators, USTs, ASTs, FINDS, ECHO, EMI, Enforcement and Compliance History Online [ECHO], Waste Data System [WDS], EDR Historical Auto Station [EDR HIST AUTO], HAZNET, or additional compliance listings), by themselves, are not necessarily indicative of a contamination concern and, therefore, are not discussed herein and were not further evaluated for purposes of this assessment. A number of facilities appear on databases indicating potential contamination concerns (i.e., ENVIROSTOR, LUST, CHMIRS, SEMS). Of the properties representing a potential environmental concern, Ramboll has discussed in Table 4 below only 1) facilities that are located adjoining to the site; and 2) facilities that are located potentially upgradient or cross gradient of the site and have not been issued regulatory closure for all listings of concern.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
Listings for Adjoining Properties [1]		
FMC Corporation (651 Martin Avenue) (Adjoining to the west, across railroad tracks)	This property is listed in the California LUST and Historical LUST, and California Historical CORTESE databases, in addition to several compliance listings (RCRA-SQG, FINDS, ECHO, EMI) and being listed as an historical auto station (CVM Commercial Vehicle Maintenance, BA Catering Truck Repair, Precision Auto Service) from 1991 to 2004. Prior to 1979, this property was owned by Bendix Forest Products (Bendix), during which a 550 gallon petroleum UST was installed on site. Subsequently, from 1979 to 1984, the property was owned by S&K Investments (S&K) and leased to FMC Corporation (FMC) for use as a chemical manufacturing facility. During its lease, FMC installed and operated a deburring machine and an 880 gallon UST for storage of water and residue from grinding of aluminum parts. The petroleum UST was removed in 1983 prior to a 1984 sale of the site to S&K and FMC continued to lease the property until 1989. The remaining UST was removed at that time. Impacts to the soil and groundwater with TPH and BTEX, as well as small quantities of chlorinated solvents (77 µg/L 1,2-DCA, 5.5 µg/L methylene chloride, 6 µg/L 1,1-dichloroethane, 8.3 µg/L 1,1,1-trichloroethane, and 5.7 µg/L trichloroethylene in groundwater) were detected following pre-closure subsurface investigations in 1989. During limited groundwater sampling in 2001, no petroleum hydrocarbons were detected and the SCVWD closed the petroleum hydrocarbon case in September 2001 indicating that residual petroleum impacts did not pose a threat to groundwater, human health, or the environment.	While the September 2001 closure addressed the former USTs located at the property, and specifically the residual petroleum hydrocarbon impacts, the closure letter expressly did not address a box beam machine area, where up to 2,200 mg/kg of TPH was detected. In addition, the SCVWD did not appear to address residual halogenated contaminants in groundwater, nor were all historical monitoring wells re-sampled during later investigations (as they could not be found).

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
Berryman Electro Plating / Keystone Consolidated Industries (650 Walsh Avenue) (Adjoining to the northwest, across railroad tracks)	This property is listed on the California EnviroStor and Superfund Enterprise Management System (SEMS) databases, as well as on several compliance listings (including RCRA-LQG and -SQG, California HAZNET, FINDS, and ECHO databases). From approximately 1946 to 1955, this property was operated as a wire galvanizing facility by an unknown tenant. Keystone Consolidated Industries (Keystone), used interchangeably by DTSC with "Berryman Electro Plating" owned the property from 1955 to 1984. Keystone manufactured barbed-wire fencing and wire netting made with galvanized wire from raw steel rods. Operations were conducted in a northern manufacturing building and a southern storage warehouse. The manufacturing building was the primary subject of investigation, with known on-site use of sulfuric acid, hydrochloric acid, lime borax, and metals including lead and zinc. Waste water was generated during cleaning and quenching. Virgin acid was stored in outdoor ASTs. Impacts to the soil with heavy metals (up to 390,000 mg/kg of lead and 45,000 mg/kg of zinc) were discovered as part of a preliminary assessment conducted under the oversight of the DTSC from 1986 to 1988. Following additional sampling, approximately 1,600 tons of contaminated soil were removed from the site under the oversight of the Fire Department and residual soil concentrations of lead exist at up to 200 mg/kg and zinc of up to 450 mg/kg. Two regions of soil contamination under the building were not removed due to threats to the integrity of the existing structure, in addition to a section of sewer line under the manufacturing building.	Ramboll notes that the southern storage warehouse – the closest structure to the site – was not the primary subject of investigation. In addition, while the DTSC noted the potential for contamination to migrate to groundwater and residual soil contamination beneath the manufacturing building, Ramboll notes that the region of known impact is perceived to be down gradient from the site. While subsequent tenants by 2005 were known to utilize hazardous materials, the USEPA issued NFRAP status in March 1991 and the property was subsequently archived for evaluation by the local regulatory agencies (i.e., Fire Department). In addition, while initial contaminants of concern included halogenated and halocarbon solvents, these were not subsequently listed as an issue in the available documentation detailing identified contamination prior to review. Because the matter has been granted regulatory closure by the state agency, it is reasonable to assume that the matter was appropriately evaluated in accordance with regulations in place at the time, and that remaining contamination, if any, is localized and unlikely to migrate at significant levels onto the subject site. Additionally, this property is located in the presumed downgradient / cross-gradient direction from the site. Thus, this closed off-site listing does not appear to represent a significant issue to the site.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
EXSL Chemical (630 Walsh Avenue) (Adjoining to the northwest, across railroad tracks)	The property is listed in the California EnviroStor, California LUST and Historical LUST, and the CHMIRS databases, in addition to compliance databases (RCRA-LQG, FINDS, ECHO) and the California Historical UST database for petroleum fuel tanks. The property was listed in 2015 as being occupied by Haros Anodizing Specialists, Inc., and for generating (as recently as 2013) chlorinated solvent and wastewater treatment sludge wastes. Impacts to soil and groundwater with diesel and gasoline range TPH, and toluene, as well as several chlorinated solvents, were discovered during a subsurface investigation conducted in September 1996 and follow up investigation in December 1988. While a comprehensive issue summary was not available, the investigation appears to have been conducted under the expectation that a fuel release occurred in connection with three former gasoline/diesel USTs removed from the property in 1985. During the 1996 sampling event, up to 24 µg/L of TCE, 5 µg/L PCE, 7 µg/L 1,1-DCA, 2 µg/L 1,1-DCE), 11 µg/L methyl tert-butyl ether (MTBE), and 220 µg/L TPH-d were identified in groundwater at MW-1, located approximately 150 feet to the northwest of the site. The fuel leak issue issued closure in November 1996 as the SCVWD considered the impact to groundwater from the fuel release to be below regulatory levels and localized to the former tank source area, therefore "not [posing] a threat to human health or the environment." While the original closure recommendation specifically did not cover solvents, an additional case closure was issued in October 1997 by the SFRWQCB indicating that residual trace solvents would be naturally attenuated/remediated over time. Ramboll notes that the additional closure does not appear to have resulted from additional information, and was based on a low risk evaluation.	Ramboll notes that while the adjoining property's operations appear to have been chemically intensive, including storage of chemicals in nearby barrels, use of several fuel USTs, and chemical mixing area, regulatory closure of the property would suggest this is unlikely to present a significant on-site issue. Because the matter has been granted regulatory closure by the state agency, it is reasonable to assume that the matter was appropriately evaluated in accordance with regulations in place at the time, and that remaining contamination, if any, is localized and unlikely to migrate at significant levels onto the subject site. If residual impacts were found to have migrated to the site, it is unlikely that the regulatory agency would find the site owner responsible for such impacts. This closed off-site listing does not represent a significant issue for the site.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
Listings for Non-Adjoining Sites [2]		
D&D Associates (570 Martin Avenue) (Approximately 180 feet to the southeast)	This property is listed on the LUST, Historical LUST, and Historical CORTESE databases. Impacts to the soil and groundwater with TPH-g, BTEX, up to 120 µg/L dichloroethene (cis-1,2-DCE), and up to 97 µg/L trichloroethene (TCE) were discovered following removal of a gasoline UST in 1991. The case appears to have been closed with a "low risk" status due to residual groundwater concentrations of up to 370 µg/L TPH-g, 120 µg/L cis-1,2-DCE, 0.7 µg/L xylenes, 0.9 µg/L ethylbenzene, and 87 µg/L TCE. The case was closed in November 1996 as the source area had been excavated, benzene concentrations were non-detect in five of six sampling events, and the fuel release did not impact groundwater above water quality objectives.	While the 1996 closure addressed the fuel release impacts at the property, the closure letter indicated that residual chlorinated solvent contamination was unrelated to the site, based on evidence of upgradient groundwater impacts.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
South Bay Showers (510/540 Martin Avenue) (Approximately 320 feet to the southeast)	This property is listed on the LUST, SLIC (Spills, Leaks, Investigations, and Cleanup), and Brownfields databases. Impacts to the soil and groundwater with TPH-g and TPH-d, BTEX, and MTBE were discovered following removal of a diesel UST in 2005. The property was developed in 1955, then occupied by Animal Food Company Industries from 1960 to 1974, Ozuna Food Productions from 1980 to 2007, Palex Metals from 2000 to 2005, and South Bay Showers from at least 2007 to 2015. A fuel UST was originally removed and replaced in 1987, then finally removed in 2005. Known residual groundwater concentrations of up to 150 µg/L TPH-g and 260 µg/L TPH-d existed at the site at the time of closure, in January 2006. At that time, benzene and MTBE were not reported above the laboratory detection limit. In addition, residual soil contamination (TPH-d/g, and xylenes) were known to exist on site. As part of subsequent due diligence activities at an adjoining property (570 Martin Avenue), VOCs were identified as a potential issue for this property, and additional sampling took place in 2015. Upon reviewing the results of the additional subsurface investigation, the SFRWQCB indicated that an on-site source of chlorinated solvents had not been identified via soil sampling. In addition, while up to 200 µg/L of TCE was detected in groundwater, no lateral down-gradient delineation to regions of greater than 100 µg/L, and concentrations were below the applicable screening concentration of 1,300 µg/L.	While the 2006 closure addressed the fuel release impacts at the property, the closure letter expressly did not address the residual chlorinated solvent contamination to groundwater. In a letter in May 2015, responding to new data, the SFRWQCB determined that a case should not be opened for detected solvents.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
Lombardo Diamond Core Drilling (585 Roberts Avenue) (Approximately 360 feet to the south)	This property is listed on the EnviroStor, CHMIRS, CORTESE, SLIC, DEED (Deed Restriction), and enforcement actions (ENF) databases. Impacts to soil and groundwater with heavy metals (primarily zinc) were identified following facility closure in 1981. Gilmore Supply Company and/or Metal Coating Company/Galvanizers, Inc. operated a galvanizing facility on the property from approximately 1960 to 1981. Operations included metal pickling solutions and plating wash solutions. Maximum concentrations of zinc in 1990 were 34,000 mg/kg in soil, and 10,000 mg/L in groundwater. Remedial activities included soil excavation in 1983 and the facility's demolition in 1987, in-situ neutralization in the late 1990s and early 2000s, and 2007 construction of an asphalt cap. Lombardo Diamond Core Drilling Company, Inc. purchased the property in 1985, currently using the site for parking and storage. Most recent contaminant concentrations include 310 mg/L zinc and 180 mg/L iron in groundwater (as compared with secondary maximum contaminant level of 5 mg/L).	The lateral extent of contamination has not extended off the property. Volatile organic compounds (VOCs) were not identified. Elevated lead concentrations were found only in the top five feet of soil, with zinc impacts primarily 10 to 25 feet bgs and localized around galvanizing area. This case is currently still open for verification monitoring as of May 2009 and is being overseen by the SFRWQCB. Based on the lack of apparent off-site groundwater impacts, this property is unlikely to pose a contamination concern to the subject site.

Table 4: Summary of Pertinent Database Listings for Off-Site Properties

Listing Name or Address and Location Relative to the Subject Site	Summary of Information Contained in Database	Ramboll's Comments
California Paperboard Company (525 Matthew Street) (Approximately 950 feet to the southeast)	This property is listed on the LUST, Historical LUST, and Historical CORTESE databases. Impacts to the soil and groundwater with petroleum hydrocarbons and associated aromatic hydrocarbons were discovered following the removal of a fuel UST in 1989. Subsequent investigations involved the advancement of 24 soil borings and eight groundwater monitoring wells. Remedial activities have included the removal and treatment of 790,000 gallons of groundwater, soil excavation, amendments of oxygen releasing compounds (ORC) and bio nutrients to the soil and groundwater, and the removal of additional unregistered USTs. Recent sampling (2015 to 2016) of soil vapor and sub slab soil vapor exhibited concentrations of benzene and vinyl chloride above regulatory action levels. While some bioattenuation has been observed, the most recent "path to closure" plan suggests that additional injection of ORC may be necessary prior to closure. The site is currently operated as a paper mill, involving the recovery and recycling of paper and the manufacture of paper products.	While this matter has not achieved case closure by the overseeing regulatory agency, the information reviewed to date (e.g., on GeoTracker) would suggest that the lateral extent of petroleum hydrocarbon contamination generally been delineated to a region near former USTs. However, VOCs (including chlorinated solvents) have been identified at low concentrations in groundwater across the majority of the site, which would suggest potential background regional concentrations of such contaminants in shallow groundwater. Ramboll notes that chlorinated VOCs have not been identified as a major contaminant of concern at the property. Based on the lack of apparent off-site groundwater impacts, this property is unlikely to pose a contamination concern to the subject site.

Notes:

[1] Ramboll's analysis of adjoining properties was based on observations made during the site reconnaissance (as discussed in Table 1) and location information for off-site listings as presented in the database report. The discussion of adjoining and non-adjoining properties does not include (if applicable) listings for certain databases that are (by themselves) not necessarily indicative of a contamination concern (e.g., compliance listings without indication of a release or chemical mishandling, such as RCRA hazardous waste generators or registered storage tanks). Also, for purposes of this analysis, Ramboll considers as "adjoining" properties that are immediately adjacent, even if separated by a road or other physical barrier.

[2] As noted in Table 1, shallow groundwater beneath the site likely flows to the north/northeast. Within this section, Ramboll did not discuss the majority of off-site non-adjoining properties that are listed on a database indicative of a contamination concern but for which regulatory closure has been issued, as the issuance of regulatory closure suggests that impacts to the subject site from the noted off-site property are unlikely. Finally, Ramboll did not discuss any off-site non-adjoining property that is presumed to be downgradient or predominantly cross gradient of the subject site. This analysis was based on the assumption that a hazardous material released to the subsurface generally does not migrate laterally within the unsaturated soil for a significant distance, but a hazardous material can migrate in the groundwater in a generally downgradient direction; however, the direction of groundwater flow may be affected by localized topographic, hydraulic, and hydrogeologic conditions.

[3] The RGA databases are EDR proprietary databases that identify prior versions of the database in which a site was listed.

4.2 Historical Uses of the Site and Adjacent Properties

4.2.1 Past Uses of the Site

The site was used for agricultural purposes in at least the late 1930s, and was subsequently undeveloped land until redevelopment with the current facility in 1956, as part of a larger parcel of land encompassing the adjoining property to the south (2500 De La Cruz Boulevard). The site was continuously operated as a paper mill from the late 1950s to 2017. See Section for 3.2.2 for recently ceased operations.

A summary of Ramboll's key observations from the available historical sources is presented in Table 5.

Table 5: Summary of Key Observations from Historical Sources for the Subject Site

Historical Source	Key Observations Regarding Site History
Aerial and Satellite Imagery[1] (1939 to 2017); Facility Personnel (2017)	The following major differences were noted between photographs: • 1939: The site appears developed as row crop style agriculture. • 1948: The site appears in the process of being re-graded, with lateral east-to-west trending cuts in the ground surface. • 1950: The site appears as undeveloped land. (The site was redeveloped with a portion of the current facility by 1956) • 1956: The site appears under redevelopment with the western-most fifth of the current site structure at the center of the site. In addition, a railroad spur appears to enter the site from the west, trending northeasterly. The northern surfaces of the site (in unimproved areas) appear to have trenches/tracks fanning out to the south from along the northern boundary. • 1960: The site facility appears developed into the majority of its current "L" shape via rectangular additions to the east and southeast, connecting the facility with the adjacent off-site building to the south. Pallets of stockpiled paper appear at the west-central portions of the site, along rail spur. A large AST appears along the western portion of the site, and a new structure with associated tanks and piping (the now decommissioned boiler) appear along the western portion of the facility. In addition, several ASTs appear along the northwest corner of the facility. • 1963: A platform/loading dock appears improved along the west-central extent of the site, adjacent to rail spur. Significant darkening/staining of the ground surface appears along the northern portion of this raised platform. A horizontal AST (likely propane tank) appears at southwest corner, a storage area appears developed at the northeast corner, and a platform/bermed area appears developed at southeast corner, of the central courtyard. In addition, liquid drainage is visible from the northern loading dock areas to the center of the courtyard. At least three large vertical cylindrical ASTs appear along the northwestern exterior corner of the facility. • 1968: Two additional ASTs appear developed at the northeastern corner of central courtyard (likely coating material ASTs). • 1974: The northeastern corner of the facility (the "Sheeter Room") appear expanded. • 1980: The western extent of the facility appears expanded to the west, towards former boilers. The maintenance shed appears developed to the west of the former boilers. Additional storage of materials appears clustered around the northern portion of the western (water) AST. Additional ASTs (for wet end cleaning chemicals) appear along the northwestern corner of the facility, near expanded area. • Between 1982 and 1987: The northwestern portion of the site is developed with structures associated with the cogeneration plant, including a large (fuel oil) AST within rectangular bermed area at the northern edge of the site. • Between 1993 and 1998: The cogeneration plant backup chemical storage and empty container sub-grade storage area along the south side of the fuel oil AST berm appear developed. • Between 1998 and 2000: The sub-grade process chemical storage area north of the north-central edge of building (near backup boiler) appears developed. In addition, the sub-grade trash washing area along the northwest appears developed. • In 2015: The wet-strength pulper process equipment appears developed in a former stock paper storage area, at northwest corner of central courtyard. In 2016 and subsequent photographs, the site appears in its present configuration.

Table 5: Summary of Key Observations from Historical Sources for the Subject Site

Historical Source	Key Observations Regarding Site History
Sanborn Fire Insurance Maps (1961 and 1966)	The following major features were identified in the available Sanborn Maps: • 1961: The west-central portion of the site is depicted as developed with a rectangular shaped "Paper Box Factory" building associated with the Container Corporation of America: Paper Converting Factory. The facility is noted as being a reinforced concrete structure with steel columns and beams with concrete floors. A 400,000 gallon AST along the west-central region is shown as supplying water to the facility. A one-story "Chlorine House" is connected to this water line, and located at the northwestern external facility corner. A transformer yard is depicted along the southwestern corner. A one-story "Boiler House" and connected "Control House" are depicted just west of the facility, with one-story "Chemical Storage" structure located along the west. In addition, a one-story "Scale House" and associated scales are shown along the southwestern corner of the site boundary, near Martin Avenue. • 1966: No major changes are depicted. However, the "Boiler House" is now labeled as having two boilers present. Ramboll notes that the site is not entirely depicted within the area of coverage for the available Sanborn Maps, with the eastern portions excluded from the mapped region.
Topographic Maps (1889 to 2012); Facility Personnel (2017)	The following major features were identified in the available topographic maps: • 1889 to 1953: The site is shown as being undeveloped land, with a northeasterly gradient, and adjoining railroad tracks along the western site boundary. • 1961: The site is shown as developed with an L-shaped portion of a larger L-shaped building that extends offsite to the southeast. The southern half of the site is shown within a shaded region designated as "urban developed." A railway spur is shown as extending through the southwestern portion of the site from an extension of the Southern Pacific Railroad. • 1968: A circular feature (likely, the water AST) is depicted along the western site margin. • 1980: The northeastern corner of the facility (the "Sheeter Room") is shown as expanded to the north. No site-specific features are depicted on the map of 2012.
City Directory Abstracts (1922 to 2014)	The occupants of the site (2600 De La Cruz Boulevard) are listed as: • 1960 to 1991: Container Corporation of America Paper Mill/Folding Carton Plant • 2001: Jefferson Smurfit • 2010 to 2014: Graphic Packaging International, Inc. Other listings include: DW Nicholson Corporation (1980) and Associated Industrial Constructors, Inc. and The Ralph M. Parsons Company (1986). According to EDR, the site address is not listed prior to 1960.

Table 5: Summary of Key Observations from Historical Sources for the Subject Site

Historical Source	Key Observations Regarding Site History
2010 ENVIRON Phase I ESA Report	According to the 2010 Phase I report, predecessors to the Company acquired the site in the 1950s. The facility has been operated by a number of different companies, including Container Corporation of America (until the 1980s), Jefferson Smurfit Corporation[5] (until the 1990s), Smurfit Stone (until the mid-2000s), Altivity Packaging (about 2006, with holding company named Bluegrass), and GPI (since 2008).
Tax assessor website	Tax assessor records available online indicate that an unspecified legal entity acquired the site on March 10, 2008. No liens are identified for the site.
Fire Department	Fire department records indicate that a fire occurred on site on April 25, 2007, for which several subsequent building and fire permits were issued for roof repair and other non-structural work. The fire reportedly took place at the dry end of the mill paper machine paper machine. According to facility personnel, the fire was likely the result of a failure in mechanical equipment. Other than combustion products, personnel were not aware of any resultant release of hazardous materials. Other than infrequent paper bale fires in the western storage yard (e.g., due to cigarette disposal), personnel could not identify other fire incidents.
Building Department Online Permit Portal (1954 to 2017)	The site has undergone several periods of development, including facility construction in the mid to late 1950s, expansion in the 1970s, 1990s, and 2000s, and the construction of a cogeneration plant in 1985.

[1] In addition to aerial photographs provided by the third-party provider, Ramboll viewed historical satellite and aerial imagery provided via Google Earth and www.historicaerials.com. Printed copies were not obtained, and imagery dates were not independently verified.

4.2.2 Past Uses of Adjacent Properties

Properties in the vicinity of the site have primarily been utilized for commercial or industrial purposes since at least the early 1950s. Prior to that time, the site and surrounding region was generally utilized for agricultural purposes since at least the late 1880s.

The adjoining property to the north of the site (2750—2752 De La Cruz Boulevard) was generally undeveloped or agricultural land until the 1990s, at which point it was improved with several smaller commercial structures and a large paved parking lot. The adjoining property to the south of the site (2500 De La Cruz Boulevard) was generally undeveloped or agricultural land until 1954, at which point it was improved with a former folding carton plant, associated with the site until the mid 2010s. Beyond Martin Avenue to the south, properties were industrial to heavy industrial by the mid 1950s.

The adjoining properties beyond De La Cruz Boulevard to the east were generally undeveloped or agricultural land until sometime between the early 1900s and late 1930s, at which time it was improved with several smaller (potentially residential) structures. By the early 1960s, several of the

[5] Container Corporation of America was sold in 1986 to Jefferson Smurfit Corporation. Jefferson Smurfit Corporation subsequently merged with Stone Container Corporation in 1998 to become Smurfit-Stone Container Corporation. (Source: https://en.wikipedia.org/wiki/Container_Corporation_of_America)

structures were removed and demolished, and by the early 1970s, the land was redeveloped with the San Jose International Airport (established beyond to the southeast by the mid 1940s). To the west, railroad tracks and right-of-way have abutted the site since at least the late 1880s, beyond which industrial to heavy industrial structures were erected by the mid 1950s.

While Ramboll did not observe significant indications of environmental concern in the historical sources reviewed, a variety of commercial to industrial properties (occupied by such tenants as metal works, automotive repair, wastewater treatment, paper mill, and other manufacturing facilities) were identified as part of database review. See Section 4.1 for more information.

4.3 Review of Local and State Agency Information

Ramboll visited or otherwise contacted local governmental agencies and regulatory bodies for information relating to the site. An overview of the findings of this review is presented in Table 6.

Table 6: Local Agency Information for the Site

Agency Contacted / Document Reviewed	Information Obtained
County Tax Assessor	Information from the Santa Clara County Assessor's Office included assessment roll information and a tax map. According to the tax map, the site (APN 230-03-105, 14.959 acres, "Unit 1") was at one time legally associated with the adjacent property to the south (APN 230-03-106, 9.312 acres, "Unit 2"), comprising a larger 24.271 acre site (APN 230-03-100, according to Building Department). As of 2017, the site was bordered by an 8.35 acre irregular shaped property to the north; former Unit 2 and Martin Avenue and beyond a 1.92 acre property to the south; De La Cruz Boulevard (formerly Stockton Avenue) and beyond City of San Jose and City of Santa Clara land to the east; and Southern Pacific Transportation (railway) and beyond several properties to the west. Ramboll attempted to contact the Assessor's Office for property ownership history; however, no response was received at the time of report writing.
City Zoning Records	Based on a review of City of Santa Clara Planning Department online maps, the site is located in a region zoned "Heavy Industrial." In addition, the primary structure on site is one-story and was reportedly constructed in 1954.
SCCDEH	Ramboll requested records from the SCCDEH for information regarding soil or groundwater investigations, USTs, LUSTs, hazardous materials inspections, or violations/permits for the property. SCCDEH reported no records on file for the property address, indicating that the City Fire Department would have responsive records for these matters.

Table 6: Local Agency Information for the Site

Agency Contacted / Document Reviewed	Information Obtained
SCVWD	Ramboll contacted the SCVWD to request information pertaining to historical leaking underground storage tank (LUST) cases for the site. The SCVWD was previously one of several regulatory agencies overseeing hazardous materials leak cases in the City of Santa Clara. However, Ramboll was directed to the County Department of Environmental Health and the SFRWQCB for files related to historical leak cases, as well as to an online SCVWD archived file database. The SCVWD online database did not contain files pertaining to the site. In addition, all historical electronic files on the Environmental Health Department website were reportedly posted to the GeoTracker online database. As such, all leak-related files were accessed at GeoTracker or in other previous environmental assessments provided to Ramboll by the Company.
SFRWQCB	Ramboll submitted a public records request to the SFRWQCB in regards to potential additional information for historical on-site leaks not already included on GeoTracker. Based on a telephonic conversation with Ms. Melinda Wong of the SFRWQCB, all files related to the case in their possession are already posted online. A review of this information (circa 1984 to 2000) is presented in Section 4.4.

Building Department Online Permit Portal and Microfiche Review (1954 to 2017) Fire Department Online Permit Portal and Microfiche Review (1954 to 2017)	The Building Department files dated 1954 to 2017 indicate that several tenant improvement (TI) permits have been issued since original construction. Major building, planning, and fire permits pertaining to potential/likely hazardous materials use include the following (with owners underlined): <u>Container Corporation of America (circa 1954—1995)</u> • 1954: Erection of a folding carton plant (April 12, 1954 – adjoining property to the south). • 1956: Erection of a paper mill on site, including construction of foundation. • 1957: Installation of a gas-fired boiler. • 1958: Erection of a boiler control house. • 1968: Construction of ink-storage shelter. • 1970: Erect addition. • 1974: Additions to a chemical storage building (now forklift maintenance shed). Drawings indicate the building had a southern adjacent sub-grade clarifier. • 1976: Demolition of an unspecified structure; repair of a damaged tank wall; remodeling the paper carton building; repair of dump chests; erection of an air compressor room; extension of a truck/loading ramp. • 1977: Construction of a loading dock. • 1979: Erection of a scrap handling system. • 1983: Removal of eight solvent tanks associated with a “Gravure Tank Area” (See Section 4.4). • 1984: Install 280 gallon diesel fuel tank for diesel fire pump. • 1985: Regrading and construction of cogeneration plant. Removal of a hazardous materials storage tank (See Section 4.4). • 1986: Construction of a lift pit. • 1987: Replacement of heating unit. Construction of a hazardous materials area. • 1990: Installation of a propane tank at northwest storage yard; review of two 25,000 gallon boiler fuel oil tanks. • 1994: Construction of a de-inking facility addition, including a top-liner de-inking system with several aboveground tanks and screen units. The addition was a two-story one; work was completed in 1996. • 1995: Addition of boiler and associated pad. 6,306 square foot addition to wet end of mill building. <u>Container Corporation of America/Jefferson Smurfit (1996)</u> • 1996: Replacement of existing 1,000 gallon propane (LPG) tank. <u>Smurfit Stone Boxboard Mill Division (2000)</u> • 2000: Installation of one 1,000 gallon diesel aboveground tank (for forklift area). Removal of a 550 gallon diesel AST at forklift maintenance shed. Plans show underground piping connecting the forklift wash pad area to a 2,000 gallon three-stage clarifier sub-grade tank. <u>Bluegrass Mills Holding/Container Company and Altivity Packaging (2004—2008)[6]</u> • 2004: Installation of anchorage of bulk sodium hydroxide (NaOH) solution system and felt wash tanks, including 350 gallon NaOH tank in basement and chemical distribution piping to the mill building. This tank farm included

Table 6: Local Agency Information for the Site

Agency Contacted / Document Reviewed	Information Obtained
	two 20,000 gallon tanks, 4,400 gallon NaOH tank, pump skids, and bermed adjacent truck unloading area at northwest corner of mill. • 2006: Removal of a 6,100 gallon NaOH tank. • 2007: Fire damage and structural roof repair. • 2008 to 2009: Installation of several tanks, including 400 gallon containers of: Nalcon 7647 and 7648, NaClO; and 120 gallons of unspecified material. <u>Graphic Packaging International (2009—Present)</u> • 2009 to 2010: Permitting existing tanks, including: 400 gallons of Nalcon 7614, 260 gallons of diesel, 4,000 gallons of Nalsize 7542, 345 gallons of Fyrewash, and recycled oil. One permit indicates that nine existing tanks containing Hazardous Materials Category 1 chemicals were formally permitted in 2010. • 2009: Installation of four ASTs. • 2010: Anchoring of six ASTs/totes (Nalco 7614 tote, diesel fuel tank, Nalsize tank, Fyrewash tank, recycled oil tank, and Nalco Elimin-Ox tote). • 2011 to 2012: Installation of a 700 gallon recycled oil AST and a 300 gallon diesel AST for fire pump system in rear; replacement of existing 4,000 gallon Nalsize 7542 AST with new 6,000 gallon AST. • 2012: Replacement of existing 300 gallon diesel tank and 700 gallon oil tank with tanks of the same size. • 2014: Installation of 750 gallon AST for NaOH; installation of three totes. • 2015: Replacement of a 750 gallon AST. <u>OPI Commercial Builders (2012)</u> • 2012: Separation of southern off-site building (2500 De La Cruz Boulevard) from the site facility. Ramboll notes that many of the permits lack information as to the exact nature of work performed at the time of issuing. In addition, no permits were listed for historical Stockton Avenue (now De La Cruz Boulevard). Since the site was formerly associated with the adjoining property to the south (i.e., within the same address range, and with the same APN), some permits may have been incorrectly attributed to the site. For instance, as is known from historical site reconnaissance, ink-related developments and washing areas were likely associated with the off-site property (2500 De La Cruz Boulevard) where printing activities historically took place.

[6] According to Bloomberg.com, Altivity Packaging, LLC was affiliated with Bluegrass Container Holdings, LLC, and was acquired in March 2008 by Graphic Packaging Corporation.

Table 6: Local Agency Information for the Site

Agency Contacted / Document Reviewed	Information Obtained
California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC)	According to the Hazardous Waste Tracking System (HWTS) online portal, the site was listed as housing three historical hazardous waste generators: <u>Container Corporation of America (EPA#CAX000044834)</u> • Registered in 1983 and inactive by 1986. No additional information is available regarding associated hazardous waste manifests. <u>Graphic Packaging International DBA Santa Clara Mill (EPA#CAD982033557)</u> • An active generator of hazardous wastes, registered by June 1988, and with information last updated in July 2017. • Listed as annually manifesting a variety of hazardous wastes between 1993 and 2017, including: unspecified hazardous wastes, alkaline solutions, aqueous solutions with organic residues, unspecified aqueous solutions, off-specification/aged/surplus [OAS] inorganics, asbestos-containing wastes (up to 66.4 tons in 2013), other inorganic solids, waste oil and mixed oil (between 0 and 11.894 tons), oil-water separation sludge (between 0 and 8.34 tons), unspecified oil-containing waste (between 0 and 11.449 tons), latex waste, OAS-organics, unspecified organic liquid mixtures, and other organic solids. • In addition, the site is listed as manifesting 0.4 tons of halogenated solvents in 1998, 0.5 tons of oxygenated solvents in 1997, 0.2 tons of hydrocarbon solvents in 1997, 0.12 tons of unspecified solvent mixture in 1997, polychlorinated biphenyl (PCB) containing waste (1.3786 tons in 1994, up to 4.71 tons in 2010, related to transformer upgrades and maintenance), laboratory waste chemicals (0.0385 tons in 1997), liquids with chromium (VI) (0.0417 tons in 1994, related to cooling tower maintenance), liquids with lead (0.68805 tons in 2013, related to oily sludge disposal), and liquids with pH <= 2 (9.174 tons in 1999, related to solid debris contaminated with caustics). <u>Graphic Packaging International (EPA#CAC002849469)</u> • A temporary EPA ID number registered and inactive in 2016. • Listed as manifesting 0.23 tons of asbestos-containing wastes in 2016.
Fire Department	Ramboll was provided recent fire code inspection reports (dated 1998 to 2013) and chemical inventories (dated 1999 to 2016). Chemical use on site has been relatively unchanged since the late 1990s, with the exception of the generation of up to approximately 2,000 gallons of sulfuric acid (in 1990s). The facility was not designated as significantly deficient in the available fire inspection reports, with most violations being related to housekeeping or administrative reporting. There are no open fire code violations.

4.4 Previous Environmental Assessments and Activities

Based on a review of historical site documents and interviews with facility personnel, the following prior environmental assessment, sampling, and remediation activities have been conducted at the site or surrounding properties:

- **USEPA Preliminary Assessment.** As noted in Section 4.1.1 above, the site is listed on the archived CERCLIS database as having been the subject of a preliminary assessment by USEPA in 1987. Upon completion of this activity, USEPA designated NFRAP status for the site, indicating

that no further investigation would be required pursuant to CERCLIS. Facility personnel were not aware of this assessment and could not provide any related documentation.

- **1991 Transformer Spill and Cleanup.** Facility personnel described one historical transformer leak and provided a "Transformer Failure Report" prepared by General Electric Power Delivery and Control on behalf of Container Corporation of American, dated January 1992. According to the report, on December 29, 1991, an electrical breaker tripped on site, resulting in the cracking of the "neutral bushing" of the ET-23 Transformer, formerly located at the southwest main transformer pad area. The crack resulted in the release of approximately 70 of 210 total gallons of transformer fluid into a bermed secondary containment area, which was cleaned the next day via application of absorbent. The transformer, which had been previously classified as a "PCB transformer" but had been retrofitted with silicon fluid, was removed from the site. Six drums of waste were generated during cleanup, and a replacement transformer was installed. According to the associated dielectric fluid test report, the released transformer fluid contained <1 ppm Aroclor 1242 and 1254, and 129 ppm of Aroclor 1260. Based on the report and a transformer listing provided by facility personnel, original transformer equipment at the site has been either replaced or retrofitted with non-PCB-containing materials. No sampling is known to have been conducted since the equipment was retrofitted to assess residual PCB content of the oil. Facility personnel were not aware of other spills from transformer equipment at the site.
- **Investigation and Remediation Associated with Former USTs.** The information reviewed by Ramboll indicates that at least eleven USTs were formerly located on site. The USTs were located at the southern edge of the courtyard to the south and west of the mill building, including a 2,000-gallon gasoline tank, a 2,000-gallon diesel fuel tank, and a solvent tank farm with eight tanks ranging in size from 1,000 to 3,000 gallons that were all installed in 1965. These solvent tanks contained: 1) 50% isopropyl acetate and 50% ethyl alcohol (3,000 gallons); 2) 90% mixed hexanes and 10% toluene (2,000 gallons); 3) isopropyl acetate (2,000 gallons); 4) toluene (1,000 gallons); 5) MEK (1,000 gallons); 6) gravure wash consisting of reclaimed solvents (1,000 gallons); 7) waste solvent (1,000 gallons); and 8) wastewater (1,000 gallons). The tank locations are depicted on Figure 2. The remaining two USTs were 25,000-gallon fuel oil tanks that had been installed at the site in approximately 1954 just south of the historical western boilers. Below is information regarding the closure of the tanks; it should be noted that no information was included in the documentation regarding closure of associated piping (at least 400 feet of gravity-fed underground piping appears to have been present that extended to the historical solvent room of the southern adjoining property).

  Gasoline UST – In 1982, the Company discovered the release of approximately 3,000 to 4,000 gallons of gasoline from the gasoline UST on the mill property. At that time, the UST was filled with concrete slurry and closed in place. Seven monitoring wells (MW-1 through MW-7, as shown on Figure 2) were installed in the courtyard of the mill property surrounding the tank in November 1982. These wells were sampled from January 1984 to 1989, during which the following constituents of concern were identified: TPH-g (up to 1,100,000 µg/L), benzene (up to 9,500 µg/L), toluene (up to 11,000 µg/L), ethylbenzene (up to 2,800 µg/L), xylenes (up to 18,000 µg/L), 1,1,1-TCA (up to 1.6 µg/L), TCE (up to 6.3 µg/L), 1,1-DCA (up to 9.4 µg/L), 1,1-DCE (up to 24 µg/L), and fuel oil #6 (up to 3,000 µg/L). Diesel #2 was not detected at that time. Free product was also identified on the

water table. Beginning in the spring of 1983, the facility operated a groundwater extraction well (EW-1) that was connected to an oil/water separator and treatment system. Up to 99 µg/L of TCE was detected in groundwater at EW-1. The system operated for a two-year period, during which approximately 3 million gallons of groundwater and 250 gallons of free-phase gasoline were reportedly removed. Following completion of the groundwater extraction activities, free product was no longer reported in subsequent groundwater monitoring events.

Solvent USTs – The eight solvent tanks located in the tank farm were removed from the mill property in August 1983.[7] According to the 2010 Phase I ESA, during tank removal activities, 15 soil samples were collected from beneath the tank pits for analysis of volatile organic compounds (VOCs). No analyzed VOCs were detected in any of the samples, except for a detection of toluene (at 590 µg/kg) in a soil sample collected beneath the waste solvent tank. Upon receipt of the sampling results, the SFRWQCB requested further investigation of the toluene release. As such, three additional soil samples were collected from this area and analyzed for select VOCs in September 1983, and one groundwater well was apparently installed 15 feet downgradient of the soil contamination (presumably to the north or northeast) that was sampled only for toluene. The soil samples were found to contain toluene (up to 9,800 µg/kg), MEK (up to 900 µg/kg), benzene (up to 26 µg/kg), ethylbenzene (up to 365 µg/kg), and o-xylene (up to 560 µg/kg); the groundwater sample did not contain toluene above the laboratory reporting limit (5 µg/L). Based on these results, the Company asserted in correspondence to the SFRWQCB that the toluene concentrations had resulted from a one-time spill of a small volume of toluene from a feed pipe as it was being removed during tank closure activities. In correspondence dated February 2, 1984, the SFRWQCB indicated that there was "significant uncertainty" as to the potential impacts to groundwater from the residual soil contamination at the property. The SFRWQCB letter indicated that the remaining soil contamination was "probably minimal and the remedial work that has been done is the minimum required." As such, the SFRWQCB indicated that it would not require any additional investigation or excavation of the residual soil contamination, and the agency recommended that the Company close and backfill the excavation. Because some soil contamination would be left in place, the SFRWQCB required continued semiannual monitoring of the groundwater from the well that was installed downgradient of the excavation (for analysis of toluene, benzene, ethylbenzene, o-xylene, and MEK). Facility files included results of groundwater sampling from this monitoring well in April 1984, at which time relatively low detections of benzene (6 µg/L), toluene (1 µg/L), and xylene isomers and ethylbenzene (collectively 2 µg/L) were identified. Additional groundwater sampling results for this well were located in facility files from May 1998; at that time, total xylenes were detected at 7 µg/L, but benzene, toluene, and ethylbenzene were not identified above the laboratory reporting limit (5 µg/L).

[7] According to the permit for removal, tanks were to be inert with dry ice, capped, and transported via hauler CAD000986718, disposed of in Kettleman Hills, CA. The excavation pit was to be filled with clean back fill following confirmatory sampling. The UST removal was to follow the applicable regulations in the Fire Department's Flammable Liquid Storage Tank Safeguard and Removal Policy, including pipe emptying and removal; however, the permit associated checklist was not completed confirming completion of these activities.

Diesel UST – In February 1985, the Company removed the diesel fuel UST upon discovery of a leak and a failed pressure test. Soil samples collected from beneath the UST contained up to 3,600 mg/kg of TPH-d at depths of up to 12.5 feet. A soil and groundwater investigation was performed, during which a soil boring was installed in the location of the former UST and free product was identified on the water table. Several groundwater monitoring events were also performed in the middle and late 1980s.

Fuel Oil USTs – In December 1990, the two 25,000-gallon fuel oil USTs were removed from the mill property. These USTs had reportedly been installed in the 1950s. During their removal, no holes, corrosion or pitting was noted. Analysis of three soil samples collected from beneath each UST did not identify TPH-d or benzene, toluene, ethylbenzene, and xylene (BTEX) above laboratory reporting limits. The excavations were backfilled with pea gravel and excavated soil.

In addition to the investigations and remedial activities described above that were completed between 1982 and 1990, the Company performed additional investigations and remedial activities in the 1990s under the oversight of the SCVWD. Associated with these investigations, two monitoring wells were installed at the southwestern and south-central sides of the southern off-site building (MW-8 and MW-10) and an additional five monitoring wells (MW-6, 7, 9, 11, and 12) were installed on site. A 1992 feasibility study recommended that groundwater contamination be addressed through groundwater extraction, although there is no documentation to indicate that groundwater extraction was subsequently undertaken. Rather, Oxygen Releasing Compound (ORC) was applied to wells at the mill site (EW-1, MW-1, and MW-2) between April 1998 and November 1999.

Upon completion of these investigation and remedial activities, it appears that the Company petitioned the SCVWD for case closure. At that time, residual contaminants of concern remained in site soils and groundwater, but the groundwater concentrations of most contaminants had been reduced. Table 7 is a summary of the maximum documented levels of non-chlorinated contaminants identified before and after (i.e, by final sampling event in 2000) groundwater remedial activities, as listed in the SCVWD closure report.

Table 7: Maximum Documented Levels of Select Petroleum-Related Contaminants Before and After Groundwater Remediation

Constituent	Groundwater Prior to Remediation (µg/L)	Groundwater After Remediation (µg/L)	Soil Before and After Remediation (mg/kg)[1]
TPH-g	640,000	24,000	400
TPH-d	Unknown	3,200	3,600
Benzene	3,700	430	1.3
Toluene	2,300	51	2.2
Xylene	3,500	1,800	44
Ethyl-benzene	1,800	2,900	9.6
Oil & Grease	NA[2]	NA	86

Table 7: Maximum Documented Levels of Select Petroleum-Related Contaminants Before and After Groundwater Remediation

Constituent	Groundwater Prior to Remediation (µg/L)	Groundwater After Remediation (µg/L)	Soil Before and After Remediation (mg/kg)[1]
MTBE[3]	NA	140	NA

Notes:
1) Soil remediation was not performed, and therefore the maximum levels of contaminants before and after groundwater remediation were not differentiated in the SCVWD closure report.
2) NA = Not Analyzed
3) According to the SCVWD closure report, methyl tert butyl ether (MTBE) was not considered likely to be a component of the gasoline and diesel fuel that were released at the mill property in the 1980s. As such, the MTBE detected on-site was apparently assumed to have resulted from an off-site source.

Monitoring data suggest that petroleum and non-chlorinated VOC contamination was largely concentrated on the mill property within the courtyard where the leaking USTs had been located, and did not migrate laterally off site to the north or east (in the direction of groundwater flow).

In addition to the petroleum and non-chlorinated VOC contamination described above, the past subsurface investigations identified chlorinated VOCs in groundwater on the site. For some of these constituents, the highest levels were identified along the up gradient (i.e., southern or southwestern) edge of the southern adjoining property, and along the eastern edge of the site (along De La Cruz Boulevard) suggesting that the contamination may be migrating onto the site from an upgradient source. In MW-10 (off site), maximum chlorinated VOC concentrations included 8.1 µg/L of 1,1,1-TCA, 580 µg/L of TCE, 0.86 µg/L of 1,1-DCE, 7.0 µg/L of cis-1,2-DCE, and 1.67 µg/L of methylene chloride. Lower levels of chlorinated VOCs were identified at the southern adjoining property along Martin Avenue at MW-8, including 1,1,1-TCA (0.92 µg/L) and methylene chloride (2.48 µg/L).

Whereas, known on-site chlorinated VOC concentrations included:

- Between 1984 and 1989 (as above)[8]:
  - TCA: 1.6 µg/L at MW-6 and MW-7 (1989)
  - TCE: 6.3 µg/L at MW-7 (1989)
  - DCA: 9.4 µg/L at MW-6 (1989)
  - DCE: 24 µg/L at MW-6 (1989)
- Between 1989 and 1990:
  - 1,1,1-TCA: 1.2 µg/L at MW-3 (1989)
  - TCE: 4.6 µg/L at MW-3 (1989)
  - 1,2-DCA: 18 µg/L at MW-2 (1990)
  - cis-1,2-DCE: 0.8 µg/L at MW-3 (1990)

[8] Ramboll notes that MW name designations are different from 1984 to 1989 than from thereafter. Ramboll was not provided with adequate information to distinguish where these sampling points were compared to subsequent sampling points. In addition, these concentrations exclude VOC Tentatively Identified Compounds (TICs) reported in the 2000 Closure Report as being detected in 1987 at wells CCA-1 and -2 (including naphthalene and aromatic hydrocarbons like trimethylbenzenes).

- Between 1991 and 2000:
  - o 1,1,1-TCA: 9.0 µg/L at MW-9 (1992)
  - o TCE: 64 µg/L at MW-4 (1993)
  - o 1,1-DCA: 15.2 µg/L at MW-9 (1992)
  - o 1,1-DCE: 2.9 µg/L at MW-3 (1993)
  - o cis-1,2-DCE: 62 µg/L at MW-11 (1996)
  - o trans-1,2-DCE: 0.8 µg/L at MW-11 (1993)
  - o methylene chloride[9] 6.42 µg/L at MW-4 (1992)
  - o chloroform[11] 48.7 µg/L at MW-11 (1992)

  In correspondence dated September 27, 2000, the SCVWD (with concurrence from the SFRWQCB) issued case regulatory closure for the releases at the mill site. The documentation included within the case closure letter indicated that the case closure was based on SCVWD's belief that the remaining contamination did not represent a significant threat to groundwater due to the stable to decreasing trends of petroleum hydrocarbon concentrations in groundwater samples from the monitoring wells and the stability of the hydrocarbon plume. It does not appear that any additional activities have been required associated with this matter since that time. Records in facility files from 2003 indicate that at least some of the existing wells were subsequently destroyed under SCVWD oversight; none of the previous wells were identified during site reconnaissance in 2017 and facility personnel were not aware of any remaining wells on site.

- **2010 Phase I Environmental Site Assessment, 2500 De La Cruz Boulevard**. A Phase I ESA was conducted at adjoining property to the south (2500 De La Cruz Boulevard) by ENVIRON in 2010, in connection with its closure and sale. Pertinent historical and site-related information contained in the 2010 Phase I report has been incorporated into other sections of this report. This report identified the presence of one REC, namely that there were known impacts to site groundwater with chlorinated VOCs. ENVIRON indicated that for many of the identified constituents, the highest levels were identified along the up gradient (i.e., southern or southwestern) edge of the site parcel (which previously encompassed the adjoining southern property), suggesting that the contamination migrated onto the parcel from an upgradient and off-site source to the south or southwest. At that time, known concentrations of up to 580 µg/L TCE and 7 µg/L of DCE were detected on or near the parcel. By that time, the Company had suggested in correspondences with regulatory authorities that chlorinated VOC contamination had migrated onto the parcel from an off-site source and that remedial activities completed on site to address non-chlorinated contaminant releases at the site did not appear to address chlorinated VOC impacts. ENVIRON noted that the Company had not been known to use TCE at the property. As such, absent additional data to indicate on-site impacts had attenuated to below regulatory criteria, the matter was characterized as a REC.
- **2010 Hazardous Materials Closure Report, 2500 De La Cruz Boulevard.** A hazardous materials facility closure report was completed by ENVIRON in 2010 at the adjoining property to the south (2500 De La Cruz Boulevard) in connection with the submission of a hazardous

[9] Ramboll notes that methylene chloride was detected in only one of fourteen groundwater sampling events between 1991 and 1996, and was detected at nine of thirteen locations during that event. This suggests a potential contamination with laboratory solvent and not an on-site source. The same is suggested for chloroform (detected only four times between 1991 and 1996 across all sample locations).

materials facility closure plan to the Fire Department. Pertinent historical and site-related information contained in the 2010 closure report has been incorporated into other sections of this report. This report indicated that GPI or its predecessor companies had owned and occupied the adjoining property since at least the mid 1950s, for manufacture of folding paperboard packages. Operations included a lamination line, rotogravure printing presses, and associated pre-press, drying, cutting, stamping, finishing, and cleaning activities. To assess the potential for subsurface impacts from hazardous materials use at the property, 34 soil borings were advanced to between 0.5 and 1 foot bgs (or up to 10 feet bgs below sub-grade features). Soil samples were tested for California Assessment Manual (CAM) 17 metals, as well as TPH and VOCs. The three closest borings to the site were soil borings (SB): SB-1 (corresponding with former wastewater treatment system), SB-2 (near wash water tank enclosure), and SB-7 and SB-8 (at west and east sides of washing machine pit), located fewer than approximately 40 feet from the site. With the exception of low concentrations (<2.2 mg/kg) of TPH-d and metals, no major concerns were identified in shallow soil near the site at these locations. In addition, six groundwater samples were taken at the adjoining property to address specific groundwater contamination concerns based on soil sampling, with maximum detected concentrations of: 23,000 µg/L TPH-g, 58,000 µg/L TPH-d, 52,000 µg/L TPH-motor oil (TPH-mo). The nearest grab groundwater location (SB-5A), located approximately 100 feet to the south of the site, exhibited up to 710 µg/L of acetone (below applicable screening level of 1,500 µg/L). ENVIRON concluded that several localized, well-defined, shallow areas of impact existed at the adjoining property, which were adequately delineated to a solvent room, printing line, maintenance area, and gravure press, and noted that up gradient sampling suggested potential migration of TPH to the property from an unknown up gradient location. ENVIRON indicated that no further investigation was warranted.

- **2011 Additional Soil and Groundwater Characterization Report.** Following regulatory closure by the Fire Department in December 2010 and issuance of a No Further Action (NFA) letter by the Environmental Health Department Voluntary Cleanup Program (VCP) in January 2011, ENVIRON conducted an additional investigation of the adjoining property at the request of a prospective purchaser. The investigation was designed to characterize groundwater conditions, particularly in terms of VOC presence beneath the property. Shallow soil and groundwater samples were taken from approximately 17 locations. Ultimately, the following conditions were encountered:

  - Soil: TCE, acetone, methyl ethyl ketone (MEK), TPH-d, TPH-mo, polycyclic aromatic hydrocarbons (PAHs), and pesticides were detected below applicable screening levels. No other VOCs were detected above laboratory reporting limits, nor were TPH-g or PCBs detected. Metal concentrations were not detected above screening levels, except for arsenic, which was detected at regional background levels.
  - Groundwater: TCE was detected at up to 84 µg/L and cis-1,2-DCE was detected at up to 62 µg/L, with all detections below vapor intrusion screening levels. 1,1-DCA, trans-1,2-DCE, naphthalene, 1,1,1-trichloroethane (TCA), and ethylbenzene were all detected below screening levels, with other VOCs detected but at low concentrations in localized regions. Up to 8,600 µg/L TPH-g, 450,000 µg/L TPH-d, and 290,000 µg/L TPH-mo were detected.

  ENVIRON noted that while VOCs (mainly TCE and cis-1,2-DCE) were present in groundwater, maximum concentrations were near the southern portions of the property, and none presented

vapor intrusion concerns. TPH findings were found to confirm the findings of the 2010 closure, which had concluded that petroleum hydrocarbon impacts were generally localized to former UST areas.

- **2018 Soil Vapor and Groundwater Investigation Report.** A limited subsurface investigation was conducted by Ramboll in December 2017, including 9 groundwater sampling locations and 5 soil vapor samples at the site, to evaluate current subsurface conditions at prior UST investigation locations and other areas. The results of the investigation included detections of petroleum hydrocarbons and fuel-related VOCs in groundwater, generally localized to former UST areas and mill areas, at concentrations that are predominantly below those measured at the time of the UST closure in 2000. A groundwater sample collected adjacent to the empty 126,000-gallon fuel oil AST did not identify impacts to groundwater. Soil vapor detections included fuel-related VOCs, chlorinated solvents (tetrachloroethene [PCE] and TCE), and several other VOCs, however all of the detections were below the most stringent (i.e., residential land use) screening criteria published by USEPA and Cal/EPA for evaluation of vapor intrusion risks. Details regarding sample locations and investigation procedures are provided in the 2018 Soil Vapor and Groundwater Investigation Report prepared by Ramboll under separate cover.

4.5 User-Provided Information

Because this assessment is being prepared on behalf of the owner of this site, user-provided information (e.g., relating to environmental liens, activity use limitations [AULs], specialized knowledge of the property, property value diminution, chain-of-title, or any other commonly known or obvious indications of site contamination) was obtained through the site reconnaissance and interviews and is referenced in the applicable sections of this report.

5. SITE RECONNAISSANCE

5.1 Methodology and Limiting Conditions

Ramboll conducted site visits on December 12, 13, and 21, 2017. During the site visits, observations of both the interior of the buildings and exterior portions of the site were made to evaluate if any RECs, as defined in Section 2, are present. Ramboll did not observe the roof of the buildings.

5.2 General Site Setting and Observations

Ramboll made observations concerning all of the interior and exterior issues specified in Sections 9.4.2 through 9.4.4 of the ASTM E1527-13 Standard. The presence or absence of each issue of environmental interest or concern is noted in Table 8. Additional information regarding observed and historical items is provided in the sections following the table.

Table 8: Summary of Site Reconnaissance Observations

ASTM Section	Issue	Observation
Interior and Exterior Issues		
9.4.2.1	Current use(s) of the property	See Section 3.2
9.4.2.2	Past use(s) of the property	See Section 4.2
9.4.2.3	Hazardous substances and petroleum products used, treated, stored, disposed of, or generated on the property in connection with identified present or past uses	**Present** (see Section 5.2.1)
9.4.2.4	Storage tanks: Underground storage tanks (fill ports, vent pipes, manholes) Aboveground storage tanks	(see Sections 5.2.2, 5.2.3) **Present** / Formerly Present **Present**
9.4.2.5	Odors (strong, pungent or noxious)	Absent
9.4.2.6	Pools of liquid, standing surface water or sumps	**Present** (see Section 5.2.4)
9.4.2.7	Drums of hazardous substances or petroleum products (five-gallon, 55-gallon or totes)	**Present** (see Section 5.2.1)
9.4.2.8	Hazardous substance and petroleum product containers (not necessarily in connection with identified uses)	**Present** (see Section 5.2.1)
9.4.2.9	Unidentified substance containers suspected of containing hazardous substances or petroleum products	**Present** (see Section 5.2.1)

Table 8: Summary of Site Reconnaissance Observations

ASTM Section	Issue	Observation
9.4.2.10	Polychlorinated biphenyls (PCBs)	(see Section 5.2.5)
	Electrical equipment on-site (e.g., transformers, capacitors) Electrical equipment known or likely to contain PCBs Hydraulic equipment on-site (e.g., elevators, truck dock lifts) Hydraulic equipment known or likely to contain PCBs	**Present** **Present** **Present** Unlikely
Interior Issues		
9.4.3.1	Heating/cooling systems	**Present** (see Table 1)
9.4.3.2	Stains or corrosion on interior floors, walls or ceilings (except for staining from water)	**Present** (see Section 5.2.6)
9.4.3.3	Floor drains and interior sumps	**Present** (see Section 3.2.3)
Exterior Issues		
9.4.4.1	Pits, ponds or lagoons on property or adjacent sites	**Present** (see Section 5.2.4)
9.4.4.2	Stained soil or pavement	**Present** (see Section 5.2.7)
9.4.4.3	Stressed vegetation (from other than insufficient water)	**Present** (see Section 5.2.8)
9.4.4.4	On-site solid waste disposal; areas apparently filled or graded by non-natural causes; or mounds or depressions suggesting solid waste disposal	Absent
9.4.4.5	Wastewater or other liquid (including storm water) or any discharge into a drain, ditch, underground injection system or stream on or adjacent to the property	**Present** (see Section 5.2.9)
9.4.4.6	Wells (including dry wells, irrigation wells, injection wells, abandoned wells, or other wells)	**Present** (see Section 5.2.10)
9.4.4.7	Septic systems or cesspools	Absent

Notes:

Observations noted in this table and discussed further below are based on information obtained during the site visit and from a review of the sources summarized in Section 4.

See the ASTM Standard for a detailed description of the issues included in each referenced ASTM section.

Per the ASTM Standard, fluorescent light ballasts likely to contain PCBs are not considered.

N/A – Not applicable

5.2.1 Hazardous Substances and Petroleum Products

Several chemicals were utilized on site in bulk quantities. These chemicals were utilized predominantly: for the treatment of process water (26,000 gallons and 8,000 pounds [lbs] of chemical treatment maximum daily storage or use); as additives to paper (60,000 gallons) or its coatings (60,000 gallons and 140,000 lbs); and the operation and maintenance of the cogeneration plant (~10,000 gallons boiler treatment chemicals and ~2,400 gallons of oils/solvents).

In addition, the Company used maintenance-related materials, such as fuels, oils, lubricants, greases, non-chlorinated degreasers, welding gases, and refrigerant chemicals.

A general overview of chemicals utilized on site during final stages of operation (i.e. before operations ceased in December 2017), as well as storage areas, are included Table 9 below.[10] It should be noted that the Company submitted a Hazardous Material Closure Plan in October, 2017 to the Santa Clara Fire Department and is in the process of properly managing/disposing of remaining hazardous substances and petroleum products.

Table 9: Hazardous Substances Use Overview

Purpose	Components and Maximum Daily Use	Storage and Use Locations
Manufacturing Process Chemicals		
Process Water Treatment	▪ Felt wash (500 gal Nalco 62513) ▪ Potable water treatment (250 gal ChemTreat 708) ▪ Boiler corrosion inhibitor (400 gal Nalco 2814) ▪ Alkaline cleaner (500 gal Nalstrip 7577) ▪ Paper colorant (250 gal Chrysoidine MR) ▪ Pigment dispersing acrylic resin (250 gal Keysperse) ▪ Retention aid polymer (400 gal Nalco 7520) ▪ Other unknown (400 gal Nalco 2651, 400 gal Nalco 3DT108, 500 gal Retain Plus R9809, 220 gal Super Pure solvent)	Exterior storage at: ▪ Cogeneration Drum Storage Area #2 along northern access way (1,925 gal capacity storage in 690 gal secondary containment) Points of use at: ▪ Wet end (inside) ▪ Cogeneration plant boilers (outside)
	▪ Felt wash (700 gal Nalco 62513) ▪ Biocides (8,000 lbs Nalco 7648) ▪ VOC/PAH-containing solvents (1,200 gal Nalstrip 1702) ▪ Defoamer (6,000 gal Nalco 7569)	Exterior storage at: ▪ Southwestern Canopy-Covered Mill Loading Dock Points of use at: ▪ Wet end (inside) The defoamer tank is located within bermed secondary containment.

[10] Ramboll referred to field observations during site reconnaissance, discussions with facility personnel, and the most recent Hazardous Materials Business Plan (HMBP) dated March 4, 2016 to develop a list of the primary chemicals utilized on site. This list is not intended to be an exhaustive survey of all possible chemicals utilized on site. When discrepancies were noted on site (e.g., in tank size or product name), Ramboll expressed the differences as a numerical range (reported and observed), or listed both chemical names.

Table 9: Hazardous Substances Use Overview

Purpose	Components and Maximum Daily Use	Storage and Use Locations
	▪ Flocculant (400 gal Nalco 71305)	Exterior storage and use at: ▪ Wet Strength Pulper at North-Central Portion of Courtyard within bermed area
	▪ Biocide (800 gal Nalco 7647)	Exterior use and storage at: ▪ Steam Pressure Washer Adjacent to Sheeter Room
	▪ Biocide (400 gal Nalcon 7614) ▪ Caustic Agent (400 gal sodium hydroxide)	Interior storage at: ▪ Wet end – pressing/forming
	▪ Flocculants and Coagulants (1,000 gal P-846E, 3,050 gal P-89L, 1,030 gal ChemTreat P-8175E)	Exterior storage and use at: ▪ Cogeneration Plant Backup Boiler (#2) in bermed area
	▪ Flocculant (500 gal Nalco 7607), containing organochlorine constituents. ▪ Causticizing agent (4,400 gal sodium hydroxide) ▪ Biocide (400 gal Nalco 7678) ▪ Unknown (1,210 gal Nalco DVPX014, Nalco DVP4K004)	Exterior storage at: ▪ Northwestern Process Chemical Enclosure (within bermed area) Points of use at: ▪ Wet end (inside)
Paper Additives	▪ Wet Strength Resin (10,000 to 20,000 gal Kymene™ or HP-100E) ▪ Core Shell Fiber Retention (20,000 gal Nalco 61067) ▪ Strength Retention and Drainage Additive (4,000 to 20,000 gal Nalsize 7542)	Exterior storage at: ▪ Northwestern Process Chemical Enclosure (within bermed area) Points of use at: Wet end (inside)
Paper Coatings and Sealants	▪ Titanium Dioxide (TiO_2) Pigment (16,000 lbs) ▪ Pigment dispersing agent (43,000 lbs carboxymethyl cellulose) ▪ Latex and special polymer binders and sealants (34,000 gal Polyco 3103, 40,000 lbs Evanol, 21,000 gal Vinnapas 100HS, 30,000 lbs Pen-Cote D-UHV, 250 gal EKA Flow L-29) ▪ Causticizing agent (2,500 lbs soda ash, 1,560 lbs sodium hydroxide) ▪ Dispersant (250 gal Kemira 211) ▪ Unknown (250 gal Nalco 8669)	Exterior storage at: ▪ Process Coating Tank Storage Areas at Northeast Corner of Courtyard (with 114 gal fill port containment, and bermed storage areas) Points of use at: ▪ Dry end – coating
	▪ Polymers for coating binding/sizing (1,125 to 2,250 lbs each of carboxymethyl cellulose, Pen-Cote D-UHV, polyvinyl alcohol)	Interior storage at: ▪ Coating Mixing Room Points of use at: ▪ Dry end – coating

Table 9: Hazardous Substances Use Overview

Purpose	Components and Maximum Daily Use	Storage and Use Locations
	▪ Defoamer (750 gal Nalco 8669) ▪ Miscellaneous water treatment chemicals (750 gal Nalco 03PK039, 250 gal Nalco 3DT108) ▪ Coating product polymer (1,000 gal ImPress FP 220)	Exterior storage and use at: ▪ Former Hydrofloat™ / Cooling Tower / Pressure Washer Area Near Sheeter Room
	▪ Grease and water repellant (500 gal Unidyne TG-811)	Exterior storage at: ▪ Cogeneration Drum Storage Area #2 within bermed area
Ancillary Process Chemicals		
Parts Cleaning Solvent	▪ Mineral Spirits (495 gal Zep Dyna 143)	Exterior storage at: ▪ Courtyard Maintenance Dock Drum Storage Area (2,310 gal capacity, 2,060 secondary containment berm with sump)** Points of use: Throughout the facility.
Supply Well Water Treatment	Water Treatment and Stabilization Chemicals: ▪ Scale control, disinfectant (400 gal Nalco 7396, 1,100 gal Nalco GEO903, 500 gal sodium hypochlorite)	Exterior storage and use at: ▪ West-Central Water AST
Cogeneration Plant Operation	Boiler Treatment Chemicals: ▪ Corrosion inhibitor (400 gal Nalco 2814) ▪ pH stabilizer (8,000 gal Nalco 8735) ▪ Oxygen scavenger (800 gal Elimin-Ox) ▪ Unknown (400 gal Nalco 8357, 400 gal Nalco 22341)	Exterior storage and use at: ▪ Cogeneration Drum Storage Area #1 at Northwest Corner of Mill in 1,665 gal capacity storage in 600 gal secondary containment)
	Maintenance Chemicals: ▪ Petroleum-based compressor cleaning solvent (345 gal Fyrewash) ▪ General purpose oil (2,090 gal)	Exterior storage and use at: ▪ Former Northwestern Gas Compressor Cogeneration Drum Storage Area in concrete bermed area with sump

Notes:

"gal" = gallons; "lbs" = pounds; "Nalco" = Nalco Water, an Ecolab Company; "PAH" = polycyclic aromatic hydrocarbons (e.g., naphthalene)

** According to the 2016 SPCC report, "Overflow from this secondary containment would flow away from the facility, across a wash pad area, into the trench that flows to the sanitary sewer drain. Overflow would not be discharged to storm drains or surface waters."

Ramboll observed blind sumps at the majority of bermed containment areas.

Several additional dedicated drum and other storage areas are maintained at the site:[11]

[11] Only major, designated storage locations included. Other storage takes place on an *ad hoc* basis near points of use/generation throughout the facility. Additionally, retail-sized containers of household-type maintenance or cleaning chemicals and cylinders of compressed gases are also stored at the site; the storage of these materials is not expected to pose a significant contamination concern.

- **Solvents**. Solvents were stored in one of two parts degreasing units (totaling 60 gallons) in the maintenance room of the mill (south-central). Up to approximately 30 gallons of waste solvent were generated on a weekly basis, with waste solvent transported to the courtyard hazardous waste maintenance dock for hauling.
- **Oils/Lubricants, Compressed Gas, and Antifreeze Storage.** Maintenance related lubricating oils and other petroleum products are stored in drums and pails in the maintenance room, as well as in ASTs and gear boxes in the basement or along the paper machine, a 1,000 gallon diesel AST near compressor house, and 1,000 gallon propane tank in the courtyard (See Section 5.2.3 regarding ASTs/reservoirs).

  Lubricating oils and small quantities of solvents were stored in drums on a wooden platform at the southwest corner of the southern loading dock. A concrete bermed ~2,060 gallon containment below the platform was utilized to collect storm water and leaked materials, and has a southwestern sump and associated sump pump. Berm water and nearby trench water was reportedly recirculated into the facility for use as process water. According to facility personnel, approximately 400 gallons each of lubricating oil (for paper machine machinery), synthetic oil for die machinery, gearbox oil for pulpers, all purpose oil, and "transformer oil cleaners" were formerly stored on the wooden platform (with a maximum potential storage of 2,310 gallons). During reconnaissance, approximately 440 gallons of lubricating oil remained on site. In addition, 55 gallons of waste solvent remained in this area.

  An additional canopy-covered platform (the "lubrication shed") is located to the west of the bermed area along the building for additional storage of gear oil in 60 gallon dispensing tanks (totaling up to 1,000 gallons) and synthetic lubricant (up to 100 gallons), as well as two flammable materials cabinets for spray enamels, pesticides, and latex paint. A drip pan under dispensers collects and conveys excess material to a separate 700 gallon additional containment area.

  A forklift drum storage shed (the "forklift shed") is located west of the compressor room and houses diesel and hydraulic oil storage of up to 440 gallons, with a containment area of 650 gallons (with associated blind sump).

  Lubricating oil was previously stored in quantities up to approximately 300 gallons at the cogeneration steam turbine, within a metal reservoir with 1,300 gallons of concrete bermed containment. In addition, a 260 gallon reservoir and 55 gallon lubricating oil reservoir are located at the gas turbine, within a 1,400 gallon concrete berm.
- **Hazardous Wastes.** Waste petroleum product generated within the manufacturing facility were collected in 55 gallon metal or plastic drums, transported, and emptied to a 700 gallon used oil AST located within the hazardous materials bermed area, along the courtyard northwestern loading dock. 55 gallons of waste paint in secondary containment, and 55 gallons of waste aerosols within secondary containment, were located near this area.

  Universal wastes (< 10 gallons), compressed gases (750 to 1,260 cubic feet of acetylene, argon, oxygen), and up to approximately 110 gallons of additional waste oil was located along the southern edge of the mill on the canopy-covered loading dock.
- **Additional Cogeneration Materials.** The cogeneration steam turbine is located within a 1,300 gallon bermed area. The gas turbine and lubrication oil reservoirs are located within a 1,400 gallon bermed containment area.

- **Out of Service Equipment.** Out-of-service equipment and landscaping chemicals are stored in the storage yard at the northwestern corner of the site, which is largely surfaced with gravel or asphalt.
- **General Trash.** Non-hazardous wastes (including solid wastes from pulping) were collected in a compactor and one of several dumpsters positioned on pavement throughout the exterior paved areas, and are washed and cleaned in a sub-grade paved area northwest of the cogeneration plant, at northern property line (See Section 5.2.4).
- **Empty Containers.** In exterior areas, Ramboll observed several empty and closed totes, drums, and process equipment positioned on the gravel parking areas north of the cogeneration plant (without secondary containment), or in chemical storage bermed areas. No staining or other evidence of release was observed in the unpaved areas.

According to facility personnel, chemical totes (200 to 300 gallons) for water treatment, coatings, and paper additives, were predominantly removed from the site by the time of site reconnaissance in December 2017. Reservoirs ("chests") used for process water, ASTs, and smaller petroleum-containing reservoirs, gear boxes, and other containers (30 to 55 gallon drums) were observed on site, in preparation for removal by a closure contractor and/or by Safety-Kleen (formerly Evergreen). Used oils and solvents were largely still present on site.

Facility personnel were not aware of any significant spills or releases of materials at drum and container storage areas. Minor spillage outside bermed storage areas was only anticipated to have occurred during loading/unloading by truck, within designated and secondarily-contained transfer areas. While dedicated secondary containment was not provided for all of the drums and containers, Ramboll did not observe evidence of spills or uncontrolled releases from these storage areas, other than minor staining in some interior (i.e., mill pulping room) and paved (i.e., central courtyard) areas.

5.2.2 Underground Storage Tanks

No active USTs are currently located at the site. A total of eleven USTs (eight solvent, one diesel, and two fuel oil tanks) were formerly located at the site and were removed between 1983 and 1990. A twelfth UST formerly utilized for gasoline is currently abandoned-in-place (filled with concrete slurry under regulatory oversight in 1982) at the southeastern corner of the central courtyard. In addition, the site is listed on the Leaking Underground Storage Tank (LUST) database. Pertinent information related to the tanks and their closure activities is provided in Section 4.4.

5.2.3 Aboveground Storage Tanks

Several aboveground storage tanks (ASTs) are maintained at the site for petroleum-based substances, as summarized in Table 10.

In addition to the tanks listed below (which focus on petroleum product vessels), tanks ranging from approximately 4,000 to 20,000 gallons are utilized to store process chemicals for water treatment and paper additives and coating and are described in Section 5.2.1. An approximately 400,000 gallon AST located along the western portion of the site is utilized for storage of supply well water.

Facility personnel reported that there are no current or former underground transfer lines used to convey the materials from the tanks, with the exception of underground piping that extends northerly from the western margin (south of the water AST and north past the forklift maintenance area) up and around the northern portion of the cogeneration plant to the 126,000 gallon fuel oil AST. This piping

was utilized to convey fuel oil from the historical western loading dock to the fuel oil AST. Use of this underground piping was limited, and facility personnel estimated the piping may have only been used when the tank was initially filled.

The Company submitted AST closure permit application documents to the Santa Clara Fire Department in January, 2018 and is planning to remove the ASTs in early 2018.

Table 10: Summary of Existing Aboveground Storage Tanks for Petroleum Substances

Number and Size (gal.)	Contents	Location	Secondary Containment	Notes / Observations
Present				
1 x 1,000	Propane (LPG)	Southern edge of courtyard	N/A due to gaseous nature	Replaced 1996
1 x 126,000	Petroleum fuel	Northern edge of site	136,000 gallon clay bermed area	Installed 1983. Facility personnel reported the AST is no longer in use and is empty, but may contain residual product.
1 x 700	Used Oil	Courtyard northern loading dock	2,060 gallon containment	Installed 2012 as replacement
1 x 750	Diesel	South of forklift maintenance shed	Double walled (1,000 gallon)	Installed 2000
1 x 280	Diesel	South of water AST	Double walled and within water AST bermed area	Installed 1984, replaced 2011
1 x 1,500	Hydraulic oil lubrication oil	Mill Basement (wet end)	No	"Bowser" – installed 1956
1 x 109		Mill Floor (wet end)		"Kobayashi"
1 x 101		Mill Floor (middle)		"Beloit"
1 x 140		Outside southern mill wall		"Extruder"
1 x 150		Mill Basement (dry end)		"Dry-End Bowser" – installed 1956
Former / Absent				
1 x 5,000	Propane	Outside, north of water tank	N/A, due to gaseous nature	Removed in 2010
1 x 550	Diesel	Forklift maintenance shed	Unknown	Removed in 2000

5.2.4 Pools of Liquid, Standing Surface Water, or Sumps

"Blind" sumps are present at all formal containment areas, including: the bermed area surrounding fuel oil AST, two process chemical storage areas at the cogeneration plant, northwestern water treatment chemical tank farm, trash bin cleaning area, coating tank farm, hazardous waste platform in courtyard, forklift maintenance pad, defoamer berm, and chemical loading areas (north of mill and at warehouse loading dock). Generally, captured fluids are either pumped directly, or pumped and transported in totes, to the mill reservoirs for wet-end processing as "white water." Wastewater management is further discussed in Section 5.2.13.

A rectangular shaped 1,600 square foot, approximately 1-foot deep paved depression/containment area is located northwest of the cogeneration plant in the storage yard, and is utilized for the storage of 30-cubic yard trash bins utilized elsewhere on site. One associated blind sump is located in the containment area, and standing water was observed during site reconnaissance. A visual evaluation of the water surface did not indicate oil sheen or debris.

Facility personnel indicated that the basement area was situated at or below the shallow groundwater zone, and that residual moisture coating floor surfaces was likely groundwater intrusion. Groundwater was reportedly encountered during historical digging activities conducted in basement areas. During reconnaissance, Ramboll observed moist and slippery surfaces and cracking of basement floor surfaces.

5.2.5 Polychlorinated Biphenyls (PCBs)

Facility personnel were aware of several pieces of on-site equipment that are known to contain polychlorinated biphenyls (PCBs); however, all were reportedly at low quantities, if any. One pole-mounted transformer is present on the property, along the northwestern parcel boundary, presumably owned by Silicon Valley Power. In addition, 21 pad-mounted transformers[12] are located throughout the site, including nine at the main transformer pad located at the southwest exterior corner of the mill building; and several at: the maintenance dock, near or within the northern cogeneration plant (control room, substation), cooling tower, basketball court, and de-inking platform.

Most of the units observed during reconnaissance were not labeled as to their PCB content or were inaccessible from direct observation (e.g., due to locked surrounding fence); however, facility personnel provided Ramboll with a transformer list indicating transformer age and PCB content, if known. Eleven of the pad-mounted transformers were known to be constructed after 1979, and all of the transformers were labeled on the list as being "Non PCB" units as their transformer fluids were retrofitted and/or determined to be below applicable thresholds (e.g., USEPA "PCB transformer" being one containing greater than 500 part-per-million [ppm] PCBs). The installation dates of several of the units are unknown and may predate the 1979 federal ban on the manufacture of PCBs, thus it is possible that transformer fluids in some transformers at the site may contain detectable quantities of PCBs.

[12] Ramboll notes that a complete inventory of all individual pad-mounted transformer units was not possible during site reconnaissance, and relies here on information provided by facility personnel, including both a Spill Prevention, Controls, and Countermeasures (SPCC) Plan and a tabulated transformer list provided by the facility. The SPCC plan indicates that 17 of the transformer units are "oil-containing," excluding spare transformers and some transformers associated with the cogeneration plant. These oil-containing transformers are within secondary containment.

Transformer maintenance and testing records provided by facility personnel indicate that transformers previously containing PCBs were generally retrofitted with silicone fluid. Seven of the transformers at the site contain trace concentrations of PCBs in their transformer fluid, below USEPA Non-PCB classification levels. Minor seepage at two of the transformers (ET 20 and ET 29) was reported in a 1998 maintenance inspection; specific records related to response or repairs of this issue were not available. Facility personnel indicated that transformer maintenance issues were typically addressed promptly.

In 1991, a spill of transformer fluid from a retrofitted transformer occurred within secondary containment in the main transformer pad area at the west end of the mill, and is described in Section 4.4. Ramboll saw no obvious indication of leaks or releases from electrical equipment in areas that were accessible during the site visit.

Because the mill building was constructed prior to the 1979 federal ban on the manufacture of PCBs, it is possible that hydraulic oils or other types of electrical equipment, such as capacitors, may contain PCBs.

5.2.6 Stains or Corrosion on Interior Floors, Walls, or Ceilings

Ramboll observed minor floor staining or damage/discoloration from long term use throughout the facility, including interior areas (the mill building maintenance room and paper machine corridors), at the compressor shed floors near floor drain, and outside in chemical storage berms, former stock paper storage areas, and the walls near the former steam washing area next to cooling towers at sheeter room. This staining did not appear to be indicative of widespread releases or losses. Concrete floors in the vicinity of the staining appeared to be in fair condition, with no evidence of cracking outside of normal settling.

5.2.7 Stained Soil or Pavement

Ramboll observed evidence of minor pavement staining in the in the loading dock and stock preparation areas along the courtyard perimeter. The staining appeared to be consistent with minor drips or spillage from the hydraulic units on the facility's trash compactor or from operation of facility vehicles. Some light red discoloration was noted in the former fuel unloading basin (concrete-bermed containment area) adjacent to the west of the fuel AST bermed enclosure, currently used for equipment storage. Residual dark staining was noted on asphalt surfaces along the southern fence line of the water AST enclosure. Pavement in the vicinity of the observed staining appeared to be in good condition, with no evidence of major cracking.

5.2.8 Stressed Vegetation

Ramboll observed that the northwestern length of the site perimeter appeared to have little vegetation in unpaved areas. Facility personnel indicated that this area had previously been used to store equipment and is not irrigated, and that vegetation does not grow in these areas largely due to lack of rainfall. No evidence of a chemical release (e.g., staining) was observed in this area at the time of Ramboll's site visit.

5.2.9 Wastewater and Storm Water

Sanitary wastewater, which includes wastewater from bathroom and kitchen areas, is discharged to the municipal sanitary sewer system.

Process wastewater was re-routed to the paper machine following treatment via an internal plumbing network separate from sanitary sewer and storm drains. Used process water was drained and filtered from equipment, then conveyed to sub-grade "chest" reservoirs in the western basement for further treatment and storage. Small amounts of excess process water were periodically routed to the sanitary sewer, under an industrial wastewater permit with periodic discharge sampling requirements (SPCC Plan; facility personnel).

Air compressor condensate is either discharged onto the concrete floor within its enclosure shed or collected in drip pans below each unit. Some staining was noted in the air compressor room. Drains for the storm drain system are located along the eastern and southern perimeter of this shed. Boiler blowdown was collected in associated containment and/or blind sumps and eventually transported or conveyed back to the processing line.

Some of the water that enters floor drains, including the occasional discharges of non-contact cooling water, and floor wash water, is discharged to the sanitary sewer system without treatment. During facility operation, some floor drains in manufacturing and basement areas conveyed water to the paper machine for reuse.

Storm water at the site infiltrates into small landscaped areas or enters one of ten storm drains in paved areas of the site. These storm drains discharge the storm water to the municipal storm sewer system located on De La Cruz Boulevard. According to the facility's SPCC plan, to prevent unintentional discharges all storm drains that are directly connected to the public storm water system have a valve installed in the associated sump, which is closed by default during dry seasons. Prior to or during a storm, the storm drains are opened to allow rainwater to drain and closed after storm events have passed.

5.2.10 Wells

Ramboll observed one water supply well along the southern side of the aboveground water tank, located at the west-central portion of the site. According to facility personnel, this production well was installed during facility construction (circa 1956) and has since been utilized to pump and store deep groundwater for use as process water.

No evidence of staining or material discharge was observed in the vicinity of the well. A diesel AST is located in the vicinity of the groundwater pump, but no indication of a release was observed by Ramboll, and except for chemical totes previously stored outside the AST containment berm immediately to the south, other chemical storage and containment areas are located several hundred feet away from the supply well. Supply well water is typically drawn from a deep aquifer located between 200 and 250 feet bgs, which is separated from shallow groundwater by an aquitard primarily composed of clay.

6. FINDINGS, OPINION, AND CONCLUSIONS

6.1 Findings, Opinions, and Conclusions

6.1.1 Recognized Environmental Conditions

Ramboll has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of the GPI facility located at 2600 De La Cruz Boulevard, Santa Clara. Any exceptions to, or deletions from, this practice are described in Section 6.2 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the site.

6.1.2 Controlled RECs

The following CRECs related to potential contamination concerns were identified:

- **On-Site Groundwater Contamination with VOCs Related to Off-Site Sources.** The site is located within a region where groundwater is impacted with chlorinated VOCs, without a primary identified source. As part of on-site subsurface investigations for UST leaks from the early 1980s to 2000, low concentrations of chlorinated VOCs (relative to regional detections) were detected in groundwater, including 1,1,1-TCA, TCE, and their breakdown products. Based on review of the information available for the adjoining or nearby properties as well as soil vapor and groundwater investigation performed by Ramboll at the site concurrent to this assessment, residual concentrations of these and related constituents of approximately the same order of magnitude have been detected in groundwater at properties to the south and southeast (up gradient) and north/northwest (cross gradient) of the facility. In evaluating the on site chlorinated VOC concentrations, Ramboll has observed the following: a) concentrations of these VOCs are approximately at, below, or of the same order of magnitude as applicable human health screening criteria; b) concentrations have been observed to generally attenuate over time; and c) The UST leak cases on site were granted low threat case closure (see Appendix D) in 2000 by the SCVWD, with concurrence from the SFRWQCB, with known residual VOC concentrations at that time.

  Given the fact that the low concentration chlorinated VOCs detected in site groundwater were reviewed and documented in the 2000 case closure, the absence of an identified on-site source for the chlorinated impacts, and the existence of regional chlorinated VOC groundwater impacts, Ramboll believes this matter is unlikely to be the subject of further regulatory scrutiny.

- **Residual Soil and Groundwater Contamination from UST Releases.** Information reviewed by Ramboll indicates that 12 USTs were formerly located on site, and were removed in the 1980s and 1990s under regulatory oversight, with the exception of a gasoline UST that was abandoned in place under regulatory closure oversight. The USTs were located at the southern edge of the courtyard to the south and west of the mill building, including a 2,000-gallon gasoline tank, a 2,000-gallon diesel fuel tank, and a solvent tank farm with eight tanks ranging in size from 1,000 to 3,000 gallons that were all installed in 1965 (see Figure 2). The solvent tanks contained solutions of isopropyl acetate, ethyl alcohol, mixed hexanes, toluene, reclaimed solvents and waste solvents, and wastewater. The remaining two USTs were 25,000-gallon fuel oil tanks that were installed at the site in approximately 1954 just south of the historical western boilers. Investigations, remediation and monitoring were conducted at the site from the 1980s until 2000, when the SCVWD (with concurrence from the SFRWQCB) issued case regulatory closure for the releases at the mill site, based on the agency's conclusion that the remaining contamination did not represent a significant threat to groundwater due to the stable or decreasing trends and

distribution of petroleum hydrocarbon concentrations in groundwater. The UST Closure Letter is provided in Appendix D. Because the site was granted regulatory case closure for the issue of the UST leaks based on the low-threat closure guidance and in acceptance of residual contamination, Ramboll considers this matter to represent a CREC. Ramboll does not consider the presence of a CREC to represent an ongoing contamination concern to the site with its existing industrial/commercial land use designation.

A limited subsurface investigation was conducted by Ramboll in December 2017, including nine (9) groundwater sampling locations and five (5) soil vapor samples at the site, to evaluate current subsurface conditions at prior UST investigation locations and other areas. The results of the investigation included detections of petroleum hydrocarbons and fuel-related VOCs in groundwater, generally localized to former UST areas and mill areas, at concentrations that are predominantly below those measured at the time of the UST closure in 2000. A groundwater sample collected adjacent to the empty 126,000-gallon fuel oil AST did not identify impacts to groundwater. Soil vapor detections included fuel-related VOCs, chlorinated solvents (PCE and TCE), and several other VOCs, however all of the detections were below the most stringent (i.e., residential land use) screening criteria published by USEPA and California Environmental Protection Agency (Cal/EPA) for evaluation of vapor intrusion risks. Details regarding sample locations and investigation procedures are provided in a report (the "2018 Soil Vapor and Groundwater Report") prepared by Ramboll under separate cover.

6.1.3 Other Findings

Ramboll identified the following other finding. The term "other finding" is not defined by ASTM; rather, Ramboll uses the term to connote areas of contingent risk that do not meet the definition of a REC and are not clearly defined by the ASTM Standard. The following other findings were identified:

- **Past Operations at the Site.** The site has been utilized as a paper mill continuously since the facility's development in the mid 1950s. These former industrial operations have included the use of petroleum products (for fueling and lubrication), solvents (both chlorinated and non-chlorinated), paints, coatings and sealants, caustics, various trade-specific water treatment chemicals, chlorine for water treatment, dyes for paper finishing, and other chemicals. Petroleum products and other chemicals were historically conveyed using aboveground and underground piping. Tank removal records indicate that some underground piping may remain at prior UST locations, and inactive fuel oil pipelines and a bulk fuel AST remain in place. Below-grade containment features are present at the site, including sumps, trenches and an oil-water separator. Historical operations (i.e., those conducted between site development in 1956 and the early 1980s) predated the enactment of robust environmental regulations related to the handling, storage, and disposal of hazardous chemicals. Facility personnel reported that chlorinated solvents were used in small quantities until the 1990s, when the use of such solvents was discontinued. While Ramboll cannot rule out the possibility that spills or releases of chemicals or petroleum products from the mill have impacted the soil and groundwater conditions at the site; sampling conducted to date has not identified new potential sources of contamination (beyond those discussed above) or evidence to suggest that the site has significantly contributed to regional groundwater impacts.

6.1.4 De Minimis Conditions

De minimis conditions are those that do not represent a material risk of harm to public health or the environment and that generally would not be the subject of enforcement action if brought to the

attention of appropriate governmental agencies. Ramboll identified the following *de minimis* conditions related to the site:

- **Pavement and Floor Staining.** Ramboll observed minor to moderate floor staining and wall staining at various locations in the interior of the building, as well as minor to moderate pavement staining on paved surfaces at certain exterior locations (e.g., the steam cleaning area outside the sheeter room, chemical storage areas adjacent to the cogeneration plant). The flooring and pavement were generally intact in most of these locations but showed signs of aging/cracking or residual spilled chemicals in some areas. The staining generally did not appear to be indicative of widespread releases (i.e., significant spills), and facility personnel were not aware of any significant chemical releases in these areas, therefore Ramboll characterizes this finding as a *de minimis* condition.
- **Historical Agricultural Use of the Property.** Based on Ramboll's review of historical information sources, the property may historically have been used for agricultural purposes in at least the late 1930s. Ramboll was not provided with any specific information regarding historical agricultural chemical use, but pesticides or other agricultural chemicals may have been applied on the property. It is possible that residual concentrations of agricultural chemicals may be present . If residual concentrations of these chemicals are present, it is unlikely that they would be the subject of regulatory scrutiny in the context of a non-residential land use scenario. As such, Ramboll characterizes this finding as a *de minimis* condition, assuming consistent future land use at the site.

6.1.5 Non-scope Considerations

Ramboll identified the following findings that relate to non-scope considerations (as discussed in Section 2.2), as detailed below:

- **Asbestos-Containing Materials.** The building was constructed before asbestos was generally phased out of use in most building material applications in the 1980s. The paperboard mill was most recently surveyed in 2017 to inventory the remaining asbestos-containing materials. A report entitled "Limited Pre-Demolition/Renovation Survey & Evaluation," prepared by ProTech Consulting & Engineering ("ProTech") and dated December 5, 2017, details the results of asbestos sampling conducted to determine the presence and composition of asbestos-containing materials. In addition, R & B Equipment, Inc. of Hayward, California is scheduled to remove asbestos-containing thermal pipe insulation during closure activities in 2018.
- **Lead-Based Paint.** Lead was a major ingredient in paint pigment prior to and through the 1940s. While other pigments were used in the 1950s, the use of lead in paint continued until the early 1970s. In 1978, the Consumer Products Safety Commission banned paint and other surfacing coating materials that are "lead-containing paint." ProTech's December, 2017 report also documents the location of lead-based paints found in the paperboard mill as a result of samples collected during their November, 2017 inspection.
- **Radon.** Based on information included in the environmental database report, the site is located in an area categorized as Zone 2, which has average indoor basement radon levels between 2 and 4 picoCuries per liter (pCi/L). The United States Environmental Protection Agency's (USEPA's) continuous exposure limit, which is the limit at which further testing or remedial action is suggested, is 4.0 pCi/L. This USEPA continuous exposure limit applies to residential, not commercial, properties. According to the California Radon database, the radon values for 17 of 18 total sites surveyed in the site zip code (95050) were below 4 pCi/L. A USEPA survey conducted

in the same zip code as the site found that the average radon level of a first floor room at two sites was 5.200 pCi/L.

6.2 Analysis of Data Gaps

The ASTM Standard defines a data gap as "a lack of or inability to obtain information required by the practice despite good faith efforts by the environmental professional to gather such information." A data gap is only significant if other information obtained during the ESA, or professional experience, raises reasonable concerns and affects the ability of the environmental professional to identify whether a given issue is a REC. The ASTM Standard requires that the ESA report identify and comment on significant data gaps.

Limiting conditions and deviations to the ASTM Standard for the assessment are discussed below.

- Due to extended age of the site, it was not possible to interview representatives dating back to the site's first developed industrial use in the mid 1950s, or agricultural use in the 1930s. However, Ramboll conducted interviews with representatives of GPI with tenure at the site dating back to 1980 and reviewed other historical sources regarding former uses of the property.
- Historical information, such as aerial photographs, was not readily available to characterize the site from the present back to the property's obvious first developed use or 1940, whichever is earlier. The earliest readily available historical source that would indicate specific site uses is an aerial photograph dated 1939, which shows that the property may have already been developed for agricultural uses. ASTM defines agricultural site use as a "developed" site use.
- During the site visit, Ramboll did not observe the roof of the buildings due to access and safety constraints.
- During the site visit, Ramboll was unable to observe below-grade features (sumps, oil-water separator systems) that were covered with plates or surfaced with concrete.
- Due to confidentiality considerations associated with the transaction contemplated, Ramboll was requested not to interview state regulatory officials concerning conditions at the site.
- Because this assessment is being prepared on behalf of the seller of this site (and not the User of the report), the information required in the User Questionnaire consistent with Appendix X3 of the ASTM Standard was obtained through the site reconnaissance and interviews. As such, no User Questionnaire was completed.
- As it is a user requirement, Ramboll did not conduct a review of records to identify whether any environmental liens or activity and use limitations (AULs) have been imposed on the site.

None of the exceptions, deletions, deviations, or site reconnaissance limitations noted above are considered to represent significant data gaps.

7. REFERENCES

7.1 Documents

BenTyler Enterprises, Inc. 2016. "GPI Spill Prevention Control and Countermeasure Plan (SPCC)." April 8.

EDR. 2017. "Certified Sanborn® Map Report." September 29.

EDR. 2017. "EDR Historical Topographic Map Report." September 1328

EDR. 2017. "EDR Aerial Photo Decade Package." September 28.

EDR. 2017. "EDR-City Directory Abstract." September 28.

EDR. 2017. "EDR Radius Map™ Report with GeoCheck®" September 28.

EMCON. 1998. "Groundwater monitoring well sampling report." June 23.

ENVIRON International Corporation (ENVIRON). 2010. "Phase I ESA of Graphic Packaging International, LLC Santa Clara Folding Carton Plant." July 10.

ENVIRON. 2010. "Hazardous Materials Closure Report of Graphic Packaging International, Inc." November 23.

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Protech Consulting & Engineering. 2017. "Limited Pre-Demolition/Renovation Survey & Evaluation". December 5.

Ramboll. 2018. "Soil Vapor and Groundwater Investigation Report, Graphic Packaging International, LLC, 2600 De La Cruz Boulevard, Santa Clara, California." February 1.

Ramboll Environ. 2018. "Revised Hazardous Materials Closure Plan." January 10.

Santa Clara Valley Water District. 2000. Fuel Leak Site Case Closure – Container Corporation, 2600 De La Cruz Boulevard, Santa Clara, CA, Case No. 12-083. September 27.

7.2 Interviews

Rick Horne. Graphic Packaging International, LLC 2017. Personal interview. December 21.

Melinda Wong. San Francisco Regional Water Quality Control Board. 2017. Telephone interview. December 22.

Melissa Belloso. County of Santa Clara Consumer and Environmental Protection Agency (County Environmental Health Department). 2017. Electronic interview. December 11.

Tamra Francis. City of Santa Clara Fire Department. 2017. Electronic interview. December 12.

8. ASTM DEFINITIONS

The following definitions are presented in the ASTM Standard:

REC - Recognized Environmental Condition:

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment.

CREC - Controlled Recognized Environmental Condition:

A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.

HREC - Historical Recognized Environmental Condition:

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.

***De minimis* Condition:**

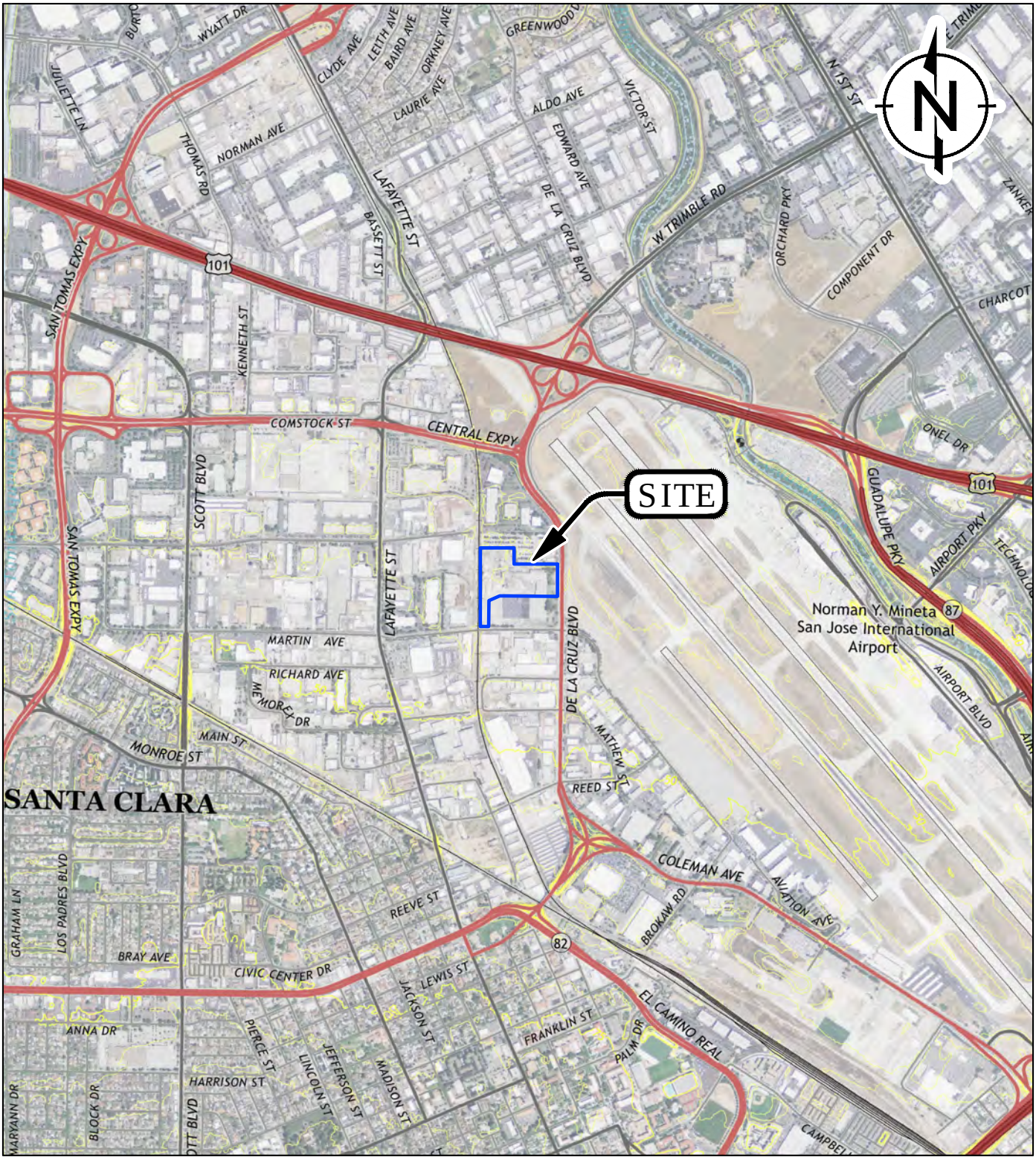
A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

Data Gap / Significant Data Gap:

A lack of or inability to obtain information required by the practice despite good faith efforts by the environmental professional to gather such information. A data gap is significant if other information and/or professional experience raises concerns involving the data gap.

Please note that the term "other finding" is not defined by ASTM; rather, Ramboll uses the term to connote areas of contingent risk that are not clearly defined by the ASTM Standard.

FIGURES



LEGEND:

PROPERTY BOUNDARY (APPROXIMATE)

NOTE:
CONTOUR INTERVAL 5 FEET

SOURCE:
USGS 2015 SAN JOSE WEST AND MILPITAS, CA 7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLES.
SITE LOCATION: N: 37.368309° W: 121.943307° WGS84.

0 1/2 1
SCALE IN MILES

0 2000 4000
SCALE IN FEET

QUADRANGLE LOCATION

RAMBOLL ENVIRON

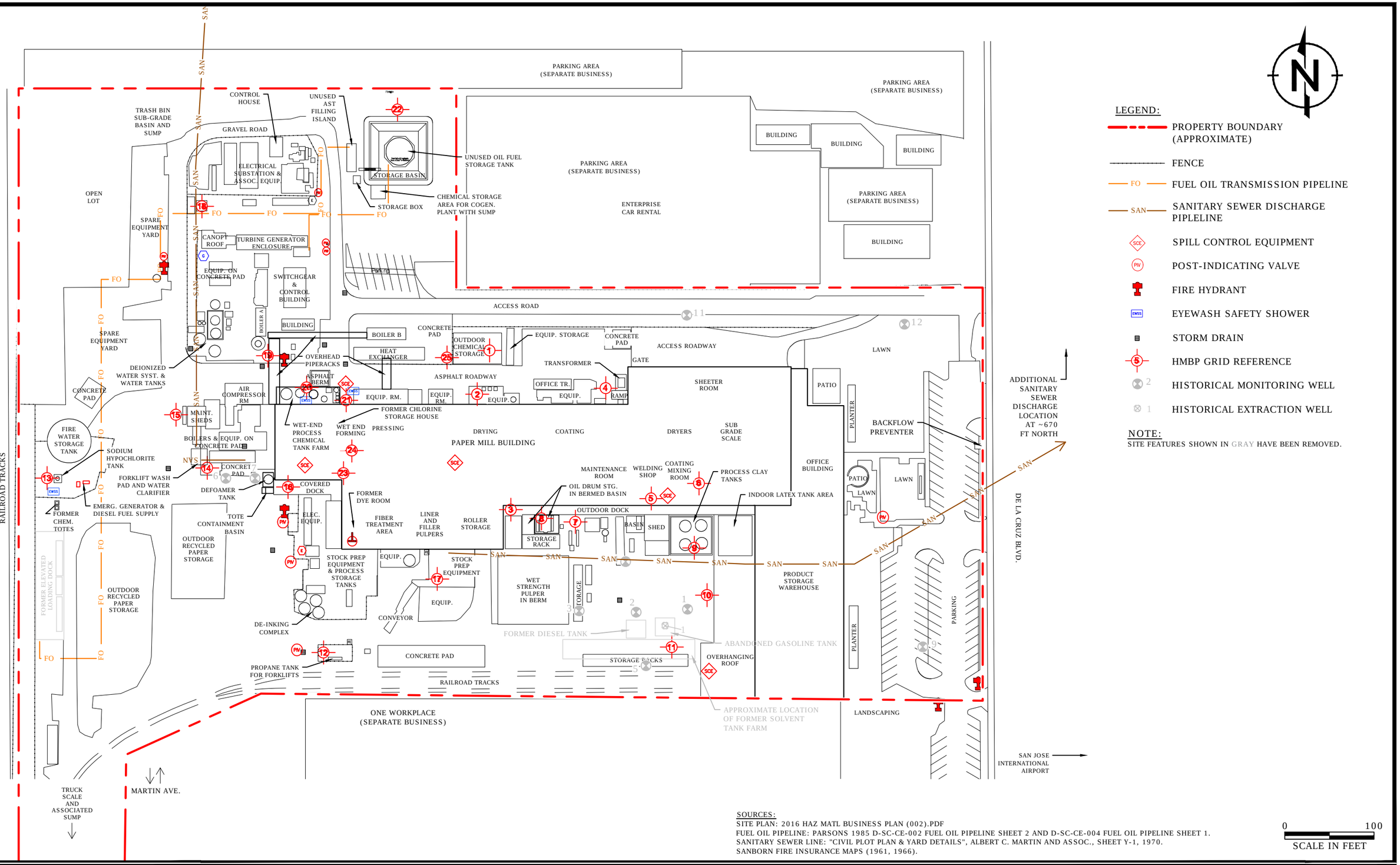
SITE LOCATION MAP

GRAPHIC PACKAGING INTERNATIONAL, LLC (GPI)
2600 DE LA CRUZ BLVD
SANTA CLARA, CALIFORNIA

FIGURE 1

DRAFTED BY: KPM | DATE: 10/06/2017 | PROJECT: 0343676A

KMAUGHAN 10/9/17 F:\0343676_SANTACLARA_CLOSURE RPT < SITE LOCATION_SANTA CLARA_0343676 >



LEGEND:

- PROPERTY BOUNDARY (APPROXIMATE)
- FENCE
- FO — FUEL OIL TRANSMISSION PIPELINE
- SAN — SANITARY SEWER DISCHARGE PIPELINE
- SCE — SPILL CONTROL EQUIPMENT
- PIV — POST-INDICATING VALVE
- FIRE HYDRANT
- EWSS — EYEWASH SAFETY SHOWER
- STORM DRAIN
- 5 — HMBP GRID REFERENCE
- 2 — HISTORICAL MONITORING WELL
- 1 — HISTORICAL EXTRACTION WELL

NOTE:
SITE FEATURES SHOWN IN GRAY HAVE BEEN REMOVED.

SOURCES:
SITE PLAN: 2016 HAZ MATL BUSINESS PLAN (002).PDF
FUEL OIL PIPELINE: PARSONS 1985 D-SC-CE-002 FUEL OIL PIPELINE SHEET 2 AND D-SC-CE-004 FUEL OIL PIPELINE SHEET 1.
SANITARY SEWER LINE: "CIVIL PLOT PLAN & YARD DETAILS", ALBERT C. MARTIN AND ASSOC., SHEET Y-1, 1970.
SANBORN FIRE INSURANCE MAPS (1961, 1966).

0 100
SCALE IN FEET

RAMBOLL

DRAFTED BY: KPM/RS | DATE: 10/13/2017

SITE LAYOUT
GRAPHICS PACKAGING INTERNATIONAL, LLC (GPI) PAPER MILL
2600 DE LA CRUZ BLVD
SANTA CLARA, CALIFORNIA

FIGURE 2

PROJECT:1690001664

RMSO 1/10/18 Q:\DRAWINGS\1690001664 < 1690001664-SITE LAYOUT_SANTA CLARA-2 >

APPENDIX A
SITE PHOTOGRAPHS

Photo 1: The site, facing west towards the eastern entrance/offices from along the eastern paved parking lot along De La Cruz Boulevard.

Photo 2: The site, facing east towards the mill complex (center to left), former off-site folding carton plant (2500 De La Cruz)(right), and western paved storage yard (bottom entirety).

Photo 3: The site, facing north from Martin Avenue towards southwestern shipping/receiving yard. The truck scale (center-left) and scale house (left) are visible, as is 2500 De La Cruz Blvd (right).

Photo 4: The site, facing the northwestern-most corner along rail way. One pole-mounted transformer is visible at top-center. Distressed vegetation is visible along the northwestern surfaces.

Photo 5: The site, facing northwest. The northwestern former stock paper storage yard with unpaved areas (left) and paved areas (right) are visible. An equipment storage yard is visible at center.

Photo 6: The site, facing north towards the equipment storage yard. Minor staining/saturated ground surfaces are present along the interior (right) areas of the yard.

Photo 7: The site, facing north towards the 400,000 gallon well water storage tank within bermed and fenced area. In addition, the former chemical tote storage area is visible along the fence line.

Photo 8: The site, facing northwest towards 300 gallon diesel AST above bermed containment, south of water AST.

Photo 9: The site, facing northwest towards the northwestern sub-grade paved trash washing area with southeastern sump. The northern site property fence line is visible beyond at center.

Photo 10: The site, facing north along the northern property line. Empty container/tote/tank storage is visible on bare ground/gravel covered area.

Photo 11: The site, facing northwest towards the 126,000 gallon former fuel AST within clay-bermed area with 136,000 gallon capacity. Backup chemical storage areas are visible beyond at center-left.

Photo 12: The site, facing north towards the fuel AST bermed area, with interior sump located at its southwestern corner (center).

Photo 13: The site, facing southeast towards a bermed former fueling area, now utilized for backup storage of unused transformer units.

Photo 14: The site, facing south towards the mill building (center), cogeneration plant (right) and backup chemical storage containment at bottom-center. Sumps are located within the sub-grade area.

Photo 15: The site, facing northwest towards the southeast corner of the cogeneration plant.

Photo 16: The site, facing east towards the northwestern corner of the cogeneration plant. Generators with gas compressor and petroleum product (jet fuel/petroleum) secondary containment are visible at center.

Photo 17: The site, facing north towards the northeastern chemical storage area, former location of chemical totes and containers for water treatment and cogeneration plant chemicals.

Photo 18: The site, facing south towards the northeastern cogeneration plant chemical storage area #2 within concrete bermed containment.

Photo 19: The site, facing southwest towards the wet end chemical storage tank farm at mill northwest corner, with 4,000 to 20,000 gallon tanks for bulk storage of water treatment chemicals, within berm containment.

Photo 20: The site, facing southwest towards the wet end tank farm unloading area within bermed pad with bottom sump (water pumped back into mill reservoirs).

Photo 21: The site, facing north towards the cogeneration plant chemical storage area #1 within concrete berm containment.

Photo 22: The site, facing northwest within the cogeneration chemical storage area #1 concrete berm containment.

Photo 23: The site, facing east towards the maintenance oil/lubricant storage shed at northwestern corner of the mill, adjacent to compressor shed. Drum storage is within secondary containment.

Photo 24: The site, facing southeast towards access grate (center-right) for 2,000 gallon oil-water clarifier system adjacent to the north of (and connected via underground piping to) sub-grade forklift maintenance wash pad.

Photo 25: The site, facing northeast towards forklift maintenance shed (left) and compressor storage shed (center), as well as 1,000 gallon double-contained diesel tank for forklifts (right), and forklift maintenance wash pad (bottom).

Photo 26: The site, facing southwest towards the forklift wash pad, with sanitary sewer line center to bottom right.

Photo 27: The site, facing east towards air compressors within the air compressor shed, with drip pans on far underside of units.

Photo 28: The site, facing northeast towards southwest corner of mill building. Abandoned boiler units are visible at left (location of former 25,000 gallon USTs). A loading dock area, previous location of chemical tote storage is visible at center. The main transformer yard is visible at right.

Photo 29: The site, facing east towards the southwestern main transformer yard, where approximately ten pad-mounted transformers are located.

Photo 30: The site, facing northwest along the northwestern corner of the central mill courtyard. The two-story "Top Liner" de-inking and water treatment are visible from west (left) to east (right).

Photo 31: The site, facing north along the northern courtyard edge at southwestern stock paper preparation loading area (center). The "wet strength" pulper system (within sub-grade concrete berm containment) is visible at right.

Photo 32: The site, facing northwest towards northwestern corner of courtyard (along loading dock). A storm drain is visible at center (with butterfly valve). A wash pad for equipment/vehicles is visible along the center.

Photo 33: The site, facing southwest towards the interior courtyard area, with northeastern corner of "wet strength" pulping equipment at center. Hazardous waste/materials storage platform is beyond to the right.

Photo 34: The site, facing northwest towards hazardous materials/waste storage platform, above concrete berm with interior sump. Surrounding trenches drain to the facility process water reservoirs (inside). Dry storage of metal parts/pipes is visible at left.

Photo 35: The site, facing southwest at the hazardous materials/waste storage platform, with used petroleum product (oil/lubricant) and solvent storage above concrete containment.

Photo 36: The site, facing south within the "lubricant shed" adjacent to hazardous materials platform, and also above concrete containment. Flammable materials cabinets and additional wastes were stored here.

Photo 37: The site, facing northeast in the hazardous materials/waste storage area. A lubricant shed is along the left, and the hazardous materials platform is beyond at center-right, with 700 gallon used oil tank visible at center, within bermed area.

Photo 38: The site, facing northwest along the southern edge of mill building loading dock, with additional hazardous materials/waste drums (including universal wastes) on plastic secondary containment.

Photo 39: The site, facing northeast towards the coating bulk (clay) storage tank farm within concrete bermed secondary containment.

Photo 40: The site, facing southeast towards the interior bulk coating (latex) material storage area within secondary containment.

Photo 41: The site, facing northeast towards the interior coating materials fill port within small bermed area. The sanitary sewer sampling point (POTW-1) is located within the canopy covered loading dock area to the right.

Photo 42: The site, facing east towards southeastern corner of central courtyard area. Abandoned former monitoring well locations are visible at center and beyond: the locations of former solvent and diesel USTs. A former gasoline UST is closed in place here.

Photo 43: The site, facing southwest towards the southern extent of the central courtyard. An unloading platform extends along the southern portion of the courtyard, with empty tote storage visible at center-right, and the rail spur beyond to the left.

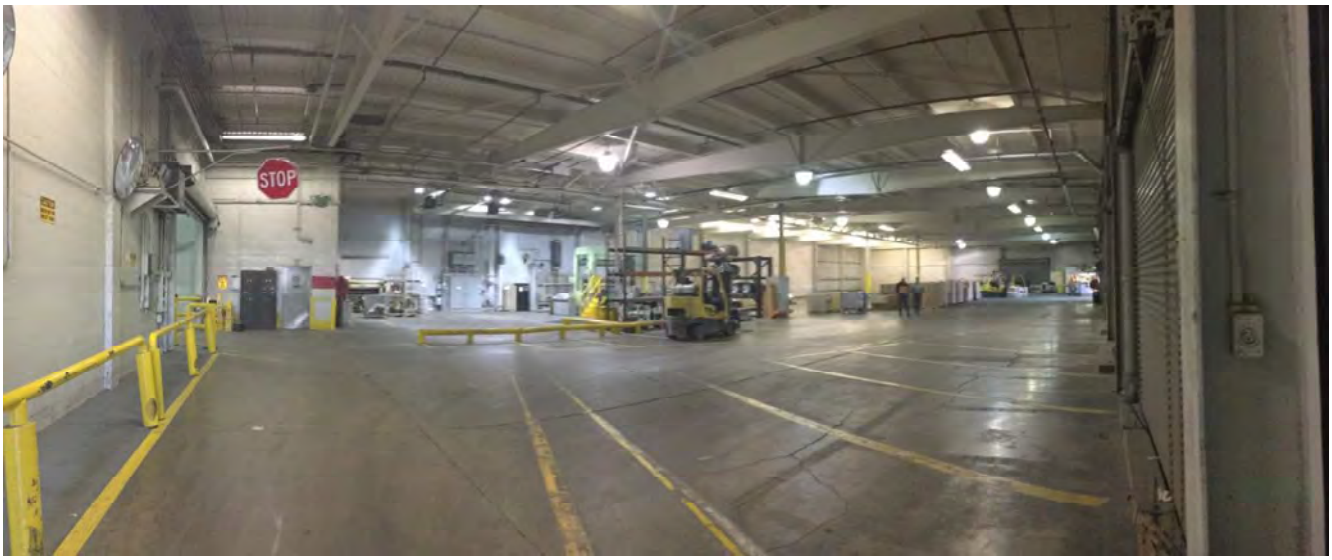


Photo 44: The site, facing southeast within the southeastern storage warehouse area (connecting the subject facility to 2500 De La Cruz) to the south (at right).

Photo 45: The site, facing northwest along the "dry" end of the process line, right sub-grade scale visible at center-right. The former sheeter room is visible beyond at center.

Photo 46: The site, facing northwest along the "dry" end of the process line, with dryer calendar stacks visible at left.

Photo 47: The site, facing northwest along the "dry" end of the process line. Scanning for product quality assurance takes place along the right.

Photo 48: The site, facing north along the western-most extent of the "wet" end of the process line, where process water is utilized to form pulp webs along felt fabric.

Photo 49: The site, facing southwest within the coating mixing room, with several aboveground vat vessels utilized to mix clay, latex, and other pigments and additives as coating/sealant for use at the "dry" end of process line.

Photo 50: The site, facing south within the coating mixing room, with additional aboveground vessels for mixing coating materials.

Photo 51: The site, facing southeast within the southern maintenance room, where machining and parts cleaning takes place.

Photo 52: The site, facing east within the eastern welding room (adjacent to maintenance room). Compressed gases are utilized here.

Photo 53: The site, facing northeast from along the southwestern interior corner of the mill building, within the fiber treatment area, The former dye room is visible along the right extent.

Photo 54: The site, within the basement area beneath the "wet" end. Several condensate tanks are stored within this area.

Photo 55: The site, facing southeast within the below-ground basement area. One of three interior pulper vessels (this is the filler pulper) with sub-grade containment (bottom-center) are located in this region of the basement. Oil reservoirs are located along the sides of each pulper.

Photo 56: The site, facing northwest within the below-ground basement area. Groundwater intrusion is visible in this area.

Photo 57: The site, facing northeast within the below-ground "basement" area. The 1,500 gallon "Bowser" AST for petroleum oil/lubricant storage for the process line is located here.

Photo 58: The site, facing northwest within the below-ground basement area. A 400 gallon aboveground container is located here within secondary containment for sodium hydroxide, conveyed here from the northwestern exterior tank farm.