APPENDIX A

AIR QUALITY ASSESSMENT

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Technical Memorandum

TO: Kim Quinn
POWER Engineers, Inc.

FROM: Terry A. Hayes Associates Inc.

DATE: January 7, 2021

RE: Air Quality Impacts Assessment for the Adelanto Switching Station Expansion Project

INTRODUCTION

Terry A. Hayes Associates Inc. (TAHA) completed an Air Quality Impacts Assessment (AQIA) for the Adelanto Switching Station Expansion Project (proposed Project) in accordance with the provisions of the California Environmental Quality Act (CEQA) Statutes and Guidelines. The Air Quality Impacts Assessment is organized as follows:

- Introduction
- Project Description
- Air Quality Topical Information
- Regulatory Framework
- Existing Setting
- Significance Thresholds
- Methodology
- Impact Assessment
- References

PROJECT DESCRIPTION

The Los Angeles Department of Water and Power (LADWP) proposes the expansion of the Adelanto Switching Station located in the City of Adelanto in San Bernardino County. The expansion would occur within the existing approximately 315-acre fenced Adelanto property, owned by LADWP and the Intermountain Power Agency, a political subdivision of the State of Utah. As part of the proposed Project, a new converter station will be built adjacent to the existing converter station in order to upgrade and replace aging infrastructure. The switching station will also be expanded to accommodate the new converter station and associated equipment. In addition, other components include: transmission line relocation, construction of new towers, site preparation, and demolition of existing structures. The proposed Project is needed to upgrade and replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability. The regional location of the proposed Project is shown in **Figure 1** and the local location is shown in **Figure 2**.

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Source: TAHA, 2021.

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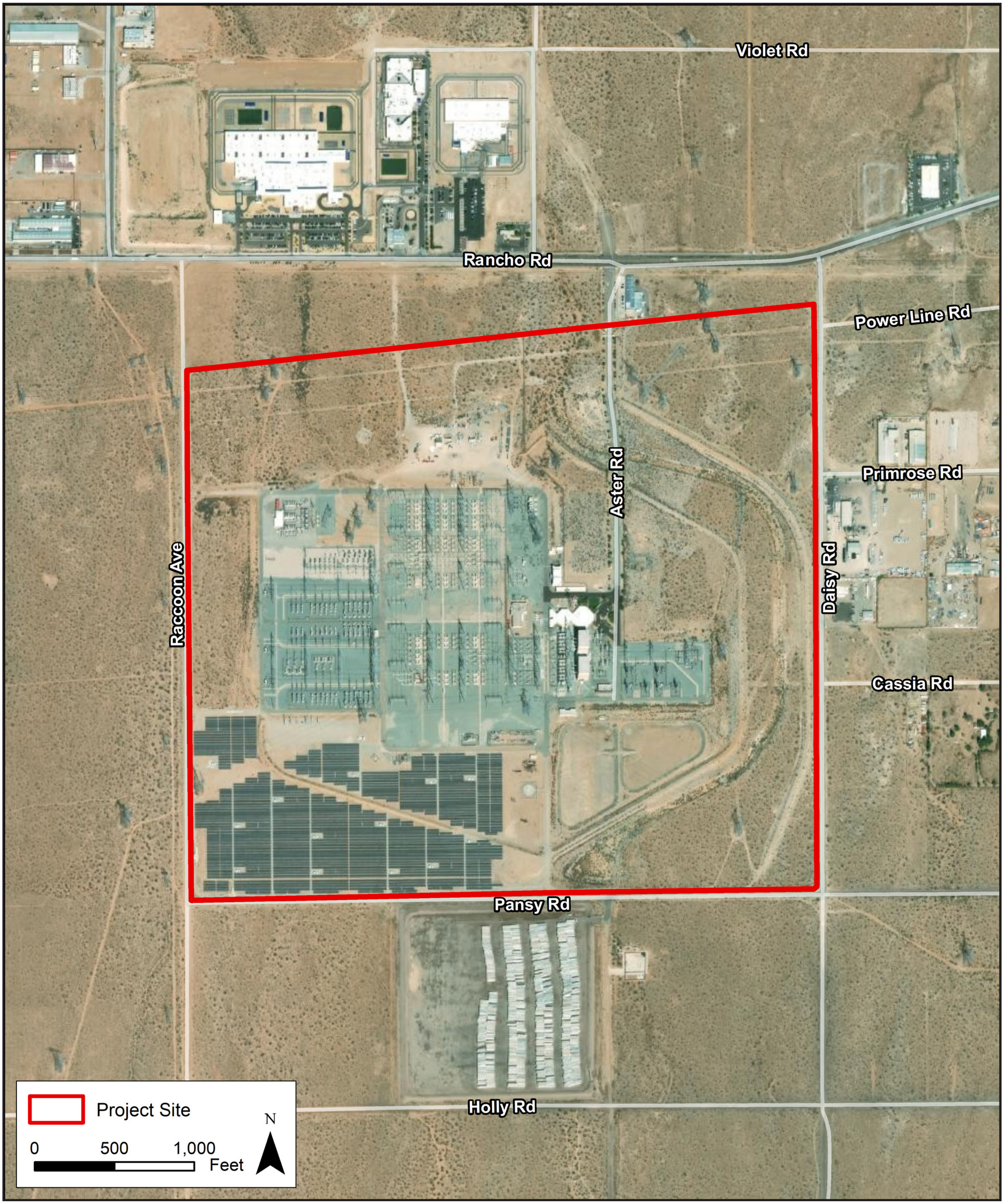
TAHA 2020-032

Adelanto Switching Station Expansion Project
Air Quality Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 1

REGIONAL PROJECT LOCATION



Source: TAHA, 2021.

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Adelanto Switching Station Expansion Project
Air Quality Impacts Assessment

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FIGURE 2
PROJECT SITE

Construction of the proposed Project is anticipated to take approximately seven years to complete. Project construction activities are expected to occur Monday through Saturday, from 7:00 a.m. to 6:00 p.m. It is not anticipated that nighttime, Sunday or holiday work would occur regularly; however, the work schedule may be modified throughout the year based on electrical system conditions and to account for the changing weather conditions (e.g., starting or ending the workday earlier in summer months to avoid work during the hottest part of the day for health and safety reasons).

AIR QUALITY TOPICAL INFORMATION

Air quality is a general characterization of how levels of air pollution and other atmospheric conditions can affect public health and the environment. Through decades of rigorous scientific research, the United States Environmental Protection Agency (USEPA) identified seven specific air pollutants that are environmentally prevalent and produced by human activities to be of concern with respect to health and welfare of the public. These specific pollutants, known as criteria air pollutants, are pollutants for which the federal and State governments have established ambient air quality standards—or criteria—for outdoor concentrations to protect public health. These pollutants are common byproducts of human activities and have been documented through scientific research to cause various adverse health effect outcomes. The federal ambient concentration criteria are known as the National Ambient Air Quality Standards (NAAQS), and the California ambient concentration criteria are referred to as the California Ambient Air Quality Standards (CAAQS). The criteria air pollutants regulated at the federal jurisdiction include ground-level ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), respirable particulate matter ten microns or less in diameter (PM_{10}), fine particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), and lead (Pb). In addition to the federal criteria pollutants, the State regulates visibility-reducing particles, sulfates (-SO_4^{2-}), hydrogen sulfide (H_2S), and vinyl chloride (VC).

In addition to the criteria pollutants, other classes of air pollutants have been identified, studied, and determined to cause adverse health effects. Toxic air contaminants (TACs) are generally defined as those contaminants that are known or suspected to cause serious health problems, but do not have a corresponding ambient air quality standard. Some TACs are also defined as an air pollutant that may increase a person's risk of developing cancer and/or other serious health effects; however, the emission of a toxic chemical does not automatically create a health hazard. Carcinogenic risks resulting from TAC exposure, for example, are typically evaluated over an exposure period of decade. Air toxics include, but are not limited to, diesel PM, metals, gases absorbed by particles, and certain vapors from fuels and other sources. Sources of substantial TAC emissions typically include large stationary industrial facilities such as petroleum refineries and locations of concentrated mobile sources such as distribution centers and heavily trafficked highways that are used by a large number of diesel-fueled vehicles.

REGULATORY FRAMEWORK

Federal

The Clean Air Act (CAA) governs air quality at the national level and the USEPA is responsible for administering the provisions in the CAA. The USEPA promulgates the NAAQS to set protective limits on concentrations of air pollutants in ambient air. Enforcement of the NAAQS is required under the 1977 CAA and subsequent amendments. The CAA grants the USEPA authority to designate areas as attainment, nonattainment, or maintenance (previously nonattainment and pending attainment) for each criteria pollutant based on whether ambient concentrations have been consistently below the corresponding NAAQS on a regional scale. The USEPA requires each state with nonattainment areas to prepare and submit a State

Implementation Plan (SIP) that demonstrates the means to attain the federal standards through emissions control strategies. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution at the state and regional scale, using a combination of performance standards and market-based programs within the timeframe identified in the SIP. The proposed Project is located in the San Bernardino County portion of the Mojave Desert Air Basin (MDAB) SIP area (northwest region of San Bernardino County). **Table 1** presents the NAAQS for each criteria pollutant along with the averaging periods and the attainment statuses of the San Bernardino County portion of the MDAB.

State

Air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). The CCAA is administered by the California Air Resources Board (CARB) at the State level and by the air quality management districts at the regional and local levels. The CCAA requires all areas of the State to achieve and maintain the CAAQS by the earliest feasible date, which is determined in the most recent SIP based on existing emissions and reasonably foreseeable control measures that will be implemented in the future. The CAAQS are also summarized in **Table 1**, which also presents the attainment status designations for MDAB under the State's criteria.

The CARB's statewide comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act created California's program to reduce exposure to air toxics. Under the Toxic Air Contaminant Identification and Control Act, the CARB is required to prioritize the identification and control of air toxics emissions. In selecting substances for review, the CARB must consider criteria relating to the risk of harm to public health, such as amount or potential amount of emissions, manner of and exposure to usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community.

Regional

California Assembly Bill 2522 established the Mojave Desert Air Quality Management District (MDAQMD) in 1992. The MDAQMD is geographically the second largest of the State's 35 air districts, encompassing over 22,000 square miles over the desert portion of San Bernardino County and the far eastern end of Riverside County. The primary responsibility of the MDAQMD is regulating stationary sources of air pollution located within its jurisdictional boundaries. The MDAQMD has adopted a variety of attainment plans for a variety of nonattainment pollutants. The pollutants NO_X and VOC are targeted for attainment by the Federal 8-Hour Ozone Attainment Plan, the 2004 Ozone Attainment Plan, the Triennial Revision to the 1991 Air Quality Attainment Plan, the Post 1996 Attainment Demonstration and Reasonable Further Progress Plan, the Reasonable Further Progress Rate-of-Progress Plan, and the 1991 Air Quality Attainment Plan. The southwest corner of the desert portion of San Bernardino County is designated as a nonattainment area for the 8-hour ozone NAAQS and San Bernardino County is designated as nonattainment for PM_{10}.

TABLE 1: AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS DESIGNATIONS

Pollutant	Averaging Time	California Standards		Federal Standards	
		Standards (CAAQS)	Attainment Status	Standards (NAAQS)	Attainment Status
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Non-attainment	-	Non-attainment*
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)	
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Non-attainment	150 µg/m^3	Non-attainment***
	Annual Arithmetic Mean	20 µg/m^3		-	
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	-	-	35 µg/m^3	Unclassified/ Attainment
	Annual Arithmetic Mean	12 µg/m^3	Non-attainment*	12 µg/m^3	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Unclassified/ Attainment
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppb (57 µg/m^3)	Attainment	0.053 ppm (100 µg/m^3	Unclassified/ Attainment
	1 Hour	0.18 ppm (330 µg/m^3)		100 ppm (196 µg/m^3)	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	-	Attainment	0.030 ppm (80 µg/m^3)	Unclassified/ Attainment
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	
	3 Hour	-		0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		75 pb (196 µg/m^3)	
Lead (Pb)	30 Day Average	1.5 µg/m^3	Attainment	-	Unclassified/ Attainment
	Calendar Quarter	-		1.5 µg/m^3	
	3-Month Average	-		0.15 µg/m^3	
Visibility Reducing Particles	8 Hour	Extinction Coefficient of 0.24 per kilometer****	Unclassified	No Federal Standards	
Sulfates	24 Hour	25 µg/m^3	Attainment		
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	Non-attainment**		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)	Unclassified		

CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter
* Southwest corner of desert portion of San Bernardino County only
**Searles Valley (northwest corner of San Bernardino County) only
***San Bernardino County portion only
****Visibility of 10 miles or more due to particles when relative humidity is less than 70 percent
SOURCE: MDAQMD, *Mojave Desert AQMD Attainment Status*, August 2019.

In addition to the plans listed above, the MDAQMD maintains a set of rules and regulations to improve and maintain air quality in the MDAB. The proposed Project proponent shall comply with all applicable MDAQMD Rules and Regulations pertaining to construction activities, including, but not limited to:

- Rule 402 (Nuisance) states that A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.
- Rule 403 (Fugitive Dust) controls fugitive dust through various requirements including, but not limited to, limiting emissions of particulate matter to not exceed 100 $\mu g/m^3$, limiting the emissions of fugitive dust so that dust does not remains visible in the atmosphere beyond the property line of the emission source, requiring every reasonable precaution to prevent visible particulate matter from being deposited upon public roadways as a direct result of project operations, use of periodic watering for short-term stabilization of Disturbed Surface Area, applying soil binders to uncovered areas, utilizing a wheel washing system before vehicles exit the project site, and limiting vehicle speeds on unpaved roads. Rule 403 also prohibits the release of fugitive dust emissions from any active operation, open storage piles, or disturbed surface area beyond the property line of the emission source and prohibits particulate matter deposits on public roadways.

EXISTING SETTING

The MDAB is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevadas in the north by the Tehachapi Pass (3,800 feet elevation). The Antelope Valley is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 feet). The Mojave Desert is bordered in the southwest by the San Bernardino Mountains, separated from the San Gabriel Mountains by the Cajon Pass (4,200 feet). A lesser channel lies between the San Bernardino Mountains and the Little San Bernardino Mountains (the Morongo Valley).

The Palo Verde Valley portion of the Mojave Desert lies in the low desert, at the eastern end of a series of valleys (notably the Coachella Valley) whose primary channel is the San Gorgonio Pass (2,300 feet) between the San Bernardino and San Jacinto Mountains. During the summer, the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time the reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. The MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert climate, with portions classified as dry-very hot desert, to indicate at least three months of high desert temperatures.

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. The CARB has identified the following groups who are most likely to experience adverse health effects due to exposure to air pollution: children less than 14 years of age, the elderly over 65 years of age, athletes, and people with cardiovascular and chronic respiratory diseases. According to the MDAQMD CEQA Guidelines, land uses that constitute sensitive receptors include residences, schools, daycare centers, playgrounds and medical facilities to be sensitive receptor land uses.

The proposed Project is located in a rural, desert environment outside of central Adelanto. Residences are scattered in the project area, including a single-family residence located approximately 1,100 feet east of the construction laydown area. Adelanto High School is located approximately 4,700 feet south of the project site. Concentrations of dust and other air pollutants dissipate with distance from emissions sources. At a distance of greater than 1,000 feet from the sources of emissions, pollutant concentrations are typically reduced by up to 80 percent relative to concentrations within 100 feet. The distance between the sources of emissions and the closest receptors would prevent the occurrence of substantial pollutant concentrations reaching sensitive uses.

SIGNIFICANCE THRESHOLDS

This AQIA was undertaken to determine whether construction or operation of the proposed Project would have the potential to result in significant environmental impacts related to Air Quality in the context of the Appendix G Environmental Checklist criteria of the CEQA Statute and Guidelines. Implementation of the proposed Project may result in a significant environmental impact related to Air Quality if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan;
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
c) Expose sensitive receptors to substantial pollutant concentrations; and/or
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Under CEQA, MDAQMD is an expert commenting agency on air quality and related matters within its jurisdiction and those impacting its jurisdiction. MDAQMD has dedicated assets to reviewing projects to ensure that they will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. Published by the District in 2016, the *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines* are intended to assist persons preparing environmental analysis or review documents for any project within the jurisdiction of the MDAQMD by providing background information and guidance on the preferred analysis approach.

The MDAQMD has established regional thresholds of significance for emissions sources subject to CEQA (**Table 2**). Implementation of the proposed Project would generate pollutant emissions from sources involved in construction activities over the seven-year construction period. Due to the length of construction activities and the fact that future operations would not substantially change from existing conditions due to introduction of a new permanent source of emissions, the AQIA focuses on annual emissions that would be generated during construction of the proposed Project. As a note, the MDAQMD Guidelines also include daily significance thresholds that are derived by averaging the annual thresholds on a daily basis; however, the daily thresholds were designed to assess multi-phased projects with distinct construction and operational phases occurring within the same year, rather than individual activities within the construction schedule. The AQIA analysis focused only on construction emissions and therefore did not apply the daily thresholds.

TABLE 2: MDAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS ANNUAL EMISSIONS	
Criteria Pollutant	**Annual Threshold (tons)**
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NOx)	25
Volatile Organic Compounds (VOC)	25
Oxides of Sulfur (SOx)	25
Particulate Matter (PM10)	15
Particulate Matter (PM2.5)	12
Hydrogen Sulfide (H2S)	10
Lead (Pb)	0.6
SOURCE: MDAQMD, *Mojave Desert AQMD Attainment Status*, August 2019.	

METHODOLOGY

The AQIA conducted for the proposed Project is consistent with the methods described in the MDAQMD *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines*. The guidelines recommend the use of the California Emissions Estimator Model (CalEEMod, version 2016.3.2) as a tool for quantifying emissions of air pollutants that will be generated by development projects under CEQA. CalEEMod is the preferred regulatory model for estimating air pollutant emissions from construction and operation of land use development projects in California. The model was developed using a compilation of robust land use survey data and CARB off-road and on-road mobile emission source inventories. CalEEMod relies on project-specific information and regional default parameters derived from the survey data and CARB models to characterize air pollutant emissions that would be generated by construction and operation of CEQA projects. As mentioned previously, the AQIA focused on emissions of air pollutants that would be generated over the approximately seven years of construction. CalEEMod produces estimated daily and annual emissions of VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ for construction projects based on the project location, construction schedule, and equipment and vehicle inventories. The AQIA produced and analyzed estimates of annual emissions in accordance with the MDAQMD Guidelines.

Construction of the proposed Project is anticipated to begin in spring of 2021 comprise several general components and stages. Decommissioning of the existing substation facilities is not anticipated to begin until the third quarter of 2027. **Table 3** presents an overview of the approximate start and end dates for each general component of proposed Project construction, as well as a brief description of the activities involved. The number of workers on the project site and the number of equipment and vehicles in use will vary throughout the construction period, as several activities for different components will be occurring simultaneously at various stages throughout construction. During peak construction activities, up to 275 workers would be on-site. During switchyard and converter station construction, the average daily crew size would be approximately 140 workers. During periods where less overlap occurs, average daily crew size would be approximately 40 workers. Construction crews would implement carpooling in shuttle vans to reduce vehicle trips to the project site.

TABLE 3: OVERVIEW OF CONSTRUCTION COMPONENTS			
Project Component	**Approximate Start**	**Approximate End**	**Activities Involved**
Site Prep/Clearing	April 2021	June 2023	Excavation, Grading, Pushing/Loading, Dumping
Transmission Line Relocation	April 2021	March 2022	Remove and relocate existing AC transmission lines
Switchyard Construction	January 2023	November 2024	General Construction: pier drilling, trenching, excavation, foundations Electrical Construction: transmission line and switchyard structures
Converter Station	May 2023	April 2026	Earthwork & utilities, pile driving, conduit & grounding, structures
Decommissioning	July 2027	December 2029	Remove existing substation structures and waste disposal
SOURCE: LADWP, September 2020.			

Site preparation work for the proposed Project includes clearing and grubbing, excavation, placement and compaction of engineered fill to provide stabilized subgrade for switching station and converter station facilities. Excavated materials would be rebalanced on-site such that no long-distance disposal hauling would occur during site preparation. Temporary silt fence and other stormwater pollution prevention Best Management Practices (BMPs) would be implemented, in accordance with the Stormwater Pollution Prevention Plan (SWPPP). The proposed Project site will be graded to maintain current drainage patterns to the greatest extent possible. Following site grading, reinforced concrete foundations would be installed to support the steel structures, electrical equipment, and control facilities. During construction, a variety of equipment and vehicles would be operating on the site at any given time. Vehicles and equipment used in the construction of the proposed Project would include, but may not be limited to, graders and excavators, backhoes, drill rigs, water trucks, bob cat, scrapers, sheep's foot compactors, front end loaders, concrete trucks and pumps, dump trucks, trash trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks may also be required.

The AQIA emissions analysis quantified annual air pollutant emissions that would be generated during each year of construction using the schedule presented in **Table 3** and equipment and vehicle inventories developed by LADWP for each of the components and activities. Sources of air pollutant emissions involved in construction activities would include combustion engine exhaust emissions from off-road construction equipment and on- and off-road vehicle travel and fugitive dust produced by ground disturbance, material loading, and vehicle travel. Vehicle trips during proposed Project construction would be associated with crews commuting to and from the site as well as on-site vehicle travel, which would comprise pickup trucks, dump trucks, buggies, flatbed trucks, and concrete trucks. On-site dumping trips were assumed to be approximately one-half mile in length on average based on the site configuration. The AQIA emissions analysis accounted for on-site light- and heavy-duty truck trips using vehicle fleet information provided by LADWP.

The decommissioning phase of the proposed Project would generate approximately 21,805 cubic yards of waste material that would be disposed of off-site. Preliminary information determined that possible disposal locations could be located up to 40 miles away at the Mid-Valley Landfill located in Rialto. Hauling trips during the decommissioning phase were assumed to be 40 miles in length. Construction activities would disturb approximately 38 acres of the project site. There are five planned laydown/material staging area on-site to facilitate the construction process. Best management practices for fugitive dust control would include water trucks to dampen disturbed areas and displaced materials, gravel on unpaved areas, and limiting vehicle speeds to 15 miles per hour when traveling unpaved surfaces. Native vegetation would be re-established where possible in the laydown and material staging areas, in accordance with fire prevention vegetation control. The detailed CalEEMod output files disclosing estimated air pollutant emissions can be found in the Appendix.

IMPACT ASSESSMENT

a) Would the proposed project conflict with or obstruct implementation of the applicable air quality plan? (Less-Than-Significant Impact)

Construction

The applicable air quality plans for the proposed Project are prepared by MDAQMD as plans for improving air quality in the region. The MDAQMD has adopted several attainment plans for the pollutants that are in nonattainment in the region, such as the 2008 Federal 8-Hour Ozone Attainment Plan, 2004 State and Federal Ozone Attainment Plan, and the 1995 Federal PM_{10} Attainment Plan. Consistency with the air quality plans is determined through evaluation of project-related air quality impacts and demonstration that project-related emissions would not increase the frequency or severity of existing violations or contribute to a new violation of the ambient air quality standards. As explained in the MDAQMD CEQA Guidelines, consistency with the MDAQMD attainment plans is also determined through consistency with the existing land use plan.

The proposed Project would involve construction-related activities, which are short term and temporary in nature. Assumptions surrounding off-road equipment emissions in the air quality plans were developed based on hours of activity and equipment population reported to CARB for rule compliance. The proposed Project is a typical utility infrastructure construction project and would be consistent with the assumptions regarding equipment activity and emissions in the air quality plans. Construction of the proposed Project would not produce a disproportionate magnitude of emissions and would not have the potential to delay attainment of the air quality standards on the schedules set forth by the air quality plans. Upgrades to the existing facility would be consistent with the existing land use and would not interfere with future land uses proposed for the project area. Implementation of the proposed Project would create temporary construction employment opportunities that would not induce substantial population growth to the project area, and therefore would not significantly affect long-term growth projections for the region. As such, construction of the proposed Project would be consistent with the applicable MDAQMD attainment plans.

Operations

After construction is complete, ongoing maintenance and operation activities would be similar to those under existing conditions on the project site. Since the proposed Project would be consistent with the existing land uses and would not increase the construction activity or emissions above assumptions in the applicable air quality attainment plans, operation of the proposed Project would not impede achieving the air quality goals of the region. Operational activities would be subject to compliance with regulations to control air pollutant emissions from electrical substation facilities. Therefore, the proposed Project would not conflict with or obstruct implementation of the applicable air quality plans. This impact would be less than significant, and no mitigation is required.

Mitigation Measures

No significant impacts would occur related to implementation of the air quality plan. Therefore, no mitigation measures are required.

b) ***Would the proposed project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard? (Less-than-Significant Impact)***

Construction

As discussed in the Existing Setting of this AQIA, the project area of the MDAB is currently designated nonattainment of the State and/or federal air quality standards for O_3, PM_{10}, and $PM_{2.5}$. Thus, there is an ongoing cumulatively significant air quality condition in the region. The cumulative analysis of construction and operational emissions focuses on whether a specific project would result in a cumulatively considerable increase in emissions. By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and this regional impact is cumulative rather than attributable to any one source. For projects to be determined to not have a significant cumulative air quality impact, consistency with the applicable air quality plans and mitigation requirements must be shown. The AQIA focused on annual emissions that would be generated during each year of construction between 2021–2029. **Table 4** shows the total construction emissions estimates and the annual MDAQMD significance thresholds for ozone precursors and criteria pollutants.

TABLE 4: ESTIMATED CONSTRUCTION EMISSIONS

	Annual Emissions (Tons)					
Year	**VOC**	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
2021	0.57	8.27	4.21	0.01	2.33	0.53
2022	0.08	0.70	0.61	<0.01	0.09	0.04
2023	0.50	6.69	4.77	0.02	4.07	0.59
2024	0.85	8.99	8.23	0.03	3.23	0.64
2025	1.09	10.54	11.53	0.03	3.22	0.71
2026	0.07	0.86	1.11	<0.01	0.07	0.03
2027	0.21	1.89	2.51	<0.01	0.31	0.12
2028	0.44	3.92	5.50	0.01	0.47	0.21
2029	0.43	3.83	5.09	0.01	0.46	0.21
IMPACT ANALYSIS						
Maximum Annual Emissions	**1.09**	**10.54**	**11.53**	**0.03**	**4.07**	**0.71**
Significance Threshold	25	25	100	25	15	12
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Note: Emissions modeling files can be found in the **Appendix**.
SOURCE: TAHA, 2020.

Construction emissions would not exceed the annual significance thresholds established by the MDAQMD in any year. These thresholds are designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable State and federal ambient air quality standards. Projects that would not exceed the thresholds of significance would not contribute a considerable amount of criteria air pollutant emissions to the region’s emissions profile and would not impede attainment and maintenance of ambient air quality standards. A project with emission rates below these thresholds is considered to have a less than significant impact on regional air quality. As shown in **Table 4**, construction of the proposed Project would not generate emissions of any ozone precursor or criteria pollutant in excess of the applicable threshold and therefore would not result in a cumulatively considerable net increase of any nonattainment pollutant.

Operations

After construction, ongoing maintenance-related activities are not expected to significantly increase above existing conditions with implementation of the proposed Project. Therefore, operation of the proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. This impact would be less than significant, and no mitigation is required.

Mitigation Measures

No significant impacts would occur related to cumulatively considerable increases of nonattainment pollutant emissions. Therefore, no mitigation measures are required.

c) Would the proposed project expose sensitive receptors to substantial pollutant concentrations? (Less-Than-Significant Impact)

The proposed Project is located in a rural environment with few sensitive receptors near construction areas. No sensitive receptors were identified within 1,000 feet of the facility boundary. Research has demonstrated that pollutant concentrations dissipate with distance from emissions sources, and it is unlikely that sensitive receptors would be impacted by pollutant concentrations emanating from construction of the proposed Project. With regards to concentrations of criteria air pollutants, the annual MDAQMD thresholds are designed to prevent the occurrence of emissions of sufficient magnitude that would raise regional and localized pollutant concentrations to unhealthy levels. The rural setting of the proposed Project creates enhanced atmospheric dispersion mechanisms that would lower pollutant concentrations substantially with distance from the construction site.

As mentioned previously in the Regulatory Framework of the AQIA, sources of toxic air contaminant (TAC) emissions are heavily regulated by the CARB. Operation of heavy-duty diesel-powered equipment and trucks that produce diesel particulate matter (diesel PM), a prevalent TAC, would be subject to the provisions of the Airborne Toxics Control Measure (ATCM) for mobile source diesel engines to control emissions during use to the maximum extent feasible. TAC exposures can be characterized for both cancer-causing (carcinogenic) risks and non-carcinogenic hazards. Carcinogenic risks are typically assessed for long-term exposures to pollutant concentrations at locations near substantial sources of emissions. No sensitive receptors were identified within 1,000 feet of the facility boundary, and therefore concentrations of diesel PM and other less prevalent TACs would dissipate before reaching any sensitive populations. There is no potential for construction of the proposed Project to generate substantial concentrations of TACs at sensitive receptor locations that could induce adverse health effects.

After construction, ongoing maintenance-related activities are not expected to significantly increase above existing conditions with implementation of the proposed Project. Therefore, the proposed Project would not expose sensitive receptors to substantial pollutant concentrations. Thus, this impact would be less than significant, and no mitigation is required.

Mitigation Measures

Implementation of the proposed Project would not result in a significant impact related to exposure of sensitive receptors to substantial pollutant concentrations. Therefore, no mitigation measures are required.

d) Would the proposed project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? (Less-than-Significant Impact)

Emissions leading to odors are the only other type of emissions requiring further assessment as fugitive dust has been addressed through the emissions analysis presented above. The occurrence and severity of odor impacts depends on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause any physical harm, they still can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies. As described in more detail above, the proposed Project is located in a rural environment with few sensitive receptors near construction areas.

The proposed Project is not expected to generate any notable sources of odors. Potential construction-related sources of odors include diesel construction. Heavy-duty trucks and off-road equipment would emit diesel exhaust odors. However, because of the number and types of equipment, the temporary nature of these emissions, and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by odors associated with project construction. Operation of the proposed Project would not add any new odor sources. As a result, the proposed Project would not create objectionable odors affecting a substantial number of people. Therefore, impacts associated with odors during construction or operation would be considered less than significant and no mitigation is required.

Mitigation Measures

Implementation of the proposed Project would not result in a significant impact related to odors or other emissions affecting a substantial number of people. Therefore, no mitigation measures are required.

REFERENCES

California Air Pollution Control Officers Association, *California Emissions Estimator Model (CalEEMod v2016.3.2) User's Guide*, November 2017.

California Air Resources Board, *Ambient Air Quality Standards*, May 2016.

Mojave Desert Air Quality Management District, *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines*, August 2016.

United States Environmental Protection Agency, *The Green Book Nonattainment Areas for Criteria Pollutants*, https://www.epa.gov/green-book, October 2019.

Appendix

LADWP Adelanto Switching Station Expansion Project

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	38.00	1,655,280.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2030
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	570	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2018 LADWP CO2 Intensity Factor = 770 lb./MWh @ 32% RPS

2030 LADWP assumes 50% RPS = 570 lb./MWh

Land Use - Project consists of removal/decommissioning of existing facilities and substation expansion.

Total Disturbed Area ~ 38 acres.

Construction Phase - Approximate Project Schedule

Off-road Equipment - Deliver and unload equipment - mostly delivery trucks.
Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Project Inventory (9/29/20)
Off-road Equipment - Project Schedule (09/29/20)

Off-road Equipment - Install Trailers/Deliver Equipment (10-day fleet)

Off-road Equipment - Pier Drilling (25-day fleet)

Off-road Equipment - 60-day fleet: 2x bobcat, 1 x backhoe

Off-road Equipment - General Construction (25-day fleet)

Off-road Equipment - Project Inventory (09/29/29) - 75 day fleet

Off-road Equipment - Project Inventory (09/29/20) - 25/30 day fleet

Off-road Equipment - 140-day fleet : 3x crane, 4x aerial lift

Off-road Equipment - Project Inventory (09/29/20) - 320 day fleet - vehicles

Off-road Equipment - Project Inventory (09/29/20) - vehicles (140-day fleet)

Off-road Equipment - Project Inventory 09/29/20 (40-day fleet) - mostly vehicles

Off-road Equipment - Earthwork & utilities (470-day fleet)

Off-road Equipment - Project Inventory (09/29/20) 700-day fleet: 1 crane, 1 forklift, 2x lifts

Off-road Equipment - Project Inventory (09/29/20) - 315-day fleet
5x crane, 1 x pump, 3 x forklifts, 2x piling, 2x loader, 2x hammer, 1x mini excavator, 1x skid steer, 1 x compactor

Off-road Equipment - Project Inventory 09/29/20
315-day fleet
2x forklift; 3x boom truck, 2 x forklift, 1 x backhoe, 2 x scissor lift, 5x booms, 3x booms, 2x crane

Off-road Equipment - Project Inventory (09/29/20) - 160 day fleet

Off-road Equipment - Project Inventory (09/29/20) - 105 days, self-propelled modulator transporter.

Off-road Equipment - Project Inventory (09/29/20)

Trips and VMT - Project Trips
Worker Trips include commute to site (avg. length 12 miles) and on-site light duty trucks
Haul trips include on-site dump trucks (0.5 mi trip) and waste disposal (40-mile trip)
Vendor trips include equipment and material deliveries

Demolition - Total Debris = 21,805 CY

Grading - All Material Balanced on Site

On-road Fugitive Dust - Accounting for on-site travel.

Energy Use -

Construction Off-road Equipment Mitigation -

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2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.5664	8.2654	4.2088	0.0146	2.5039	0.2019	2.7058	0.5297	0.1874	0.7170	0.0000	1,335.4441	1,335.4441	0.2661	0.0000	1,342.0973
2022	0.0819	0.7018	0.6120	1.8400e-003	0.0596	0.0262	0.0858	0.0159	0.0245	0.0404	0.0000	165.8209	165.8209	0.0273	0.0000	166.5021
2023	0.4998	6.6944	4.7730	0.0204	4.0427	0.1079	4.1505	0.4999	0.0993	0.5993	0.0000	1,890.8963	1,890.8963	0.2797	0.0000	1,897.8890
2024	0.8520	8.9941	8.2322	0.0282	3.1289	0.2325	3.3614	0.4371	0.2146	0.6516	0.0000	2,567.4645	2,567.4645	0.4710	0.0000	2,579.2382
2025	1.0931	10.5408	11.5286	0.0323	3.0031	0.3444	3.3475	0.4033	0.3179	0.7212	0.0000	2,898.5272	2,898.5272	0.6603	0.0000	2,915.0353
2026	0.0729	0.8557	1.1083	2.6600e-003	0.0454	0.0233	0.0687	0.0122	0.0214	0.0336	0.0000	240.3334	240.3334	0.0537	0.0000	241.6764
2027	0.2100	1.8863	2.5075	6.5200e-003	0.2764	0.0681	0.3444	0.0648	0.0631	0.1279	0.0000	581.0530	581.0530	0.1297	0.0000	584.2946
2028	0.4350	3.9165	5.2033	0.0135	0.3961	0.1415	0.5376	0.0909	0.1313	0.2221	0.0000	1,205.6800	1,205.6800	0.2696	0.0000	1,212.4191
2029	0.4248	3.8344	5.0913	0.0133	0.3917	0.1387	0.5304	0.0899	0.1287	0.2186	0.0000	1,179.9742	1,179.9742	0.2643	0.0000	1,186.5804
Maximum	**1.0931**	**10.5408**	**11.5286**	**0.0323**	**4.0427**	**0.3444**	**4.1505**	**0.5297**	**0.3179**	**0.7212**	**0.0000**	**2,898.5272**	**2,898.5272**	**0.6603**	**0.0000**	**2,915.0353**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.5664	8.2653	4.2088	0.0146	2.1260	0.2019	2.3279	0.3428	0.1874	0.5302	0.0000	1,335.4434	1,335.4434	0.2661	0.0000	1,342.0966
2022	0.0819	0.7018	0.6120	1.8400e-003	0.0596	0.0262	0.0858	0.0159	0.0245	0.0404	0.0000	165.8208	165.8208	0.0273	0.0000	166.5020
2023	0.4998	6.6944	4.7729	0.0204	3.9667	0.1079	4.0745	0.4917	0.0993	0.5911	0.0000	1,890.8956	1,890.8956	0.2797	0.0000	1,897.8884
2024	0.8520	8.9941	8.2322	0.0282	3.0019	0.2325	3.2345	0.4234	0.2146	0.6379	0.0000	2,567.4630	2,567.4630	0.4710	0.0000	2,579.2367
2025	1.0931	10.5408	11.5286	0.0323	2.8761	0.3444	3.2205	0.3896	0.3179	0.7075	0.0000	2,898.5248	2,898.5248	0.6603	0.0000	2,915.0330
2026	0.0729	0.8557	1.1083	2.6600e-003	0.0454	0.0233	0.0687	0.0122	0.0214	0.0336	0.0000	240.3332	240.3332	0.0537	0.0000	241.6762
2027	0.2100	1.8863	2.5075	6.5200e-003	0.2426	0.0681	0.3106	0.0597	0.0631	0.1228	0.0000	581.0525	581.0525	0.1297	0.0000	584.2941
2028	0.4350	3.9165	5.2033	0.0135	0.3258	0.1415	0.4673	0.0802	0.1313	0.2115	0.0000	1,205.6791	1,205.6791	0.2696	0.0000	1,212.4182
2029	0.4248	3.8344	5.0913	0.0133	0.3227	0.1387	0.4614	0.0795	0.1287	0.2081	0.0000	1,179.9732	1,179.9732	0.2643	0.0000	1,186.5794
Maximum	**1.0931**	**10.5408**	**11.5286**	**0.0323**	**3.9667**	**0.3444**	**4.0745**	**0.4917**	**0.3179**	**0.7075**	**0.0000**	**2,898.5248**	**2,898.5248**	**0.6603**	**0.0000**	**2,915.0330**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**6.36**	**0.00**	**5.82**	**11.60**	**0.00**	**7.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**4-5-2021**	**7-4-2021**	3.3028	3.3028

2	**7-5-2021**	**10-4-2021**	3.0888	3.0888
3	**10-5-2021**	**1-4-2022**	2.3458	2.3458
4	**1-5-2022**	**4-4-2022**	0.6808	0.6808
5	**4-5-2022**	**7-4-2022**	0.0640	0.0640
8	**1-5-2023**	**4-4-2023**	1.0321	1.0321
9	**4-5-2023**	**7-4-2023**	1.7672	1.7672
10	**7-5-2023**	**10-4-2023**	2.6484	2.6484
11	**10-5-2023**	**1-4-2024**	1.7028	1.7028
12	**1-5-2024**	**4-4-2024**	2.0209	2.0209
13	**4-5-2024**	**7-4-2024**	2.1222	2.1222
14	**7-5-2024**	**10-4-2024**	2.6786	2.6786
15	**10-5-2024**	**1-4-2025**	3.0223	3.0223
16	**1-5-2025**	**4-4-2025**	3.5241	3.5241
17	**4-5-2025**	**7-4-2025**	3.3973	3.3973
18	**7-5-2025**	**10-4-2025**	3.0666	3.0666
19	**10-5-2025**	**1-4-2026**	1.4999	1.4999
20	**1-5-2026**	**4-4-2026**	0.8654	0.8654
26	**7-5-2027**	**10-4-2027**	1.0156	1.0156
27	**10-5-2027**	**1-4-2028**	1.1004	1.1004
28	**1-5-2028**	**4-4-2028**	1.0863	1.0863
29	**4-5-2028**	**7-4-2028**	1.0851	1.0851
30	**7-5-2028**	**10-4-2028**	1.0971	1.0971
31	**10-5-2028**	**1-4-2029**	1.0982	1.0982
32	**1-5-2029**	**4-4-2029**	1.0722	1.0722
33	**4-5-2029**	**7-4-2029**	1.0830	1.0830
34	**7-5-2029**	**9-30-2029**	1.0473	1.0473
		Highest	3.5241	3.5241

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	1a Site Prep - Mobilization	Site Preparation	3/22/2021	4/2/2021	5	10	Move equipment/materials to site.
2	1b Site Prep - Excavate/Grade	Site Preparation	4/5/2021	12/10/2021	5	180	
3	2a Transmission Line Foundation	Grading	4/5/2021	7/16/2021	5	75	
4	2b - Transmission Line Construction	Building Construction	6/7/2021	3/11/2022	5	200	
5	1c Site Prep - Push/Load/Level	Site Preparation	1/3/2022	5/6/2022	5	90	
6	3a General Construction - Mobilization	Building Construction	1/9/2023	1/20/2023	5	10	
7	3b General Construction - Pier Drilling	Building Construction	1/23/2023	2/24/2023	5	25	
8	3c General Construction - Trenching	Trenching	3/6/2023	5/26/2023	5	60	
9	3d General Construction - Misc.	Building Construction	3/6/2023	4/7/2023	5	25	
10	6a Converter Station - Earthwork/Utilities	Grading	5/1/2023	2/14/2025	5	470	
11	6b Converter Station - Offloading/Vehicles	Building Construction	5/1/2023	1/2/2026	5	700	
12	3e General Construction - Concrete	Paving	6/5/2023	9/15/2023	5	75	
13	5a Testing & Commissioning (QA/Inspect)	Trenching	8/28/2023	11/15/2024	5	320	
14	4a Electrical Construction - High (100 ft)	Building Construction	9/25/2023	11/3/2023	5	30	
15	4b Electrical Construction - Ground/Mid	Building Construction	1/8/2024	7/19/2024	5	140	
16	5b Testing & Commissioning (Vehicles)	Trenching	5/6/2024	11/15/2024	5	140	
17	6c Converter Station - Foundations	Site Preparation	8/5/2024	10/17/2025	5	315	Concrete, Pile Driving, Conduit/Grounding
18	5c Testing & Commissioning (Testing)	Trenching	9/23/2024	11/15/2024	5	40	
19	6d Converter Station - Structures	Building Construction	1/20/2025	4/3/2026	5	315	
20	6e Converter Station - Gen. Construciton	Building Construction	1/20/2025	8/29/2025	5	160	
21	6f Transformer Delivery	Building Construction	10/20/2025	3/13/2026	5	105	
22	7 Decommissioning	Demolition	7/12/2027	12/21/2029	5	640	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1a Site Prep - Mobilization	Cranes	1	7.00	231	0.29
1b Site Prep - Excavate/Grade	Excavators	3	8.00	158	0.38
1b Site Prep - Excavate/Grade	Graders	1	8.00	187	0.41
1b Site Prep - Excavate/Grade	Rubber Tired Dozers	1	8.00	247	0.40
1b Site Prep - Excavate/Grade	Skid Steer Loaders	2	8.00	65	0.37
1b Site Prep - Excavate/Grade	Tractors/Loaders/Backhoes	1	8.00	97	0.37
2a Transmission Line Foundation	Bore/Drill Rigs	1	8.00	221	0.50
2a Transmission Line Foundation	Crawler Tractors	1	6.00	212	0.43
2a Transmission Line Foundation	Excavators	1	8.00	158	0.38
2a Transmission Line Foundation	Graders	1	6.00	187	0.41
2a Transmission Line Foundation	Rubber Tired Loaders	1	6.00	203	0.36
2a Transmission Line Foundation	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2b - Transmission Line Construction	Air Compressors	2	8.00	78	0.48
2b - Transmission Line Construction	Cranes	3	6.00	231	0.29
2b - Transmission Line Construction	Rough Terrain Forklifts	1	8.00	100	0.40
1c Site Prep - Push/Load/Level	Rollers	1	8.00	80	0.38
1c Site Prep - Push/Load/Level	Rubber Tired Loaders	1	8.00	203	0.36
3a General Construction - Mobilization	Cranes	1	4.00	231	0.29
3b General Construction - Pier Drilling	Bore/Drill Rigs	2	8.00	221	0.50

3b General Construction - Pier Drilling	Excavators		2	8.00	158	0.38
3c General Construction - Trenching	Skid Steer Loaders		2	8.00	65	0.37
3c General Construction - Trenching	Tractors/Loaders/Backhoes		1	8.00	97	0.37
3d General Construction - Misc.	Cranes		1	8.00	231	0.29
3d General Construction - Misc.	Excavators		2	8.00	158	0.38
3d General Construction - Misc.	Rough Terrain Forklifts		1	4.00	100	0.40
6a Converter Station - Earthwork/Utilities	Excavators		3	8.00	158	0.38
6a Converter Station - Earthwork/Utilities	Graders		1	8.00	187	0.41
6a Converter Station - Earthwork/Utilities	Off-Highway Trucks		1	8.00	402	0.38
6a Converter Station - Earthwork/Utilities	Rollers		1	8.00	80	0.38
6a Converter Station - Earthwork/Utilities	Skid Steer Loaders		3	8.00	65	0.37
6b Converter Station - Offloading/Vehicles	Aerial Lifts		2	8.00	63	0.31
6b Converter Station - Offloading/Vehicles	Cranes		1	8.00	231	0.29
6b Converter Station - Offloading/Vehicles	Rough Terrain Forklifts		1	8.00	100	0.40
3e General Construction - Concrete	Paving Equipment		2	4.00	132	0.36
3e General Construction - Concrete	Rollers		1	8.00	80	0.38
5a Testing & Commissioning (QA/Inspect)	Other Construction Equipment		1	0.00	172	0.42
4a Electrical Construction - High (100 ft)	Aerial Lifts		2	8.00	63	0.31
4a Electrical Construction - High (100 ft)	Cranes		2	8.00	231	0.29
4b Electrical Construction - Ground/Mid	Aerial Lifts		4	8.00	63	0.31
4b Electrical Construction - Ground/Mid	Cranes		3	8.00	231	0.29
5b Testing & Commissioning (Vehicles)	Other Construction Equipment		1	0.00	172	0.42
6c Converter Station - Foundations	Bore/Drill Rigs		2	8.00	221	0.50
6c Converter Station - Foundations	Cranes		5	8.00	231	0.29
6c Converter Station - Foundations	Crawler Tractors		1	8.00	212	0.43

6c Converter Station - Foundations	Excavators	2	8.00	158	0.38
6c Converter Station - Foundations	Pumps	1	8.00	84	0.74
6c Converter Station - Foundations	Rough Terrain Forklifts	3	8.00	100	0.40
6c Converter Station - Foundations	Skid Steer Loaders	1	8.00	65	0.37
6c Converter Station - Foundations	Tractors/Loaders/Backhoes	2	8.00	97	0.37
5c Testing & Commissioning (Testing)	Other Construction Equipment	1	0.00	172	0.42
6d Converter Station - Structures	Aerial Lifts	11	8.00	63	0.31
6d Converter Station - Structures	Cranes	2	8.00	231	0.29
6d Converter Station - Structures	Rough Terrain Forklifts	4	8.00	100	0.40
6d Converter Station - Structures	Tractors/Loaders/Backhoes	1	8.00	97	0.37
6e Converter Station - Gen. Construciton	Cranes	2	8.00	231	0.29
6e Converter Station - Gen. Construciton	Off-Highway Trucks	2	8.00	402	0.38
6e Converter Station - Gen. Construciton	Rubber Tired Dozers	1	8.00	185	0.40
6e Converter Station - Gen. Construciton	Rubber Tired Dozers	1	8.00	310	0.40
6e Converter Station - Gen. Construciton	Tractors/Loaders/Backhoes	1	8.00	62	0.37
6f Transformer Delivery	Other Construction Equipment	1	8.00	172	0.42
7 Decommissioning	Cranes	2	8.00	231	0.29
7 Decommissioning	Excavators	4	8.00	158	0.38
7 Decommissioning	Other Material Handling Equipment	1	8.00	168	0.40
7 Decommissioning	Plate Compactors	10	8.00	8	0.43
7 Decommissioning	Rubber Tired Loaders	2	8.00	203	0.36
7 Decommissioning	Skid Steer Loaders	4	8.00	65	0.37
7 Decommissioning	Tractors/Loaders/Backhoes	3	8.00	97	0.37
6c Converter Station - Foundations	Plate Compactors	1	8.00	8	0.43

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1a Site Prep - Mobilization	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
1b Site Prep - Excavate/Grade	8	60.00	0.00	57,600.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
2a Transmission Line Foundation	7	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
2b - Transmission Line Construction	6	120.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
1c Site Prep - Push/Load/Level	2	60.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
3a General Construction - Mobiliz	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3b General Construction - Pier Dril	4	160.00	40.00	8,000.00	12.00	20.00	0.50	LD_Mix	HHDT	HHDT
3c General Construction - Trenchi	3	160.00	40.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3d General Construction - Misc	4	80.00	0.00	8,000.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
6a Converter Station - Earthwork/Utilities	9	180.00	0.00	75,200.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
6b Converter Station - Offloading/Vehicles	4	180.00	40.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3e General Construction - Concret	3	160.00	40.00	24,000.00	12.00	20.00	0.50	LD_Mix	HHDT	HHDT
5a Testing & Commissioning (QA/In	1	20.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
4a Electrical Construction - High (1	4	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
4b Electrical Construction - Ground	7	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
5b Testing & Commissioning (Vehic	1	60.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6c Converter Station - Foundations	16	80.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
5c Testing & Commissioning (Testi	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6d Converter Station - Structures	18	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6e Converter Station - Gen. Construciton	7	80.00	0.00	0.00	12.00	0.00	20.00	LD_Mix	HHDT	HHDT
6f Transformer Delivery	1	20.00	20.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
7 Decommissioning	26	80.00	0.00	12,800.00	12.00	6.60	40.00	LD_Mix	HHDT	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 1a Site Prep - Mobilization - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0212	8.6700e-003	3.0000e-005		8.6000e-004	8.6000e-004		7.9000e-004	7.9000e-004	0.0000	2.2176	2.2176	7.2000e-004	0.0000	2.2355
Total	**1.8100e-003**	**0.0212**	**8.6700e-003**	**3.0000e-005**	**0.0000**	**8.6000e-004**	**8.6000e-004**	**0.0000**	**7.9000e-004**	**7.9000e-004**	**0.0000**	**2.2176**	**2.2176**	**7.2000e-004**	**0.0000**	**2.2355**

3.2 1a Site Prep - Mobilization - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.1000e-004	0.0234	3.7500e-003	8.0000e-005	1.7200e-003	6.0000e-005	1.7900e-003	4.7000e-004	6.0000e-005	5.3000e-004	0.0000	7.4036	7.4036	4.2000e-004	0.0000	7.4140
Worker	7.9000e-004	5.8000e-004	6.0000e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4928	1.4928	4.0000e-005	0.0000	1.4939
Total	**1.4000e-003**	**0.0239**	**9.7500e-003**	**1.0000e-004**	**3.5100e-003**	**7.0000e-005**	**3.5900e-003**	**9.5000e-004**	**7.0000e-005**	**1.0200e-003**	**0.0000**	**8.8964**	**8.8964**	**4.6000e-004**	**0.0000**	**8.9079**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0212	8.6700e-003	3.0000e-005		8.6000e-004	8.6000e-004		7.9000e-004	7.9000e-004	0.0000	2.2176	2.2176	7.2000e-004	0.0000	2.2355
Total	**1.8100e-003**	**0.0212**	**8.6700e-003**	**3.0000e-005**	**0.0000**	**8.6000e-004**	**8.6000e-004**	**0.0000**	**7.9000e-004**	**7.9000e-004**	**0.0000**	**2.2176**	**2.2176**	**7.2000e-004**	**0.0000**	**2.2355**

3.2 1a Site Prep - Mobilization - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.1000e-004	0.0234	3.7500e-003	8.0000e-005	1.7200e-003	6.0000e-005	1.7900e-003	4.7000e-004	6.0000e-005	5.3000e-004	0.0000	7.4036	7.4036	4.2000e-004	0.0000	7.4140
Worker	7.9000e-004	5.8000e-004	6.0000e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4928	1.4928	4.0000e-005	0.0000	1.4939
Total	**1.4000e-003**	**0.0239**	**9.7500e-003**	**1.0000e-004**	**3.5100e-003**	**7.0000e-005**	**3.5900e-003**	**9.5000e-004**	**7.0000e-005**	**1.0200e-003**	**0.0000**	**8.8964**	**8.8964**	**4.6000e-004**	**0.0000**	**8.9079**

3.3 1b Site Prep - Excavate/Grade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5897	0.0000	0.5897	0.3031	0.0000	0.3031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2273	2.4533	1.8595	3.4100e-003		0.1104	0.1104		0.1016	0.1016	0.0000	299.7173	299.7173	0.0969	0.0000	302.1407
Total	**0.2273**	**2.4533**	**1.8595**	**3.4100e-003**	**0.5897**	**0.1104**	**0.7001**	**0.3031**	**0.1016**	**0.4047**	**0.0000**	**299.7173**	**299.7173**	**0.0969**	**0.0000**	**302.1407**

3.3 1b Site Prep - Excavate/Grade - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0641	3.1743	0.3638	4.7300e-003	1.6864	1.4000e-003	1.6878	0.1704	1.3400e-003	0.1718	0.0000	454.2349	454.2349	0.0794	0.0000	456.2192
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0214	0.0157	0.1619	4.5000e-004	0.0483	3.2000e-004	0.0487	0.0128	3.0000e-004	0.0131	0.0000	40.3055	40.3055	1.1500e-003	0.0000	40.3341
Total	**0.0855**	**3.1900**	**0.5257**	**5.1800e-003**	**1.7347**	**1.7200e-003**	**1.7364**	**0.1833**	**1.6400e-003**	**0.1849**	**0.0000**	**494.5404**	**494.5404**	**0.0805**	**0.0000**	**496.5534**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2300	0.0000	0.2300	0.1182	0.0000	0.1182	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2273	2.4533	1.8595	3.4100e-003		0.1104	0.1104		0.1016	0.1016	0.0000	299.7170	299.7170	0.0969	0.0000	302.1404
Total	**0.2273**	**2.4533**	**1.8595**	**3.4100e-003**	**0.2300**	**0.1104**	**0.3404**	**0.1182**	**0.1016**	**0.2198**	**0.0000**	**299.7170**	**299.7170**	**0.0969**	**0.0000**	**302.1404**

3.3 1b Site Prep - Excavate/Grade - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0641	3.1743	0.3638	4.7300e-003	1.6864	1.4000e-003	1.6878	0.1704	1.3400e-003	0.1718	0.0000	454.2349	454.2349	0.0794	0.0000	456.2192
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0214	0.0157	0.1619	4.5000e-004	0.0483	3.2000e-004	0.0487	0.0128	3.0000e-004	0.0131	0.0000	40.3055	40.3055	1.1500e-003	0.0000	40.3341
Total	**0.0855**	**3.1900**	**0.5257**	**5.1800e-003**	**1.7347**	**1.7200e-003**	**1.7364**	**0.1833**	**1.6400e-003**	**0.1849**	**0.0000**	**494.5404**	**494.5404**	**0.0805**	**0.0000**	**496.5534**

3.4 2a Transmission Line Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0298	0.0000	0.0298	3.2200e-003	0.0000	3.2200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0667	0.7720	0.4908	1.3000e-003		0.0299	0.0299		0.0275	0.0275	0.0000	114.6135	114.6135	0.0371	0.0000	115.5402
Total	**0.0667**	**0.7720**	**0.4908**	**1.3000e-003**	**0.0298**	**0.0299**	**0.0598**	**3.2200e-003**	**0.0275**	**0.0307**	**0.0000**	**114.6135**	**114.6135**	**0.0371**	**0.0000**	**115.5402**

3.4 2a Transmission Line Foundation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5400e-003	0.1752	0.0282	5.8000e-004	0.0129	4.9000e-004	0.0134	3.5500e-003	4.7000e-004	4.0100e-003	0.0000	55.5270	55.5270	3.1200e-003	0.0000	55.6051
Worker	0.0119	8.7100e-003	0.0900	2.5000e-004	0.0269	1.8000e-004	0.0270	7.1300e-003	1.6000e-004	7.3000e-003	0.0000	22.3919	22.3919	6.4000e-004	0.0000	22.4079
Total	**0.0164**	**0.1839**	**0.1181**	**8.3000e-004**	**0.0398**	**6.7000e-004**	**0.0404**	**0.0107**	**6.3000e-004**	**0.0113**	**0.0000**	**77.9189**	**77.9189**	**3.7600e-003**	**0.0000**	**78.0129**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0116	0.0000	0.0116	1.2600e-003	0.0000	1.2600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0667	0.7720	0.4908	1.3000e-003		0.0299	0.0299		0.0275	0.0275	0.0000	114.6133	114.6133	0.0371	0.0000	115.5400
Total	**0.0667**	**0.7720**	**0.4908**	**1.3000e-003**	**0.0116**	**0.0299**	**0.0416**	**1.2600e-003**	**0.0275**	**0.0288**	**0.0000**	**114.6133**	**114.6133**	**0.0371**	**0.0000**	**115.5400**

3.4 2a Transmission Line Foundation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5400e-003	0.1752	0.0282	5.8000e-004	0.0129	4.9000e-004	0.0134	3.5500e-003	4.7000e-004	4.0100e-003	0.0000	55.5270	55.5270	3.1200e-003	0.0000	55.6051
Worker	0.0119	8.7100e-003	0.0900	2.5000e-004	0.0269	1.8000e-004	0.0270	7.1300e-003	1.6000e-004	7.3000e-003	0.0000	22.3919	22.3919	6.4000e-004	0.0000	22.4079
Total	**0.0164**	**0.1839**	**0.1181**	**8.3000e-004**	**0.0398**	**6.7000e-004**	**0.0404**	**0.0107**	**6.3000e-004**	**0.0113**	**0.0000**	**77.9189**	**77.9189**	**3.7600e-003**	**0.0000**	**78.0129**

3.5 2b - Transmission Line Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1227	1.2446	0.8702	1.8300e-003		0.0567	0.0567		0.0537	0.0537	0.0000	159.3102	159.3102	0.0385	0.0000	160.2731
Total	**0.1227**	**1.2446**	**0.8702**	**1.8300e-003**		**0.0567**	**0.0567**		**0.0537**	**0.0537**	**0.0000**	**159.3102**	**159.3102**	**0.0385**	**0.0000**	**160.2731**

3.5 2b - Transmission Line Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0800e-003	0.3503	0.0563	1.1500e-003	0.0258	9.7000e-004	0.0268	7.0900e-003	9.3000e-004	8.0200e-003	0.0000	111.0539	111.0539	6.2500e-003	0.0000	111.2101
Worker	0.0356	0.0261	0.2699	7.4000e-004	0.0806	5.4000e-004	0.0811	0.0214	4.9000e-004	0.0219	0.0000	67.1758	67.1758	1.9100e-003	0.0000	67.2236
Total	**0.0447**	**0.3764**	**0.3262**	**1.8900e-003**	**0.1064**	**1.5100e-003**	**0.1079**	**0.0285**	**1.4200e-003**	**0.0299**	**0.0000**	**178.2298**	**178.2298**	**8.1600e-003**	**0.0000**	**178.4337**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1227	1.2446	0.8702	1.8300e-003		0.0567	0.0567		0.0537	0.0537	0.0000	159.3100	159.3100	0.0385	0.0000	160.2729
Total	**0.1227**	**1.2446**	**0.8702**	**1.8300e-003**		**0.0567**	**0.0567**		**0.0537**	**0.0537**	**0.0000**	**159.3100**	**159.3100**	**0.0385**	**0.0000**	**160.2729**

3.5 2b - Transmission Line Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0800e-003	0.3503	0.0563	1.1500e-003	0.0258	9.7000e-004	0.0268	7.0900e-003	9.3000e-004	8.0200e-003	0.0000	111.0539	111.0539	6.2500e-003	0.0000	111.2101
Worker	0.0356	0.0261	0.2699	7.4000e-004	0.0806	5.4000e-004	0.0811	0.0214	4.9000e-004	0.0219	0.0000	67.1758	67.1758	1.9100e-003	0.0000	67.2236
Total	**0.0447**	**0.3764**	**0.3262**	**1.8900e-003**	**0.1064**	**1.5100e-003**	**0.1079**	**0.0285**	**1.4200e-003**	**0.0299**	**0.0000**	**178.2298**	**178.2298**	**8.1600e-003**	**0.0000**	**178.4337**

3.5 2b - Transmission Line Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0374	0.3663	0.2846	6.1000e-004		0.0165	0.0165		0.0156	0.0156	0.0000	53.1078	53.1078	0.0128	0.0000	53.4272
Total	**0.0374**	**0.3663**	**0.2846**	**6.1000e-004**		**0.0165**	**0.0165**		**0.0156**	**0.0156**	**0.0000**	**53.1078**	**53.1078**	**0.0128**	**0.0000**	**53.4272**

3.5 2b - Transmission Line Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8600e-003	0.1069	0.0182	3.8000e-004	8.6000e-003	2.7000e-004	8.8700e-003	2.3600e-003	2.6000e-004	2.6200e-003	0.0000	36.6023	36.6023	2.0300e-003	0.0000	36.6531
Worker	0.0111	7.8200e-003	0.0825	2.4000e-004	0.0269	1.7000e-004	0.0270	7.1300e-003	1.6000e-004	7.2900e-003	0.0000	21.5854	21.5854	5.7000e-004	0.0000	21.5997
Total	**0.0140**	**0.1147**	**0.1006**	**6.2000e-004**	**0.0355**	**4.4000e-004**	**0.0359**	**9.4900e-003**	**4.2000e-004**	**9.9100e-003**	**0.0000**	**58.1877**	**58.1877**	**2.6000e-003**	**0.0000**	**58.2528**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0374	0.3663	0.2846	6.1000e-004		0.0165	0.0165		0.0156	0.0156	0.0000	53.1077	53.1077	0.0128	0.0000	53.4272
Total	**0.0374**	**0.3663**	**0.2846**	**6.1000e-004**		**0.0165**	**0.0165**		**0.0156**	**0.0156**	**0.0000**	**53.1077**	**53.1077**	**0.0128**	**0.0000**	**53.4272**

3.5 2b - Transmission Line Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8600e-003	0.1069	0.0182	3.8000e-004	8.6000e-003	2.7000e-004	8.8700e-003	2.3600e-003	2.6000e-004	2.6200e-003	0.0000	36.6023	36.6023	2.0300e-003	0.0000	36.6531
Worker	0.0111	7.8200e-003	0.0825	2.4000e-004	0.0269	1.7000e-004	0.0270	7.1300e-003	1.6000e-004	7.2900e-003	0.0000	21.5854	21.5854	5.7000e-004	0.0000	21.5997
Total	**0.0140**	**0.1147**	**0.1006**	**6.2000e-004**	**0.0355**	**4.4000e-004**	**0.0359**	**9.4900e-003**	**4.2000e-004**	**9.9100e-003**	**0.0000**	**58.1877**	**58.1877**	**2.6000e-003**	**0.0000**	**58.2528**

3.6 1c Site Prep - Push/Load/Level - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0206	0.2138	0.1526	4.0000e-004		9.0400e-003	9.0400e-003		8.3200e-003	8.3200e-003	0.0000	35.0986	35.0986	0.0114	0.0000	35.3824
Total	**0.0206**	**0.2138**	**0.1526**	**4.0000e-004**	**0.0000**	**9.0400e-003**	**9.0400e-003**	**0.0000**	**8.3200e-003**	**8.3200e-003**	**0.0000**	**35.0986**	**35.0986**	**0.0114**	**0.0000**	**35.3824**

3.6 1c Site Prep - Push/Load/Level - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9800e-003	7.0400e-003	0.0742	2.1000e-004	0.0242	1.6000e-004	0.0243	6.4200e-003	1.4000e-004	6.5600e-003	0.0000	19.4269	19.4269	5.1000e-004	0.0000	19.4397
Total	**9.9800e-003**	**7.0400e-003**	**0.0742**	**2.1000e-004**	**0.0242**	**1.6000e-004**	**0.0243**	**6.4200e-003**	**1.4000e-004**	**6.5600e-003**	**0.0000**	**19.4269**	**19.4269**	**5.1000e-004**	**0.0000**	**19.4397**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0206	0.2138	0.1526	4.0000e-004		9.0400e-003	9.0400e-003		8.3200e-003	8.3200e-003	0.0000	35.0985	35.0985	0.0114	0.0000	35.3823
Total	**0.0206**	**0.2138**	**0.1526**	**4.0000e-004**	**0.0000**	**9.0400e-003**	**9.0400e-003**	**0.0000**	**8.3200e-003**	**8.3200e-003**	**0.0000**	**35.0985**	**35.0985**	**0.0114**	**0.0000**	**35.3823**

3.6 1c Site Prep - Push/Load/Level - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9800e-003	7.0400e-003	0.0742	2.1000e-004	0.0242	1.6000e-004	0.0243	6.4200e-003	1.4000e-004	6.5600e-003	0.0000	19.4269	19.4269	5.1000e-004	0.0000	19.4397
Total	**9.9800e-003**	**7.0400e-003**	**0.0742**	**2.1000e-004**	**0.0242**	**1.6000e-004**	**0.0243**	**6.4200e-003**	**1.4000e-004**	**6.5600e-003**	**0.0000**	**19.4269**	**19.4269**	**5.1000e-004**	**0.0000**	**19.4397**

3.7 3a General Construction - Mobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.8000e-004	9.5400e-003	4.5900e-003	1.0000e-005		4.0000e-004	4.0000e-004		3.7000e-004	3.7000e-004	0.0000	1.2674	1.2674	4.1000e-004	0.0000	1.2776
Total	**8.8000e-004**	**9.5400e-003**	**4.5900e-003**	**1.0000e-005**		**4.0000e-004**	**4.0000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**1.2674**	**1.2674**	**4.1000e-004**	**0.0000**	**1.2776**

3.7 3a General Construction - Mobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9000e-004	0.0142	3.1500e-003	7.0000e-005	1.7200e-003	2.0000e-005	1.7500e-003	4.7000e-004	2.0000e-005	5.0000e-004	0.0000	7.0719	7.0719	3.4000e-004	0.0000	7.0804
Worker	6.9000e-004	4.7000e-004	5.0400e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3850	1.3850	3.0000e-005	0.0000	1.3859
Total	**1.0800e-003**	**0.0147**	**8.1900e-003**	**9.0000e-005**	**3.5100e-003**	**3.0000e-005**	**3.5500e-003**	**9.5000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**8.4569**	**8.4569**	**3.7000e-004**	**0.0000**	**8.4663**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.8000e-004	9.5400e-003	4.5900e-003	1.0000e-005		4.0000e-004	4.0000e-004		3.7000e-004	3.7000e-004	0.0000	1.2674	1.2674	4.1000e-004	0.0000	1.2776
Total	**8.8000e-004**	**9.5400e-003**	**4.5900e-003**	**1.0000e-005**		**4.0000e-004**	**4.0000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**1.2674**	**1.2674**	**4.1000e-004**	**0.0000**	**1.2776**

3.7 3a General Construction - Mobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9000e-004	0.0142	3.1500e-003	7.0000e-005	1.7200e-003	2.0000e-005	1.7500e-003	4.7000e-004	2.0000e-005	5.0000e-004	0.0000	7.0719	7.0719	3.4000e-004	0.0000	7.0804
Worker	6.9000e-004	4.7000e-004	5.0400e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3850	1.3850	3.0000e-005	0.0000	1.3859
Total	**1.0800e-003**	**0.0147**	**8.1900e-003**	**9.0000e-005**	**3.5100e-003**	**3.0000e-005**	**3.5500e-003**	**9.5000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**8.4569**	**8.4569**	**3.7000e-004**	**0.0000**	**8.4663**

3.8 3b General Construction - Pier Drilling - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0897	0.1323	3.7000e-004		3.5500e-003	3.5500e-003		3.2600e-003	3.2600e-003	0.0000	32.1032	32.1032	0.0104	0.0000	32.3628
Total	**0.0101**	**0.0897**	**0.1323**	**3.7000e-004**		**3.5500e-003**	**3.5500e-003**		**3.2600e-003**	**3.2600e-003**	**0.0000**	**32.1032**	**32.1032**	**0.0104**	**0.0000**	**32.3628**

3.8 3b General Construction - Pier Drilling - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	1.9500e-003	0.0711	0.0157	3.7000e-004	8.6000e-003	1.2000e-004	8.7300e-003	2.3600e-003	1.2000e-004	2.4800e-003	0.0000	35.3596	35.3596	1.7000e-003	0.0000	35.4021
Worker	6.9200e-003	4.6900e-003	0.0504	1.5000e-004	0.0179	1.1000e-004	0.0180	4.7600e-003	1.0000e-004	4.8600e-003	0.0000	13.8501	13.8501	3.4000e-004	0.0000	13.8587
Total	**0.0148**	**0.4271**	**0.1042**	**1.1400e-003**	**0.2607**	**3.1000e-004**	**0.2611**	**0.0308**	**3.0000e-004**	**0.0311**	**0.0000**	**109.1216**	**109.1216**	**0.0102**	**0.0000**	**109.3773**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0897	0.1323	3.7000e-004		3.5500e-003	3.5500e-003		3.2600e-003	3.2600e-003	0.0000	32.1032	32.1032	0.0104	0.0000	32.3627
Total	**0.0101**	**0.0897**	**0.1323**	**3.7000e-004**		**3.5500e-003**	**3.5500e-003**		**3.2600e-003**	**3.2600e-003**	**0.0000**	**32.1032**	**32.1032**	**0.0104**	**0.0000**	**32.3627**

3.8 3b General Construction - Pier Drilling - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	1.9500e-003	0.0711	0.0157	3.7000e-004	8.6000e-003	1.2000e-004	8.7300e-003	2.3600e-003	1.2000e-004	2.4800e-003	0.0000	35.3596	35.3596	1.7000e-003	0.0000	35.4021
Worker	6.9200e-003	4.6900e-003	0.0504	1.5000e-004	0.0179	1.1000e-004	0.0180	4.7600e-003	1.0000e-004	4.8600e-003	0.0000	13.8501	13.8501	3.4000e-004	0.0000	13.8587
Total	**0.0148**	**0.4271**	**0.1042**	**1.1400e-003**	**0.2607**	**3.1000e-004**	**0.2611**	**0.0308**	**3.0000e-004**	**0.0311**	**0.0000**	**109.1216**	**109.1216**	**0.0102**	**0.0000**	**109.3773**

3.9 3c General Construction - Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4500e-003	0.0980	0.1501	2.2000e-004		4.0300e-003	4.0300e-003		3.7100e-003	3.7100e-003	0.0000	19.1203	19.1203	6.1800e-003	0.0000	19.2749
Total	**8.4500e-003**	**0.0980**	**0.1501**	**2.2000e-004**		**4.0300e-003**	**4.0300e-003**		**3.7100e-003**	**3.7100e-003**	**0.0000**	**19.1203**	**19.1203**	**6.1800e-003**	**0.0000**	**19.2749**

3.9 3c General Construction - Trenching - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6900e-003	0.1707	0.0378	8.8000e-004	0.0207	3.0000e-004	0.0210	5.6700e-003	2.8000e-004	5.9600e-003	0.0000	84.8629	84.8629	4.0900e-003	0.0000	84.9651
Worker	0.0166	0.0113	0.1209	3.7000e-004	0.0430	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	33.2403	33.2403	8.2000e-004	0.0000	33.2608
Total	**0.0213**	**0.1820**	**0.1586**	**1.2500e-003**	**0.0636**	**5.7000e-004**	**0.0642**	**0.0171**	**5.3000e-004**	**0.0176**	**0.0000**	**118.1032**	**118.1032**	**4.9100e-003**	**0.0000**	**118.2258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4500e-003	0.0980	0.1501	2.2000e-004		4.0300e-003	4.0300e-003		3.7100e-003	3.7100e-003	0.0000	19.1202	19.1202	6.1800e-003	0.0000	19.2748
Total	**8.4500e-003**	**0.0980**	**0.1501**	**2.2000e-004**		**4.0300e-003**	**4.0300e-003**		**3.7100e-003**	**3.7100e-003**	**0.0000**	**19.1202**	**19.1202**	**6.1800e-003**	**0.0000**	**19.2748**

3.9 3c General Construction - Trenching - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6900e-003	0.1707	0.0378	8.8000e-004	0.0207	3.0000e-004	0.0210	5.6700e-003	2.8000e-004	5.9600e-003	0.0000	84.8629	84.8629	4.0900e-003	0.0000	84.9651
Worker	0.0166	0.0113	0.1209	3.7000e-004	0.0430	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	33.2403	33.2403	8.2000e-004	0.0000	33.2608
Total	**0.0213**	**0.1820**	**0.1586**	**1.2500e-003**	**0.0636**	**5.7000e-004**	**0.0642**	**0.0171**	**5.3000e-004**	**0.0176**	**0.0000**	**118.1032**	**118.1032**	**4.9100e-003**	**0.0000**	**118.2258**

3.10 3d General Construction - Misc. - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.7700e-003	0.0952	0.1187	2.2000e-004		4.1700e-003	4.1700e-003		3.8300e-003	3.8300e-003	0.0000	19.5717	19.5717	6.3300e-003	0.0000	19.7300
Total	**9.7700e-003**	**0.0952**	**0.1187**	**2.2000e-004**		**4.1700e-003**	**4.1700e-003**		**3.8300e-003**	**3.8300e-003**	**0.0000**	**19.5717**	**19.5717**	**6.3300e-003**	**0.0000**	**19.7300**

3.10 3d General Construction - Misc. - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4600e-003	2.3500e-003	0.0252	8.0000e-005	8.9500e-003	6.0000e-005	9.0100e-003	2.3800e-003	5.0000e-005	2.4300e-003	0.0000	6.9251	6.9251	1.7000e-004	0.0000	6.9293
Total	**9.4200e-003**	**0.3536**	**0.0633**	**7.0000e-004**	**0.2432**	**1.4000e-004**	**0.2433**	**0.0261**	**1.3000e-004**	**0.0262**	**0.0000**	**66.8370**	**66.8370**	**8.3600e-003**	**0.0000**	**67.0459**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.7700e-003	0.0952	0.1187	2.2000e-004		4.1700e-003	4.1700e-003		3.8300e-003	3.8300e-003	0.0000	19.5717	19.5717	6.3300e-003	0.0000	19.7300
Total	**9.7700e-003**	**0.0952**	**0.1187**	**2.2000e-004**		**4.1700e-003**	**4.1700e-003**		**3.8300e-003**	**3.8300e-003**	**0.0000**	**19.5717**	**19.5717**	**6.3300e-003**	**0.0000**	**19.7300**

3.10 3d General Construction - Misc. - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4600e-003	2.3500e-003	0.0252	8.0000e-005	8.9500e-003	6.0000e-005	9.0100e-003	2.3800e-003	5.0000e-005	2.4300e-003	0.0000	6.9251	6.9251	1.7000e-004	0.0000	6.9293
Total	**9.4200e-003**	**0.3536**	**0.0633**	**7.0000e-004**	**0.2432**	**1.4000e-004**	**0.2433**	**0.0261**	**1.3000e-004**	**0.0262**	**0.0000**	**66.8370**	**66.8370**	**8.3600e-003**	**0.0000**	**67.0459**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.4937	1.8168	3.8700e-003		0.0598	0.0598		0.0550	0.0550	0.0000	339.4729	339.4729	0.1098	0.0000	342.2178
Total	**0.1577**	**1.4937**	**1.8168**	**3.8700e-003**	**0.1246**	**0.0598**	**0.1844**	**0.0135**	**0.0550**	**0.0685**	**0.0000**	**339.4729**	**339.4729**	**0.1098**	**0.0000**	**342.2178**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0209	1.2295	0.1333	2.1800e-003	2.1986	2.8000e-004	2.1989	0.2214	2.7000e-004	0.2217	0.0000	209.6917	209.6917	0.0287	0.0000	210.4080
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0754**	**1.2664**	**0.5299**	**3.3900e-003**	**2.3396**	**1.1700e-003**	**2.3408**	**0.2588**	**1.0900e-003**	**0.2599**	**0.0000**	**318.7615**	**318.7615**	**0.0313**	**0.0000**	**319.5448**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.4937	1.8167	3.8700e-003		0.0598	0.0598		0.0550	0.0550	0.0000	339.4725	339.4725	0.1098	0.0000	342.2173
Total	**0.1577**	**1.4937**	**1.8167**	**3.8700e-003**	**0.0486**	**0.0598**	**0.1084**	**5.2500e-003**	**0.0550**	**0.0603**	**0.0000**	**339.4725**	**339.4725**	**0.1098**	**0.0000**	**342.2173**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0209	1.2295	0.1333	2.1800e-003	2.1986	2.8000e-004	2.1989	0.2214	2.7000e-004	0.2217	0.0000	209.6917	209.6917	0.0287	0.0000	210.4080
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0754**	**1.2664**	**0.5299**	**3.3900e-003**	**2.3396**	**1.1700e-003**	**2.3408**	**0.2588**	**1.0900e-003**	**0.2599**	**0.0000**	**318.7615**	**318.7615**	**0.0313**	**0.0000**	**319.5448**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2260	2.0562	2.7124	5.7900e-003		0.0815	0.0815		0.0750	0.0750	0.0000	508.3434	508.3434	0.1644	0.0000	512.4536
Total	**0.2260**	**2.0562**	**2.7124**	**5.7900e-003**	**0.1246**	**0.0815**	**0.2061**	**0.0135**	**0.0750**	**0.0884**	**0.0000**	**508.3434**	**508.3434**	**0.1644**	**0.0000**	**512.4536**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0308	1.8310	0.1947	3.2300e-003	2.1995	4.0000e-004	2.1999	0.2217	3.8000e-004	0.2221	0.0000	310.6665	310.6665	0.0429	0.0000	311.7397
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.1075**	**1.8811**	**0.7471**	**4.9800e-003**	**2.4106**	**1.7100e-003**	**2.4123**	**0.2778**	**1.5900e-003**	**0.2794**	**0.0000**	**468.6611**	**468.6611**	**0.0466**	**0.0000**	**469.8258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2260	2.0562	2.7124	5.7900e-003		0.0815	0.0815		0.0750	0.0750	0.0000	508.3428	508.3428	0.1644	0.0000	512.4530
Total	**0.2260**	**2.0562**	**2.7124**	**5.7900e-003**	**0.0486**	**0.0815**	**0.1301**	**5.2500e-003**	**0.0750**	**0.0802**	**0.0000**	**508.3428**	**508.3428**	**0.1644**	**0.0000**	**512.4530**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0308	1.8310	0.1947	3.2300e-003	2.1995	4.0000e-004	2.1999	0.2217	3.8000e-004	0.2221	0.0000	310.6665	310.6665	0.0429	0.0000	311.7397
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.1075**	**1.8811**	**0.7471**	**4.9800e-003**	**2.4106**	**1.7100e-003**	**2.4123**	**0.2778**	**1.5900e-003**	**0.2794**	**0.0000**	**468.6611**	**468.6611**	**0.0466**	**0.0000**	**469.8258**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0265	0.2278	0.3389	7.3000e-004		8.8800e-003	8.8800e-003		8.1700e-003	8.1700e-003	0.0000	64.0117	64.0117	0.0207	0.0000	64.5293
Total	**0.0265**	**0.2278**	**0.3389**	**7.3000e-004**	**0.1246**	**8.8800e-003**	**0.1335**	**0.0135**	**8.1700e-003**	**0.0216**	**0.0000**	**64.0117**	**64.0117**	**0.0207**	**0.0000**	**64.5293**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8100e-003	0.2293	0.0240	4.0000e-004	2.1972	5.0000e-005	2.1972	0.2209	4.0000e-005	0.2209	0.0000	38.7184	38.7184	5.3800e-003	0.0000	38.8530
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1200e-003	5.7300e-003	0.0643	2.1000e-004	0.0266	1.6000e-004	0.0268	7.0600e-003	1.5000e-004	7.2100e-003	0.0000	19.1101	19.1101	4.2000e-004	0.0000	19.1205
Total	**0.0129**	**0.2350**	**0.0883**	**6.1000e-004**	**2.2238**	**2.1000e-004**	**2.2240**	**0.2279**	**1.9000e-004**	**0.2281**	**0.0000**	**57.8284**	**57.8284**	**5.8000e-003**	**0.0000**	**57.9735**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0265	0.2278	0.3389	7.3000e-004		8.8800e-003	8.8800e-003		8.1700e-003	8.1700e-003	0.0000	64.0117	64.0117	0.0207	0.0000	64.5292
Total	**0.0265**	**0.2278**	**0.3389**	**7.3000e-004**	**0.0486**	**8.8800e-003**	**0.0575**	**5.2500e-003**	**8.1700e-003**	**0.0134**	**0.0000**	**64.0117**	**64.0117**	**0.0207**	**0.0000**	**64.5292**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8100e-003	0.2293	0.0240	4.0000e-004	2.1972	5.0000e-005	2.1972	0.2209	4.0000e-005	0.2209	0.0000	38.7184	38.7184	5.3800e-003	0.0000	38.8530
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1200e-003	5.7300e-003	0.0643	2.1000e-004	0.0266	1.6000e-004	0.0268	7.0600e-003	1.5000e-004	7.2100e-003	0.0000	19.1101	19.1101	4.2000e-004	0.0000	19.1205
Total	**0.0129**	**0.2350**	**0.0883**	**6.1000e-004**	**2.2238**	**2.1000e-004**	**2.2240**	**0.2279**	**1.9000e-004**	**0.2281**	**0.0000**	**57.8284**	**57.8284**	**5.8000e-003**	**0.0000**	**57.9735**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0461	0.5496	0.5518	1.1000e-003		0.0195	0.0195		0.0179	0.0179	0.0000	96.6723	96.6723	0.0313	0.0000	97.4539
Total	**0.0461**	**0.5496**	**0.5518**	**1.1000e-003**		**0.0195**	**0.0195**		**0.0179**	**0.0179**	**0.0000**	**96.6723**	**96.6723**	**0.0313**	**0.0000**	**97.4539**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0137	0.4980	0.1101	2.5700e-003	0.0602	8.7000e-004	0.0611	0.0165	8.3000e-004	0.0174	0.0000	247.5168	247.5168	0.0119	0.0000	247.8148
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0682**	**0.5349**	**0.5067**	**3.7800e-003**	**0.2012**	**1.7600e-003**	**0.2030**	**0.0540**	**1.6500e-003**	**0.0556**	**0.0000**	**356.5866**	**356.5866**	**0.0146**	**0.0000**	**356.9516**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0461	0.5496	0.5518	1.1000e-003		0.0195	0.0195		0.0179	0.0179	0.0000	96.6722	96.6722	0.0313	0.0000	97.4538
Total	**0.0461**	**0.5496**	**0.5518**	**1.1000e-003**		**0.0195**	**0.0195**		**0.0179**	**0.0179**	**0.0000**	**96.6722**	**96.6722**	**0.0313**	**0.0000**	**97.4538**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0137	0.4980	0.1101	2.5700e-003	0.0602	8.7000e-004	0.0611	0.0165	8.3000e-004	0.0174	0.0000	247.5168	247.5168	0.0119	0.0000	247.8148
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0682**	**0.5349**	**0.5067**	**3.7800e-003**	**0.2012**	**1.7600e-003**	**0.2030**	**0.0540**	**1.6500e-003**	**0.0556**	**0.0000**	**356.5866**	**356.5866**	**0.0146**	**0.0000**	**356.9516**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0659	0.7738	0.8187	1.6500e-003		0.0269	0.0269		0.0247	0.0247	0.0000	144.7228	144.7228	0.0468	0.0000	145.8930
Total	**0.0659**	**0.7738**	**0.8187**	**1.6500e-003**		**0.0269**	**0.0269**		**0.0247**	**0.0247**	**0.0000**	**144.7228**	**144.7228**	**0.0468**	**0.0000**	**145.8930**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0208	0.7456	0.1673	3.8300e-003	0.0902	1.2900e-003	0.0915	0.0248	1.2400e-003	0.0260	0.0000	369.5931	369.5931	0.0180	0.0000	370.0417
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.0976**	**0.7957**	**0.7197**	**5.5800e-003**	**0.3013**	**2.6000e-003**	**0.3039**	**0.0808**	**2.4500e-003**	**0.0833**	**0.0000**	**527.5876**	**527.5876**	**0.0216**	**0.0000**	**528.1279**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0659	0.7738	0.8187	1.6500e-003		0.0269	0.0269		0.0247	0.0247	0.0000	144.7227	144.7227	0.0468	0.0000	145.8928
Total	**0.0659**	**0.7738**	**0.8187**	**1.6500e-003**		**0.0269**	**0.0269**		**0.0247**	**0.0247**	**0.0000**	**144.7227**	**144.7227**	**0.0468**	**0.0000**	**145.8928**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0208	0.7456	0.1673	3.8300e-003	0.0902	1.2900e-003	0.0915	0.0248	1.2400e-003	0.0260	0.0000	369.5931	369.5931	0.0180	0.0000	370.0417
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.0976**	**0.7957**	**0.7197**	**5.5800e-003**	**0.3013**	**2.6000e-003**	**0.3039**	**0.0808**	**2.4500e-003**	**0.0833**	**0.0000**	**527.5876**	**527.5876**	**0.0216**	**0.0000**	**528.1279**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0624	0.7168	0.8096	1.6400e-003		0.0246	0.0246		0.0226	0.0226	0.0000	144.1705	144.1705	0.0466	0.0000	145.3362
Total	**0.0624**	**0.7168**	**0.8096**	**1.6400e-003**		**0.0246**	**0.0246**		**0.0226**	**0.0226**	**0.0000**	**144.1705**	**144.1705**	**0.0466**	**0.0000**	**145.3362**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0206	0.7323	0.1661	3.7900e-003	0.0898	1.2700e-003	0.0911	0.0247	1.2200e-003	0.0259	0.0000	366.1152	366.1152	0.0179	0.0000	366.5627
Worker	0.0722	0.0453	0.5082	1.6700e-003	0.2103	1.2800e-003	0.2116	0.0559	1.1800e-003	0.0570	0.0000	151.1433	151.1433	3.3000e-003	0.0000	151.2257
Total	**0.0928**	**0.7776**	**0.6743**	**5.4600e-003**	**0.3001**	**2.5500e-003**	**0.3027**	**0.0805**	**2.4000e-003**	**0.0829**	**0.0000**	**517.2585**	**517.2585**	**0.0212**	**0.0000**	**517.7884**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0624	0.7168	0.8096	1.6400e-003		0.0246	0.0246		0.0226	0.0226	0.0000	144.1703	144.1703	0.0466	0.0000	145.3360
Total	**0.0624**	**0.7168**	**0.8096**	**1.6400e-003**		**0.0246**	**0.0246**		**0.0226**	**0.0226**	**0.0000**	**144.1703**	**144.1703**	**0.0466**	**0.0000**	**145.3360**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0206	0.7323	0.1661	3.7900e-003	0.0898	1.2700e-003	0.0911	0.0247	1.2200e-003	0.0259	0.0000	366.1152	366.1152	0.0179	0.0000	366.5627
Worker	0.0722	0.0453	0.5082	1.6700e-003	0.2103	1.2800e-003	0.2116	0.0559	1.1800e-003	0.0570	0.0000	151.1433	151.1433	3.3000e-003	0.0000	151.2257
Total	**0.0928**	**0.7776**	**0.6743**	**5.4600e-003**	**0.3001**	**2.5500e-003**	**0.3027**	**0.0805**	**2.4000e-003**	**0.0829**	**0.0000**	**517.2585**	**517.2585**	**0.0212**	**0.0000**	**517.7884**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.8000e-004	5.4900e-003	6.2000e-003	1.0000e-005		1.9000e-004	1.9000e-004		1.7000e-004	1.7000e-004	0.0000	1.1048	1.1048	3.6000e-004	0.0000	1.1137
Total	**4.8000e-004**	**5.4900e-003**	**6.2000e-003**	**1.0000e-005**		**1.9000e-004**	**1.9000e-004**		**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.1048**	**1.1048**	**3.6000e-004**	**0.0000**	**1.1137**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.5300e-003	1.2700e-003	3.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	2.7908	2.7908	1.4000e-004	0.0000	2.7943
Worker	5.2000e-004	3.2000e-004	3.6200e-003	1.0000e-005	1.6100e-003	1.0000e-005	1.6200e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.1162	1.1162	2.0000e-005	0.0000	1.1168
Total	**6.8000e-004**	**5.8500e-003**	**4.8900e-003**	**4.0000e-005**	**2.3000e-003**	**2.0000e-005**	**2.3200e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**3.9070**	**3.9070**	**1.6000e-004**	**0.0000**	**3.9110**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.8000e-004	5.4900e-003	6.2000e-003	1.0000e-005		1.9000e-004	1.9000e-004		1.7000e-004	1.7000e-004	0.0000	1.1048	1.1048	3.6000e-004	0.0000	1.1137
Total	**4.8000e-004**	**5.4900e-003**	**6.2000e-003**	**1.0000e-005**		**1.9000e-004**	**1.9000e-004**		**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.1048**	**1.1048**	**3.6000e-004**	**0.0000**	**1.1137**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.5300e-003	1.2700e-003	3.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	2.7908	2.7908	1.4000e-004	0.0000	2.7943
Worker	5.2000e-004	3.2000e-004	3.6200e-003	1.0000e-005	1.6100e-003	1.0000e-005	1.6200e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.1162	1.1162	2.0000e-005	0.0000	1.1168
Total	**6.8000e-004**	**5.8500e-003**	**4.8900e-003**	**4.0000e-005**	**2.3000e-003**	**2.0000e-005**	**2.3200e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**3.9070**	**3.9070**	**1.6000e-004**	**0.0000**	**3.9110**

3.13 3e General Construction - Concrete - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0122	0.1205	0.1653	2.5000e-004		6.2500e-003	6.2500e-003		5.7500e-003	5.7500e-003	0.0000	22.0641	22.0641	7.1400e-003	0.0000	22.2425
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.1205**	**0.1653**	**2.5000e-004**		**6.2500e-003**	**6.2500e-003**		**5.7500e-003**	**5.7500e-003**	**0.0000**	**22.0641**	**22.0641**	**7.1400e-003**	**0.0000**	**22.2425**

3.13 3e General Construction - Concrete - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	1.0538	0.1142	1.8700e-003	0.7027	2.4000e-004	0.7029	0.0710	2.3000e-004	0.0712	0.0000	179.7358	179.7358	0.0246	0.0000	180.3497
Vendor	5.8600e-003	0.2134	0.0472	1.1000e-003	0.0258	3.7000e-004	0.0262	7.0900e-003	3.6000e-004	7.4500e-003	0.0000	106.0786	106.0786	5.1100e-003	0.0000	106.2063
Worker	0.0208	0.0141	0.1511	4.6000e-004	0.0537	3.4000e-004	0.0541	0.0143	3.1000e-004	0.0146	0.0000	41.5504	41.5504	1.0200e-003	0.0000	41.5759
Total	**0.0445**	**1.2813**	**0.3125**	**3.4300e-003**	**0.7822**	**9.5000e-004**	**0.7831**	**0.0924**	**9.0000e-004**	**0.0933**	**0.0000**	**327.3648**	**327.3648**	**0.0307**	**0.0000**	**328.1319**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0122	0.1205	0.1653	2.5000e-004		6.2500e-003	6.2500e-003		5.7500e-003	5.7500e-003	0.0000	22.0641	22.0641	7.1400e-003	0.0000	22.2425
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.1205**	**0.1653**	**2.5000e-004**		**6.2500e-003**	**6.2500e-003**		**5.7500e-003**	**5.7500e-003**	**0.0000**	**22.0641**	**22.0641**	**7.1400e-003**	**0.0000**	**22.2425**

3.13 3e General Construction - Concrete - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	1.0538	0.1142	1.8700e-003	0.7027	2.4000e-004	0.7029	0.0710	2.3000e-004	0.0712	0.0000	179.7358	179.7358	0.0246	0.0000	180.3497
Vendor	5.8600e-003	0.2134	0.0472	1.1000e-003	0.0258	3.7000e-004	0.0262	7.0900e-003	3.6000e-004	7.4500e-003	0.0000	106.0786	106.0786	5.1100e-003	0.0000	106.2063
Worker	0.0208	0.0141	0.1511	4.6000e-004	0.0537	3.4000e-004	0.0541	0.0143	3.1000e-004	0.0146	0.0000	41.5504	41.5504	1.0200e-003	0.0000	41.5759
Total	**0.0445**	**1.2813**	**0.3125**	**3.4300e-003**	**0.7822**	**9.5000e-004**	**0.7831**	**0.0924**	**9.0000e-004**	**0.0933**	**0.0000**	**327.3648**	**327.3648**	**0.0307**	**0.0000**	**328.1319**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1100e-003	0.0227	7.0000e-005	8.0600e-003	5.0000e-005	8.1100e-003	2.1400e-003	5.0000e-005	2.1900e-003	0.0000	6.2326	6.2326	1.5000e-004	0.0000	6.2364
Total	**3.1100e-003**	**2.1100e-003**	**0.0227**	**7.0000e-005**	**8.0600e-003**	**5.0000e-005**	**8.1100e-003**	**2.1400e-003**	**5.0000e-005**	**2.1900e-003**	**0.0000**	**6.2326**	**6.2326**	**1.5000e-004**	**0.0000**	**6.2364**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1100e-003	0.0227	7.0000e-005	8.0600e-003	5.0000e-005	8.1100e-003	2.1400e-003	5.0000e-005	2.1900e-003	0.0000	6.2326	6.2326	1.5000e-004	0.0000	6.2364
Total	**3.1100e-003**	**2.1100e-003**	**0.0227**	**7.0000e-005**	**8.0600e-003**	**5.0000e-005**	**8.1100e-003**	**2.1400e-003**	**5.0000e-005**	**2.1900e-003**	**0.0000**	**6.2326**	**6.2326**	**1.5000e-004**	**0.0000**	**6.2364**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4900e-003	4.8900e-003	0.0539	1.7000e-004	0.0206	1.3000e-004	0.0207	5.4700e-003	1.2000e-004	5.5900e-003	0.0000	15.4108	15.4108	3.6000e-004	0.0000	15.4198
Total	**7.4900e-003**	**4.8900e-003**	**0.0539**	**1.7000e-004**	**0.0206**	**1.3000e-004**	**0.0207**	**5.4700e-003**	**1.2000e-004**	**5.5900e-003**	**0.0000**	**15.4108**	**15.4108**	**3.6000e-004**	**0.0000**	**15.4198**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4900e-003	4.8900e-003	0.0539	1.7000e-004	0.0206	1.3000e-004	0.0207	5.4700e-003	1.2000e-004	5.5900e-003	0.0000	15.4108	15.4108	3.6000e-004	0.0000	15.4198
Total	**7.4900e-003**	**4.8900e-003**	**0.0539**	**1.7000e-004**	**0.0206**	**1.3000e-004**	**0.0207**	**5.4700e-003**	**1.2000e-004**	**5.5900e-003**	**0.0000**	**15.4108**	**15.4108**	**3.6000e-004**	**0.0000**	**15.4198**

3.15 4a Electrical Construction - High (100 ft) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.1305	0.0878	2.2000e-004		5.0600e-003	5.0600e-003		4.6500e-003	4.6500e-003	0.0000	19.6344	19.6344	6.3500e-003	0.0000	19.7931
Total	**0.0116**	**0.1305**	**0.0878**	**2.2000e-004**		**5.0600e-003**	**5.0600e-003**		**4.6500e-003**	**4.6500e-003**	**0.0000**	**19.6344**	**19.6344**	**6.3500e-003**	**0.0000**	**19.7931**

3.15 4a Electrical Construction - High (100 ft) - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1700e-003	0.0427	9.4400e-003	2.2000e-004	5.1600e-003	7.0000e-005	5.2400e-003	1.4200e-003	7.0000e-005	1.4900e-003	0.0000	21.2157	21.2157	1.0200e-003	0.0000	21.2413
Worker	4.1500e-003	2.8200e-003	0.0302	9.0000e-005	0.0107	7.0000e-005	0.0108	2.8500e-003	6.0000e-005	2.9200e-003	0.0000	8.3101	8.3101	2.0000e-004	0.0000	8.3152
Total	**5.3200e-003**	**0.0455**	**0.0397**	**3.1000e-004**	**0.0159**	**1.4000e-004**	**0.0161**	**4.2700e-003**	**1.3000e-004**	**4.4100e-003**	**0.0000**	**29.5258**	**29.5258**	**1.2200e-003**	**0.0000**	**29.5565**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.1305	0.0878	2.2000e-004		5.0600e-003	5.0600e-003		4.6500e-003	4.6500e-003	0.0000	19.6343	19.6343	6.3500e-003	0.0000	19.7931
Total	**0.0116**	**0.1305**	**0.0878**	**2.2000e-004**		**5.0600e-003**	**5.0600e-003**		**4.6500e-003**	**4.6500e-003**	**0.0000**	**19.6343**	**19.6343**	**6.3500e-003**	**0.0000**	**19.7931**

3.15 4a Electrical Construction - High (100 ft) - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1700e-003	0.0427	9.4400e-003	2.2000e-004	5.1600e-003	7.0000e-005	5.2400e-003	1.4200e-003	7.0000e-005	1.4900e-003	0.0000	21.2157	21.2157	1.0200e-003	0.0000	21.2413
Worker	4.1500e-003	2.8200e-003	0.0302	9.0000e-005	0.0107	7.0000e-005	0.0108	2.8500e-003	6.0000e-005	2.9200e-003	0.0000	8.3101	8.3101	2.0000e-004	0.0000	8.3152
Total	**5.3200e-003**	**0.0455**	**0.0397**	**3.1000e-004**	**0.0159**	**1.4000e-004**	**0.0161**	**4.2700e-003**	**1.3000e-004**	**4.4100e-003**	**0.0000**	**29.5258**	**29.5258**	**1.2200e-003**	**0.0000**	**29.5565**

3.16 4b Electrical Construction - Ground/Mid - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.8833	0.6787	1.6800e-003		0.0332	0.0332		0.0305	0.0305	0.0000	147.7651	147.7651	0.0478	0.0000	148.9598
Total	**0.0794**	**0.8833**	**0.6787**	**1.6800e-003**		**0.0332**	**0.0332**		**0.0305**	**0.0305**	**0.0000**	**147.7651**	**147.7651**	**0.0478**	**0.0000**	**148.9598**

3.16 4b Electrical Construction - Ground/Mid - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0182	0.0119	0.1312	4.1000e-004	0.0501	3.1000e-004	0.0505	0.0133	2.9000e-004	0.0136	0.0000	37.5220	37.5220	8.7000e-004	0.0000	37.5438
Total	**0.0238**	**0.2111**	**0.1759**	**1.4300e-003**	**0.0742**	**6.6000e-004**	**0.0749**	**0.0199**	**6.2000e-004**	**0.0206**	**0.0000**	**136.2683**	**136.2683**	**5.6600e-003**	**0.0000**	**136.4099**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.8833	0.6787	1.6800e-003		0.0332	0.0332		0.0305	0.0305	0.0000	147.7649	147.7649	0.0478	0.0000	148.9596
Total	**0.0794**	**0.8833**	**0.6787**	**1.6800e-003**		**0.0332**	**0.0332**		**0.0305**	**0.0305**	**0.0000**	**147.7649**	**147.7649**	**0.0478**	**0.0000**	**148.9596**

3.16 4b Electrical Construction - Ground/Mid - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0182	0.0119	0.1312	4.1000e-004	0.0501	3.1000e-004	0.0505	0.0133	2.9000e-004	0.0136	0.0000	37.5220	37.5220	8.7000e-004	0.0000	37.5438
Total	**0.0238**	**0.2111**	**0.1759**	**1.4300e-003**	**0.0742**	**6.6000e-004**	**0.0749**	**0.0199**	**6.2000e-004**	**0.0206**	**0.0000**	**136.2683**	**136.2683**	**5.6600e-003**	**0.0000**	**136.4099**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0137	8.9300e-003	0.0984	3.1000e-004	0.0376	2.3000e-004	0.0378	9.9900e-003	2.2000e-004	0.0102	0.0000	28.1415	28.1415	6.5000e-004	0.0000	28.1578
Total	**0.0192**	**0.2081**	**0.1431**	**1.3300e-003**	**0.0617**	**5.8000e-004**	**0.0623**	**0.0166**	**5.5000e-004**	**0.0172**	**0.0000**	**126.8878**	**126.8878**	**5.4400e-003**	**0.0000**	**127.0240**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0137	8.9300e-003	0.0984	3.1000e-004	0.0376	2.3000e-004	0.0378	9.9900e-003	2.2000e-004	0.0102	0.0000	28.1415	28.1415	6.5000e-004	0.0000	28.1578
Total	**0.0192**	**0.2081**	**0.1431**	**1.3300e-003**	**0.0617**	**5.8000e-004**	**0.0623**	**0.0166**	**5.5000e-004**	**0.0172**	**0.0000**	**126.8878**	**126.8878**	**5.4400e-003**	**0.0000**	**127.0240**

3.18 6c Converter Station - Foundations - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0835	0.0000	0.0835	9.0200e-003	0.0000	9.0200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2069	2.1122	2.0510	4.9100e-003		0.0849	0.0849		0.0786	0.0786	0.0000	429.5666	429.5666	0.1301	0.0000	432.8194
Total	**0.2069**	**2.1122**	**2.0510**	**4.9100e-003**	**0.0835**	**0.0849**	**0.1684**	**9.0200e-003**	**0.0786**	**0.0877**	**0.0000**	**429.5666**	**429.5666**	**0.1301**	**0.0000**	**432.8194**

3.18 6c Converter Station - Foundations - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	9.1000e-003	0.1003	3.2000e-004	0.0383	2.4000e-004	0.0386	0.0102	2.2000e-004	0.0104	0.0000	28.6776	28.6776	6.7000e-004	0.0000	28.6942
Total	**0.0139**	**9.1000e-003**	**0.1003**	**3.2000e-004**	**0.0383**	**2.4000e-004**	**0.0386**	**0.0102**	**2.2000e-004**	**0.0104**	**0.0000**	**28.6776**	**28.6776**	**6.7000e-004**	**0.0000**	**28.6942**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0326	0.0000	0.0326	3.5200e-003	0.0000	3.5200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2069	2.1122	2.0510	4.9100e-003		0.0849	0.0849		0.0786	0.0786	0.0000	429.5661	429.5661	0.1301	0.0000	432.8189
Total	**0.2069**	**2.1122**	**2.0510**	**4.9100e-003**	**0.0326**	**0.0849**	**0.1175**	**3.5200e-003**	**0.0786**	**0.0822**	**0.0000**	**429.5661**	**429.5661**	**0.1301**	**0.0000**	**432.8189**

3.18 6c Converter Station - Foundations - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	9.1000e-003	0.1003	3.2000e-004	0.0383	2.4000e-004	0.0386	0.0102	2.2000e-004	0.0104	0.0000	28.6776	28.6776	6.7000e-004	0.0000	28.6942
Total	**0.0139**	**9.1000e-003**	**0.1003**	**3.2000e-004**	**0.0383**	**2.4000e-004**	**0.0386**	**0.0102**	**2.2000e-004**	**0.0104**	**0.0000**	**28.6776**	**28.6776**	**6.7000e-004**	**0.0000**	**28.6942**

3.18 6c Converter Station - Foundations - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0835	0.0000	0.0835	9.0200e-003	0.0000	9.0200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3777	3.7403	3.9518	9.5400e-003		0.1478	0.1478		0.1369	0.1369	0.0000	835.0510	835.0510	0.2527	0.0000	841.3692
Total	**0.3777**	**3.7403**	**3.9518**	**9.5400e-003**	**0.0835**	**0.1478**	**0.2313**	**9.0200e-003**	**0.1369**	**0.1459**	**0.0000**	**835.0510**	**835.0510**	**0.2527**	**0.0000**	**841.3692**

3.18 6c Converter Station - Foundations - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0256	0.0161	0.1800	5.9000e-004	0.0745	4.5000e-004	0.0749	0.0198	4.2000e-004	0.0202	0.0000	53.5339	53.5339	1.1700e-003	0.0000	53.5631
Total	**0.0256**	**0.0161**	**0.1800**	**5.9000e-004**	**0.0745**	**4.5000e-004**	**0.0749**	**0.0198**	**4.2000e-004**	**0.0202**	**0.0000**	**53.5339**	**53.5339**	**1.1700e-003**	**0.0000**	**53.5631**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0326	0.0000	0.0326	3.5200e-003	0.0000	3.5200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3777	3.7403	3.9518	9.5400e-003		0.1478	0.1478		0.1369	0.1369	0.0000	835.0501	835.0501	0.2527	0.0000	841.3682
Total	**0.3777**	**3.7403**	**3.9518**	**9.5400e-003**	**0.0326**	**0.1478**	**0.1804**	**3.5200e-003**	**0.1369**	**0.1404**	**0.0000**	**835.0501**	**835.0501**	**0.2527**	**0.0000**	**841.3682**

3.18 6c Converter Station - Foundations - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0256	0.0161	0.1800	5.9000e-004	0.0745	4.5000e-004	0.0749	0.0198	4.2000e-004	0.0202	0.0000	53.5339	53.5339	1.1700e-003	0.0000	53.5631
Total	**0.0256**	**0.0161**	**0.1800**	**5.9000e-004**	**0.0745**	**4.5000e-004**	**0.0749**	**0.0198**	**4.2000e-004**	**0.0202**	**0.0000**	**53.5339**	**53.5339**	**1.1700e-003**	**0.0000**	**53.5631**

3.19 5c Testing & Commissioning (Testing) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.19 5c Testing & Commissioning (Testing) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0569	0.0128	2.9000e-004	6.8800e-003	1.0000e-004	6.9800e-003	1.8900e-003	9.0000e-005	1.9800e-003	0.0000	28.2132	28.2132	1.3700e-003	0.0000	28.2475
Worker	2.6000e-003	1.7000e-003	0.0187	6.0000e-005	7.1600e-003	4.0000e-005	7.2100e-003	1.9000e-003	4.0000e-005	1.9400e-003	0.0000	5.3603	5.3603	1.2000e-004	0.0000	5.3634
Total	**4.1900e-003**	**0.0586**	**0.0315**	**3.5000e-004**	**0.0140**	**1.4000e-004**	**0.0142**	**3.7900e-003**	**1.3000e-004**	**3.9200e-003**	**0.0000**	**33.5735**	**33.5735**	**1.4900e-003**	**0.0000**	**33.6109**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.19 5c Testing & Commissioning (Testing) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0569	0.0128	2.9000e-004	6.8800e-003	1.0000e-004	6.9800e-003	1.8900e-003	9.0000e-005	1.9800e-003	0.0000	28.2132	28.2132	1.3700e-003	0.0000	28.2475
Worker	2.6000e-003	1.7000e-003	0.0187	6.0000e-005	7.1600e-003	4.0000e-005	7.2100e-003	1.9000e-003	4.0000e-005	1.9400e-003	0.0000	5.3603	5.3603	1.2000e-004	0.0000	5.3634
Total	**4.1900e-003**	**0.0586**	**0.0315**	**3.5000e-004**	**0.0140**	**1.4000e-004**	**0.0142**	**3.7900e-003**	**1.3000e-004**	**3.9200e-003**	**0.0000**	**33.5735**	**33.5735**	**1.4900e-003**	**0.0000**	**33.6109**

3.20 6d Converter Station - Structures - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1885	2.2980	3.3289	5.8200e-003		0.0701	0.0701		0.0645	0.0645	0.0000	511.0908	511.0908	0.1653	0.0000	515.2233
Total	**0.1885**	**2.2980**	**3.3289**	**5.8200e-003**		**0.0701**	**0.0701**		**0.0645**	**0.0645**	**0.0000**	**511.0908**	**511.0908**	**0.1653**	**0.0000**	**515.2233**

3.20 6d Converter Station - Structures - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.7900e-003	0.3479	0.0789	1.8000e-003	0.0427	6.0000e-004	0.0433	0.0117	5.8000e-004	0.0123	0.0000	173.9398	173.9398	8.5000e-003	0.0000	174.1524
Worker	0.0305	0.0192	0.2146	7.1000e-004	0.0888	5.4000e-004	0.0894	0.0236	5.0000e-004	0.0241	0.0000	63.8289	63.8289	1.3900e-003	0.0000	63.8637
Total	**0.0403**	**0.3671**	**0.2935**	**2.5100e-003**	**0.1315**	**1.1400e-003**	**0.1326**	**0.0353**	**1.0800e-003**	**0.0364**	**0.0000**	**237.7687**	**237.7687**	**9.8900e-003**	**0.0000**	**238.0161**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1885	2.2980	3.3289	5.8200e-003		0.0701	0.0701		0.0645	0.0645	0.0000	511.0902	511.0902	0.1653	0.0000	515.2226
Total	**0.1885**	**2.2980**	**3.3289**	**5.8200e-003**		**0.0701**	**0.0701**		**0.0645**	**0.0645**	**0.0000**	**511.0902**	**511.0902**	**0.1653**	**0.0000**	**515.2226**

3.20 6d Converter Station - Structures - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.7900e-003	0.3479	0.0789	1.8000e-003	0.0427	6.0000e-004	0.0433	0.0117	5.8000e-004	0.0123	0.0000	173.9398	173.9398	8.5000e-003	0.0000	174.1524
Worker	0.0305	0.0192	0.2146	7.1000e-004	0.0888	5.4000e-004	0.0894	0.0236	5.0000e-004	0.0241	0.0000	63.8289	63.8289	1.3900e-003	0.0000	63.8637
Total	**0.0403**	**0.3671**	**0.2935**	**2.5100e-003**	**0.1315**	**1.1400e-003**	**0.1326**	**0.0353**	**1.0800e-003**	**0.0364**	**0.0000**	**237.7687**	**237.7687**	**9.8900e-003**	**0.0000**	**238.0161**

3.20 6d Converter Station - Structures - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.6208	0.8993	1.5700e-003		0.0190	0.0190		0.0174	0.0174	0.0000	138.0770	138.0770	0.0447	0.0000	139.1934
Total	**0.0509**	**0.6208**	**0.8993**	**1.5700e-003**		**0.0190**	**0.0190**		**0.0174**	**0.0174**	**0.0000**	**138.0770**	**138.0770**	**0.0447**	**0.0000**	**139.1934**

3.20 6d Converter Station - Structures - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6300e-003	0.0927	0.0213	4.8000e-004	0.0115	1.6000e-004	0.0117	3.1700e-003	1.5000e-004	3.3200e-003	0.0000	46.7466	46.7466	2.2900e-003	0.0000	46.8039
Worker	7.8000e-003	4.7300e-003	0.0538	1.8000e-004	0.0240	1.4000e-004	0.0241	6.3700e-003	1.3000e-004	6.5000e-003	0.0000	16.6188	16.6188	3.4000e-004	0.0000	16.6274
Total	**0.0104**	**0.0974**	**0.0751**	**6.6000e-004**	**0.0355**	**3.0000e-004**	**0.0358**	**9.5400e-003**	**2.8000e-004**	**9.8200e-003**	**0.0000**	**63.3654**	**63.3654**	**2.6300e-003**	**0.0000**	**63.4312**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.6208	0.8993	1.5700e-003		0.0190	0.0190		0.0174	0.0174	0.0000	138.0768	138.0768	0.0447	0.0000	139.1932
Total	**0.0509**	**0.6208**	**0.8993**	**1.5700e-003**		**0.0190**	**0.0190**		**0.0174**	**0.0174**	**0.0000**	**138.0768**	**138.0768**	**0.0447**	**0.0000**	**139.1932**

3.20 6d Converter Station - Structures - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6300e-003	0.0927	0.0213	4.8000e-004	0.0115	1.6000e-004	0.0117	3.1700e-003	1.5000e-004	3.3200e-003	0.0000	46.7466	46.7466	2.2900e-003	0.0000	46.8039
Worker	7.8000e-003	4.7300e-003	0.0538	1.8000e-004	0.0240	1.4000e-004	0.0241	6.3700e-003	1.3000e-004	6.5000e-003	0.0000	16.6188	16.6188	3.4000e-004	0.0000	16.6274
Total	**0.0104**	**0.0974**	**0.0751**	**6.6000e-004**	**0.0355**	**3.0000e-004**	**0.0358**	**9.5400e-003**	**2.8000e-004**	**9.8200e-003**	**0.0000**	**63.3654**	**63.3654**	**2.6300e-003**	**0.0000**	**63.4312**

3.21 6e Converter Station - Gen. Construciton - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2362	2.0206	1.5988	4.5800e-003		0.0844	0.0844		0.0777	0.0777	0.0000	401.8625	401.8625	0.1300	0.0000	405.1117
Total	**0.2362**	**2.0206**	**1.5988**	**4.5800e-003**		**0.0844**	**0.0844**		**0.0777**	**0.0777**	**0.0000**	**401.8625**	**401.8625**	**0.1300**	**0.0000**	**405.1117**

3.21 6e Converter Station - Gen. Construciton - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0197	0.0124	0.1385	4.6000e-004	0.0573	3.5000e-004	0.0577	0.0152	3.2000e-004	0.0155	0.0000	41.1799	41.1799	9.0000e-004	0.0000	41.2024
Total	**0.0197**	**0.0124**	**0.1385**	**4.6000e-004**	**0.0573**	**3.5000e-004**	**0.0577**	**0.0152**	**3.2000e-004**	**0.0155**	**0.0000**	**41.1799**	**41.1799**	**9.0000e-004**	**0.0000**	**41.2024**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2362	2.0206	1.5988	4.5800e-003		0.0844	0.0844		0.0777	0.0777	0.0000	401.8620	401.8620	0.1300	0.0000	405.1113
Total	**0.2362**	**2.0206**	**1.5988**	**4.5800e-003**		**0.0844**	**0.0844**		**0.0777**	**0.0777**	**0.0000**	**401.8620**	**401.8620**	**0.1300**	**0.0000**	**405.1113**

3.21 6e Converter Station - Gen. Construciton - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0197	0.0124	0.1385	4.6000e-004	0.0573	3.5000e-004	0.0577	0.0152	3.2000e-004	0.0155	0.0000	41.1799	41.1799	9.0000e-004	0.0000	41.2024
Total	**0.0197**	**0.0124**	**0.1385**	**4.6000e-004**	**0.0573**	**3.5000e-004**	**0.0577**	**0.0152**	**3.2000e-004**	**0.0155**	**0.0000**	**41.1799**	**41.1799**	**9.0000e-004**	**0.0000**	**41.2024**

3.22 6f Transformer Delivery - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9300e-003	0.0732	0.1059	1.6000e-004		3.7800e-003	3.7800e-003		3.4800e-003	3.4800e-003	0.0000	14.3912	14.3912	4.6500e-003	0.0000	14.5075
Total	**7.9300e-003**	**0.0732**	**0.1059**	**1.6000e-004**		**3.7800e-003**	**3.7800e-003**		**3.4800e-003**	**3.4800e-003**	**0.0000**	**14.3912**	**14.3912**	**4.6500e-003**	**0.0000**	**14.5075**

3.22 6f Transformer Delivery - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1800e-003	0.0549	8.5900e-003	1.8000e-004	3.0200e-003	5.0000e-005	3.0600e-003	8.3000e-004	4.0000e-005	8.7000e-004	0.0000	16.9698	16.9698	1.3100e-003	0.0000	17.0026
Worker	1.6300e-003	1.0200e-003	0.0115	4.0000e-005	4.7400e-003	3.0000e-005	4.7700e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.4102	3.4102	7.0000e-005	0.0000	3.4121
Total	**2.8100e-003**	**0.0559**	**0.0201**	**2.2000e-004**	**7.7600e-003**	**8.0000e-005**	**7.8300e-003**	**2.0900e-003**	**7.0000e-005**	**2.1600e-003**	**0.0000**	**20.3800**	**20.3800**	**1.3800e-003**	**0.0000**	**20.4147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9300e-003	0.0732	0.1059	1.6000e-004		3.7800e-003	3.7800e-003		3.4800e-003	3.4800e-003	0.0000	14.3912	14.3912	4.6500e-003	0.0000	14.5075
Total	**7.9300e-003**	**0.0732**	**0.1059**	**1.6000e-004**		**3.7800e-003**	**3.7800e-003**		**3.4800e-003**	**3.4800e-003**	**0.0000**	**14.3912**	**14.3912**	**4.6500e-003**	**0.0000**	**14.5075**

3.22 6f Transformer Delivery - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1800e-003	0.0549	8.5900e-003	1.8000e-004	3.0200e-003	5.0000e-005	3.0600e-003	8.3000e-004	4.0000e-005	8.7000e-004	0.0000	16.9698	16.9698	1.3100e-003	0.0000	17.0026
Worker	1.6300e-003	1.0200e-003	0.0115	4.0000e-005	4.7400e-003	3.0000e-005	4.7700e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.4102	3.4102	7.0000e-005	0.0000	3.4121
Total	**2.8100e-003**	**0.0559**	**0.0201**	**2.2000e-004**	**7.7600e-003**	**8.0000e-005**	**7.8300e-003**	**2.0900e-003**	**7.0000e-005**	**2.1600e-003**	**0.0000**	**20.3800**	**20.3800**	**1.3800e-003**	**0.0000**	**20.4147**

3.22 6f Transformer Delivery - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.7800e-003	0.0718	0.1039	1.6000e-004		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	14.1197	14.1197	4.5700e-003	0.0000	14.2338
Total	**7.7800e-003**	**0.0718**	**0.1039**	**1.6000e-004**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**14.1197**	**14.1197**	**4.5700e-003**	**0.0000**	**14.2338**

3.22 6f Transformer Delivery - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1500e-003	0.0534	8.3800e-003	1.7000e-004	2.9600e-003	5.0000e-005	3.0100e-003	8.1000e-004	4.0000e-005	8.6000e-004	0.0000	16.5351	16.5351	1.2800e-003	0.0000	16.5671
Worker	1.5100e-003	9.2000e-004	0.0105	4.0000e-005	4.6600e-003	3.0000e-005	4.6800e-003	1.2400e-003	3.0000e-005	1.2600e-003	0.0000	3.2245	3.2245	7.0000e-005	0.0000	3.2262
Total	**2.6600e-003**	**0.0543**	**0.0188**	**2.1000e-004**	**7.6200e-003**	**8.0000e-005**	**7.6900e-003**	**2.0500e-003**	**7.0000e-005**	**2.1200e-003**	**0.0000**	**19.7596**	**19.7596**	**1.3500e-003**	**0.0000**	**19.7933**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.7800e-003	0.0718	0.1039	1.6000e-004		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	14.1196	14.1196	4.5700e-003	0.0000	14.2338
Total	**7.7800e-003**	**0.0718**	**0.1039**	**1.6000e-004**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**14.1196**	**14.1196**	**4.5700e-003**	**0.0000**	**14.2338**

3.22 6f Transformer Delivery - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1500e-003	0.0534	8.3800e-003	1.7000e-004	2.9600e-003	5.0000e-005	3.0100e-003	8.1000e-004	4.0000e-005	8.6000e-004	0.0000	16.5351	16.5351	1.2800e-003	0.0000	16.5671
Worker	1.5100e-003	9.2000e-004	0.0105	4.0000e-005	4.6600e-003	3.0000e-005	4.6800e-003	1.2400e-003	3.0000e-005	1.2600e-003	0.0000	3.2245	3.2245	7.0000e-005	0.0000	3.2262
Total	**2.6600e-003**	**0.0543**	**0.0188**	**2.1000e-004**	**7.6200e-003**	**8.0000e-005**	**7.6900e-003**	**2.0500e-003**	**7.0000e-005**	**2.1200e-003**	**0.0000**	**19.7596**	**19.7596**	**1.3500e-003**	**0.0000**	**19.7933**

3.23 7 Decommissioning - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0554	0.0000	0.0554	8.3900e-003	0.0000	8.3900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1881	1.6426	2.3449	4.5600e-003		0.0672	0.0672		0.0623	0.0623	0.0000	393.6493	393.6493	0.1230	0.0000	396.7249
Total	**0.1881**	**1.6426**	**2.3449**	**4.5600e-003**	**0.0554**	**0.0672**	**0.1227**	**8.3900e-003**	**0.0623**	**0.0707**	**0.0000**	**393.6493**	**393.6493**	**0.1230**	**0.0000**	**396.7249**

3.23 7 Decommissioning - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0700e-003	0.2357	0.0690	1.6300e-003	0.1762	5.8000e-004	0.1768	0.0445	5.5000e-004	0.0451	0.0000	157.4281	157.4281	6.0600e-003	0.0000	157.5797
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0138	8.0800e-003	0.0936	3.3000e-004	0.0448	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121	0.0000	29.9756	29.9756	5.8000e-004	0.0000	29.9901
Total	**0.0218**	**0.2438**	**0.1626**	**1.9600e-003**	**0.2210**	**8.3000e-004**	**0.2218**	**0.0564**	**7.8000e-004**	**0.0572**	**0.0000**	**187.4036**	**187.4036**	**6.6400e-003**	**0.0000**	**187.5697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0216	0.0000	0.0216	3.2700e-003	0.0000	3.2700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1881	1.6426	2.3449	4.5600e-003		0.0672	0.0672		0.0623	0.0623	0.0000	393.6489	393.6489	0.1230	0.0000	396.7244
Total	**0.1881**	**1.6426**	**2.3449**	**4.5600e-003**	**0.0216**	**0.0672**	**0.0889**	**3.2700e-003**	**0.0623**	**0.0656**	**0.0000**	**393.6489**	**393.6489**	**0.1230**	**0.0000**	**396.7244**

3.23 7 Decommissioning - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0700e-003	0.2357	0.0690	1.6300e-003	0.1762	5.8000e-004	0.1768	0.0445	5.5000e-004	0.0451	0.0000	157.4281	157.4281	6.0600e-003	0.0000	157.5797
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0138	8.0800e-003	0.0936	3.3000e-004	0.0448	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121	0.0000	29.9756	29.9756	5.8000e-004	0.0000	29.9901
Total	**0.0218**	**0.2438**	**0.1626**	**1.9600e-003**	**0.2210**	**8.3000e-004**	**0.2218**	**0.0564**	**7.8000e-004**	**0.0572**	**0.0000**	**187.4036**	**187.4036**	**6.6400e-003**	**0.0000**	**187.5697**

3.23 7 Decommissioning - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1153	0.0000	0.1153	0.0175	0.0000	0.0175	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3913	3.4165	4.8774	9.4900e-003		0.1398	0.1398		0.1297	0.1297	0.0000	818.7906	818.7906	0.2559	0.0000	825.1877
Total	**0.3913**	**3.4165**	**4.8774**	**9.4900e-003**	**0.1153**	**0.1398**	**0.2551**	**0.0175**	**0.1297**	**0.1471**	**0.0000**	**818.7906**	**818.7906**	**0.2559**	**0.0000**	**825.1877**

3.23 7 Decommissioning - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0167	0.4845	0.1437	3.3800e-003	0.1877	1.1900e-003	0.1889	0.0487	1.1400e-003	0.0498	0.0000	326.4208	326.4208	0.0126	0.0000	326.7351
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0270	0.0154	0.1822	6.7000e-004	0.0931	4.8000e-004	0.0936	0.0247	4.4000e-004	0.0252	0.0000	60.4687	60.4687	1.1100e-003	0.0000	60.4963
Total	**0.0437**	**0.5000**	**0.3258**	**4.0500e-003**	**0.2808**	**1.6700e-003**	**0.2825**	**0.0734**	**1.5800e-003**	**0.0750**	**0.0000**	**386.8894**	**386.8894**	**0.0137**	**0.0000**	**387.2315**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0450	0.0000	0.0450	6.8100e-003	0.0000	6.8100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3913	3.4165	4.8774	9.4900e-003		0.1398	0.1398		0.1297	0.1297	0.0000	818.7896	818.7896	0.2559	0.0000	825.1867
Total	**0.3913**	**3.4165**	**4.8774**	**9.4900e-003**	**0.0450**	**0.1398**	**0.1848**	**6.8100e-003**	**0.1297**	**0.1365**	**0.0000**	**818.7896**	**818.7896**	**0.2559**	**0.0000**	**825.1867**

3.23 7 Decommissioning - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0167	0.4845	0.1437	3.3800e-003	0.1877	1.1900e-003	0.1889	0.0487	1.1400e-003	0.0498	0.0000	326.4208	326.4208	0.0126	0.0000	326.7351
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0270	0.0154	0.1822	6.7000e-004	0.0931	4.8000e-004	0.0936	0.0247	4.4000e-004	0.0252	0.0000	60.4687	60.4687	1.1100e-003	0.0000	60.4963
Total	**0.0437**	**0.5000**	**0.3258**	**4.0500e-003**	**0.2808**	**1.6700e-003**	**0.2825**	**0.0734**	**1.5800e-003**	**0.0750**	**0.0000**	**386.8894**	**386.8894**	**0.0137**	**0.0000**	**387.2315**

3.23 7 Decommissioning - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1131	0.0000	0.1131	0.0171	0.0000	0.0171	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3838	3.3508	4.7836	9.3100e-003		0.1371	0.1371		0.1272	0.1272	0.0000	803.0446	803.0446	0.2510	0.0000	809.3187
Total	**0.3838**	**3.3508**	**4.7836**	**9.3100e-003**	**0.1131**	**0.1371**	**0.2502**	**0.0171**	**0.1272**	**0.1443**	**0.0000**	**803.0446**	**803.0446**	**0.2510**	**0.0000**	**809.3187**

3.23 7 Decommissioning - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.4698	0.1409	3.3000e-003	0.1873	1.1600e-003	0.1884	0.0485	1.1100e-003	0.0496	0.0000	319.2487	319.2487	0.0123	0.0000	319.5561
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0247	0.0139	0.1668	6.4000e-004	0.0913	4.4000e-004	0.0918	0.0243	4.0000e-004	0.0247	0.0000	57.6809	57.6809	9.9000e-004	0.0000	57.7056
Total	**0.0410**	**0.4836**	**0.3077**	**3.9400e-003**	**0.2786**	**1.6000e-003**	**0.2802**	**0.0728**	**1.5100e-003**	**0.0743**	**0.0000**	**376.9296**	**376.9296**	**0.0133**	**0.0000**	**377.2617**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0441	0.0000	0.0441	6.6800e-003	0.0000	6.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3838	3.3508	4.7836	9.3100e-003		0.1371	0.1371		0.1272	0.1272	0.0000	803.0437	803.0437	0.2510	0.0000	809.3177
Total	**0.3838**	**3.3508**	**4.7836**	**9.3100e-003**	**0.0441**	**0.1371**	**0.1812**	**6.6800e-003**	**0.1272**	**0.1339**	**0.0000**	**803.0437**	**803.0437**	**0.2510**	**0.0000**	**809.3177**

3.23 7 Decommissioning - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.4698	0.1409	3.3000e-003	0.1873	1.1600e-003	0.1884	0.0485	1.1100e-003	0.0496	0.0000	319.2487	319.2487	0.0123	0.0000	319.5561
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0247	0.0139	0.1668	6.4000e-004	0.0913	4.4000e-004	0.0918	0.0243	4.0000e-004	0.0247	0.0000	57.6809	57.6809	9.9000e-004	0.0000	57.7056
Total	**0.0410**	**0.4836**	**0.3077**	**3.9400e-003**	**0.2786**	**1.6000e-003**	**0.2802**	**0.0728**	**1.5100e-003**	**0.0743**	**0.0000**	**376.9296**	**376.9296**	**0.0133**	**0.0000**	**377.2617**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.568260	0.033614	0.184668	0.102877	0.010818	0.004253	0.018932	0.067054	0.001372	0.001348	0.005404	0.000777	0.000623

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.9181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.4647					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.9181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.4647					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B
B1: BIOLOGICAL RESOURCES HABITAT ASSESSMENT

B2: WESTERN JOSHUA TREE CENSUS REPORT

B3: JURISDICTIONAL DELINEATION

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October 2020

LOS ANGELES DEPARTMENT OF WATER AND POWER

Adelanto Switching Station Expansion Project
San Bernardino County, California

Draft – Biological Resources Habitat Assessment

PROJECT NUMBER:
164629

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POWER ENGINEERS

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Draft – Biological Resources Habitat Assessment

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ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
BLM	Bureau of Land Management
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
°F	degrees Fahrenheit
FR	Federal Register
HVDC	High Voltage Direct Current
IPA	Intermountain Power Agency
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
POWER	POWER Engineers, Inc.
Project	Adelanto Switching Station Project
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1.0 INTRODUCTION

The Los Angeles Department of Water and Power (LADWP) proposes the expansion of the Adelanto Switching Station (Project) located in the City of Adelanto in San Bernardino County. The expansion would occur within the existing approximate 315-acre fenced Adelanto property, owned by LADWP and the Intermountain Power Agency (IPA), a political subdivision of the State of Utah. As part of the proposed Project, a new converter station will be built adjacent to the existing converter station in order to upgrade and replace aging infrastructure. The switching station will also be expanded to accommodate the new converter station and associated equipment. In addition, other Project components include: transmission line relocation, construction of new towers, site preparation, and demolition of existing structures. The proposed Project is needed to upgrade and replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability.

1.1 Project Location

The proposed Project is located in San Bernardino County, California within the City of Adelanto, approximately two miles west of Highway 395 and three miles north of State Route 18 (Figure 1). It is situated in the northeast portion of Sections 5 and 6 of Township 5N, Range 5W as shown on the Adelanto, CA 1:24,000 United States Geological Survey (USGS) quadrangle (Figure 2). It is bounded on the north by Rancho Road, to the east by Daisy Road, to the south by Pansy Road, and to the east by Raccoon Avenue. Interstate 15 is located approximately eight miles to the east of the Project site, United States Highway 395 is approximately 1.5 miles to the east and State Route 18 is approximately three miles to the south. The Project site contains two earthen berms; one berm is located on the south and western portions of the site. The second berm is located on the south and eastern portions of the site. Vegetative cover in the Project site consists mainly of disturbed Joshua tree woodland and creosote bush scrub.

The elevation of the site ranges from approximately 2,950 to 3,000 feet above mean sea level and has relatively flat topography. The area is vegetated with native and non-native plant species, with large portions of the area that have been previously mechanically disturbed by human activities. Annual average precipitation is approximately seven inches, with January through March February receiving the majority of the yearly rainfall (Natural Resources Conservation Service, Victorville Station 2020). The average low temperature is 45.2 degrees Fahrenheit (°F), and the average high temperature is 81.1°F.

The fenced Project site is bordered by paved roads. Surrounding land uses are zoned for Light Manufacturing Cannabis Only (City of Adelanto 2020). Adjacent uses are primarily undeveloped; vacant property and a manufacturing facility are located to the east, and vacant property and a former San Bernardino County sludge composting facility to the south. Land uses farther to the north, across Rancho Road, include San Bernardino County Fire Station 322, the Adelanto Community Correctional Facility, and a California Department Correctional facility. Industrial facilities are also located to the northwest and west of the Project site. A few isolated residences are located approximately 0.5 mile to the east of the Adelanto Station; otherwise, the nearest residential developments to the Project site are located over a mile to the north, southeast, and south.

The City of San Bernardino is located approximately 30 miles southeast of the site; the City of Barstow is located approximately 32 miles northeast of the site; the cities of Victorville and Apple Valley are located approximately eight and 14 miles southeast from the site, respectively. Victorville Airport, also known as Southern California Logistics Airport, is a public airport located in the City of Victorville approximately three miles northeast of the Project site. From 1941 to 1992, prior to its civil use, the airport facility was known as George Air Force Base.

The Study Area exists within the fenced Project site, which includes all land within the above described boundaries. The Project site is approximately 315 acres in total and the Study Area is approximately 120 acres in area.

1.2 Project Description

The Project site consists of the existing Adelanto Switching Station, owned and operated by LADWP, and the Adelanto Converter Station, owned and operated by the IPA. The Adelanto Station began operations in 1986. The Adelanto Converter Station is the southern terminus of the 2,400-megawatt Western Electricity Coordinating Council Path 27 Intermountain Power Project high voltage direct current (HVDC) transmission line. At the Adelanto Converter Station, power delivered over the ± 500-kilovolt (kV) HVDC Southern Transmission System from the Intermountain Converter Station in Utah is changed from direct current power to alternating current (AC) power to be transmitted to load centers throughout Southern California. The Adelanto Switching Station is the interface between the converter station and a regional AC transmission network that consists of five separate 500-kV transmission lines (refer to Figure 2).

The converter and switching station facilities are generally located in the central portion of the site. Solar panels occupy the southwestern portion of the Project site. Other facilities located on site include towers and other large-scale switching equipment, power transformers, operations and maintenance buildings, and two large converter equipment buildings. The area between the facilities and the fence line of the entire Adelanto Station is generally undeveloped except for several transmission towers and site drainage control structures consisting of earthen berms. Some ancillary uses, such as materials storage, evaporation ponds, and a helipad, are also located within the Adelanto Station.

Site Location

Adelanto Switching Station

Figure 1
Vicinity Map

0 4 8 12
Miles

N

POWER ENGINEERS

Sources: ESRI, HERE, Garmin, USGS, OpenStreetMap Contributors, 2019.

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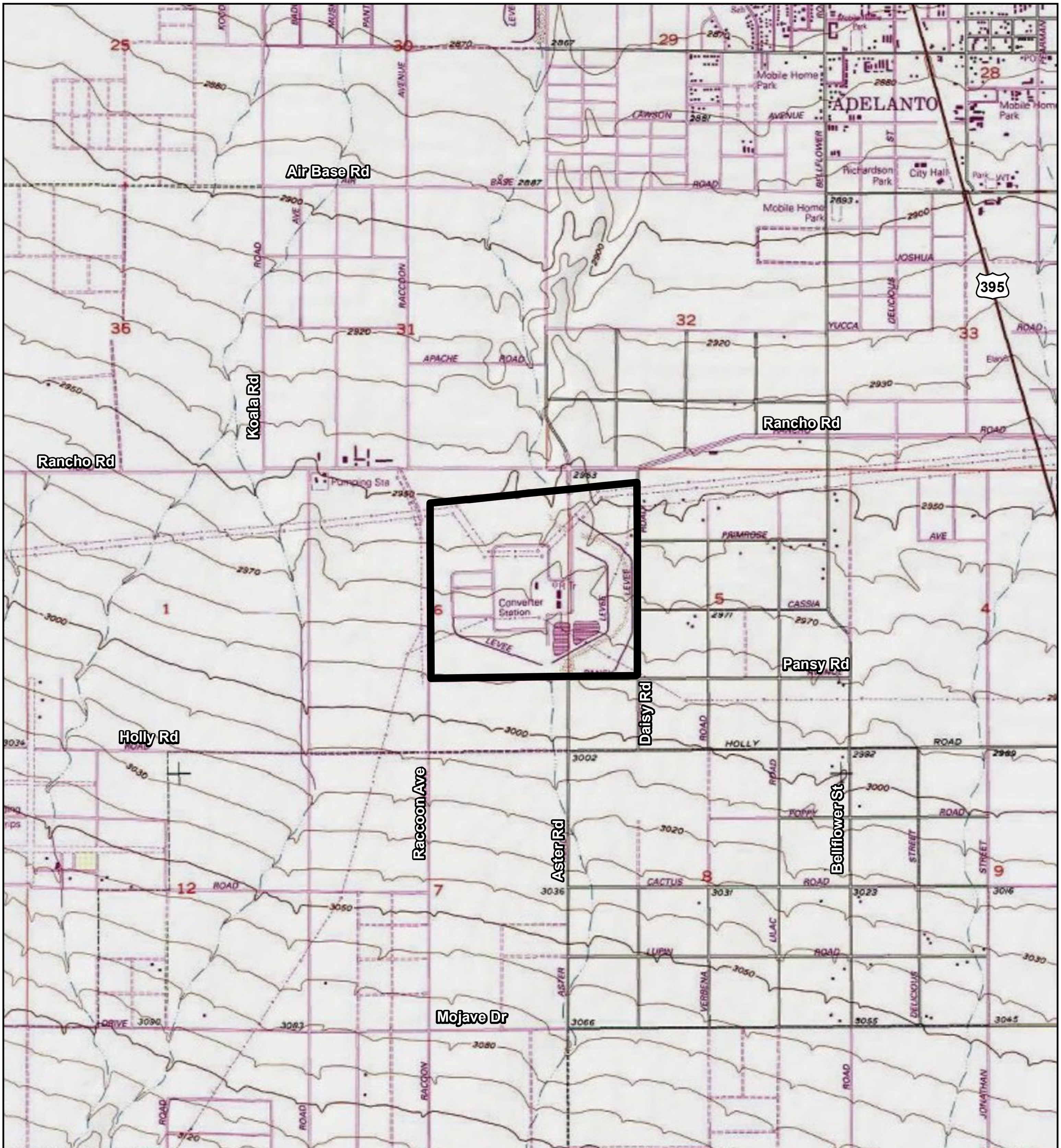

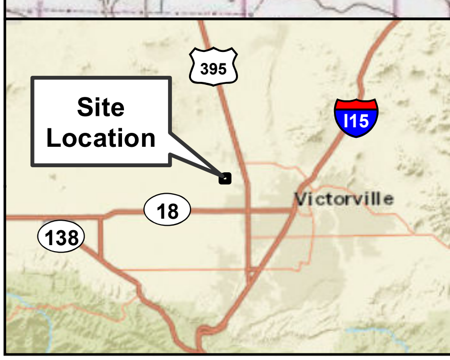

Site Boundary

Adelanto Switching Station

Figure 2
Location Map

0 1,000 2,000 3,000 4,000
Feet

N

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Aerial Photography Source: USDA NAIP\California 2018-07-23

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2.0 METHODS

2.1 Approach to Data Collection

The first step in the approach to data collection for this analysis included the identification and characterization of biological resources, including vegetation community types and special-status plant and animal species that are known to occur or have potential to occur in the vicinity of the Project site. The biological Study Area that was assessed is approximately 120 acres and is shown in Figure 3.

"Special-status," as used in this report, refers to species that are:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (50 Code of Federal Regulations [CFR] Part 17.12 [listed plants], 50 CFR Part 17.11 [listed animals], 67 Federal Register [FR] 40657 [candidate species], and various notices in the Federal Register [proposed species]);
- Listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act California Department of Fish and Wildlife (CDFW; CDFW 2020);
- Identified by the CDFW as species of concern or fully protected species, including fish and wildlife that do not have State or federal threatened or endangered status but may still be threatened with extinction (CDFW 2020);
- California Species of Special Concern: vertebrate species that have been designated as "species of special concern" by the CDFW because declining population levels, limited range, and/or continuing threats have made them vulnerable to extinction (CDFW 2020);
- Included in the California Native Plant Society (CNPS) Rare Plant Inventory (CNPS 2020);
- Otherwise defined as rare, threatened, or endangered under the California Environmental Quality Act (CEQA; CEQA Guidelines, Section 15380); or
- Identified by the Bureau of Land Management (BLM) as a sensitive species (BLM 2015).

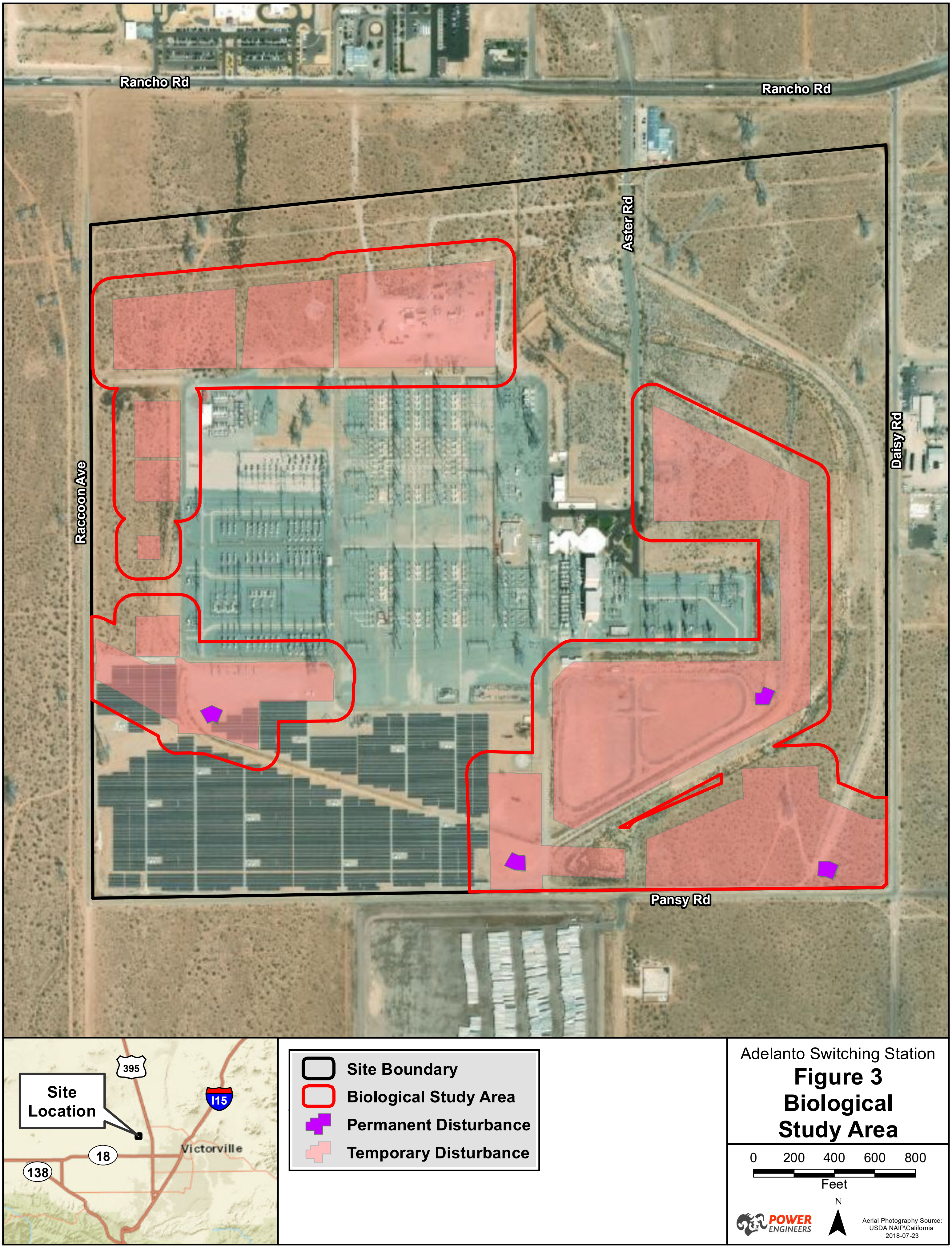
Prior to conducting fieldwork, the biologist reviewed records of known occurrences to identify special-status species that may occur within the vicinity of the Project site, including the proposed Study Area. Those records were then compared with lists of federal- or State-listed threatened, endangered, or other special-status species. Details of the survey work and approaches to collecting data are described below.

2.2 Literature Review

Preliminary investigation included review of information obtained from literature searches, examinations of habitat as discernible from aerial photographs, and database searches including CNPS and the California Natural Diversity Database (CNDDB) records (CDFW 2020), previous reports pertaining to the Project site (POWER Engineers, Inc. [POWER] 2010), and previous CDFW issued Incidental Take Permit (ITP) 2081-2011-0511-06 (2011) for the Project site. To identify the existing and potential biological resources present in the vicinity of the proposed Project, a geographic information system search was performed. This consisted of mapping baseline biological resource data (vegetation mapping and CNDDB records).

2.3 Field Survey

Reconnaissance-level biological resource surveys were conducted by POWER biologist, Ken McDonald. An initial survey was conducted on June 11, 2020. Weather was sunny during the survey effort, with the temperature ranging from mid-80s to high-90s°F. The survey included vegetation mapping as well as general botanical and wildlife inventories within the Study Area, and was conducted by driving to various points within the Study Area and then walking within representative areas and recording detected species. Vegetation communities were classified according to Holland (1986). The botanical inventory of the site was floristic in nature, meaning that all plants observed were identified to the taxonomic level needed to determine whether they were special-status plant species. Wildlife species were detected either by observation, by vocalization, or by sign (e.g., tracks, burrows, scat). Because the reconnaissance-level survey was not conducted during an optimum time of year to detect presence of all special-status plant species with potential to occur, focused floral surveys may be required prior to construction and during the appropriate blooming period(s), as close to the actual construction date as feasible.



Site Boundary
Biological Study Area
Permanent Disturbance
Temporary Disturbance

Adelanto Switching Station

Figure 3 Biological Study Area

0 200 400 600 800
Feet

N

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Aerial Photography Source: USDA NAIP\California 2018-07-23

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3.0 RESULTS

Vegetation communities consisted mostly of Joshua tree woodland. The entire Project site is heavily disturbed by the presence of non-native plant species, including the Study Area. A more detailed description of these vegetation communities is provided below. No special-status plant species were observed during the survey. A list of plant species observed during the field survey is provided in Appendix A. No special-status wildlife species were detected during the surveys. Few wildlife species were observed within the Study Area, but wildlife sign was observed more frequently. Burrows of varying sizes were present intermittently throughout the Study Area, primarily small rodent burrows. Appendix B provides a list of observed animal species the Study Area.

3.1 Vegetation Community Descriptions

The following vegetation communities were mapped according to Holland (1986) within the Study Area. Vegetation communities within the Study Area are shown in Figure 4.

3.1.1 Joshua Tree Woodland

Joshua tree woodland (Holland 1986) is an open woodland with Joshua trees (*Yucca brevifolia*), up to 12 feet in height, as the only arborescent species, and many other shrub and cactus species in the understory. This vegetation type typically occupies well-drained, gentle alluvial slopes, with sandy, loamy or gravelly substrates. Joshua trees are currently under review by CDFW as a Candidate species for listing as Threatened and may require a 2081 ITP for removal or relocation (City of Victorville 2020).

Within the Study Area, scattered Joshua trees form the overstory where this community was present. This vegetation community was very disturbed by the presence of Sahara mustard, which dominated the understory. Native shrub species were comprised of creosote, rabbitbrush, and burrobush, with occasional cholla, with abundant Mediterranean grass in the herbaceous layer. This community was observed mainly on the northern and western portions of the Study Area.

3.1.2 Mojave Creosote Bush Scrub

Mojave Creosote Bush Scrub (Holland 1986) is the predominant vegetation type of the valleys, alluvial fans and the lower mountain slopes of the Mojave Desert. It is composed of widely spaced evergreen and drought-deciduous shrubs, cacti and yucca that range in height from one to nine feet. Creosote bush (*Larrea tridentata*) is the dominant shrub and indicator species for this vegetation type. Burrobush (*Ambrosia dumosa*) is a common associated species. Soils are typically well-drained, non-alkaline and non-saline, and sandy to gravelly.

Mojave Creosote Bush Scrub within the Study Area was dominated by creosote bush and Sahara mustard. Burrobush and occasional rabbitbrush occurred in the shrub layer, with Mediterranean grass common in the herbaceous layer. This community was observed on the western portion of the Study Area.

3.1.3 Saltbush Scrub

Saltbush scrub is comprised of low, grayish, microphyllous shrubs, 0.3 to 1 meter tall, with occasional succulent species, matching the Holland type desert saltbush scrub community. Overall cover is often low, with bare ground surrounded widely spaced shrubs. Stands of desert saltbush scrub as usually dominated by a single species of saltbush (*Atriplex* spp.). Site characteristics include finely textured, poorly drained soils (Holland 1986). A small amount of this vegetation community was observed on the southern portion of the Study Area.

3.1.4 Disturbed

Disturbed areas include cleared or graded lands. Disturbed areas are typically characterized by heavily compacted soils that have been frequently or recently disturbed. They are often devoid of vegetation or possess only a sparse cover, or are vegetated by weedy plant species adapted to disturbance.

Within the Study Area, disturbed areas ranged from completely bare of all vegetation to sparse amounts of non-native plant species, mostly Sahara mustard and Mediterranean grass. This community was observed throughout the Study Area.

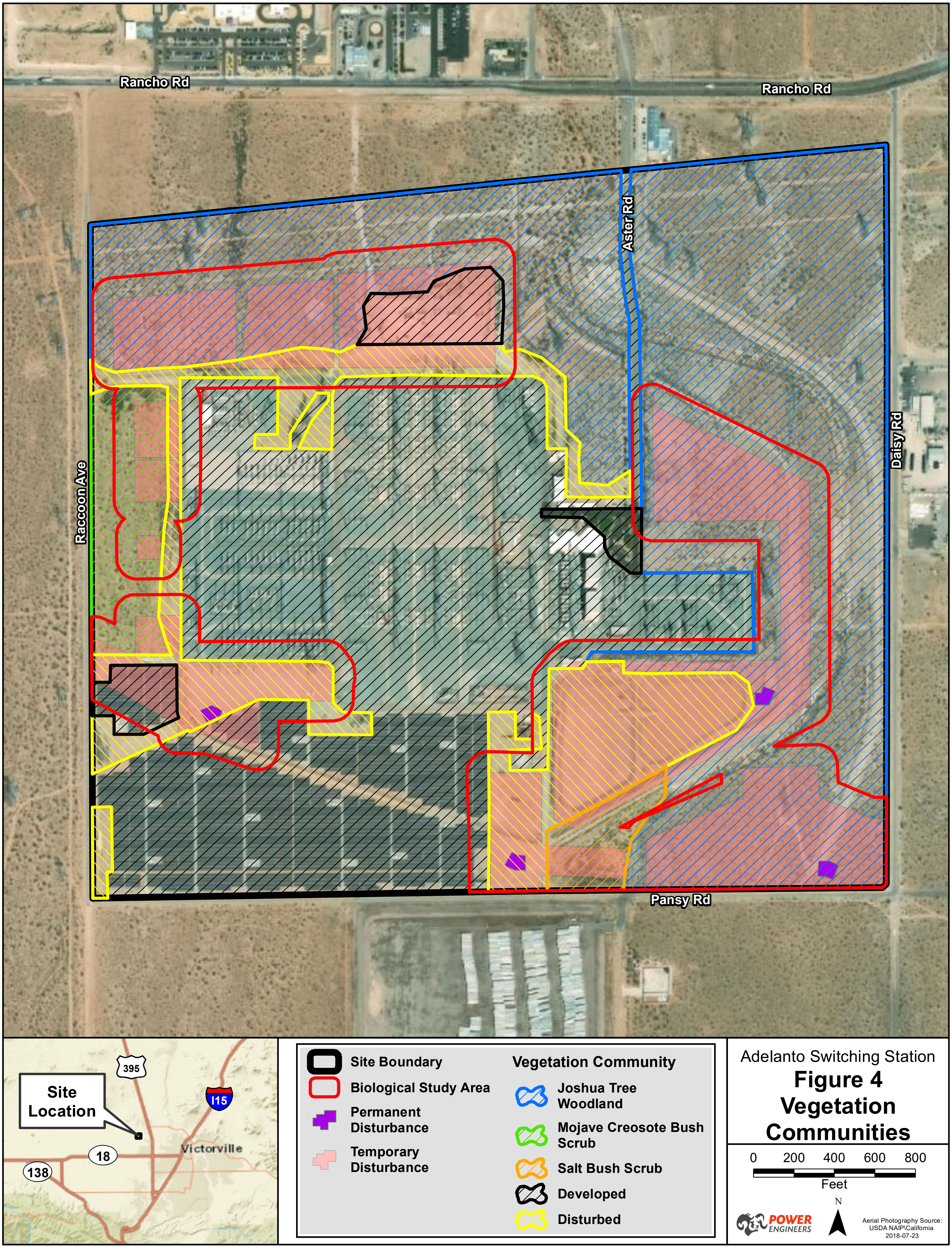
3.1.5 Developed

Developed area include roads, man-made structures, and associated infrastructure. Areas generally considered developed include dirt and paved roads, transmission lines, underground pipelines, railroads, and any other permanent structures. Ornamental vegetation may occur within developed areas, and may include native plant species, as well as non-native plant species and turf grass. Developed areas occur throughout the Study Area.

Table 1 provides approximate vegetation community acreages found within Study Area and within the greater Project site.

TABLE 1 VEGETATION COMMUNITIES WITHIN THE PROJECT STUDY AREA

VEGETATION COMMUNITY	PROJECT SITE ACRES	STUDY AREA ACRES
Joshua Tree Woodland	138.3	57.6
Mojave Creosote Bush Scrub	11.0	7.4
Saltbush Scrub	4.5	4.4
Disturbed	37.4	30.0
Developed	123.6	21.0
TOTAL ACRES	314.5	120.4


Rancho Rd
Rancho Rd
Aster Rd
Raccoon Ave
Daisy Rd
Pansy Rd
395
I15
18
138
Site Location
Victorville
Site Boundary
Biological Study Area
Permanent Disturbance
Temporary Disturbance
Vegetation Community
Joshua Tree Woodland
Mojave Creosote Bush Scrub
Salt Bush Scrub
Developed
Disturbed
Adelanto Switching Station
Figure 4
Vegetation Communities
0 200 400 600 800
Feet
N
POWER ENGINEERS
Aerial Photography Source: USDA NAIP\California 2018-07-23

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3.2 Special-Status Plant Species

Three special-status plant species were determined by the literature review to potentially occur within the Study Area and are described below. Special-status botanical species were not detected during the field survey. However, the Study Area provides habitat that could support special-status species. The three plant species were considered to have a moderate potential to occur within the Study Area. Potential for occurrence was based on habitat, elevation, soil, and proximity to known recorded occurrences of a species. The accounts for these species with known occurrences within the Adelanto USGS 7.5' quadrangle are included below. Their habitat description, status, and potential for occurrence within the survey area are provided in Table 2.

3.2.1 White Pygmy-poppy

White pygmy-poppy (*Canbya candida*) is included on List 4.2 of the CNPS online inventory (CNPS 2020). It is a white-flowered with yellow anther annual herb in the Poppy Family (*Papaveraceae*). This species occurs in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland on gravelly, sandy, and granitic soils. It ranges from 1,460 to 4,790 feet in elevation, and blooms from March to June. White pygmy-poppy is threatened by habitat loss. Suitable habitat for this species occurs within the Study Area. White pygmy-poppy has a moderate potential to occur.

3.2.2 Mojave Spineflower

Mojave spineflower (*Chorizanthe spinosa*) is included on List 4.2 of the CNPS online Inventory (CNPS 2020). It is a white-flowered annual herb in the Buckwheat Family (*Polygonaceae*). This species occurs in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and playas, occasionally on alkaline soils. It ranges from 1,300 to 4,265 feet in elevation, and blooms from March to July. Suitable habitat for this species occurs within the Study Area. Mojave spineflower has a moderate potential to occur.

3.2.3 Crowned Muilla

Crowned muilla (*Muilla coronata*) is included on List 4.2 of the CNPS online Inventory (CNPS 2020). It is a white to blue-flowered perennial bulbiferous herb in the Brodiaea Family (*Themidaceae*). This species occurs in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland, usually in sand or gravel. It ranges from 1,960 to 6,430 feet in elevation, and blooms from March to April. Suitable habitat for this species occurs within the Study Area. Crowned muilla has a moderate potential to occur.

3.3 Non-native Plant Species

A comprehensive plant inventory, including non-native species, was taken during the reconnaissance surveys and is included in Appendix A. Non-native plants are rated by the California Invasive Plant Council (Cal-IPC) as falling into one of three categories (Cal-IPC 2020):

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal,

though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

- **Limited** – These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Some species are not currently rated due to lack of adequate information or lack of significant impacts on native communities.

The non-native plant species that were detected during reconnaissance surveys and are rated by Cal-IPC as follows:

- cheat grass (*Bromus tectorum*) – rated as High
- tamarisk (*Tamarix ramossisima*) – rated as High
- Sahara mustard (*Brassica tournefortii*) – rated at High
- redstem filaree (*Erodium cicutarium*) – rated as Limited
- Mediterranean grass (*Schismus barbatus*) – rated as Limited

TABLE 2 SPECIAL-STATUS PLANT SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL STUDY AREA

SPECIES[1]	STATUS[2]	HABITAT[2]	BLOOMING PERIOD[2]	POTENTIAL FOR OCCURRENCE
Canbya candida white pygmy poppy	Fed: None State: None CNPS: 4.2	Annual herb occurring in Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland, on gravelly, sandy, and granitic soils. From 1,460 to 4,790 feet in elevation.	March – June	**Moderate.** Suitable habitat occurs on site.
Chorizanthe spinosa *Mojave spineflower*	Fed: None State: None CNPS: 4.2	Annual herb occurring in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and playas, sometimes on alkaline soils. From 1,300 to 4,265 feet in elevation.	March – July	**Moderate.** Suitable habitat occurs on site.
Muilla coronata crowned muilla	Fed: None State: None CNPS: 4.2	*Perennial bulbiferous herb occurring in chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland. From 1,960 to 6,430 feet in elevation.*	March – April	**Moderate.** Suitable habitat occurs on site.

Notes:
1. Sources of scientific names and common names are: Hickman (1993), CNPS (2020), and CalFlora (2020).
2. Sources of habitat characteristics and flowering times are: CNDDB (CDFW 2020) and CNPS (2020).

CNPS (State Rare Plant Rank)
4: Plants of Limited Distribution - A Watch List

Threat Ranks/ Decimal notations: A CNPS extension added to the State Rare Plant Rank
.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

Occurrence Code:
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.

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3.4 Special-Status Wildlife Species

A total of five special-status wildlife species were determined by the literature review to potentially occur within the Study Area. Of the five wildlife species considered to have a potential to occur within the vicinity, one was determined to have a high potential for occurrence within the Study Area, two had a moderate potential, and the rest were determined to be absent. Their habitat description, status, and potential for occurrence within the Study Area are provided in Table 3.

The accounts below provide greater detail of the species initially determined to have potential to occur within the Adelanto USGS quadrangle.

3.4.1 Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a BLM Sensitive Species, CDFW Species of Special Concern, and U.S. Fish and Wildlife Service (USFWS) Bird of Conservation Concern. It typically inhabits lowlands, including those in the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. For shelters, the burrowing owl uses rodent burrows in sparse grassland, desert, and agricultural habitats. Nesting begins in late March and April. Burrowing owls are typically active at dusk and dawn, but can also be active at night.

Suitable habitat occurs within the Study Area. There are multiple recent sightings of burrowing owl in the vicinity, with one sighting within two miles from the Study Area (CDFW 2020), giving this species a moderate potential for occurrence.

3.4.2 Swainson's Hawk

Swainson's hawk (*Buteo swainsonii*) is State-listed as Threatened and a BLM Sensitive Species, as well as a USFWS Bird of Conservation Concern. Its breeding habitat includes grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural fields and ranches. Swainson's hawk also requires adjacent suitable foraging areas, such as grasslands or alfalfa or grain fields, which support rodent populations. During winter and migration or for nonbreeding individuals in summer, this raptor forages primarily on insects (Bechard et al. 2010). Hawks are restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available. The loss of agricultural lands to various residential and commercial developments is a serious threat to this hawk throughout California.

Only marginal suitable habitat occurs within the developed portions of the Study Area, and no observations of the species has been made within the past 80 years. Swainson's hawk is determined to be absent from the Study Area.

3.4.3 Le Conte's Thrasher

Le Conte's thrasher (*Toxostoma lecontei*) is a California Species of Special Concern and is endemic to the southwestern United States and northwestern Mexico (Sheppard 1996). The northern breeding limits are central California from the Carrizo Plain of eastern San Luis Obispo County; the San Joaquin Valley of Fresno and Kern Counties, and east of the Sierra Nevada north to Mono County; and southern Nevada and southwestern Utah (Sheppard 1996). It occupies open desert scrub habitats, particularly saltbush and creosote in association with sandy washes. Suitable habitat occurs within the Study Area, with observations within four miles (CDFW 2020), giving this species a moderate potential to occur.

3.4.4 Mohave Ground Squirrel

Mohave ground squirrel (*Xerosermophilus mohavensis*) is a State-listed as Threatened species. It is a small ground squirrel that is morphologically distinguished from the more common antelope ground squirrel (*Ammospermophilus leucurus*) by the absence of stripes or spots (Best 1995). It occurs in the Mojave Desert and in parts of Inyo, Kern, Los Angeles, and San Bernardino Counties. It is most commonly found in creosote scrub, but also in Joshua tree woodland, desert saltbush scrub, desert sink scrub, desert greasewood scrub, and shadscale scrub (Leitner 2008; Zeiner et al. 1990). Mohave ground squirrels dig burrows in sandy and gravelly soils on flat to moderately sloping terrain. The burrows are used to avoid predators and high temperatures, and for aestivating during the winter months. Mohave ground squirrels are active only during spring and summer and spend most of the year (approximately seven months) below ground (Best 1995; Leitner 2008). The Study Area provides suitable habitat for this species. Previous surveys have detected this species within the Study Area (CDFW 2020), hence the previously issued ITP (CDFW 2011) for an earlier project. Mohave ground squirrel is considered to have a high potential to occur within the Study Area.

3.4.5 Desert Tortoise

The desert tortoise (*Gopherus agassizii*) is listed by USFWS as Threatened in 1990 (55 FR 12178) and CDFW listed the species as Threated in 1989 within the California Endangered Species Act (CESA; CDFW 2020). The threats detailed in the listing continue to affect the species with the most obvious threats being those that result in mortality and permanent habitat loss across large areas.

The desert tortoise occupies a variety of habitats from flats and slopes within creosote bush scrub at lower elevations, to rocky slopes in blackbrush (*Coleogyne* sp.) scrub and juniper (*Juniperus* sp.) woodland ecotones at high elevations (Germano et al. 1994). Its range includes the Mojave Desert. It is most common in desert scrub, creosote bush scrub, desert wash, and Joshua tree habitats, though it occurs in almost every desert habitat below 3,530 feet in elevation. Tortoises typically inhabit soft sandy loams and loamy sands, although they are also found on rocky slopes and in rimrock that provide natural-cover sites in crevices. It requires friable soil for burrowing and nest construction.

Diets typically consist of herbs, grasses, cactus, and wildflowers, and foraging occurs in the spring before aestivation in the summer. Desert tortoises emerge again in the fall with the cooler weather, absorbing water from their bladders if no major thunderstorms have occurred lately. Aestivation occurs again in the winter (Jennings 1997). Mating season peaks from August to October. Because this long-lived species requires 13 to 20 years to reach sexual maturity and has low reproductive rates, it is especially subject to external threats (USFWS 2010). Therefore, it is crucial that projects minimize their impacts to this species to mitigate additional threats to its survival.

Although suitable habitat occurs within the Study Area, the LADWP property in which the Project site occurs has been fenced and regularly monitored and maintained since 1985, with no sign observed during that time. Additionally, the previously issued ITP (CDFW 2011) does not indicate that desert tortoise are present or an issue for the Project site. Desert tortoise is determined to be absent from the Study Area.

TABLE 3 SPECIAL-STATUS WILDLIFE SPECIES AND THEIR POTENTIAL TO OCCUR WITHIN THE BIOLOGICAL STUDY AREA

SPECIES	STATUS	HABITAT	POTENTIAL FOR OCCURRENCE
Athene cunicularia burrowing owl	Fed: None State: SSC BLM: S	Occurs in open, dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. This includes a wide variety of vegetation communities, including coastal prairies, coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, and valley and foothill grasslands. Depends on fossorial mammals for burrows.	Moderate. Suitable foraging and nesting habitat for this species occurs within the study area, with records of occurrences within 2 miles of the Study Area, but no observations for more than 10 years (CDFW 2020).
Buteo swainsoni Swainson's hawk	Fed: None State: THR BLM: S	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, agricultural areas, and ranches. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	Absent. Suitable habitat for nesting occurs immediately adjacent to consistently utilized buildings, which would preclude nesting activities of this easily disturbed nester. One recorded observation within 2 miles of the Study Area exists from more than 80 years ago (CDFW 2020).
Toxostoma lecontei Le Conte's thrasher	Fed: None State: SSC BLM: None	Occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in dense, spiny shrubs or densely-branched cacti.	Moderate. Suitable foraging and nesting habitat for this species occurs within the Study Area, with records of observation within three miles of the Study Area, but no observations within the last 20 years (CDFW 2020).
Xerospermophilus mohavensis Mohave ground squirrel	Fed: None State: THR BLM: S	Occurs in chenopod scrub, Joshua tree woodland, and Mojavean desert scrub.	High. Suitable habitat to support this species occurs within the Study Area and one onsite observation in 2011 (CDFW 2020).
Gopherus agassizii desert tortoise	Fed: THR State: THR BLM: None	Occurs in Joshua tree woodland, Mojavean desert scrub, and Sonoran desert scrub.	Absent. Suitable habitat to support this species occurs within the Study Area, but the site is fenced and patrolled weekly with no observations since the construction of the switching station. One record within 3.5 miles of the Study Area exists, but no observation within the last 13 years (CDFW 2020).

Absent: Habitat or conditions on the site are not sufficient to support the species.
Moderate: Species or sign not observed on the site, but conditions suitable for occurrence and/or an historical record exists in the vicinity.
High: Species or sign not observed on the site, but reasonably certain to occur on the site based on conditions, species ranges, and recent records.

Federal Status
THR = listed as Threatened
State Status
THR = listed as Threatened under the California Endangered Species Act
SSC = designated as a Species of Concern
BLM Status
S = designated as a Sensitive species

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4.0 RECOMMENDATIONS

The following recommendations are provided for avoidance and minimization of effects to biological resources:

1. Conduct pre-construction focused floral surveys within the Study Area to determine presence/absence of special-status plant species determined to have a potential to occur, within the appropriate blooming periods, prior to and as close to the actual construction date as feasible.
2. A qualified biologist(s) will monitor all initial earth-moving and vegetation altering construction activities to ensure that standard and special-status species-specific avoidance and minimization recommendations are adhered to. The monitor will retain stop work authority in the event there is the likelihood of imminent take of special-status species. The biological monitor will conduct a general pre-construction inspection no more than 14 days prior to the start of construction to verify that no special-status species are in the project work area or its buffers. The monitor will also conduct periodic surveys in and around work to verify adherence to any applicable environmental compliance requirements. If the site is adequately fenced off following initial vegetation disturbance, the monitor will only be needed for periodic check-ins.
3. The footprint of disturbance will be minimized to the extent feasible. Access to sites will be via pre-existing access routes, to the greatest extent possible, and the work area boundaries will be delineated with staking, flagging, or other comparable markings to minimize surface disturbance associated with vehicle straying. Signs and/or fencing will be placed around the Project footprint to restrict access to Project-related vehicles.
4. Conduct pre-construction focused burrowing owl surveys within the Project footprint to determine presence/absence of the species. Surveys will record presence of any other species that might be considered to be of concern. If burrows are found, the appropriate CDFW-recommended buffer or a buffer deemed appropriate by a qualified biologist, will be installed until occupancy status is determined. If the buffer cannot be maintained during the non-breeding season, owls may be evicted from the burrows using accepted methodology as approved by resource agencies. Occupied burrows will not be disturbed during the owl nesting season, February 1 and August 31. Eviction will not occur during the nesting season.
5. If construction occurs between February 15 and August 15, the time period typically referenced in California for the general bird nesting season, pre-construction nesting surveys will be conducted within the Project footprint by a qualified biologist within one week of the start of construction. If no active bird nests are found within this area, no further mitigation is required. If an active nest is found, a 250-foot no disturbance buffer will be instated around the nest if it belongs to a non-listed or migratory bird. If the nest belongs to a listed or fully-protected species, a 500-foot no disturbance buffer will be instated around the nest. Nest buffers may be negotiated and nest removal prior to nesting season may be implemented through discussions with CDFW or other agencies, as applicable.
6. Coordinate with CDFW personnel to determine how to procede with potential preparation and submittal of a 2081 Incidental Take Permit for potential impacts associated with the Project.
7. Upon Project completion, any disturbance will be, to the extent practicable in areas not occupied by permanent project facilities, restored to pre-construction conditions. As required, the area of Project-related temporary disturbance will be revegetated (reseeded) to pre-disturbance levels.
8. Only certified weed-free straw and hay bales will be used, as necessary, during construction and weed-free seed for post-construction revegetation.

9. Project-related equipment will be cleaned (pressure wash or compressed air) prior to entering the Project site for the first time to reduce the chance of transporting noxious weed seeds from outside the area.
10. Vehicles and equipment should be maintained and free of leaks. All hazardous material, oil, hydraulic, or other fluid leaks should be contained and cleaned immediately to reduce the risk of negatively impacting water quality.
11. To avoid attracting predators and nuisance species, the Project footprint will be clear of debris, where possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the Project site.
12. To the extent practical project activities will avoid evening or night work, when common local wildlife species are most likely to be active.
13. No pets or firearms will be allowed on-site, and no harrassment, injuring, or killing of wildlife will be allowed.
14. The potential for fires will be minimized by using shields, mats, or other fire prevention methods when grinding, welding, or conducting any other activities that generate sparks or could otherwise start a fire. Fire extinguishers, water, and shovels will be kept on-site during construction activities.

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APPENDIX A PLANT SPECIES OBSERVED DURING THE FIELD SURVEY

SCIENTIFIC NAME	COMMON NAME
GYMNOSPERMS	
CUPRESSACEAE	CYPRESS FAMILY
*Cupressus sempervirens**	Italian cypress
ANGIOSPERMS (DICOTYLEDONS)	
ASTERACEAE	SUNFLOWER FAMILY
Ambrosia dumosa	burro bush
Ambrosia psilostachya	western ragweed
Chrysothamnus nauseosus	rubber rabbitbrush
Conyza sp.	horseweed
Coreopsis bigelovii	tickseed
Ericameria linearifolia	interior goldenbush
Filago californica	California fluffweed
Hymenoclea salsola	cheesebush
Malacothrix glabrata	desert dandelion
Stephanomeria sp.	wreathplant
BORAGINACEAE	BORAGE FAMILY
Amsinckia sp.	fiddleneck
Cryptantha sp.	cryptantha
Pectocarya penicillata	peninsular pectocarya
BRASSICACEAE	MUSTARD FAMILY
*Brassica tournefortii**	Sahara mustard
Descurainia pinnata	western tansy-mustard
Lepidium fremontii	desert peppergrass
CACTACEAE	CACTUS FAMILY
Cylindropuntia echinocarpa	silver cholla
Opuntia basilaris ssp. *basilaris*	beavertail cactus
CHENOPODIACEAE	GOOSEFOOT FAMILY
Atriplex confertifolia	spiny saltbush
Chenopodium californicum	California goosefoot
Grayia spinosa	spiny hopsage
Krascheninnikovia lanata	winter fat
EUPHORBIACEAE	SPURGE FAMILY
Chamaesyce albomarginata	rattlesnake weed
GERANIACEAE	GERANIUM FAMILY
*Erodium cicutarium**	red-stemmed filaree
LAMIACEAE	MINT FAMILY
Salazaria mexicana	bladder sage
Salvia columbariae	chia
NYCTAGINACEAE	FOUR O'CLOCK FAMILY

SCIENTIFIC NAME	COMMON NAME
Mirabilis sp.	wishbone bush
OLEACEAE	OLIVE FAMILY
*Olea europaea**	olive
POLEMONIACEAE	PHLOX FAMILY
Langloisia setosissima	langlosia
POLYGONACEAE	BUCKWHEAT FAMILY
Eriogonum fasciculatum	California buckwheat
Eriogonum sp.	annual buckwheat
ROSACEAE	ROSE FAMILY
Rosa sp.	ornamental rose
SALICACEAE	WILLOW FAMILY
Populus fremontii	Fremont cottonwood
TAMARICACEAE	TAMARISK FAMILY
*Tamarix ramosissima**	Mediterranean tamarisk
ZYGOPHYLLACEAE	CALTROP FAMILY
Larrea tridentata	creosote bush
ANGIOSPERMS (MONOCOTYLEDONS)	
LILIACEAE	LILY FAMILY
Agave sp.*	agave
Yucca brevifolia	Joshua tree
POACEAE	GRASS FAMILY
Achnatherum hymenoides	Indian rice-grass
*Bromus tectorum**	cheat grass
*Schismus barbatus**	Mediterranean schismus
TYPHACEAE	CATTAIL FAMILY
Typha sp.	cattail

*non-native species

APPENDIX B WILDLIFE SPECIES OBSERVED DURING THE FIELD SURVEY

SCIENTIFIC NAME	COMMON NAME	SIGN
CLASS REPTILIA	REPTILES	
IGUANIDAE	IGUANID LIZARDS	
Uta stansburiana	common side-blotched lizard	O
CLASS AVES	BIRDS	
CATHARTIDAE	NEW WORLD VULTURES	
Cathartes aura	turkey vulture	O
COLUMBIDAE	PIGEONS & DOVES	
Zenaida macroura	mourning dove	O, A
ALAUDIDAE	LARKS	
Eremophila alpestris	horned lark	O, A
CORVIDAE	JAYS & CROWS	
Corvus corax	common raven	O, A
MIMIDAE	MOCKINGBIRDS, THRASHERS	
Mimus polyglottos	northern mockingbird	O, A
Toxostoma sp.	thrasher	O
EMBERIZIDAE	EMBERIZIDS	
Amphispiza belli	sage sparrow	O
Spizella atrogularis	black-chinned sparrow	O, A
PASSERIDAE	OLD WORLD SPARROWS	
Passer domesticus	house sparrow	O, A
CLASS MAMMALIA	MAMMALS	
LEPORIDAE	HARES & RABBITS	
Lepus californicus	black-tailed jackrabbit	O
Sylvilagus audubonii	desert cottontail	O
SCIURIDAE	SQUIRRELS	
Ammospermophilus leucurus	white-tailed antelope squirrel	O, B

O = observed
A = aural
B = burrow

January 2021

LOS ANGELES DEPARTMENT OF POWER

Adelanto Switching Station

Draft - Western Joshua Tree Census Report

PROJECT NUMBER:
164629

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POWER ENGINEERS

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Draft - Western Joshua Tree Census Report

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ACRONYMS AND ABBREVIATIONS

CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
°F	degrees Fahrenheit
IPA	Intermountain Power Agency
LADWP	Los Angeles Department of Water and Power
POWER	POWER Engineers, Inc.
Project	Adelanto Switching Station Project

1.0 EXECUTIVE SUMMARY

The Los Angeles Department of Water and Power (LADWP) proposes the expansion of the Adelanto Switching Station (Project) located in the City of Adelanto in San Bernardino County. POWER Engineers, Inc. (POWER) was retained by LADWP to conduct a Western Joshua Tree Census on the approximate 315-acre Project site. Western Joshua trees (Joshua tree; *Yucca Brevifolia*) are candidate species under review by the California Department of Fish and Wildlife (CDFW) to be potentially listed as Threatened. During this review period, a permit is needed in order to remove and/or relocate any Joshua trees from a project site. The Project site consists of the existing Adelanto Switching Station, owned and operated by LADWP, and the Adelanto Converter Station, owned and operated by the Intermountain Power Agency (IPA). The fenced site is surrounded by paved roads and adjacent land use includes vacant lots and manufacturing facilities. The Project involves the expansion of the existing switching station and construction of a new converter station and associated facilities within the existing fenced Adelanto Station. On December 4, 2020 and December 9, 2020, POWER staff biologists conducted field surveys of the approximate 315-acre Project site. A total of 162 Joshua trees ranging from 1 to 25 feet in height were documented on-site. Of the 162 Joshua trees, 93 are estimated to be impacted by proposed Project activities. LADWP will consult with CDFW prior to construction activities regarding individual tree suitability for removal and/or transplantation to a new location within the Adelanto Station property. Based on the findings in this report, recommendations were made in order to avoid and/ or minimize impacts to the Joshua trees found on-site.

2.0 INTRODUCTION

As of October 9, 2020, Joshua trees are currently under review by CDFW as a candidate for listing under the California Endangered Species Act (CESA) as Threatened. Pursuant to CESA regulations, under which this species is granted protection, a census survey was required to document the location and health of all Joshua trees onsite. (California Fish and Game Commission 2020.). LADWP will then evaluate Joshua trees within the construction footprint for feasibility of relocating them to another location within the Project site and would relocate suitable trees in consultation with CDFW or adjusting the footprint of the Project to avoid Joshua trees, to the extent feasible. Understanding the number of trees and the age classes of trees on-site to be impacted by proposed Project activities allows an understanding of the available habitat and its capabilities to support and sustain transplanted trees.

Joshua trees that have grown to at least one meter in height tend to have a higher survivability rate than those less than one meter. They are more likely to survive transplantation and, therefore, have better chance at reaching reproductive age. Branching, or having more than one secondary access is a sign of maturity found in reproductive adult plants. Branch sets were noted when documenting Joshua trees as it is a good indicator of the reproducing population.

2.1 Project Location

The proposed Project is located within San Bernardino County, California in the City of Adelanto, approximately two miles west of Highway 395 and three miles north of State Route 18 (refer to Figure 1). It is situated in the northeast portion of Sections 5 and 6 of Township 5N, Range 5W as shown on the Adelanto, CA 1:24,000 United States Geological Survey quadrangle (refer to Figure 2). It is bounded on the north by Rancho Road, to the east by Daisy Road, to the south by Pansy Road, and to the east by Raccoon Avenue. Interstate 15 is located approximately eight miles to the east of the Project site, Highway 395 is approximately 1.5 miles to the east and State Route 18 is approximately three miles to the south.

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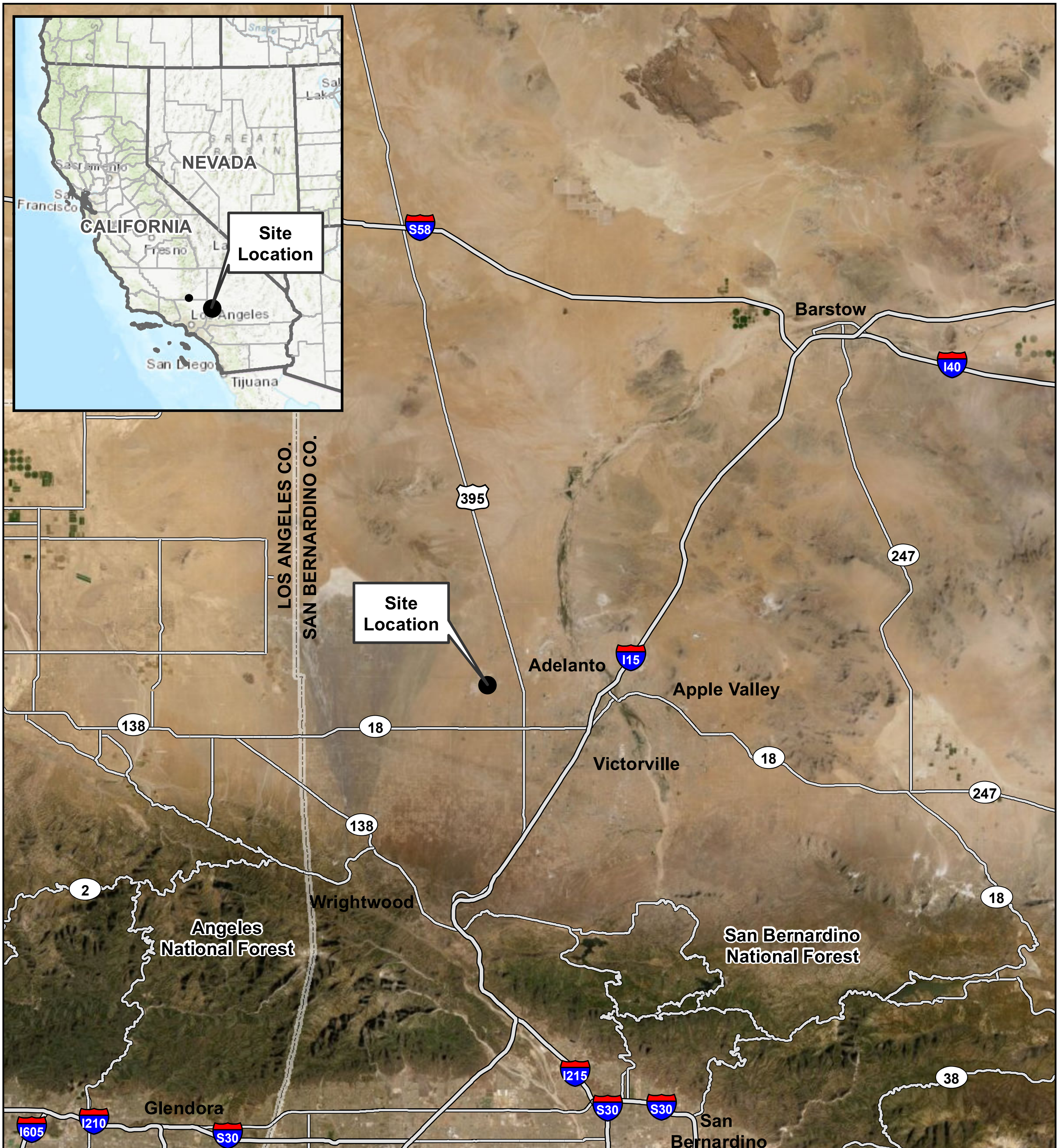

Site Location

Adelanto Switching Station

Figure 1
Vicinity Map

0 4 8 12
Miles

N

POWER ENGINEERS

Sources: ESRI, HERE, Garmin, USGS, OpenStreetMap Contributors, 2019.

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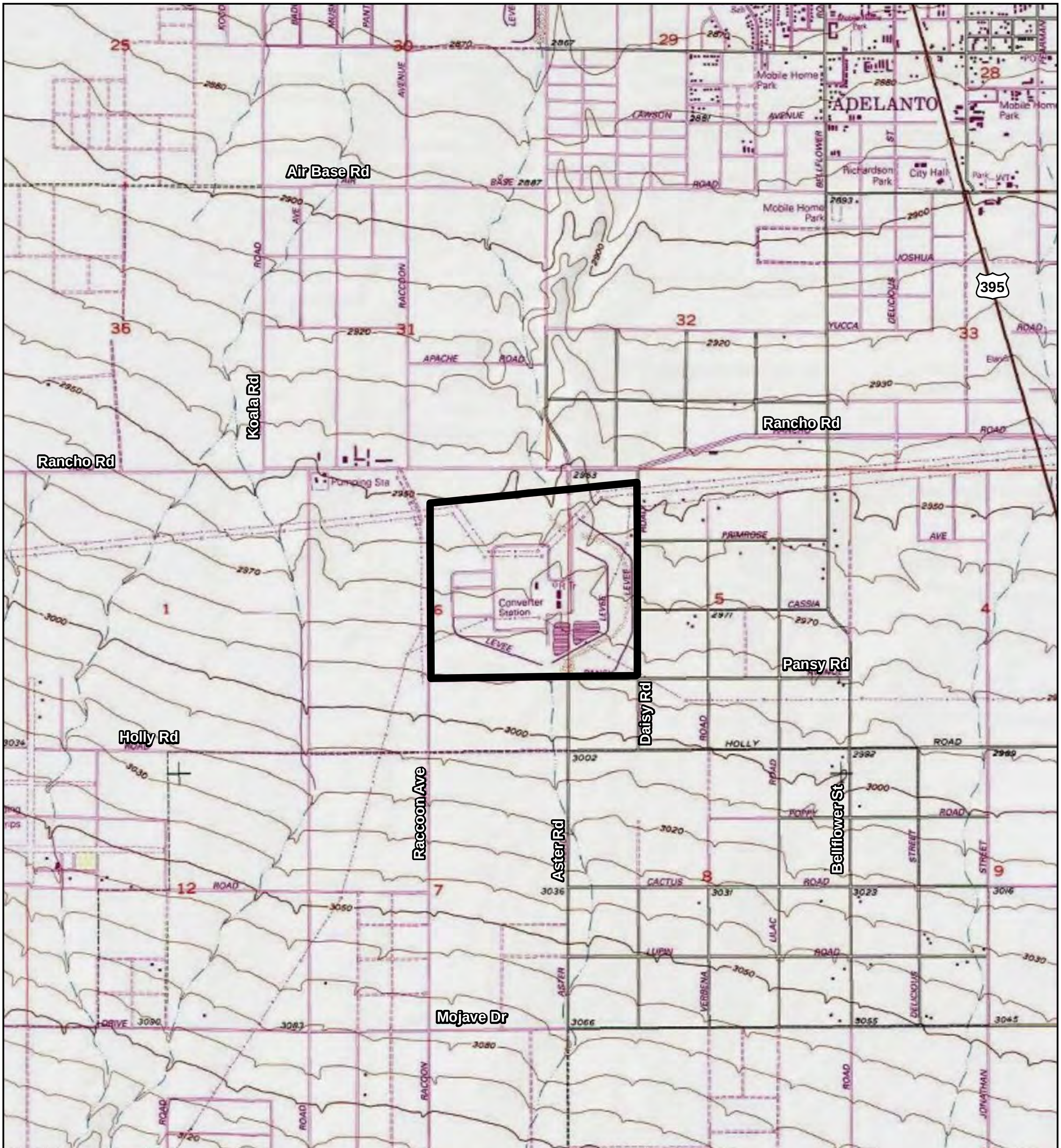

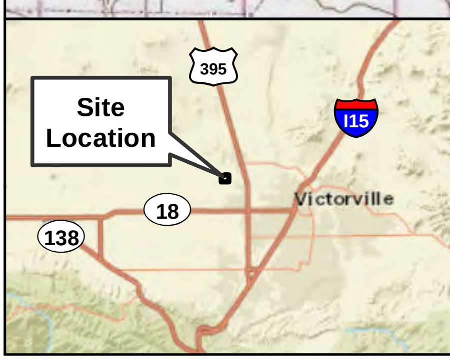

Site Boundary

Adelanto Switching Station

Figure 2
Location Map

0 1,000 2,000 3,000 4,000
Feet

N

POWER ENGINEERS

Aerial Photography Source:
USDA NAIP\California
2018-07-23

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2.2 Existing Conditions

The converter and switching station facilities are generally located in the central portion of the site. Solar panels occupy the southwestern portion of the Project site. Other facilities located on site include towers and other large-scale switching equipment, power transformers, operations and maintenance buildings, and two large converter equipment buildings. The Project site contains two earthen berms; one berm is located on the south and western portions of the site. The second berm is located on the south and eastern portions of the site with a low flow channel. Vegetative cover in the Project site consists mainly of disturbed Joshua tree woodland and creosote bush scrub. Representative photos are included in Appendix A. The elevation of the site ranges from approximately 2,950 to 3,000 feet above mean sea level and has relatively flat topography. The area is vegetated with native and non-native plant species, with large portions of the area that have been previously mechanically disturbed by human activities. Annual average precipitation is approximately seven inches January through March, with February receiving most of the yearly rainfall (Natural Resources Conservation Service 2020). The average low temperature is 45.2 degrees Fahrenheit (°F), and the average high temperature is 81.1°F.

2.3 Project Description

LADWP proposes the expansion of the Adelanto Switching Station and construction of a new Converter Station located at the existing Adelanto Station in the City of Adelanto in San Bernardino County. The expansion would occur entirely within the existing approximate 315-acre fenced Adelanto property. The property and switching station are owned by LADWP and the converter station is owned by the IPA, a political subdivision of the state of Utah. As part of the proposed Project, a new converter station would be built adjacent to the existing converter station in order to upgrade and replace aging infrastructure. The existing converter station would be demolished once the new converter station is operational. The switching station would also be expanded to accommodate the new converter station and associated equipment. In addition, other Project components include transmission line relocation, construction of new towers, site preparation, and demolition of existing structures. The proposed Project is needed to upgrade and replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability.

2.4 Methodology

The Project site was surveyed by POWER biologist Bailey Bentley and biologist Ryan Young on December 4 and December 9, 2020, documenting Joshua trees within the entire LADWP property. Temperatures ranged from 40°F to 50°F during the survey with clear skies and a calm breeze. A global positioning system unit was utilized mark coordinates of Joshua tree locations found on-site (refer to Figure 3). Attribute data such as tree height, diameter at breast height, canopy spread, health condition, and branch sets was logged along with number of trunks, if clones were found. The specific tree height was further categorized into three classes. Class 1 being trees that were under one meter in height. Class 2 trees were classified at one meter in height, not to exceed five meters. Class 3 trees were classified as trees above five meters in height. Health condition assessment was based on the overall health of each individual Joshua tree. Trees were classified as Good, Average, Poor, and Dead. Although clonal clumping was noted and locations were taken using one point per "clump," the number of trunks was counted as well.

2.5 Results

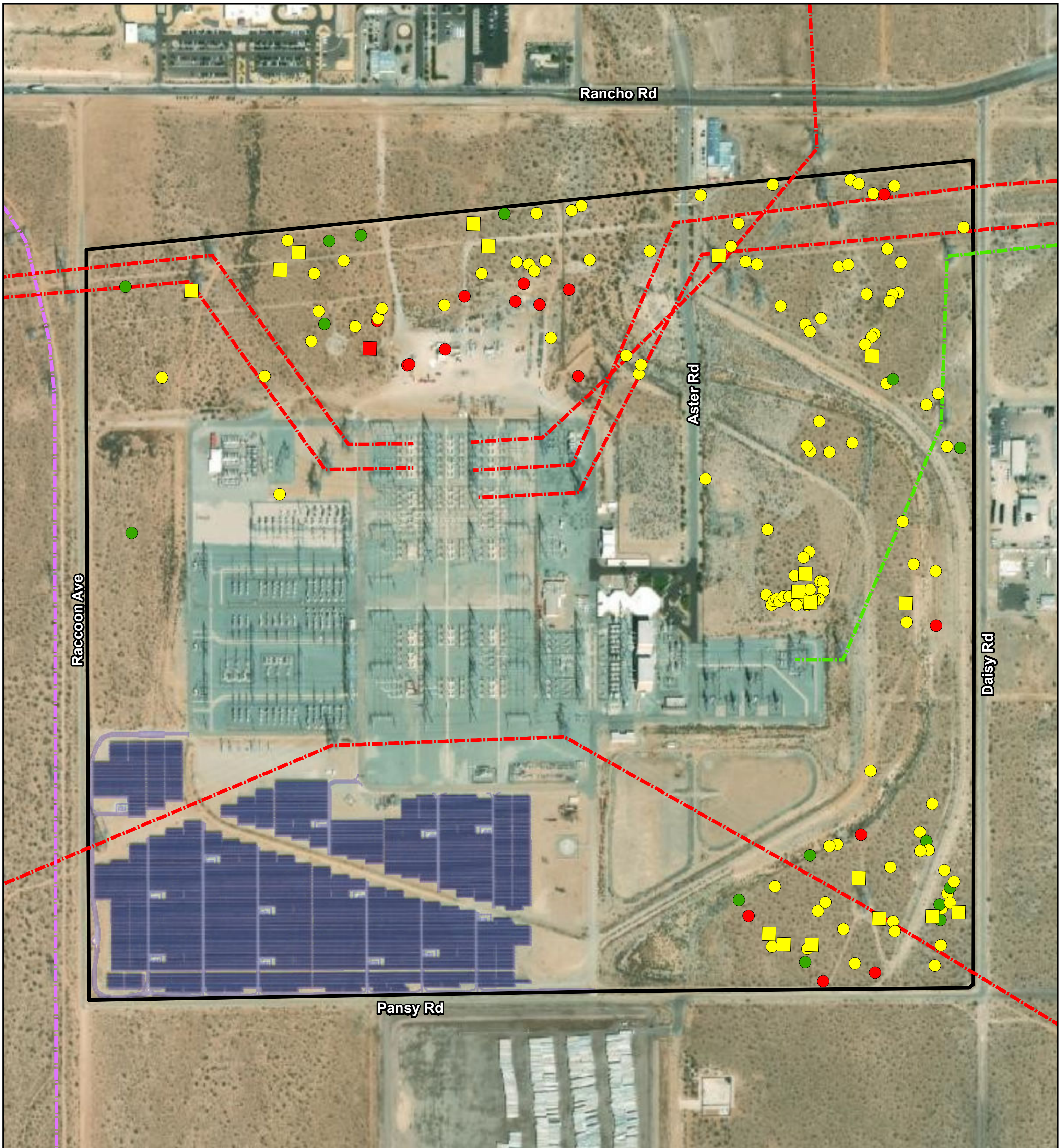
162 Joshua trees were found to be located within the Project boundary. Of that total, 93 trees are located within the temporary and permanent construction disturbance areas (refer to Figure 3). Class 2 trees (1.0 to 5.0 meters in height) were found to be evenly spread throughout the Project site. These trees were on

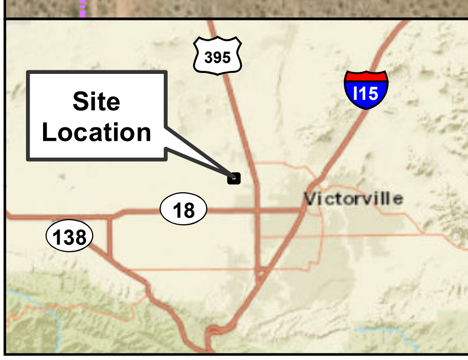
average in good health with two to three branch sets. The Class 3 trees (greater than 5.0 meters) were mainly concentrated in the northern portion of the site within a disturbed yard where vehicles and trailers were stored. These trees were also in good health despite being situated in a developed space. Class 1 trees (under 5.0 meters) were just as common as Class 3 but were spread out over the Project site. Although the Class 1 trees were in relatively good condition overall, they were not good candidates for transplantation (CDFW 2011) (Appendix B).

3.0 RECOMMENDATIONS

Based upon the findings of this report, it is recommended that measures be implemented as part of the Project to avoid, minimize, or compensate for the anticipated impacts from Project activities. LADWP shall discuss with CDFW any further measures that should be implemented in addition to or in place of on-site restoration mitigation.

1. Avoid Joshua trees to the extent feasible.
2. Transplantation of salvaged Joshua trees will take place during the months of October through March.
3. Salvaged Joshua trees should be replanted in the same season they were dug.
4. Salvaged Joshua trees that are not transplanted immediately should be temporarily planted either upright or at a slant in dry soil.
5. A qualified biologist should be onsite to oversee all transplantation activities. The Project biologist will coordinate a meeting with all contractors before transplantation activities.





Height Class

- 1 - Less than 1 Meter
- 2 - 1 to 5 Meters
- 3 - Greater than 5 Meters
- 2 (Clonal Clump) - 1 to 5 Meters
- 3 (Clonal Clump) - Greater than 5 Meters

Site Boundary

Existing Transmission Line

- 500 kV
- 230 kV
- DC Line

Adelanto Switching Station

Figure 3: Joshua Tree Census Survey

0 300 600 900
Feet

N

POWER ENGINEERS

Aerial Photography Source: USDA NAIP\California 2018-07-23

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4.0 REFERENCES

California Department of Fish and Wildlife (CDFW). 2011. Incidental Take Permit for Adelanto Solar Power Project, (208102011-051-06).

California Fish and Game Commission. 2020. Finding of Emergency and Statement of Proposed Emergency Regulatory Action.

Natural Resources Conservation Service. 2020. National Water and Climate Center. Victorville Station. http://www.wcc.nrcs.usda.gov/climate/navigate_wets.htm?state=ca.

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APPENDIX A REPRESENTATIVE PHOTOGRAPHS

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PHOTO 1 PHOTO POINT LOCATED IN THE NORTHEASTERN PORTION OF THE PROJECT SITE, FACING SOUTHWEST.

PHOTO 2 PHOTO POINT LOCATED IN THE NORTHWESTERN PORTION OF THE PROJECT SITE, FACING SOUTHEAST.

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APPENDIX B IMPACT INVENTORY

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GPS Record #	Tree #	DBH (ft)	Height Class*	Height (meters)	Spread (meters)	Health	Branch Sets	Clonal	Number of Trunks
1	1	1	2	4.57	4.57	Good	4	No	1
2	2	<1	2	3.05	1.83	Good	1	No	1
3	3	<1	2	3.05	.30	Good	1	No	1
4	4	<1	2	4.27	.91	Good	1	No	1
5	5	<1	2	3.66	.91	Average	1	No	1
6	6	<1	2	4.57	.91	Good	1	No	1
7	7	<1	2	3.05	.91	Good	1	Yes	3
8	8	<1	2	3.05	.91	Good	1	No	1
9	9	1	2	4.57	1.52	Good	2	No	1
10	10	1	2	3.05	.91	Good	1	No	1
11	11	<1	2	3.66	1.22	Good	1	No	1
12	12	1	2	4.57	3.05	Good	3	No	1
13	13	<1	2	3.96	1.52	Average	2	No	1
14	14	1	2	3.66	1.83	Good	2	No	1
15	15	<1	2	1.52	.30	Good	0	No	1
16	16	<1	2	3.66	.61	Good	1	Yes	3
17	17	<1	2	1.22	.30	Good	0	No	1
18	18	<1	2	1.52	.30	Good	0	No	1
19	19	1	2	4.57	3.05	Good	3	No	1
20	20	1	2	3.05	.91	Good	0	No	1
21	21	1	2	4.57	1.22	Good	1	No	1
22	22	1	2	3.66	1.22	Good	3	No	1
23	23	1	2	3.05	.30	Poor	1	No	1
24	24	1	2	1.83	.30	Good	1	Yes	4
25	25	1	2	4.57	.91	Average	2	No	1
26	26	1	2	3.66	1.22	Good	2	No	1
28	27	1<	2	5.49	3.05	Good	3	No	1
30	28	1<	2	4.57	3.05	Good	3	No	1
31	29	2	2	6.10	6.10	Good	5	No	1

32	30	<1	1	.30	.61	Good	0	No	1
33	31	1	2	4.57	1.83	Good	2	No	1
34	32	<1	2	2.44	.61	Good	1	No	1
35	33	2	3	6.10	6.10	Poor	7	No	1
36	34	1	2	4.57	3.05	Good	3	Yes	2
37	35	<1	2	1.83	.91	Good	1	No	1
38	36	<1	2	4.57	1.52	Good	1	Yes	3
39	37	<1	2	.61	.30	Good	0	No	1
40	38	<1	2	.61	.30	Good	0	No	1
41	39	2	3	18	4.57	Poor	1	No	1
42	40	<1	2	3.96	1.22	Average	2	No	1
43	41	<1	2	.91	.30	Good	0	No	1
44	42	<1	2	16	1.22	Good	2	Yes	1
45	43	<1	1	.61	.30	Good	0	No	1
46	44	<1	2	1.83	.61	Good	0	No	1
47	45	<1	1	.61	.30	Average	0	No	1
48	46	1	2	14	1.52	Good	2	No	1
49	47	<1	1	.61	.30	Good	0	No	1
50	48	<1	2	1.52	.30	Good	0	No	1
51	49	<1	2	4.57	.61	Average	1	No	1
52	50	<1	2	.91	.30	Good	0	No	1
54	51	1	2	4.57	.61	Average	3	Yes	2
55	52	<1	2	3.66	.91	Good	1	No	1
56	53	<1	2	.91	.30	Good	0	No	1
57	54	<1	2	3.05	.91	Good	1	Yes	2
58	55	<1	2	.91	.30	Good	0	No	1
59	56	<1	1	.61	.30	Good	0	No	1
60	57	2	3	18	3.05	Good	3	No	1
61	58	<1	2	.91	.30	Good	0	No	1
62	59	<1	2	.91	.30	Average	0	No	1
63	60	<1	2	1.52	.61	Good	0	No	1

64	61	<1	2	.91	.30	Good	0	No	1
65	62	<1	1	.61	.30	Good	0	No	1
66	63	<1	2	4.57	.91	Good	1	No	1
67	64	<1	2	2.44	.30	Good	0	yes	2
68	65	<1	2	1.52	.61	Good	0	No	1
69	66	<1	2	.91	.91	Good	0	Yes	2
70	67	<1	3	18	.91	Average	2	No	1
71	68	<1	1	.30	.30	Good	0	No	1
73	69	<1	1	.61	.30	Good	0	No	1
74	70	<1	2	1.22	.30	Good	0	No	1
75	71	<1	2	1.83	.61	Good	0	No	1
76	72	1	3	16	1.22	Good	2	Yes	2
77	73	3	3	20	6.10	Good	6	No	1
78	74	2	3	20	6.10	Average	6	No	1
79	75	2	3	25	4.57	Good	3	No	1
80	76	1	2	1.52	.30	Good	0	No	1
81	77	2	3	20	3.05	Average	3	No	1
82	78	2	3	18	2.44	Average	3	No	1
83	79	1	3	18	2.44	Good	3	No	1
84	80	1	2	1.83	.61	Good	0	No	1
85	81	1	2	4.57	.91	Good	1	No	1
86	82	1	2	7	.61	Good	0	No	1
88	83	1	2	2.44	1.22	Good	1	No	1
89	84	1	2	2.44	.61	Good	0	No	1
90	85	3	3	20	6.10	Average	6	No	1
91	86	2	2	4.57	4.57	Average	5	No	1
92	87	1	3	18	1.83	Good	3	No	1
93	88	<1	2	2.44	.61	Good	0	No	1
94	89	<1	2	3.05	1.22	Good	2	No	1
95	90	<1	2	1.22	.30	Good	0	No	1
96	91	<1	2	3.66	.30	Good	1	No	1

97	92	<1	1	.61	.61	Average	1	No	1
98	93	1	2	12	.91	Average	1	No	1
793	94	1	2	15	.91	Good	1	Yes	3
794	95	<1	1	.30	.30	Good	0	No	1
795	96	<1	1	.61	.30	Good	0	No	1
796	97	<1	2	1.83	.61	Average	0	Yes	2
797	98	<1	2	.91	.61	Average	0	No	1
798	99	<1	1	.61	.30	Average	0	No	1
800	100	1	2	.91	.91	Good	2	Yes	2
801	101	1	2	15	1.52	Good	5	Yes	2
802	102	1	2	3.05	1.22	Good	2	No	1
803	103	<1	2	.91	.30	Average	0	No	1
804	104	<1	2	1.83	.91	Poor	0	Yes	3
805	105	<1	1	.61	.30	Good	0	No	1
806	106	<1	2	.91	.30	Poor	0	No	1
808	107	<1	2	1.83	.61	Average	0	No	1
810	108	1	2	15	1.83	Good	6	No	1
811	109	1	2	15	1.83	Good	5	No	1
812	110	1	2	15	1.52	Average	3	No	1
813	111	3	3	20	4.57	Poor	15	No	1
814	112	1	3	18	1.83	Good	4	No	1
815	113	1	2	.91	.61	Good	0	No	1
817	114	<1	2	1.52	.30	Good	0	No	1
818	115	<1	2	.91	.30	Average	0	No	1
819	116	<1	2	1.83	.61	Average	0	No	1
820	117	<1	2	1.83	.30	Average	0	No	1
821	118	1	2	15	1.83	Good	8	No	1
822	119	1	2	3.05	1.83	Good	6	Yes	2
823	120	<1	2	15	1.52	Good	2	No	1
824	121	1	3	20	1.83	Good	7	No	1
825	122	<1	2	3.05	1.22	Average	3	No	1

826	123	<1	2	1.52	.61	Poor	2	No	1
827	124	1	2	15	.91	Average	4	Yes	5
828	125	<1	2	1.83	.61	Average	0	No	1
829	126	1	2	3.05	1.22	Good	4	No	1
830	27	1	2	4.57	3.05	Good	11	No	1
831	128	1	2	4.57	1.83	Average	5	No	1
832	129	<1	2	3.05	.30	Average	0	No	1
833	130	<1	2	4.57	.61	Average	1	No	1
834	131	<1	2	1.83	.61	Average	0	No	1
835	132	1	2	3.05	1.22	Good	5	No	1
836	133	1	2	3.05	.91	Good	3	No	1
837	134	1	2	3.05	1.83	Good	5	No	1
838	135	1	2	4.57	1.52	Good	4	No	1
839	136	1	2	3.05	.91	Good	3	No	1
840	137	<1	2	.91	.30	Average	2	No	1
841	138	2	3	6.10	15	Poor	10+	No	1
842	139	<1	2	1.22	.30	Average	2	No	1
843	140	1	2	3.05	1.22	Average	3	No	1
845	141	2	2	3.05	1.52	Good	7	No	1
846	142	1	2	3.05	1.52	Good	7	No	1
847	143	<1	2	.91	.30	Good	0	No	1
848	144	<1	2	1.83	.30	Good	0	No	1
849	145	1	2	3.05	1.22	Good	5	No	1
850	146	1	2	15	.91	Good	4	No	1
851	147	2	2	15	1.83	Good	9	No	1
852	148	2	2	15	7	Average	15	No	1
853	149	1	2	3.05	1.83	Poor	3	No	1
854	150	1	2	3.05	1.83	Good	3	Yes	2
855	151	1	2	7	.91	Average	2	No	1
856	152	<1	1	.30	.30	Good	0	No	1
857	153	<1	2	3.05	7	Good	8	No	1

858	154	1	2	15	1.83	Good	3	No	1
859	155	1	2	15	1.83	Good	7	No	1
860	156	<1	1	.61	.30	Good	0	No	1
861	157	<1	2	.91	.30	Poor	0	No	1
862	158	<1	2	7	.30	Average	0	No	1
863	159	1	2	15	1.52	Good	8	No	1
864	160	<1	2	3.05	.30	Good	0	No	1
865	161	1	2	15	1.83	Average	3	No	1
868	162	1	2	15	3.05	Poor	11	No	1

** Class 1: Trees less than 1 meter in height. Class 2: Trees more than one meter but less than 5 meters in height. Class 3: Over 5 meters in height.*

Jurisdictional Delineation Report

Adelanto Converter Station Project

Located in the City of Victorville, County of San Bernardino, California

Prepared for

Los Angeles Department of Water and Power
Environmental Affairs
Wastewater Quality and Compliance
111 North Hope Street, Room 1213
Los Angeles, California 90012
Contact: Edgar Gomez

Prepared by

Psomas
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707

March 2020

TABLE OF CONTENTS

TABLES

EXHIBITS

ATTACHMENTS

EXECUTIVE SUMMARY

This Jurisdictional Delineation Report provides baseline data regarding the type and extent of jurisdictional resources occurring within the vicinity of the Adelanto Converter Station Project (Project). Jurisdictional resources considered for this report include wetlands and non-wetland "waters of the United States" (WOTUS) regulated by the U.S. Army Corps of Engineers (USACE); "waters of the State" regulated by the Regional Water Quality Control Board (RWQCB); and the bed, bank, and channel of all lakes, rivers, and/or streams (and associated riparian vegetation), as regulated by the California Department of Fish and Wildlife (CDFW).

The limits of non-wetland WOTUS and "waters of the State" were identified by the presence of an ordinary high water mark (OHWM) and by determining potential inundation. The presence of a wetland feature on the site was identified utilizing the USACE's three-parameter approach in which wetlands are defined by the presence of hydrophytic vegetation, hydric soils, and wetland hydrology indicators. The limits of CDFW jurisdictional waters were identified as either the top of the bank or the outer drip-line of riparian vegetation.

The jurisdictional delineation work was performed by Psomas Project Manager Sean Noonan on January 14, 2020. Based on the results of the jurisdictional delineation field work, it was determined that the total amount of jurisdictional resources in the survey area are as follows:

- **USACE Jurisdictional WOTUS:**

  There were no WOTUS identified in the survey area.

- **RWQCB Jurisdictional "waters of the State":**

  A total of 5.687 acre of jurisdictional "waters of the State" were identified in the survey area, of which 0.006 acres are wetland and 5.681 acres are non-wetland.

- **CDFW Jurisdictional Streambeds:**

  A total of 7.729 acres of jurisdictional streambeds were identified in the survey area.

1.0 INTRODUCTION

This Jurisdictional Delineation Report was prepared for the Los Angeles Department of Water and Power (LADWP) to provide baseline data regarding the type and extent of resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), Lahontan Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) for the Adelanto Converter Station Project (Project) located in the City of Adelanto, California (Exhibit 1).

1.1 PROJECT LOCATION

The Project is located in the western portion of San Bernardino County, west of U.S. Route 395 (US 395) and north of State Route 18 (SR-18) (Exhibit 2). The Project site lies approximately 350 feet south of Rancho Road, and immediately adjacent to Raccoon Avenue to the west, Daisy Road to the east, and Pansy Road to the south. The survey area for this report consists of an approximate 315-acre area including the Project disturbance area and an adjacent buffer that spans to the fenced boundaries of the Adelanto Converter Station. The Adelanto Converter Station was constructed in 1986 and is the southern terminus of the 2,400 megawatt Path 27 Utah-California high voltage DC power (HVDC) transmission line. The Project survey area is depicted on the U.S. Geological Survey's (USGS') Adelanto 7.5-minute topographic quadrangle of the San Bernardino Meridian (Exhibit 3) in Township 5 North, Range 5 West, Sections 5 and 6.

1.2 EXISTING CONDITIONS

The Project survey area is located in an area of Adelanto that has recently experienced growth including residential, light industrial, and institutional uses; however, parcels adjacent to the Project site are still generally undeveloped. The Project site is entirely fenced from public access. Some portions of the interior of the converter station were off limits to the surveyors due to the presence of high voltage lines and conductors, which presented a safety hazard, although these areas had no potential to contain jurisdictional resources.

Much of the Project site is developed as an existing power station. Two berms were constructed as part of the power station. One berm is located on the south and western portion of the site. The second berm is located on the south and eastern portions of the site, providing protection to the other side of the Project site from a more defined drainage feature that appears to, at times, convey a high stormwater flows.

There is evidence of some areas of the Project site having been utilized in the past for access, storage/staging, and other uses. These areas are generally earthen. Other areas of the site support scattered creosote bush scrub habitat that includes creosote bush (*Larrea tredentata*), cheese-bush (*Ambrosia salsola*), white bur-sage (*Ambrosia dumosa)* with some limited occurrences of brittlebush (*Encelia farinose*).

1.3 PROJECT DESCRIPTION

As part of this Project, LADWP proposes to conduct various improvements within the limits of the Project site including, but not limited to, construction of new buildings, reconstruction and provision of new stormwater improvements in the Project site, demolition of existing structures, and construction of new towers.

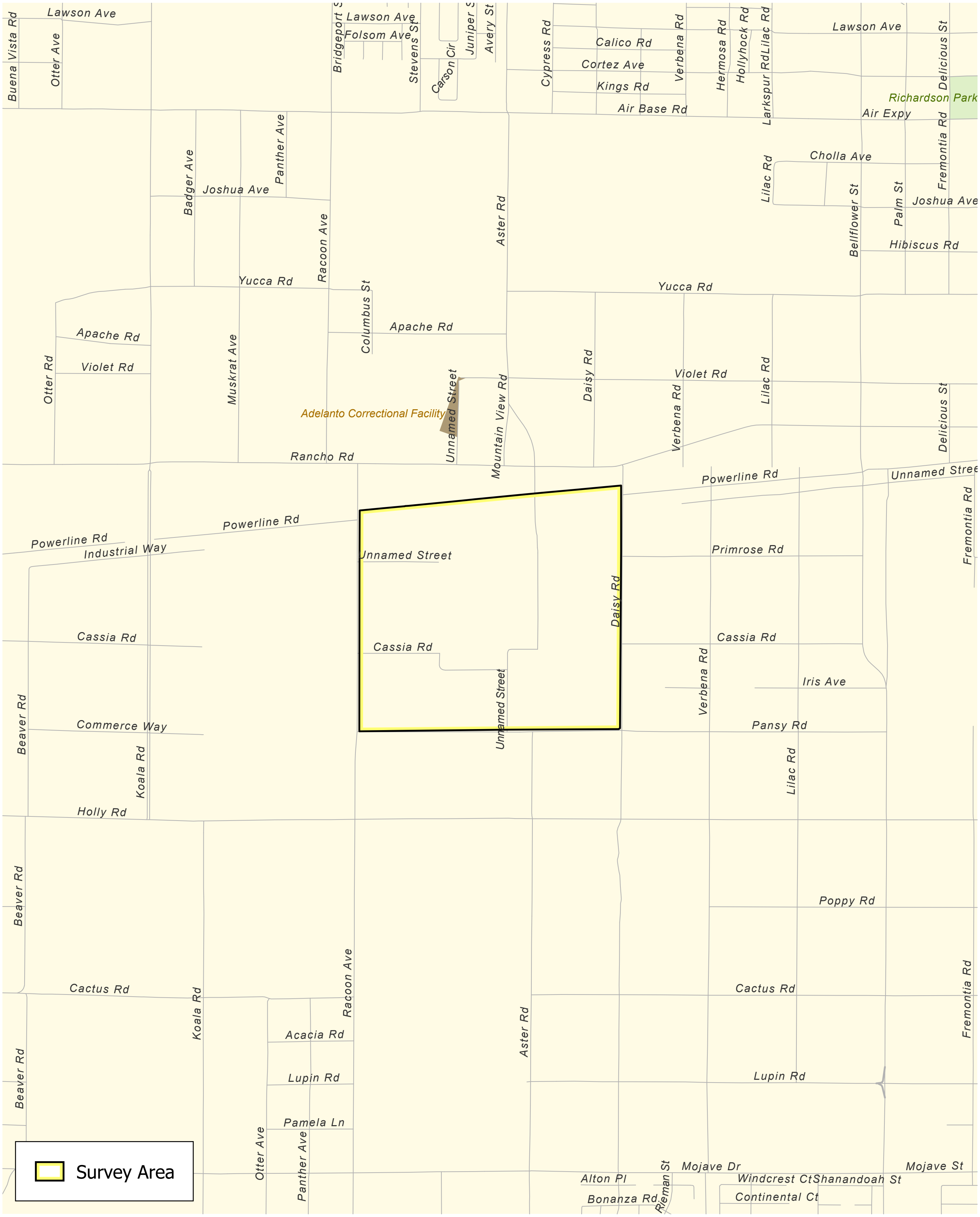
Regional Location

Exhibit 1

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(Rev: 1-29-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_RL.pdf



Local Vicinity

Exhibit 2

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N S E W

2,000 1,000 0 2,000 Feet

PSOMAS

(Rev: 1-29-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_LV.pdf

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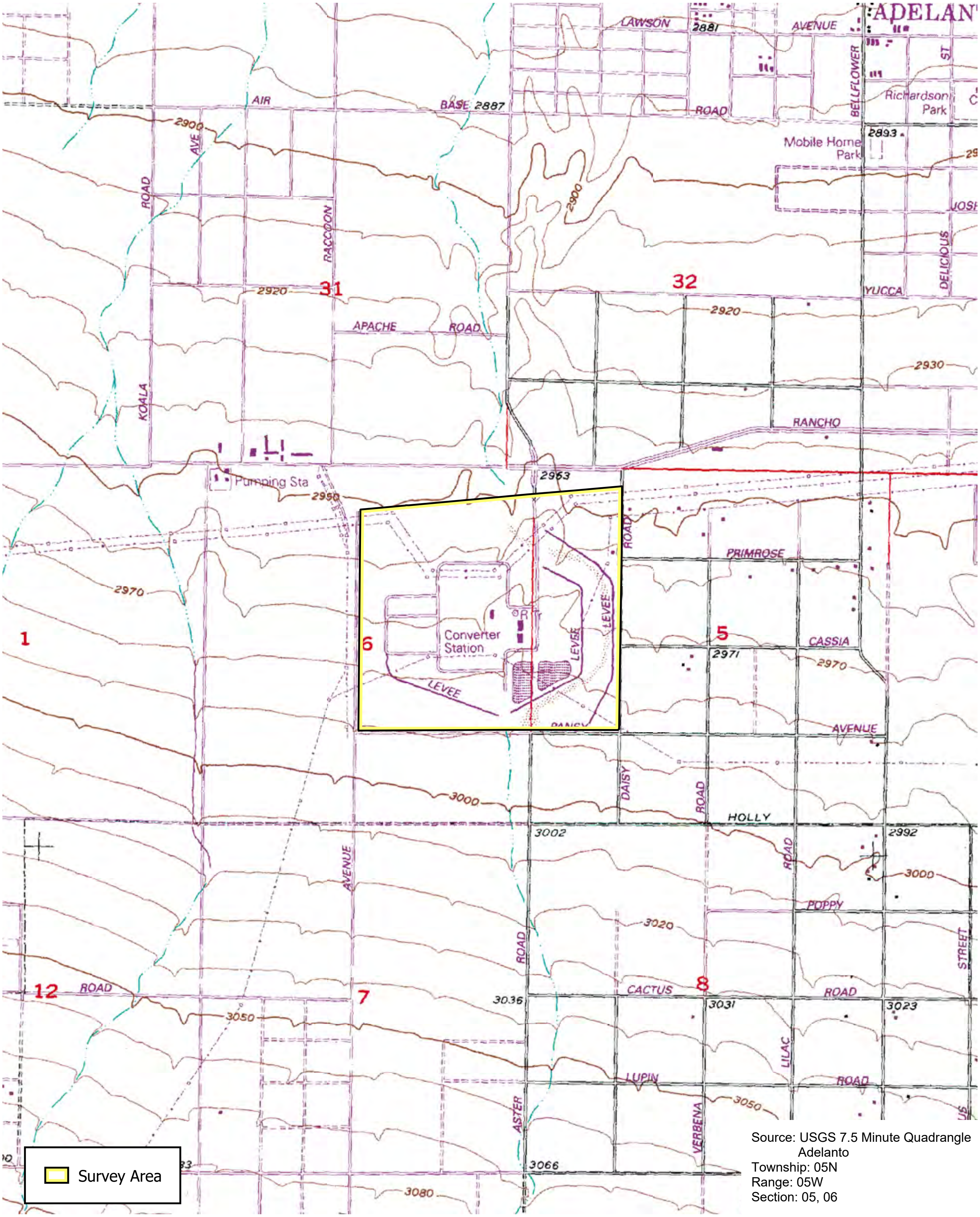

Source: USGS 7.5 Minute Quadrangle
Adelanto
Township: 05N
Range: 05W
Section: 05, 06

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USGS 7.5-Minute Digital Quadrangle

Exhibit 3

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N W E S

2,000 1,000 0 2,000 Feet

PSOMAS

(Rev: 2-26-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_USGS.pdf

1.4 REGULATORY AUTHORITY

This section summarizes the federal and State agencies' regulatory jurisdiction over activities that have a potential to impact jurisdictional resources. A detailed explanation of each agency's regulatory authority is provided in Attachment A.

1.4.1 U.S. Army Corps of Engineers

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into WOTUS under Section 404 of the federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. The USACE's authority applies to all WOTUS where the material (1) replaces any portion of a WOTUS with dry land or (2) changes the bottom elevation of any portion of any WOTUS. Activities that result in fill or dredge of WOTUS require a permit from the USACE.

On October 22, 2019, the Environmental Protection Agency and Department of the Army (the agencies) published a final rule (Step One) to repeal the 2015 Rule defining WOTUS and re-codify the regulatory text that existed prior to the 2015 Rule. The final Step One rule became effective on December 23, 2019. On September 12, 2019, the Environmental Protection Agency and Department of the Army signed a final rule to repeal the 2015 Clean Water Rule (2015 Rule) and re-codify the regulatory text defining WOTUS that existed prior to the 2015 Rule. The Step One rule will be replaced by the Navigable Waters Protection Rule upon its effective date, 60 days after publication in the Federal Register. On January 23, 2020, the agencies finalized the Navigable Waters Protection Rule to define WOTUS. The new rule will go into effect 60 days following its publication in the Federal Register. The new rule has not yet been published in the Federal Register.

1.4.2 Regional Water Quality Control Board

The State Water Resources Control Board (SWRCB), in conjunction with the nine RWQCBs, is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the Federal CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The SWRCB's and RWQCBs' jurisdictions extend to all "waters of the State" and to all WOTUS, including wetlands (isolated and non-isolated).

On August 28, 2019, the Office of Administrative Law approved the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to "waters of the State". The procedures will go into effect on May 28, 2020. Under these new regulations, the State Water Resources Control Board and its nine RWQCBs will assert jurisdiction over all existing WOTUS, and all waters that would have been considered WOTUS under the 2015 Rule. Thus, the WOTUS that would no longer be under USACE jurisdiction, such as ephemeral features, would be under RWQCB jurisdiction.

1.4.3 California Department of Fish and Wildlife

The CDFW regulates activities that may affect rivers, streams, and lakes pursuant to the *California Fish and Game Code* (§§1600–1616). According to Section 1602 of the *California Fish and Game Code,* the CDFW has regulatory authority over any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

2.0 METHODS

2.1 LITERATURE REVIEW

Prior to conducting the delineation and during the course of report preparation, Psomas reviewed the following documents to identify areas that may fall under agency jurisdiction: the USGS' Adelanto 7.5-minute topographic quadrangle map; color aerial photography provided by Google Earth; soil data provided by the U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS 2020a); the National Hydric Soils List (USDA NRCS 2020b); the National Wetlands Inventory's *Wetland Mapper* (USFWS 2020); and the *Water Quality Control Plan for the Lahontan Region* (Lahontan Region RWQCB 1995).

2.2 JURISDICTIONAL DELINEATION

Non-wetland WOTUS are delineated based on the limits of the Ordinary High Water Mark (OHWM), which can be determined by a number of factors, including the presence of a clear, natural line impressed on the bank' shelving' changes in the character of the soil' destruction of terrestrial vegetation, and the presence of litter and debris. The OHWM limits (e.g., active floodplain) occurring in the survey area were further verified using methods contained in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*, *A Delineation Manual* (Lichvar and McColley 2008) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010).

In September 2008, the USACE issued the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.* This regional supplement is designed for use with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of WOTUS and wetland resources. A three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. Wetlands generally include swamps, marshes, bogs, and similar areas. To be considered a wetland, an area must exhibit at least minimal hydric characteristics within the three parameters. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability or the nature of the soils or plant species on site. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the Regional Supplement.

The RWQCB shares USACE jurisdiction unless isolated conditions are present, or if the drainage is ephemeral. If isolated waters are present or if waters are ephemeral in nature, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands method pursuant to the 1987 Wetlands Manual.

The CDFW's jurisdiction is defined as the top of the bank on either side of a stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, lake, or other impoundment.

The analysis contained in this report uses the results of a field survey conducted by Psomas Project Manager Sean Noonan on January 14, 2020. Jurisdictional features were delineated using a 1 inch equals 200 feet (1″ = 200′) scale aerial photograph. Jurisdictional features were delineated as a drainage polygon with corresponding width measurements. A preliminary assessment of the presence of wetland WOTUS was made based on vegetation and hydrology; if potential wetlands were observed, test pits were dug to analyze soil and to confirm the presence or absence of wetlands. Representative photographs of site conditions in the survey area are provided in Attachment B. A Wetland Determination Data Form that was prepared for the Project to determine the potential presence of wetlands at one location within the survey area is included in Attachment C.

2.2.1 Vegetation

Hydrophytic vegetation (or hydrophytes) is defined as any macrophytic plant that "grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; plants typically found in wet habitats" (Environmental Laboratory 1987). Specifically, these plant species have specialized morphological, physiological, or other adaptations for surviving in permanently saturated to periodically saturated soils where oxygen levels are very low or the soils are anaerobic. Lichvar and Gillrich (2011) provide the following technical definitions of wetland plant indicator status categories, which are also commonly known as Cowardin Codes:

- **Obligate Wetland (OBL):** These wetland-dependent plants (herbaceous or woody) require standing water or seasonally saturated soils (14 or more consecutive days) near the surface to ensure adequate growth, development, and reproduction and to maintain healthy populations. These plants consist of four types:
    - *submerged:* plants that conduct virtually all of their growth and reproductive activity under water.
    - *floating:* plants that grow with leaves and most often their vegetative and reproductive organs floating on the water surface.
    - *floating-leaved:* plants that are rooted in sediment but also have leaves that float on the water surface.
    - *emergent:* herbaceous and woody plants that grow with their bases submerged and rooted in inundated sediment or seasonally saturated soil and their upper portions, including most of the vegetative and reproductive organs, growing above the water level.
- **Facultative Wetlands (FACW):** These plants depend on and predominantly occur with hydric soils, standing water, or seasonally high water tables in wet habitats for ensuring optimal growth, development, and reproduction and for maintaining healthy populations. These plants often grow in geomorphic locations where water saturates soils or floods the soil surface at least seasonally.
- **Facultative (FAC):** These plants can occur in wetlands or non-wetlands. They can grow in hydric, mesic, or xeric habitats. The occurrence of these plants in different habitats represents responses to a variety of environmental variables other than just hydrology (e.g., shade tolerance, soil hydrogen potential [pH], and elevation) and they have a wide tolerance of soil moisture conditions.
- **Facultative Upland (FACU):** These plants are not wetland dependent. They can grow on hydric and seasonally saturated soils, but they develop optimal growth and healthy populations on predominantly drier or more mesic sites. Unlike FAC plants, these plants are non-wetland plants by habitat preference.
- **Obligate Upland (UPL):** These plants occupy mesic to xeric non-wetland habitats. They almost never occur in standing water or saturated soils. Typical growth forms include herbaceous, shrubs, woody vines, and trees.

The USACE—as part of an interagency effort with the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), and the USDA NRCS—has approved a National Wetland Plant List (NWPL), which provides the current indicator status for plant species. The NWPL is used to determine whether the hydrophytic vegetation parameter is met when conducting wetland determinations under the CWA and the Wetland Conservation Provisions of the Food Security Act. The NWPL is also intended to be used for wetland restoration, establishment, and enhancement projects. This report utilizes the indicator statuses for the Arid West Supplement portion of the NWPL.

The following are three procedures for determining whether the hydrophytic vegetation criterion is met: Indicator 1, "Dominance Test", using the "50/20 Rule"; Indicator 2, "Prevalence Index"; or Indicator 3, "Morphological Adaptation", as identified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). The hydrophytic vegetation criterion is met if any indicator is satisfied. If none of the indicators are satisfied, then hydrophytic vegetation is absent unless (1) indicators of hydric soil and wetland hydrology are present and (2) the site meets the requirements for a problematic wetland situation.

- **Dominance Test:** Vegetative cover is estimated and is ranked according to its dominance. Dominant species are the most abundant species for each stratum of the community (e.g., tree, sapling/shrub, herb, or woody vine) that individually or collectively amount to 50 percent of the total coverage of vegetation plus any other species that, by itself, accounts for 20 percent of the total vegetation cover (also known as the "50/20 Rule"). These species are recorded on the "Wetland Determination Data Form – Arid West Region". The wetlands indicator status of each species is also recorded on the data forms based on the NWPL (Lichvar and Kartesz 2009). If greater than 50 percent of the dominant species across all strata are OBL, FACW, or FAC species, the criterion for wetland vegetation is considered to be met.
- **Prevalence Index:** The prevalence index considers all plant species in a community, not just the dominant ones. The prevalence index is the average of the wetland indicator status of all plant species in a sampling plot. Each indicator status category is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and is weighted by the species' abundance (percent cover). Hydrophytic vegetation is present if the prevalence index is 3.0 or less.
- **Morphological Adaptation:** Morphological adaptations, such as adventitious roots (e.g., roots that take advantage of the wet conditions) and shallow root systems, must be observed on more than 50 percent of the individuals of a FACU species for the hydrophytic vegetation wetland criterion to be met.

2.2.2 Soils

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that is formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions (or conditions of limited oxygen) at or near the soil surface and that favor the establishment of hydrophytic vegetation (USDA NRCS 2020). Hydric soils created under artificial conditions of flooding and inundation sufficient for the establishment of hydrophytic vegetation would also meet this hydric soil indicator.

The soil conditions are verified by digging test pits along each transect to a depth of at least 20 inches (except where a restrictive layer occurs in areas containing hard pan, cobble, or solid rock). It should be noted that, at some sites, it may be necessary to make exploratory soil test pits up to 40 inches deep to more accurately document and understand the variability in soil properties and hydrologic relationships on the site. Soil test pit locations are usually dug in the drainage invert or at the edge of a waterbody/drainage course in vegetated areas. Soil extracted from each soil test pit is then examined for texture and color using the standard plates on the Munsell Soil Color Chart (1994) and recorded on the Data Form. The Munsell Soil Color Chart aids in designating soils by color labels based on gradations of three simple variables: hue, value, and chroma. Any indicators of hydric soils, such as the following, are also recorded on the Data Form: redoximorphic features (e.g., areas where iron is reduced under anaerobic conditions and oxidized following a return to aerobic conditions); buried organic matter; organic streaking; reduced soil conditions; gleyed (e.g., soils having a characteristic bluish-gray or greenish-gray color) or low-chroma soils; or sulfuric odor. If hydric soils are found, progressive pits are dug along the transect moving laterally away from the active channel area until hydric soil features are no longer present in the top 20 inches of the soil.

2.2.3 Hydrology

Wetland hydrology indicators provide evidence that a site has a continuing wetland hydrologic regime. Wetlands hydrology is represented by either (1) all of the hydrological elements or characteristics of areas permanently or periodically inundated or (2) areas containing soils that are saturated for a sufficient duration of time to create hydric soils suitable for the establishment of plant species that are typically adapted to anaerobic soil conditions. The presence of wetland hydrology is evaluated at each intersect by recording the extent of observed surface flows; the depth of inundation; the depth to saturated soils; and the depth to free water in soil test pits. In instances where stream flow is divided into multiple channels with intervening sandbars, the entire area between the channels is considered to be within the “Active Floodplain” and within the OHWM. Therefore, an area containing these features would meet the indicator requirements for wetland hydrology.

3.0 RESULTS

A description of the literature review results is provided in Section 3.1, and a detailed analysis of each regulatory agency's jurisdiction is provided in Section 3.2.

3.1 LITERATURE REVIEW RESULTS

USGS Topographic Quadrangle. The USGS topographic quadrangle maps depict geological formations and their characteristics; they describe the physical settings of an area through topographic contour lines and other major surface features. These features include lakes, streams, rivers, buildings, roadways, landmarks, and other features that may fall under the jurisdiction of one or more regulatory agencies. In addition, the USGS maps provide topographic information that is useful in determining elevations, latitude and longitude, and Universal Transverse Mercator (UTM) Grid coordinates for a survey area.

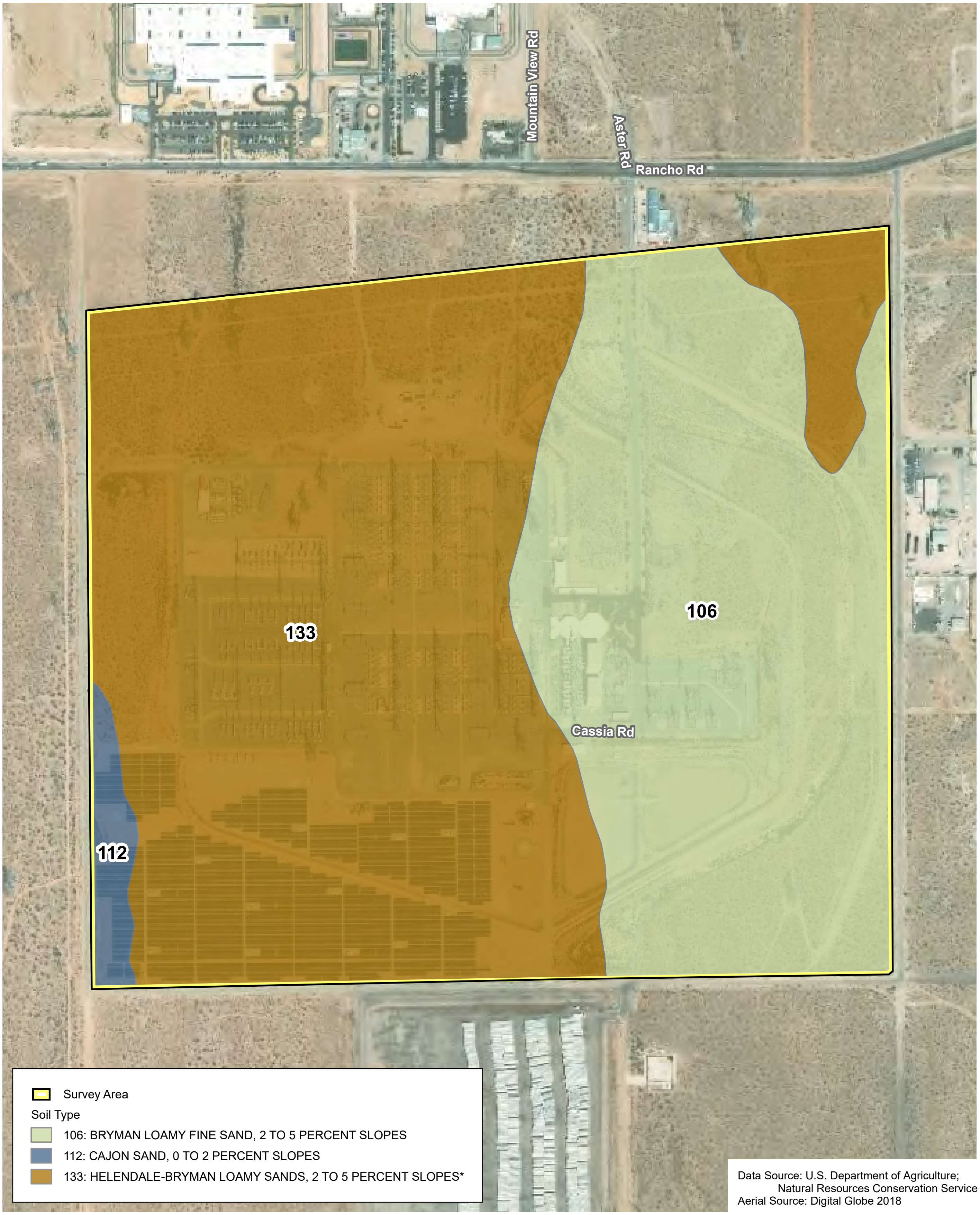
The Project survey area is depicted on the USGS' Adelanto 7.5-minute topographic quadrangle map. Although no prominent topographic features occur in the nearby vicinity, the map shows that the topography in the vicinity gently slopes down towards the north and that the Project site occurs at a low topographic point within the local vicinity. As shown in the mapping, this topographic low point generally parallels and crisscrosses Aster Road north and south of the Project site. Elevation in the Project survey area ranges from approximately 2,950 feet above mean sea level at the southern portion of the site and 3,000 feet above mean sea level at the northern portion of the Project site.

Color Aerial Photography. Psomas reviewed an existing color aerial photograph prior to conducting the field delineation to identify the extent of any drainages/waterbodies and riparian vegetation occurring in the survey area. Aerial imagery clearly show a drainage course traversing the Project site from south to north on the eastern portion of the site, as well as two basins in the center of the site. Various other smaller drainages are also visible. Imagery also depict a property south of Pansy Road, south of the Project site, which was developed in-line with portions of two drainage channels. This adjacent development has likely redirected stormwater flows from traveling north towards the Adelanto Converter Station.

U.S. Department of Agriculture, Natural Resources Conservation Service. The presence of hydric soils is one of the chief indicators of jurisdictional wetlands. Psomas reviewed the USDA's soil data for the survey area (Exhibit 4).

Three types of soils are present in the Project study area: 106: Bryman Loamy Fine Sane, 2 to 5 percent slopes; 112: Cajon Sand, 0 to 2 percent slopes; and 133: Helendale-Bryman Loamy Sands, 2 to 5 percent slopes. The NRCS has delineated the boundaries of 'soil map units', which often contain components of multiple soil types that may be classified as hydric or non-hydric. The National Hydric Soils List identifies a soil map unit as "hydric" if it contains either a major or minor component that is at least in part hydric (USDA NRCS 2020c). The survey area occurs in the "San Bernardino County, California, Mojave River Area" (CA671) soil survey area. One of the soil types occurring in the Project survey area is listed as hydric on the National List for this soil survey area: 112: Cajon Sand, 0 to 2 percent slopes. This soil series is mapped as occurring on a small area within the southwest portion of the Project site, a portion of which occurs under a solar panel array. A brief description of the soils mapped in the survey area is provided in Attachment D of this report.

U.S. Fish and Wildlife Service, National Wetlands Inventory. The *National Wetland Mapper* shows wetland resources available from the Wetlands Spatial Data Layer of the National Spatial Data Infrastructure. This resource provides the classification of known wetlands following the Classification of Wetlands and Deepwater Habitats of the United States (FGDC 2013). This



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Soil Types

Exhibit 4

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N W E S

650 325 0 650 Feet

PSOMAS

(Rev: 1-29-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_Soils.pdf classification system is arranged in a hierarchy of (1) Systems that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors (i.e., Marine Estuarine, Riverine, Lacustrine, and Palustrine); (2) Subsystems (i.e., Subtidal and Intertidal; Tidal, Lower Perennial, Upper Perennial, and Intermittent; or Littoral and Limnetic); (3) Classes, which are based on substrate material and flooding regime or on vegetative life forms; (4) Subclasses; and (5) Dominance Types, which are named for the dominant plant or wildlife forms. In addition, there are modifying terms applied to Classes or Subclasses.

Two features are shown in the National Wetland Inventory (NWI) mapping just south and southwest of the Project site with a classification code of R4SBJ (Riverine, Intermittent, Streambed, Intermittently Flooded) (Exhibit 5). These features appear to be the upstream sources of Drainages 6 and 11, which are described in more detail below in Section 4.0. The description for this code is as follows:

- **System – Riverine (R)**: The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 parts per thousand or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.
    - **Subsystem – Intermittent (4)**: This Subsystem includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
        - **Class – Streambed (SB)**: Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
            - **Water Regime – Intermittently Flooded (J)**: The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks, months, or even years may intervene between periods of inundation. The dominant plant communities under this Water Regime may change as soil moisture conditions change. Some areas exhibiting this Water Regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes. This Water Regime is generally limited to the arid West.

Regional Water Quality Control Plans. The Project survey area is located within RWQCB Region 6, the Lahontan Region. The SWRCB and the Lahontan RWQCB have adopted a Water Quality Control Plan (or "Basin Plan") for the Lahontan Region. The Basin Plan contains goals and policies, descriptions of conditions, and proposed solutions to surface and groundwater issues. The Basin Plan also establishes water quality standards for surface and groundwater resources and includes beneficial uses and levels of water quality that must be met and maintained to protect these uses. These water quality standards are implemented through various regulatory permits pursuant to CWA Section 401 for Water Quality Certifications and Section 402 for Report of Waste Discharge permits.

The Project site is located within Hydrologic Unit Number 625.00 (HU No. 625.00). More specifically, the Project site is located within Hydrologic Unit Code (HUC) 12-180902080503 (Manzanita Wash). Drainage features that occur on the Project site and the nearby vicinity have

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National Wetlands Inventory

Exhibit 5

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N W E S

1,000 500 0 1,000 Feet

PSOMAS

(Rev: 1-29-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_NWI.pdf hydrologic connectivity to Fremont Wash, which flows northeast to join the Mojave River just east of the community of Silver Lakes.

The Basin Plan provides water quality objectives applicable to all surface waters within the Basin, as described in more detail in Chapter 3 of the Basin Plan (Lahontan RWQCB 1995). Also, the Project occurs within the Mojave Hydrologic Unit and is subject to additional water quality objectives for this area, which are provided below in Table 1.

TABLE 1
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES, MOJAVE HYDROLOGIC UNIT AT LOWER NARROWS

Water Quality Objectives (mg/L)	
Total Dissolved Solids	**NO_3 as NO_3**
312	5
NO_3 as NO_3: Nitrate as Nitrate Source: Lahontan RWQCB 1995.	

Beneficial uses are defined in the Porter-Cologne Act as those uses of water that are necessary for tangible and intangible economic, social, and environmental benefits. As listed below in Table 2, the Basin Plan identifies a number of existing or potential beneficial uses for minor surface waters that ultimately flow into Fremont Wash such as the drainage features that occur within the Project site (Lahontan RWQCB 1995).

TABLE 2
BENEFICIAL USES FOR MINOR SURFACE WATERS WITHIN THE FREMONT HYDROLOGIC UNIT

Identifier	Beneficial Uses							
	MUN	**AGR**	**GWR**	**REC-1**	**REC-2**	**COMM**	**WARM**	**WILD**
HU No. 625.00 Minor Surface Waters	X	X	X	X	X	X		
MUN: Municipal Water Supply; AGR: Agricultural Supply; GWR: Ground Water Recharge; REC-1: Water Contact Recreation; REC-2: Noncontact Water Recreation; COMM: Commercial and Sportfishing; WARM: Warm Freshwater Habitat; WILD: Wildlife Habitat. Source: Lahontan RWQCB 1995.								

Possible effects to these existing and potential beneficial uses would need to be addressed as part of the request for a Waste Discharge Requirements authorization for this Project.

3.2 FIELD SURVEY RESULTS

Summary of Field Survey Observations.

During the site visit, the entire Project site was accessible. Prior to the site visit, Psomas staff drove around the perimeter of the Project site and identified several culverts and other informal inlet locations where stormwater drainage appears to flow into the site during rain events.

All drainage features observed in the site exhibited an OHWM. One feature, Drainage 6, also exhibited a clear bed and bank. The outermost point, either OHWM or bed and bank, was mapped as the limits of RWQCB jurisdiction for this site. Other notes on particular drainage features are provided below.

Drainage 3 traverses a low point in the topography near the northern edge of the property and fans out to establish a distinguishable bank area that benches up to a higher point beyond which erosion and scour are not as evident.

Drainage 6, which curves along the eastern edge of the Project site along a constructed berm, begins as a narrow feature at the south of the site; however, as it reaches the center of the property where it passes beneath Aster Road via a box culvert, this feature’s morphology changes as it becomes a wider feature with adjacent high flow terraces and channels. This appears to be caused primarily from the fact that Drainage 6 picks up additional sheet flow from Aster Road, adjacent slopes, and Drainage 5 beginning at this location, which likely leads to more flooding and erosion during extreme precipitation events than the areas further upstream in Drainage 6 would be exposed to.

Drainages 7 and 8 convey stormwater from the Adelanto Converter Station site towards Drainage 6; however, they are impeded from connecting at the surface and instead appear to evaporate south/southwest of a berm that protects the site and conveys stormwater through this area within Drainage 6.

Drainage 9 is discussed in more detail in Section 4.4.

Drainage 11 receives flows from off-site via a culvert, as does Drainage 2, before they join just north of the solar panels on the Project site. This combined drainage, Drainage 2, follows the foot of a berm that was constructed on the west side of the Converter Station.

Two evaporation ponds, shown on Exhibit 6b, were observed during the site visit. These two ponds are adjacent to Drainage 6, but they are separated by a berm that was constructed concurrently along with the ponds during the original construction of the Adelanto Converter Station. According to information provided by LADWP staff, the ponds were designed to be evaporation ponds that were designed and tested to receive and allow for the evaporation of process water from the converter station. The bottom of the ponds are sealed to encourage evaporation, rather than percolation. No hydraulic connections between the ponds and any other drainage features were observed during the site visit.

4.0 JURISDICTIONAL ANALYSIS

The Project survey area contains a total of nine features that exhibit OHWM indicators and other evidence of flow (Exhibit 6). Details on resource agency jurisdiction over this drainage are provided below and summarized in Table 3.

4.1 "WATERS OF THE UNITED STATES" DETERMINATION

Given that no water was observed in any of the drainages that occur in the survey area and due to the limited land areas that flow to these drainages, all the drainages are considered ephemeral, and none of the drainage features surveys are considered WOTUS.

4.2 CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD JURISDICTION

A total of 5.687 acre of jurisdictional "waters of the State" were identified in the survey area, of which 0.006 acres are wetland and 5.681 acres are non-wetland (Table 3; Exhibit 6).

4.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE JURISDICTION

A total of 7.729 acres of jurisdictional streambeds were identified in the survey area (Table 3; Exhibit 6).

4.4 WETLAND DETERMINATION

Three sampling points (Sampling Points 1, 2, and 3) were collected and analyzed to determine if wetland conditions are present in Drainage 9, which is the only potential wetland location within the survey area (Table 4 and Attachment C). The soil pits were dug adjacent to a building within the Adelanto Converter Station. After less than 100 feet, wetland indicator vegetation disappears, likely due to a mix of evaporation and infiltration into the soil. Three soil pits were dug at edges of the suspected wetland to confirm the limits. Downstream areas in the drainage were not investigated beyond the soil pits because no wetland indicator vegetation occurred in these areas. Vegetation observed for all three soil pits includes: cattail (*Typha latifolia*) with small black willow (*Salix gooddingii*) trying to also establish in this small patch.

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Jurisdictional Resources

Exhibit 6a

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N W E S

300 150 0 300
Feet

PSOMAS

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Jurisdictional Resources

Exhibit 6b

Jurisdictional Delineation Report for the Adelanto Converter Station Project

N W E S

300 150 0 300
Feet

PSOMAS

(Rev: 3-18-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_JD.pdf

TABLE 3
SUMMARY OF JURISDICTIONAL RESOURCES IN THE SURVEY AREA

Feature ID	Latitude/Longitude of Drainage Centerpoint	OHWM Width Range (feet)	Area of USACE Jurisdiction (acres)		Area of RWQCB Jurisdiction (acres)		Area of CDFW Jurisdiction (acres)[a]
			Non-wetland	Wetland	Non-wetland	Wetland	
1	34.555435, -117.443062	2-3	-	-	0.006	-	0.017
2	34.547226, -117.442709	3-5	-	-	0.110	-	0.303
3	34.555391, -117.44095	2-24	-	-	0.106	-	0.637
4	34.555835, -117.437623	1-2	-	-	0.004	-	0.012
5	34.55507, -117.435969	2-8	-	-	0.023	-	0.039
6	34.5543, -117.433931	15-95	-	-	5.125	-	6.089
7	34.554335, -117.436182	1-3	-	-	0.009	-	0.018
8	34.553713, -117.435728	12-16	-	-	0.089	-	0.177
9	34.549895, -117.433507	1-3	-	-	0.164	0.006	0.345
10	34.549287, -117.442122	3-4	-	-	0.009	-	0.027
11	34.548084, -117.44315	4-5	-	-	0.037	-	0.064
TOTAL JURISDICTIONAL AREA			**0.00**	**0.00**	**5.681**	**0.006**	**7.729**

OHWM: Ordinary High Water Mark; USACE: U.S. Army Corps of Engineers; RWQCB: Regional Water Quality Control Board; CDFW: California Department of Fish and Wildlife.

[a] Represents the maximum extent of CDFW jurisdiction as indicated by top of bank or outer edge of riparian dripline, whichever is wider.

TABLE 4
SUMMARY OF WETLAND SAMPLING POINT DATA

Sampling Point	Vegetated	Dominance Test Result*	Prevalence Index Result	Hydrophytic Vegetation Present	Hydric Soil Indicators	Wetland Hydrology Indicators	Wetland?
1	Yes	100%	1.5	Yes	S1	B1, B6	Yes
2	Yes	100%	1.5	Yes	S1	B1, B6	Yes
3	Yes	100%	1.5	Yes	S1	B1, B6	Yes

* Percent of dominant species that are OBL, FACW, or FAC.

B1: Water Marks; B6: Surface Soil Cracks; S1: Sandy Mucky Mineral.

Vegetation

The portion of Drainage 9 where Sampling Points 1, 2, and 3 are located is generally along the limits of the vegetation that is rooted within the OHWM, which includes cattail with small black willow. The cattail are larger and better developed; whereas, due to their small stature, it appears that the willow are either recently introduced or are struggling to establish at each of the three sample points. Due to the presence and density of an obligate wetland species, cattails, the three soil pits satisfied the dominance test and prevalence tests related to wetland vegetation.

Soils

Soils encountered at all three of the sampling points were of uniform color and texture; no restrictive layers were encountered above a depth of 20 inches below ground surface (bgs). The soils are classified as S1, or Sandy Mucky Mineral, which is indicated by a layer of mucky modified sandy soil material 2 inches or more thick starting at a depth of approximately 6 inches bgs.

Hydrology

Due to the evidence of process water that is provided on a consistent basis at this portion of Drainage 9, the wetland hydrology criterion was met for this feature.

Results

All three sampling points exhibited identical evidence related to vegetation, soil, and hydrology that indicate that the portion of Drainage 9 analyzed is a wetland. Downstream from the sampling points, hydraulic flows are insufficient to establish vegetation of any kind, including wetland vegetation. The wetland sampling data form is provided as Attachment C. Please note that because information collected for all three of the sampling points was the same, only one representative data form is provided within Attachment C.

5.0 REGULATORY APPROVAL PROCESS

This section summarizes the various permits, agreements, and certifications that are expected to be required prior to initiation of Project activities that involve impacts to jurisdictional waters. This includes:

- RWQCB Waste Discharge Requirements
- CDFW Section 1602 Notification of Lake or Streambed Alteration

It should be noted that all regulatory permit applications can be processed concurrently.

5.1 U.S. ARMY CORPS OF ENGINEERS

On October 22, 2019, the Environmental Protection Agency and Department of the Army (the agencies) published a final rule (Step One) to repeal the 2015 Rule defining WOTUS and re-codify the regulatory text that existed prior to the 2015 Rule. The final Step One rule became effective on December 23, 2019. The Step One rule will be replaced by the Navigable Waters Protection Rule upon its effective date, 60 days after publication in the Federal Register. On January 23, 2020, the agencies finalized the Navigable Waters Protection Rule to define WOTUS. The new rule will go into effect 60 days following its publication in the Federal Register. The new rule has not yet been published in the Federal Register. One of the proposed changes is that ephemeral features that contain water only during or in response to rainfall are no longer be considered WOTUS under the jurisdiction of the USACE.

Given that all of the drainage features within the survey area are ephemeral, these features are no longer defined as WOTUS and are therefore no longer under USACE jurisdiction.

5.2 REGIONAL WATER QUALITY CONTROL BOARD

The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that the application would also require the payment of an application fee, which would be based on project impacts. In the absence of USACE jurisdiction as is the case for this project as discussed above in Section 5.1, the RWQCB will take jurisdiction under the Porter-Cologne Act and will require a Report of Waste Discharge. The application requirements for the Report of Waste Discharge are the same as for a 401 Certification.

As stated above in Section 1.4.2, on August 28, 2019, the Office of Administrative Law approved the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to “waters of the State”. The procedures will go into effect on May 28, 2020. Under these new regulations, the State Water Resources Control Board and its nine RWQCBs will assert jurisdiction over all existing WOTUS, and all waters that would have been considered WOTUS under the 2015 Rule. Thus, the WOTUS that would no longer be under USACE jurisdiction, such as ephemeral features, would be under RWQCB jurisdiction.

5.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Prior to construction, a Notification of a Lake or Streambed Alteration (LSA) must be submitted to the CDFW that describes any proposed streambed alteration contemplated by the applicant.

In addition to the formal application materials and the fee, a copy of the appropriate environmental document or proof that a Notice of Exemption (NOE) has been filed should be included in the submittal, consistent with CEQA requirements. The CDFW will not issue a permit until proof of CEQA compliance has been provided.

5.4 RECOMMENDATIONS

Based on the conclusions of this Jurisdictional Delineation Report, the following recommendations are identified:

- The following should be prepared and processed: a RWQCB Waste Discharge Requirements coverage and a CDFW Section 1602 Streambed Alteration Agreement.

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ATTACHMENT A

SUMMARY OF REGULATORY AUTHORITY

REGULATORY AUTHORITY

This attachment summarizes the regulatory authority of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW) over activities that have potential to impact jurisdictional resources.

U.S. Army Corps of Engineers

The USACE Regulatory Branch regulates activities that discharge dredged or fill materials into WOTUS under Section 404 of the federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. This permitting authority applies to all WOTUS where the material (1) replaces any portion of WOTUS with dry land or (2) changes the bottom elevation of any portion of any WOTUS. These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in these waters.

Waters of the United States

WOTUS can be divided into three categories: territorial seas, tidal waters, or non-tidal waters. The term WOTUS is defined by the *Code of Federal Regulations*[1] (CFR) and includes:

1. All waters that have, are, or may be used in interstate or foreign commerce (including sightseeing or hunting), including all waters subject to the ebb and flow of the tide (e.g., Traditional Navigable Waters [TNWs]).
2. All interstate waters including interstate wetlands.
3. All other waters such as intrastate lakes, rivers, or streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds where the use, degradation, or destruction of which could affect interstate or foreign commerce.
4. All impoundments of waters otherwise defined as WOTUS under the definition.
5. All tributaries of waters identified above.
6. The territorial seas.
7. All wetlands adjacent to waters (other than waters that are themselves wetlands) identified above.

The U.S. Supreme Court has issued three decisions that provide context and guidance in determining the appropriate scope of WOTUS In *United States v. Riverside Bayview Homes*, the Court upheld the inclusion of adjacent wetlands in the regulatory definition of WOTUS. In *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC), the Court held that the use of “isolated” non-navigable intrastate ponds by migratory birds was not, by itself, sufficient basis for the exercise of federal regulatory authority under the CWA. In *Rapanos v. United States* (Rapanos),[2] a majority of the U.S. Supreme Court overturned two Sixth Circuit Court of Appeals decisions, finding that certain wetlands constituted WOTUS under the CWA. In his plurality opinion, Justice Scalia argued that WOTUS should not include channels through which water flows intermittently or ephemerally or channels that periodically provide drainage for rainfall. He also stated that a wetland may not be considered “adjacent to” remote WOTUS based on a mere hydrologic connection. Justice Kennedy authored a separate

[1] Specifically, Title 33, Navigation and Navigable Waters; Part 328, Definition of waters of the United States; §328.3, Definitions.

[2] Consolidated cases: *Rapanos v. United States* and *Carabell v. United States* refer to the U.S. Supreme Court’s decision concerning USACE jurisdiction over “waters of the United States” under the CWA.

concurring opinion concluding that wetlands are WOTUS if they, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as "navigable". Lacking a majority opinion, regulatory jurisdiction under the CWA exists over a water body if either the plurality's or Justice Kennedy's "significant nexus" standard is satisfied.

In summary, the USACE and the USEPA will assert jurisdiction over the following waters: (1) TNWs; (2) wetlands adjacent to a TNW; (3) relatively permanent, non-navigable tributaries of a TNW that typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and (4) wetlands that directly abut such tributaries.

The USACE and the USEPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW: (1) non-navigable tributaries that are not relatively permanent; (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent; and (3) wetlands adjacent to, but that do not directly abut, a relatively permanent, non-navigable tributary.

The USACE and the USEPA will apply the significant nexus standard defined as follows:

1. A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream TNWs.
2. A significant nexus includes consideration of hydrologic and ecological factors.

The USACE and the USEPA generally will not assert jurisdiction over the following features: (1) swales or erosional features (e.g., gullies or small washes characterized by low volume, infrequent, or short duration flow) and (2) ditches (including roadside ditches) excavated wholly within and draining only uplands and that do not carry a relatively permanent flow of water.

On October 22, 2019, the Environmental Protection Agency and Department of the Army (the agencies) published a final rule (Step One) to repeal the 2015 Rule defining WOTUS and re-codify the regulatory text that existed prior to the 2015 Rule. The final Step One rule became effective on December 23, 2019. On September 12, 2019, the Environmental Protection Agency and Department of the Army signed a final rule to repeal the 2015 Clean Water Rule (2015 Rule) and re-codify the regulatory text defining WOTUS that existed prior to the 2015 Rule. The Step One rule will be replaced by the Navigable Waters Protection Rule upon its effective date, 60 days after publication in the Federal Register. On January 23, 2020, the agencies finalized the Navigable Waters Protection Rule to define WOTUS. The new rule will go into effect 60 days following its publication in the Federal Register. The new rule has not yet been published in the Federal Register.

Ordinary High Water Mark

The landward limit of tidal WOTUS is the high-tide line. In non-tidal waters where adjacent wetlands are absent, the lateral limits of USACE jurisdiction extend to the ordinary high water mark (OHWM).[3] The OHWM is defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics

[3] U.S. Army Corps of Engineers (USACE). 2005 (December 7). Regulatory Guidance Letter. Ordinary High Water Mark Identification. Washington, D.C.: USACE.

of the surrounding areas".[4] When wetlands are present, the lateral limits of USACE jurisdiction extend beyond the OHWM to the limits of the adjacent wetlands.[5]

Wetlands

A wetland is a subset of jurisdictional waters and is defined by the USACE and the USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions".[6] Wetlands generally include swamps, marshes, bogs, and areas containing similar features.

The definition and methods for identifying wetland resources can be found in the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*,[7] a supplement to the 1987 *Corps of Engineers Wetlands Delineation Manual*.[8] Both the 1987 Wetlands Manual and the 2008 Arid West Supplement to the manual provide technical methods and guidelines for determining the presence of wetland WOTUS. Pursuant to these manuals, a three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. In order to be considered a wetland, an area must exhibit one or more indicators of all three of these parameters. However, problem areas may periodically or permanently lack certain indicators for reasons such as seasonal or annual variability of rainfall, vegetation, and other factors. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement.

On September 12, 2019, the Environmental Protection Agency and Department of the Army signed a final rule to repeal the 2015 Clean Water Rule (2015 Rule) and re-codify the regulatory text defining WOTUS that existed prior to the 2015 Rule. The new regulations went into effect on November 14, 2019. One of the proposed changes is that ephemeral features that contain water only during or in response to rainfall are no longer be considered WOTUS under the jurisdiction of the USACE. Given that all of the drainage features within the survey area are ephemeral, these features are no longer defined as WOTUS and are therefore no longer under USACE jurisdiction.

Section 404 Permit

Except as specified in Section 323.4 of the CFR, impacts to WOTUS require a Section 404 Permit. Permit authorization may be in the form of (1) a "general permit" authorizing a category of activities in a specific geographical region or nationwide or (2) an "individual permit" (IP) following a review of an individual application form (to be obtained from the district office having jurisdiction over the waters in which the activity is proposed to be located).

Regulatory authorization in the form of a Nationwide Permit (NWP) is provided for certain categories of activities such as repair, rehabilitation, or replacement of a structure or fill which was previously authorized; utility line placement; or bank stabilization. The current set of NWPs became effective on March 19, 2017 and will expire in on March 18, 2022. NWPs authorize only those activities with minimal adverse effects on the aquatic environment and are valid only if the

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4 *Code of Federal Regulations* (CFR), Title 33, §328.3(e)
5 USACE 2005
6 33 CFR §328.3(b)
7 USACE. 2008a. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*. (J.S. Wakeley, R.W. Lichvar, and C.V. Noble, Eds.). Vicksburg, MS: U.S. Army Engineer Research and Development Center.
8 Environmental Laboratory. 1987. Co*rps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1)*. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

conditions applicable to the permits are met or waivers to these conditions are provided in writing from the USACE. Please note that waivers may require consultation with affected federal and State agencies, which can be a lengthy process with no mandated processing time frames. Certain activities do not require submission of an application form, but may require a separate notification. If the NWP conditions cannot be met, an IP will be required. WOTUS temporarily filled, flooded, excavated, or drained but restored to pre-construction contours and elevations after construction are not included in the measurement of loss of WOTUS. The appropriate permit authorization will be based on the amount of impacts to WOTUS, as determined by the USACE. There is no filing fee for the Section 404 Permit.

Approximately three or four months are typically required to process a routine permit application; large or complex activities may take longer to process. When a permit application is received, it will be assigned an identification number and reviewed for completeness by the District Engineer. If an application is incomplete, additional information will be requested within 15 days of receipt of the application. If an application is complete, the District Engineer will issue a public notice within 15 days unless specifically exempted by provisions of the CFR. Public comments will be accepted no more than 30 days but not less than 15 days from the date of public notice; these will become part of the administrative record of the application. Generally, the District Engineer will decide on the application no later than 60 days after receipt of the completed application. Additional permit situations may increase the permit processing time (e.g., projects involving a Section 401 Water Quality Certification, a coastal zone management consistency analysis, historic properties, a federal agency, and/or Endangered species). The Project Applicant will be given time, not to exceed 30 days, to respond to requests of the District Engineer.

On January 31, 2007, the USACE published a memorandum clarifying the Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) implementing regulations.[9] The Interim Guidance applies to all Department of the Army requests for authorization/verification, including Individual Permits (IPs, e.g., standard permits and letters of permission) and all Regional General Permits (RGPs) and Nationwide Permits (NWPs). The State or Tribal Historic Preservation Officer (SHPO/THPO) has 30 days to respond to a determination that a proposed activity, which otherwise qualifies for an NWP or an RGP, has no effect or no adverse effect on a historic property. If the SHPO/THPO does not respond within 30 days of notification, the Los Angeles District may proceed with verification. If the SHPO/THPO disagrees with the District's determination, the District may work with the SHPO/THPO to resolve the disagreement or request an opinion from the ACHP. The USACE will submit the Draft Jurisdictional Delineation Report to the SHPO/THPO for review prior to initiating the actual regulatory process.

Please note that, if the USACE determines that the drainages/waterbodies are jurisdictional and would be impacted by project implementation, the Applicant will be required to obtain a CWA Section 401 Water Quality Certification from the RWQCB before the USACE will issue the Section 404 Permit. If the USACE determines that the impacted drainage/waterbody is not jurisdictional, the Applicant will be required to obtain RWQCB authorization under the provisions of a Report of Waste Discharge (ROWD).

<u>Jurisdictional Determinations</u>

Pursuant to USACE Regulatory Guidance Letter (RGL) 08-02 (dated June 26, 2008), the USACE can issue two types of jurisdictional determinations to implement Section 404 of

[9] USACE. 2007 (January 31). Memorandum: Interim Guidance for Amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) Implementing Regulations. Washington, D.C.: USACE.

the CWA: Approved Jurisdictional Determinations and Preliminary Jurisdictional Determinations.[10] An Approved Jurisdictional Determination is an official USACE determination that jurisdictional WOTUS, "Navigable Waters of the U.S.", or both are either present or absent on a site. An Approved Jurisdictional Determination also identifies the precise limits of jurisdictional waters on a project site.

The USACE will provide an Approved Jurisdictional Determination when (1) an Applicant requests an official jurisdictional determination; (2) an Applicant contests jurisdiction over a particular water body or wetland; or (3) when the USACE determines that jurisdiction does not exist over a particular water body or wetland. The Approved Jurisdictional Determination then becomes the USACE's official determination that can then be relied upon over a five-year period to request regulatory authorization as part of the permit application.

In addition, an Applicant may decline to request an Approved Jurisdictional Determination and instead obtain a USACE IP or General Permit Authorization based on a Preliminary Jurisdictional Determination or, in certain circumstances (e.g., authorizations by non-reporting nationwide general permits), with no Jurisdictional Determination.

Preliminary Jurisdictional Determinations are non-binding, advisory in nature, and may not be appealed. They indicate that there may be WOTUS on a project site. An Applicant may elect to use a Preliminary Jurisdictional Determination to voluntarily waive or set aside questions regarding CWA jurisdiction over a site, usually in the interest of expediting the permitting process. The USACE will determine what form of Jurisdictional Determination is appropriate for a particular project site.

The USACE Regulatory Branch Offices will coordinate with the USEPA Regional Office and USACE Headquarters (HQ), as outlined in its January 28, 2008, memorandum entitled "Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the *Rapanos* and *SWANCC* Supreme Court Decisions".[11] The guidance provided in this memorandum is quoted as follows:

1. Effective immediately, unless and until paragraph 5(b) of the June 5, 2007, Rapanos guidance coordination memorandum is modified by a joint memorandum from Army and EPA, we will follow these procedures:
   a. For jurisdictional determinations involving significant nexus determinations, USACE districts will send copies of draft jurisdictional delineations via e-mail to appropriate EPA regional offices. The EPA regional office will have 15 calendar days to decide whether to take the draft jurisdictional delineation as a special case under the January 19, 1989, "Memorandum of Agreement Between the Department of the Army and the USEPA Concerning the Determination of the Section 404 Program and the Application of the Exceptions under Section 404(f) of the Clean Water Act." If the EPA regional office does not respond to the district within 15 days, the district will finalize the jurisdictional determination.
   b. For jurisdictional determinations involving isolated waters determinations, the agencies will continue to follow the procedure in paragraph 5(b) of

10 USACE. 2008b (June 26). Regulatory Guidance Letter. Jurisdictional Determinations. Washington, D.C.: USACE.

11 USACE. 2008c (January 28). *Memorandum for Commander, Major Subordinate Commands and District Commands. Process for Coordinating Jurisdictional Determinations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the Rapanos and SWANCC Supreme Court Decisions.* Washington, D.C.: USACE.

June 5, 2007, coordination memorandum, until a new coordination memorandum is signed by USACE and EPA. (In accordance with paragraph 6 of the June 5, 2007, coordination memorandum, this is a 21-day timeline that can only be changed through a joint memorandum between agencies).

2. Approved JDs are not required for non-reporting NWPs, unless the project proponent specifically requests an approved JD. For proposed activities that may qualify for authorization under a State Programmatic General Permit (SPGP) or RGP, an approved JD is not required unless requested by the project proponent.
3. The USACE will continue to work with EPA to resolve the JDs involving significant nexus and isolated waters determinations that are currently in the elevation process.
4. USACE districts will continue posting completed Approved JD Forms on their web pages.

Regional Water Quality Control Board

The RWQCB is the primary agency responsible for protecting water quality in California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCB's jurisdiction extends to all waters of the State and to all WOTUS, including wetlands (isolated and non-isolated).

Section 401 of the CWA provides the RWQCB with the authority to regulate, through a Water Quality Certification, any proposed, federally permitted activity that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the USACE pursuant to Section 404 of the CWA. Section 401 requires the RWQCB to provide certification that there is reasonable assurance that an activity which may result in discharge to navigable waters will not violate water quality standards. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which contain numeric and narrative objectives that can be found in each of the nine RWQCBs' Basin Plans.

The Porter-Cologne Act provides the State with very broad authority to regulate waters of the State (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC (Solid Waste Agency of Northern Cook Counties vs. United States Army Corps of Engineers) and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file an ROWD when there is no federal nexus, such as under Section 404(b)(1) of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

Wetlands

In 2019, the SWRCB adopted rules to provide a common, statewide definition of what constitutes a wetland and to provide consistency in the way they and the RWQCBs regulate activities to protect wetlands and other waterways. The SWRCB defines an area as wetlands "if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation".[12] The following wetlands are waters of the State:

1. Natural wetlands,
2. Wetlands created by modification of a surface water of the State, and
3. Artificial wetlands that meet any of the following criteria:
    a. Approved by an agency as compensatory mitigation for impacts to other waters of the State, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the State;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (e.g., the following artificial wetlands are not waters of the State unless they also satisfy the criteria set forth in 2, 3a, or 3b):
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,
        iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
        iv. Treatment of surface waters,
        v. Agricultural crop irrigation or stock watering,
        vi. Fire suppression,
        vii. Industrial processing or cooling,
        viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
        ix. Log storage,
        x. Treatment, storage, or distribution of recycled water, or
        xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
        xii. Fields flooded for rice growing.

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the State.

Section 401 Water Quality Certification

Issuance of the USACE Section 404 Permit would be contingent upon the approval of a Section 401 Water Quality Certification from the RWQCB. Also, the RWQCB requires certification of the

12 State Water Resources Control Board (SWRCB). 2019 (March 22). *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*.

project's California Environmental Quality Act (CEQA) documentation before it will approve the Section 401 Water Quality Certification or ROWD. The RWQCB, as a responsible agency, will use the project's CEQA document to satisfy its own CEQA-compliance requirements.

Upon acceptance of a complete permit application, the RWQCB has between 60 days and 1 year to make a decision regarding the permit request. This is compliant with USACE regulations, which indicate that the RWQCB has 60 days from the date of receipt of a completed application that requests water quality certification to make a decision.[13] The RWQCB has the option of issuing a "Denial Without Prejudice", which does not mean that the request is denied, but that it requires more information in order to make a decision. This effectively stops the processing clock until this information is provided.

The RWQCB is required under the *California Code of Regulations* (CCR) to have a "minimum 21 day public comment period" before any action can be taken on the Section 401 application.[14] This period closes when the RWQCB acts on the application. Since projects often change or are revised during the Section 401 permit process, the comment period can remain open. The public comment period starts as soon as an application has been received. Generally, the RWQCB Section 401, USACE Section 404, and CDFW Section 1602 permit applications are submitted at the same time. However, the RWQCB Section 401 Water Quality Certification may take longer to process than the other two applications.

The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. The notification/application for a CWA Section 401 Water Quality Certification must also address compliance with the Basin Plan. Please note that filing an application would also require the payment of an application fee which would be based on project impacts. The fee schedule calculator is available at http://www.waterboards.ca.gov/santaana/water_issues/programs/401_certification/index.shtml.

California Department of Fish and Wildlife

The CDFW has jurisdictional authority over wetland resources associated with rivers, streams, and lakes pursuant to the *California Fish and Game Code*.[15] Activities of any person, State or local governmental agency, or public utility that are project proponents are regulated by the CDFW under Section 1602 of the *California Fish and Game Code.* This section regulates any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Section 1602 of the *California Fish and Game Code* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

The CDFW jurisdictional limits are not as clearly defined by regulation as those of the USACE. While they closely resemble the limits described by USACE regulations, they include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric and saturated soils conditions. In general, the CDFW takes jurisdiction from the top of a stream bank or to the outer limits of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place within or in the vicinity of a river, stream, lake or within or in the vicinity of tributaries to a river, stream, or lake.

[13] 33 CFR §325.2(b)(1)(ii)
[14] 23 CCR §3858(a)
[15] See §§1600–1616.

This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish and other aquatic plant and/or wildlife species. It also includes watercourses that have a surface or subsurface flow that support or have supported riparian vegetation.

Section 1602 Lake or Streambed Alteration Agreement

The CDFW enters into a Lake or Streambed Alteration (LSA) Agreement with a project proponent in order to ensure protection of wildlife and habitat values and acreages.

Prior to construction, a Notification of an LSA must be submitted to the CDFW that describes any proposed lake or streambed alteration that would occur with implementation of a project. The Notification of an LSA must address the initial construction and long-term operation and maintenance of any structures (such as a culvert or a desilting basin) included in the project design that are located within any river, stream, or lake and that may require periodic maintenance. In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., a Mitigated Negative Declaration) should be included in the submittal, consistent with CEQA requirements. The complete notification package must be submitted to the CDFW regional office that services the county where the activity will take place. This notification will serve as the basis for the CDFW's issuance of a Section 1602 LSA Agreement. Note that notification is not required before beginning emergency work, but the CDFW must be notified in writing within 14 days after beginning the work.

After receiving Notification of an LSA Agreement, the CDFW will determine whether an LSA Agreement will be required for the proposed activity. An LSA Agreement will be required if the activity could substantially adversely affect an existing fish and wildlife resource. If an LSA Agreement is required, the CDFW may want to conduct an on-site inspection.

If the CDFW does not respond in writing concerning the completeness of the Notification within 30 days of its submittal, the Notification automatically becomes complete. If the CDFW does not submit a draft LSA Agreement to the Applicant within 60 days of the determination of a completed Notification package, the CDFW will issue a letter that either (1) identifies the final date to transmit a draft LSA Agreement or (2) indicates that an LSA Agreement was not required. The CDFW will also indicate that it was unable to meet this mandated compliance date and that, by law, the Applicant is authorized to complete the project without an LSA Agreement as long as the Applicant constructs the project as proposed and complies with all avoidance, minimization, and mitigation measures described in the submitted Notification package. Please note that, if the project requires revisions to the design or project construction, the CDFW may require submittal of a new Notification/application with an additional 90-day permit process.

If determined to be necessary, the CDFW will prepare a draft LSA Agreement, which will include standard measures to protect fish and wildlife resources during project construction and during ongoing operation and maintenance of any project element that occurs within a CDFW jurisdictional area. The draft Agreement must be transmitted to the Applicant within 60 calendar days of the CDFW's determination that the notification is complete. It should be noted that the 60-day timeframe might not apply to long-range agreements. Following receipt of a draft LSA Agreement from the CDFW, the Applicant has 30 calendar days to notify the CDFW concerning the acceptability of the proposed terms, conditions, and measures. If the Applicant agrees with these terms, conditions and measures, the Agreement must be signed and returned to the CDFW. The Agreement becomes final once the CDFW executes it and an LSA Agreement is issued. Please note that all application fees must be paid and the final certified CEQA documentation must be provided prior to the CDFW's execution of the Agreement.

ATTACHMENT B

SITE PHOTOGRAPHS

D:\Projects\3MBC000124\PRO\JD\JD_Exhibits_20200128\JD_Exhibits_20200226.aprx

Site Photograph Locations

Attachment B

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(Rev: 2-26-2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\ex_SitePhotographLocations.pdf

Photo A - View of the upstream portion of Drainage 3 from the northern edge of the Project site.

Photo B - View of Drainage 1 from the northern edge of the Project site with the Adelanto Converter Station in the background.

Site Photographs

Attachment B-1

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

D:\Projects\3MBC\000124\GRAPHICS\JD\AttB-1_SitePhotographs.ai

Photo C - View downstream of Drainage 2 as it flows over an Arizona Crossing on the western third of the Project site.

Photo D - View of Drainage 10, which flows beneath an existing solar panel array on the Project site.

Site Photographs

Attachment B-2

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

Photo E - View to the north along Drainage 11 which flows out of a culvert and along a ribbon gutter before joining Drainage 2 to the north.

Photo F - View north along Drainage 2 as it crosses an access road and then continues through a field of solar panels. Downstream it connects to Drainages 10 and 11.

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Site Photographs

Attachment B-3

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

Photo G - View east along this v-ditch that occurs within the Project site.

Photo H - View of the western evaporation pond within the Project site.

Site Photographs

Attachment B-4

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

D:\Projects\3MBC\000124\GRAPHICS\JD\AttB-4_SitePhotographs.ai

Photo I - View to the north at the berm that separates the western and eastern evaporation ponds within the Project site.

Photo J - View to the northeast at the eastern evaporation pond and the berm that separates the pond from Drainage 6 to the east.

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Site Photographs

Attachment B-5

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

Photo K - View of the culvert that conveys Drainage 6 beneath Aster Road.

Photo L - Looking north towards where Drainage, to the left, merges with Drainage 6, which is to the right.

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Site Photographs

Attachment B-6

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

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Photo M - View to the north approximately 100 feet before this feature (Drainage 5) merges with Drainage 6.

Site Photographs

Attachment B-7

Jurisdictional Delineation Report for the Adelanto Converter Station Project

PSOMAS

(01/29/2020 RMB) R:\Projects\MBC\3MBC000124\Graphics\JD\AttB_SitePhotographs.pdf

ATTACHMENT C

WETLAND DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Adelanto Converter Station City/County: Adelanto/San Bernardino Sampling Date: January 14, 2020

Applicant/Owner: Los Angeles Department of Water and Power (LADWP) State: California Sampling Point: SP-1

Investigator(s): Sean Noonan Section, Township, Range: S6, T5N, R5W

Landform (hillslope, terrace, etc.): Manufactured drainage with process water inflow. Local relief (concave, convex, none): Convex Slope (%): 1%

Subregion (LRR): California Lat: 34.550036 Long: -117.434797 Datum: WGS84

Soil Map Unit Name: 106: Bryman Loamy Fine Sand, 2 to 5 percent slopes. NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20'x20')	Absolute % Cover	Dominant Species?	Indicator Status
1. Goodding's Black Willow (*Salix gooddingii*)	50	YES	FACW
2.			
3.			
4.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 20"X20")			
1. Broad-Leaf Cat-Tail	50	YES	OBL
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	50	x 1 = 50
FACW species	50	x 2 = 100
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	150 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

Soil pits collected within a patch of cattails, with emerging (but stressed) willows.

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
1-20”	2.5Y/5/3							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
X Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
X Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This drainage is manufactured adjacent to an access road and ultimately outlets to the northeast into Drainage 6 (main drainage on site). There is a small patch that receives process water flows from a nearby structure within the Adelanto Converter Station site. This relatively perennial source of water is provided to a small portion before it evaporates and/or percolates.

ATTACHMENT D

LITERATURE REVIEW DETAILS

ATTACHMENT D1 – DESCRIPTIONS OF SOILS IN THE SURVEY AREA

106—BRYMAN LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES

Map Unit Setting

- *National map unit symbol:* hkrb
- *Elevation:* 3,000 to 3,400 feet
- *Mean annual precipitation:* 3 to 6 inches
- *Mean annual air temperature:* 59 to 63 degrees F
- *Frost-free period:* 180 to 280 days
- *Farmland classification:* Prime farmland if irrigated

Map Unit Composition

- *Bryman and similar soils:* 80 percent
- *Minor components:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Bryman

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite sources

Typical profile

- *H1 - 0 to 9 inches:* loamy fine sand
- *H2 - 9 to 43 inches:* sandy clay loam
- *H3 - 43 to 60 inches:* sandy loam

Properties and qualities

- *Slope:* 2 to 5 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 5 percent
- *Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Available water storage in profile:* Moderate (about 8.3 inches)

Interpretive groups

- *Land capability classification (irrigated):* 2e
- *Land capability classification (nonirrigated):* 7e
- *Hydrologic Soil Group:* C
- *Ecological site:* Sandy (R030XF012CA)
- *Hydric soil rating:* No

Minor Components

Cajon, loamy surface

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

Helendale

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

Mohave variant

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

Bryman, gravelly surface

- *Percent of map unit:* 5 percent

112—CAJON SAND, 0 TO 2 PERCENT SLOPES

Map Unit Setting

- *National map unit symbol:* hkrj
- *Elevation:* 1,800 to 3,200 feet
- *Mean annual precipitation:* 3 to 6 inches
- *Mean annual air temperature:* 59 to 66 degrees F
- *Frost-free period:* 180 to 290 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

- *Cajon and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Cajon

Setting

- *Landform:* Alluvial fans
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Tread
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite sources

Typical profile

- *H1 - 0 to 7 inches:* sand
- *H2 - 7 to 25 inches:* sand
- *H3 - 25 to 45 inches:* gravelly sand
- *H4 - 45 to 60 inches:* stratified sand to loamy fine sand

Properties and qualities

- *Slope:* 0 to 2 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Somewhat excessively drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 1 percent
- *Available water storage in profile:* Low (about 4.1 inches)

Interpretive groups

- *Land capability classification (irrigated):* 3e
- *Land capability classification (nonirrigated):* 7e
- *Hydrologic Soil Group:* A
- *Ecological site:* Sandy (R030XF012CA)
- *Hydric soil rating:* No

Minor Components

Manet

- *Percent of map unit:* 5 percent
- *Landform:* Playas
- *Hydric soil rating:* Yes

<u>Kimberlina</u>

- *Percent of map unit:* 5 percent

<u>Helendale</u>

- *Percent of map unit:* 5 percent

133—HELENDALE-BRYMAN LOAMY SANDS, 2 TO 5 PERCENT SLOPES*

Map Unit Setting

- *National map unit symbol:* hks6
- *Elevation:* 2,500 to 4,000 feet
- *Mean annual precipitation:* 3 to 6 inches
- *Mean annual air temperature:* 59 to 63 degrees F
- *Frost-free period:* 180 to 280 days
- *Farmland classification:* Prime farmland if irrigated

Map Unit Composition

- *Helendale and similar soils:* 50 percent
- *Bryman and similar soils:* 35 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Helendale

Setting

- *Landform:* Fan remnants
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite sources

Typical profile

- *H1 - 0 to 6 inches:* loamy sand
- *H2 - 6 to 30 inches:* sandy loam
- *H3 - 30 to 66 inches:* sandy loam
- *H4 - 66 to 99 inches:* loamy sand, sandy loam
- *H4 - 66 to 99 inches:*

Properties and qualities

- *Slope:* 2 to 5 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 5 percent
- *Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Available water storage in profile:* Low (about 5.8 inches)

Interpretive groups

- *Land capability classification (irrigated):* 2e
- *Land capability classification (nonirrigated):* 7e
- *Hydrologic Soil Group:* A
- *Ecological site:* Sandy (R030XF012CA)
- *Hydric soil rating:* No

Description of Bryman

Setting

- *Landform:* Fan remnants

- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Linear
- *Parent material:* Alluvium derived from granite sources

Typical profile

- *H1 - 0 to 8 inches:* loamy sand
- *H2 - 8 to 12 inches:* sandy loam
- *H3 - 12 to 44 inches:* sandy clay loam
- *H4 - 44 to 60 inches:* loamy sand, coarse sandy loam
- *H4 - 44 to 60 inches:*

Properties and qualities

- *Slope:* 2 to 5 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Calcium carbonate, maximum in profile:* 5 percent
- *Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
- *Available water storage in profile:* Moderate (about 8.2 inches)

Interpretive groups

- *Land capability classification (irrigated):* 2e
- *Land capability classification (nonirrigated):* 7e
- *Hydrologic Soil Group:* C
- *Ecological site:* Sandy (R030XF012CA)
- *Hydric soil rating:* No

Minor Components

Cajon

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

Mohave variant

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

Unnamed soils

- *Percent of map unit:* 5 percent
- *Hydric soil rating:* No

ATTACHMENT D2 – BENEFICIAL USES FROM THE BASIN PLAN

The *Basin Plan for the Lahontan Region: North and South Basins* (Lahontan RWQCB, 1995) identifies a number of beneficial uses, some or all of which may apply to a specific hydrologic subarea (HSA), including the following:

- AGR – Agricultural Supply. Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.

- AQUA – Aquaculture. Beneficial uses of waters used for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.

- BIOL – Preservation of Biological Habitats of Special Significance. Beneficial uses of waters that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, and Areas of Special Biological Significance (ASBS), where the preservation and enhancement of natural resources requires special protection.

- COLD – Cold Freshwater Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

- COMM – Commercial and Sportfishing. Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

- FLD – Flood Peak Attenuation/Flood Water Storage. Beneficial uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.

- FRSH – Freshwater Replenishment. Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

- GWR – Ground Water Recharge. Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

- IND – Industrial Service Supply. Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

- MIGR – Migration of Aquatic Organisms. Beneficial uses of waters that support habitats necessary for migration, acclimatization between fresh and salt water, or temporary activities by aquatic organisms, such as anadromous fish.

- MUN – Municipal and Domestic Supply. Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.

- NAV – Navigation. Beneficial uses of waters used for shipping, travel, or other transportation by private, military, or commercial vessels.

- POW – Hydropower Generation. Beneficial uses of waters used for hydroelectric power generation.

- PRO – Industrial Process Supply. Beneficial uses of waters used for industrial activities that depend primarily on water quality.

- RARE – Rare, Threatened, or Endangered Species. Beneficial uses of waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered.

- REC-1 – Water Contact Recreation. Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.

- REC-2 – Noncontact Water Recreation. Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.

- SAL – Inland Saline Water Habitat. Beneficial uses of waters that support inland saline water ecosystems including, but not limited to, preservation and enhancement of aquatic saline habitats, vegetation, fish, and wildlife, including invertebrates.

- SPWN – Spawning, Reproduction, and Development. Beneficial uses of waters that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.

- WARM – Warm Freshwater Habitat. Beneficial uses of waters that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

- WILD – Wildlife Habitat. Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

- WQE – Water Quality Enhancement. Beneficial uses of waters that support natural enhancement or improvement of water quality in or downstream of a water body including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.

APPENDIX C

CULTURAL RESOURCES ASSESSMENT

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August 2020

LOS ANGELES DEPARTMENT OF WATER AND POWER

Adelanto Switching Station Expansion Project
San Bernardino County, California

Phase I Cultural Resource Survey

PROJECT NUMBER:
164629

PROJECT CONTACT:
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POWER ENGINEERS

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Phase I Cultural Resource Survey

PREPARED FOR: LOS ANGELES DEPARTMENT OF WATER AND POWER
PREPARED BY: MICHAEL HARRISON DICE, MA, R.P.A.
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ABSTRACT

In June 2020, POWER Engineers, Inc. (POWER) performed a Phase I cultural resource survey on certain undeveloped areas within the perimeter of an active high voltage switching station owned and operated by the Los Angeles Department of Water and Power (LADWP). The survey was undertaken in support of the proposed Adelanto Switching Station Expansion Project (Project), the Project would be constructed, owned, and operated by LADWP, and is not subject to federal environmental oversight.

This report summarizes the methods and results of the cultural resource investigation of the Project area. The assessment included archaeological and historical background research, fieldwork, description of new cultural resource finds, and recommendations for further archaeological research. The purpose of the investigation was to determine the potential for the proposed Project to impact historical resources under the California Environmental Quality Act (CEQA). LADWP will serve as the lead CEQA agency.

The Project is located in San Bernardino County, California approximately eight miles west of the Mojave River and in the far eastern portion of the Mojave Desert. Approximately two and a half miles southwest of the center of the City of Adelanto, California, the Project is situated in the northwest portion of Section 5 and the northeast portion of Section 6 of Township 5N, Range 5W as shown on the *Adelanto, CA.* 1:24,000 United States Geological Survey quadrangle. Rancho Road borders the Project site to the north, and Raccoon Avenue is located to the west. The Adelanto Station was built in 1986; solar panels were added to the southwest corner of the property in 2013.

Background historical research shows that a few previously recorded cultural resources are known for the area. Portions of the Project area were surveyed as part of previous high voltage transmission line work in 1985 but no archaeological survey work has occurred on-site since that time except for recent research on the adjoining solar panel installation. A new records search run in support of this Project revealed that no previously recorded cultural resource sites or isolates have been previously recorded within the footprint of the area POWER surveyed for this report.

The survey took place on June 11, 2020 by Michael Dice, MA, RPA and one isolated granite cobblestone hammerstone with battering and burning was detected. The isolate is not considered eligible for listing on the California Register of Historical Resources. No new cultural resource sites were observed.

We have concluded that the potential for impacts to buried or unknown cultural resources during Project construction should be considered low. Because no new sites were detected during the survey, we recommend that archaeological monitoring need not take place in those portions of the station that will be disturbed by Project-related construction.

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ACRONYMS AND ABBREVIATIONS

AB 52	Assembly Bill No. 52
BP	Before present
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CRHR	California Register of Historical Resources
GLO	General Land Office
HVDC	High Voltage Direct Current
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
POWER	POWER Engineers, Inc.
PRC	[California] Public Resources Code
Project	Adelanto Switching Station Expansion Project
ROW	Right-of-way
SCCIC	South Central Coastal Information Center
SSJVIC	Southern San Joaquin Valley Information Center
TCR	Tribal Cultural Resources
USGS	United States Geological Survey

1.0 INTRODUCTION

The Los Angeles Department of Water and Power (LADWP) proposes to construct new components in, and rebuild existing elements of, the Adelanto Switching Station (Project). The proposed Project is located within the approximate 315-acre fenced Adelanto property, owned by LADWP. The Project would be located within an existing high voltage switching station were several high voltage transmission lines that enter the station from the north, south, east and west. Reconstruction of portions of the switching station is needed to replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and increase long-term reliability.

1.1 Project Location

The Adelanto Station was completed in 1986 and is the southern terminus of the 2,400 megawatt Path 27 Utah-California high voltage direct current power (HVDC) transmission line. The Project is located in the western portion of San Bernardino County, southwest of the city of Adelanto (Figure 1). The switching station and associated transmission lines are depicted on the United States Geological Survey (USGS) Adelanto, CA. 7.5-minute topographic quadrangle of the San Bernardino Meridian in Township 5 North, Range 5 West, Sections 5 and 6 (Figure 2). The area surveyed by POWER Engineers, Inc. (POWER) staff covered more ground than might be necessary to accomplish the construction work. The fieldwork was larger than needed to provide a buffer zone for flexibility should revisions in construction design be needed in the future. While in the field, the survey excluded all previously disturbed and built upon ground within the inventory areas depicted in Figure 3.

1.2 Project Description

LADWP proposes to conduct various improvements within the limits of the Project site including, but not limited to, construction and demolition of a new switching station and converter station, construction of new buildings, reconstruction and provision of new stormwater improvements, a new berm near the extreme western center of the property, and demolition of certain existing structures. Temporary construction laydown areas include ground beneath the Adelanto-Toluca Line 1 and Adelanto-Rinaldi Line 1 in the far northwest corner of the property, as well as ground beneath the Victorville-Rinaldi Line 1 in the far southeast corner of the property. Once the Project is completed, many of the existing facilities will be replaced on the existing areas of disturbance within the existing approximate 315-acre Project site.

1.3 Regulatory Environment

1.3.1 California Environmental Quality Act

LADWP is the lead California Environmental Quality Act (CEQA) agency. According to CEQA (Public Resources Code [PRC] Section 21084.1), historical resources include any resource listed, or determined eligible for listing, in the California Register of Historical Resources (CRHR). Properties listed, or determined eligible for listing, in the National Register of Historic Places, such as those identified in the Section 106 process, are automatically listed in the CRHR. Therefore, all “historic properties” under federal preservation law are automatically “historical resources” under state preservation law. Historical resources are also presumed to be significant if they are included in a local register of historical resources or identified as significant in a qualified historical resource survey. Section 21084.1 of CEQA states that a project has a significant adverse environmental impact if the project causes a substantial or potentially substantial adverse change in the significance of a historical resource.

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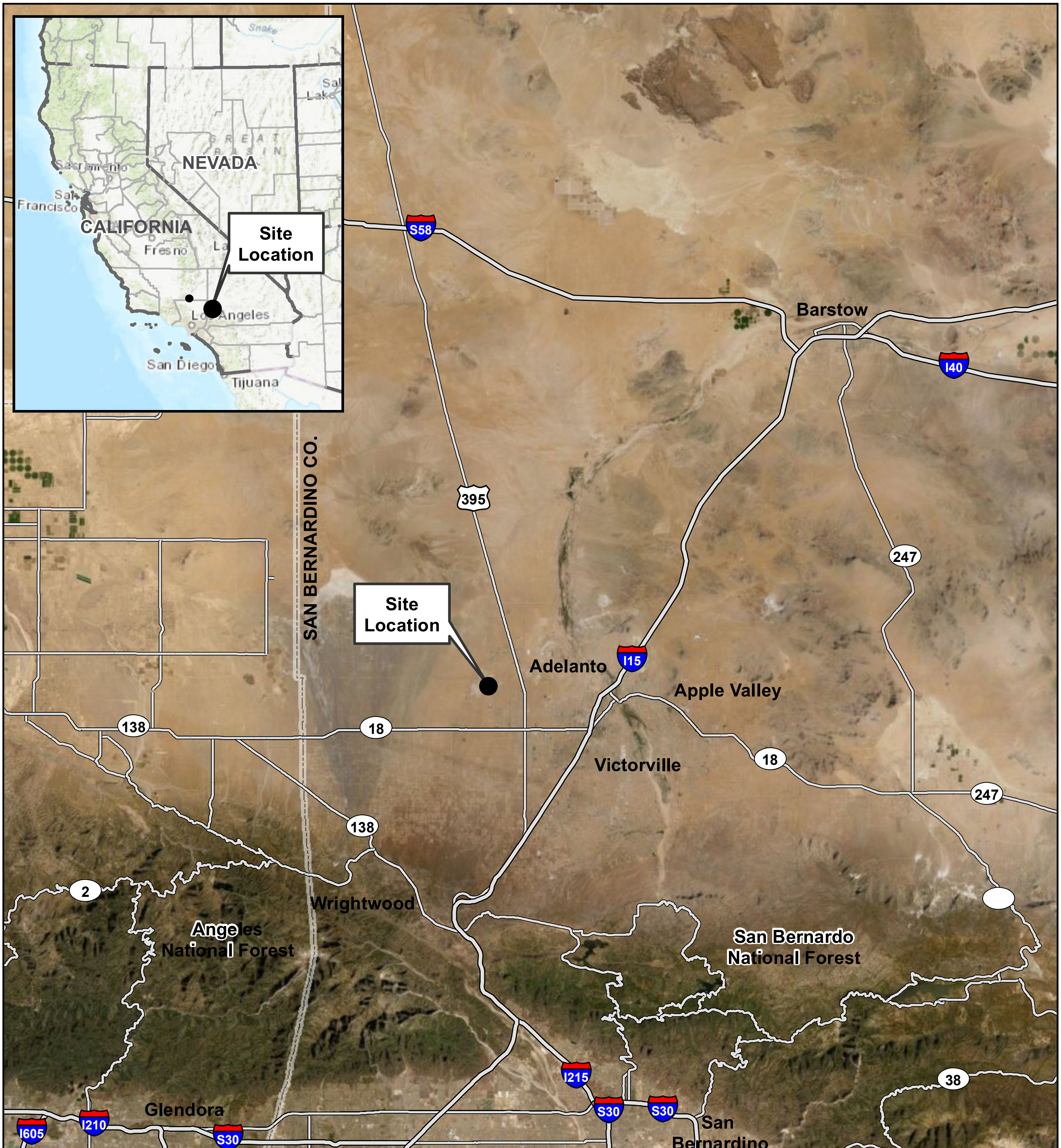

Adelanto Switching Station

Figure 1
Vicinity Map

0 4 8 12
Miles

N

POWER ENGINEERS

Sources: ESRI, HERE, Garmin, USGS, OpenStreetMap Contributors, 2019.

Project #164629

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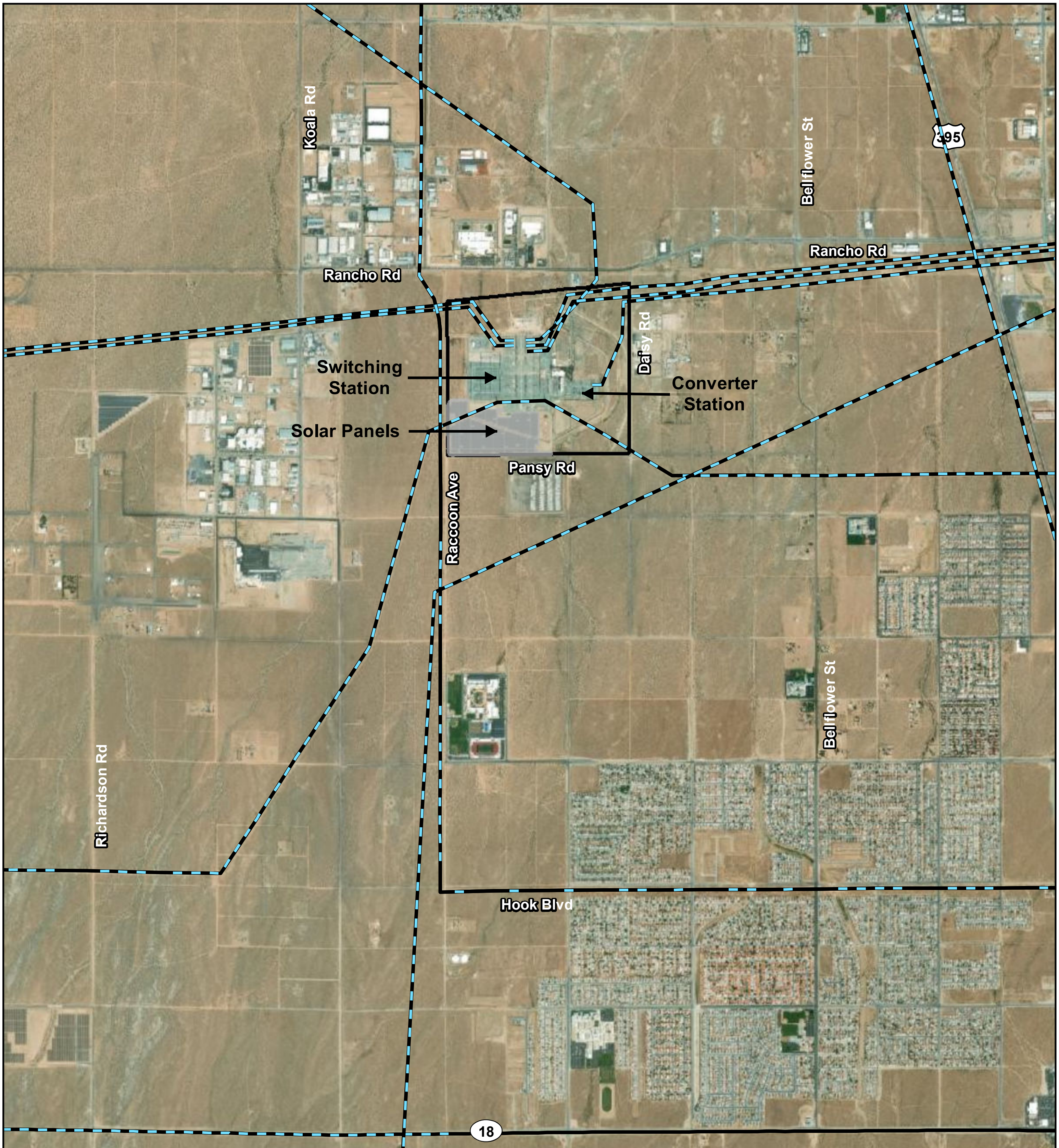

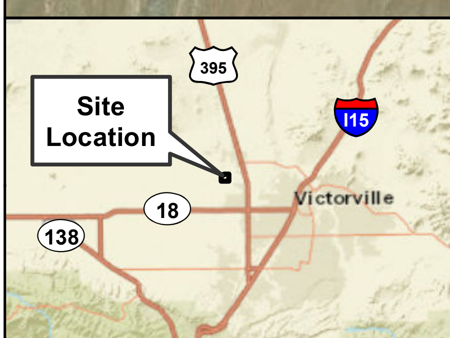

Site Boundary

Existing Transmission Lines

Project #164629

Adelanto Switching Station

Figure 2
Location Map

0 1,000 2,000 3,000 4,000
Feet

N

POWER ENGINEERS

Aerial Photography Source: USDA NAIP\California 2018-07-23

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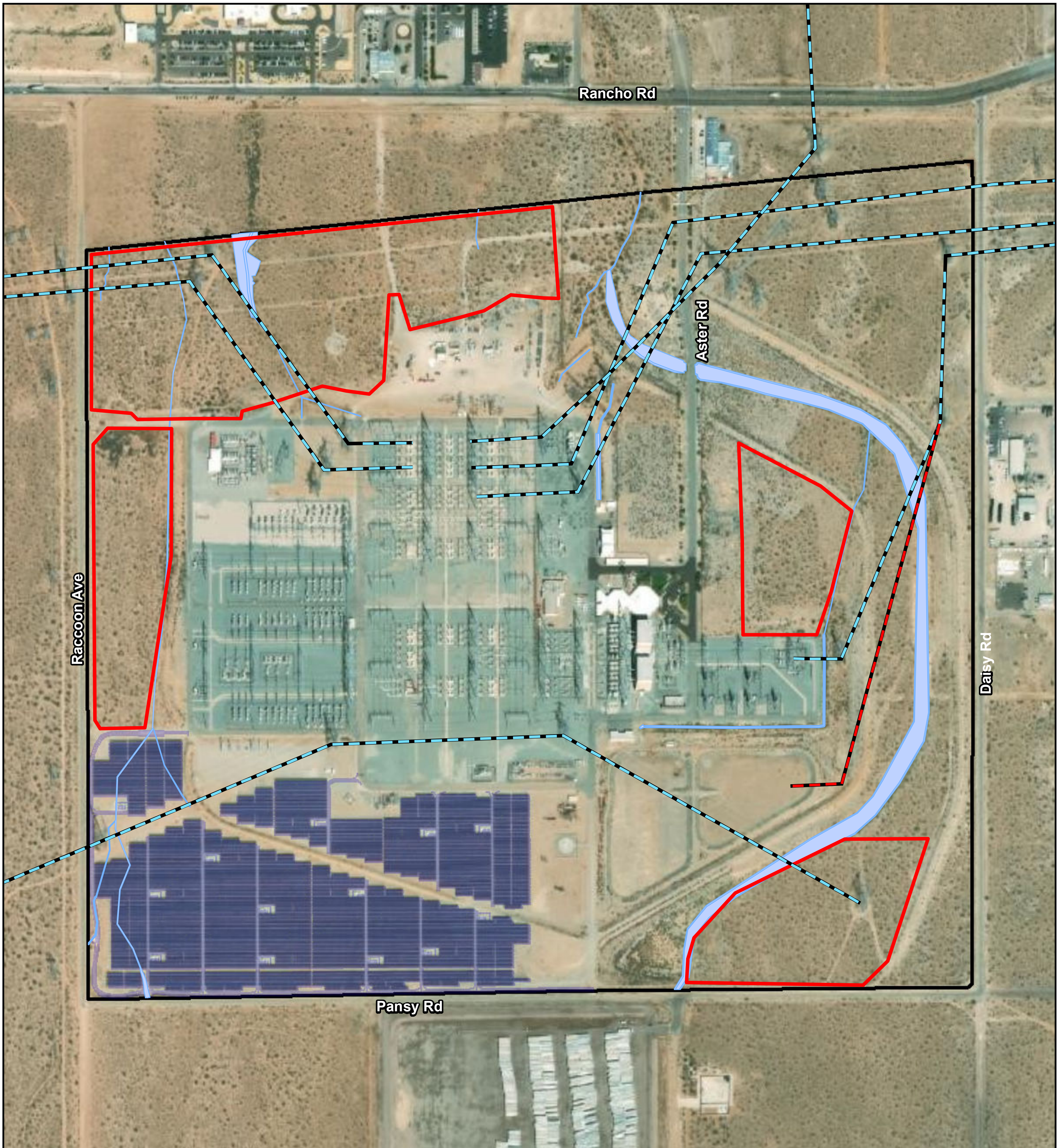

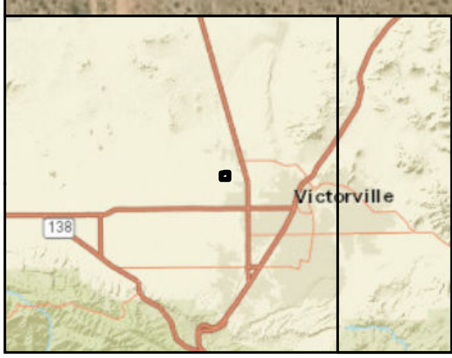

Site Boundary

Achaeologically Surveyed Area

New 500k C Line Location

Existing T smission Line

RWQCB CDFW Area

Project #164629

Adelanto Switching Station

Figure 3

Cultural Resources Survey Area

0 300 600 900

Feet

N

POWER ENGINEERS

Aerial Photography Source: USDA NAIP\California 2018-07-23

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As defined under state law in Title 14, California Code of Regulations (CCR) Section 4850, the term "historical resource" means "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or which is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural history of California." For the purposes of CEQA, "historical resource" is further defined under PRC Section15064.5 as a "resource listed in or determined eligible for listing in the California Register." Section 15064.5 of the CEQA Guidelines sets forth the criteria and procedure for determining significant historical resources and the potential effects of a project on such resources. Generally, a cultural resource shall be considered by the lead CEQA agency to be eligible for the California Register if the resource meets any of the following criteria for listing in the CRHR:

- The resource is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- The resource is associated with the lives of persons important in our past.
- The resource embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values.
- The resource has yielded, or may be likely to yield, information important in prehistory or history.

1.3.2 California Assembly Bill 52

Effective January 1, 2015, CEQA was revised to include early consultation between local agencies and California Native American tribes, and to include the consideration of Tribal Cultural Resources (TCRs) in this consultation. Pursuant to Assembly Bill 52 (AB 52) (PRC 21074[a]), a TCR means either of the following:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    a. Included or determined to be eligible for inclusion in the California Register of Historical Resources
    b. Included in a local register of historical resources as defined in PRC Section 5020.1, subdivision (k)

A resource determined by a California lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC 5024.1, subdivision (c).PRC 21074(a) further relays that a cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape. PRC 21074(a) also states that a historical resource described in PRC 21084.1, a unique archaeological resource as defined in subdivision (g) of PRC 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of PRC 21083.2 may also be a TCR if it conforms with the above criteria.

AB 52 requires that the lead CEQA agency consult in good faith with California Native American tribes that have requested a consultation for projects that may affect TCRs. The lead CEQA agency shall begin consultation with participating Native American tribes prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report. Under AB 52, a project that has potential to impact a tribal cultural resource such that it would cause a substantial adverse change constitutes a significant effect on the environment unless mitigation reduces such effects to a less than significant level.

1.3.3 State Health and Safety Code Section 7050.5

According to the CEQA Guidelines, archaeological sites known to contain human remains shall be treated in accordance with the provisions of State Health and Safety Code Section 7050.5. The protection of human remains is also ensured by PRC Sections 5097.94, 5097.98, and 5097.99. If human remains are exposed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. Construction must halt in the area of the discovery, the project proponent must guarantee that the area is protected, and consultation and treatment shall occur as prescribed by law.

2.0 CULTURAL SETTING

This section provides the results of a cultural resource records check and background literature review within a buffer that extended one mile from the switching station footprint. To place these records into historical context, an overview of the prehistory, history, and ethnographic information of the region is provided below.

2.1 Prehistoric Context

Sutton (1996) categorized the cultural chronology of the Mojave Desert as follows: Paleo-Indian (12,000-10,000 before present [BP]), Lake Mojave Complex (10,000-8000 BP), Pinto Complex (9000-5000 BP), Gypsum Lake Complex (4000-1800 BP), Rose Spring Complex (1800-900 BP), and Late Prehistoric (900 BP – European contact). Social and temporal models of prehistoric occupations in areas surrounding the Project site are reflected in this chronology, which has been refined in recent years (see Sutton et al. 2007).

2.1.1 Paleo-Indian (ca. 12,000 – ca. 10,000 BP)

The time of the earliest arrival of humans to the Americas is inconclusive, although concrete evidence for human occupation of California can be traced to 11,000 years ago. Several archaeological studies push back this date to at least 13,000 years ago based on data indicating nearshore seasonal resource exploitation by people in the Northern Channel Islands, including Arlington Springs, Daisy Cave, and Cardwell Bluffs (Erlandson et al. 2007; Erlandson et al. 2011; Johnson et al. 2002; Kennett et al. 2008). Chipped stone crescents are often thought to be indicators of late Pleistocene and early Holocene occupations, numbering approximately 2,000 in California (Erlandson 2011). The dominant tool type used among Paleo-Indian found in the archaeological record is the fluted projectile point, a type of point which includes the well-known Clovis spearhead. Over 400 fluted projectile points have been found in California. None are known near the Project.

2.1.2 Lake Mojave Period (ca. 8000 – ca. ~6000 BP)

In the California deserts, the number of archaeological sites increases significantly after 8000 BP, which suggests a dramatic increase in the Native American population during and following the late Paleo-Indian period, possibly due to advantageous climatic change. Warren and Crabtree (1986) treat the Lake Mojave period as the first phase in the transition from Paleo-Indian to Archaic adaptations. In the Mojave Desert, sites of the Lake Mojave period are characterized by large, Great Basin Stemmed and concave-based projectile points, gravers, drills, scrapers, crescents, and a few heavy core tools. Fluted points are rare according to Warren and Crabtree (1986) and absent according to Sutton (1996). Milling stones are rare or absent (Warren and Crabtree 1986). Most Lake Mojave sites are limited to surface scatters only.

Lake Mojave sites are well known in the central and eastern Mojave, but rare in the Western Mojave except in the China Lake/Coso area near Ridgecrest (Sutton 1996).

The Lake Mojave period is thought by some archaeologists to have been a time of generalized hunting and gathering, similar to that found throughout the Great Basin (Warren 1967; Warren and Crabtree 1986). However, Lake Mojave sites are often found along the former shorelines of dry Pleistocene lakes (Warren 1980 and 1984; Warren and Crabtree 1986), which has led other archaeologists to suggest that this period was characterized by an economic focus on wetland plants and animals. Some of these sites may have been occupied periodically but over many subsequent generations (Thomas 2012). The large projectile points found at these sites suggest that large game hunting was important, but because the sites are usually only surface scatters, bones and other organic remains are very rare and it is difficult to infer the specific plants and game animals that were exploited (Thomas 2012). This adaptation is thought to have ended with the slow disappearance of pluvial lakes that marks the formal end of the Late Pleistocene/Early Holocene across much of the western United States.

2.1.3 Pinto Period (ca. 6000 – ca. 4000 BP)

With the onset of the Middle Holocene, the climate throughout the western United States became drier and hotter than earlier times. This period, also known as the Clyde Phase (Bettinger 1982), is much debated by archaeologists as it is argued that the tribes withdrew to more desirable locations as the Late Pleistocene pluvial lakes dried (Moratto 1984). It is unknown exactly how people adjusted to the new arid environment. Warren and Crabtree (1986) suggest that populations may have fluctuated with lower elevations essentially being uninhabited at times. Settlement patterns might have shifted from lakeshores to streams and springs found in upland areas, because this would have been where game and plant resources would be more readily available (Sutton 1996): short-term encampments were established near available resources (Gilreath 1995).

Sites of the Pinto Period are relatively rare in the Mojave Desert and those that are known are typically small in size. These facts suggest a regional drop in human population. Pinto sites also seem to appear slightly before the end of the Lake Mojave Period, with the earliest dated at roughly 8500 B.C. (Sutton et al. 2007). Pinto Period sites in the Mojave Desert are often only surface scatters, lacking stratigraphy; however, evidence suggests that the populations were highly mobile and utilized a wide selection of animal and plant resources. Faunal assemblages from sites at Fort Irwin show that lagomorphs (rabbits and hares), followed by artiodactyls (including deer, sheep, and pronghorn), were the primary focus (Sutton 1996). At some sites, tortoise bones are also present.

Archaeological evidence suggests a change in tool types during this period; the Pinto Period is characterized by the distinctive Pinto and Little Lake projectile points (Bettinger 1976; Moratto 1984; Warren and Crabtree 1986), which have been associated with ephemeral lakes. Lithic material was predominantly basalt and rhyolite; obsidian was not yet frequently used. Percussion flaking was the preferred technology (Warren and Crabtree 1986). Common tool types included scraper-planes and choppers; and the earliest appearance of ground stone tools such as basin metates and manos for grinding plant foods. Milling stones are present but rare at Pinto Period sites (Warren 1980 and 1984; Warren and Crabtree 1986; Sutton 1996). Evidence of pinyon nut exploitation at some sites suggests a shift to seed processing to supplement the diet (Sutton 1996). Sutton (ibid) sees cultural continuity from the Lake Mohave Period to the Pinto Period, suggesting that Pinto can be seen as the final phase of a transition from Paleo-Indian material culture to adaptations more typical of Archaic sites. Pinto appears to be a broadly generalized cultural adaption related to a climatic shift to an increasingly xeric environment and the final desiccation of the Pleistocene lakes (ibid).

2.1.4 Gypsum Period (ca. 4000 BP – ca. 1800 BP)

About 4,000 years ago, climatic conditions shifted again to a cooler and moister environment than the previous Pinto Period. This change led to more favorable environmental conditions in terms of plant and animal populations, which in turn seems to have contributed to an increase in population in the Mojave Desert; the development of trade between different groups; and greater social complexity beyond a simple band structure. Gypsum Period hunters exploited a wide range of game animals, including mountain sheep. They probably used the atlatl, a weighted stick used to throw a large dart farther and more accurately than was possible with the unaided arm. Stone tools used at this time included two-edged blades, scrapers, hammerstones for lithic core reduction, and milling stones for grinding seeds collected from grasses and other plants (Warren 1980 and 1984; Warren and Crabtree 1986).

2.1.5 Rose Spring/Saratoga Springs Period (ca. 1800 BP – ca. 900 BP)

Throughout the Great Basin, approximately 1,500 years ago, smaller projectile point types were introduced, indicating the introduction of the bow and arrow. This technology probably replaced the atlatl, which had been used for nearly 10,000 years. Numerous sites dating to this period, including major villages, have been recorded in eastern California. Many of them contain bedrock milling features and portable milling stones, which suggest that gathering seeds, nuts, and other plant foods, had increased in importance in the people’s diet. In the Antelope Valley, artifacts from some Rose Spring Period sites suggest that trade or other ties to coastal Native American groups may have been associated with local changes in subsistence and the development of larger villages (Warren 1980 and 1984; Warren and Crabtree 1986).

2.1.6 Late Prehistoric Period (ca. 900 BP – Contact)

During the Late Period, the Desert Side-notched projectile point became a distinctive temporal marker. Pottery also appears for the first time in this Period. Trade between different Native American groups increased along the Mojave River and over the Sawmill-Liebre Range, although there is evidence at the very end of the period that the trade network along the Mojave River had broken down, possibly due to a collapse of Anasazi economies, the droughts of the thirteenth century, or the introduction of Shoshoneans into eastern California. Concurrently with this decline in trade in the eighteenth century, the abundance and size of villages in the Antelope Valley declined (Warren 1980 and 1984; Warren and Crabtree 1986).

2.2 Historic Context

The transition from the prehistoric period to the historic era began during the late 1690s with the arrival of Spanish Jesuit Missionaries on the lower Baja Peninsula. Establishing the first outpost in La Paz in 1697, the Jesuits slowly extended Spanish control northward. In 1768, the Jesuits were expelled to Cuba (Bancroft 1883) and replaced by the Franciscan Order in California and the Dominican Order in Baja California. The Franciscans established the first Mission on what is now American soil in 1769 at San Diego, and that year marks the standard transition end point between the prehistoric and historic in southern California. A short-lived phenomenon, Franciscan rule was ended in 1773 when the Spanish Crown required the Dominicans to begin managing all existing Missions and establish new Missions. Because of Russian and British territorial advances in the North Pacific during the mid to late 1700s, the Dominicans, initially under Fr. Junipero Serra, were allowed to establish new Missions northward from San Diego near the coast until 1823 when the last Spanish mission was founded at Sonoma.

Once the lands near each Mission were stocked with cattle, a need to survey nearby unexplored lands was required not only for calculation of pasture size and knowledge of water sources, but to control the ubiquitous Indian raiders and determine the whereabouts of trails associated with coast to interior trade routes. Regionally, one of the first explorations into the interior was led by Gaspar de Portola in 1769 into the upper reaches of the Santa Clara Valley near present day Newhall. The expense of maintaining the Missions caused the Spanish Crown to question holding onto them (McCarty 1976) and once king Charles IV and Ferdinand VII abdicated in favor of Napoleon Bonaparte (in 1808), Mexicans began to assert their territorial rights. The decline of the Missions as religious institutions and as the local political seat had been occurring since 1804, when the Spanish Crown began reducing funding in its Colonies in reaction to a series of economic recessions in Europe (Bancroft 1883).

Political change began in 1821 when Mexico gained independence from Spain. The authority of the Dominicans began to erode when, in 1826, the Mexican military removed the neophytes at the Missions from church control (Castillo 1978). Mission lands were seized by the Mexican government in August 1833 after the Act of Secularization was formalized: ranchos composed of former Mission lands were deeded to important Mexican loyalists and leading citizens (aka the Californios) through the decrees of local Mexican governors. Several years later, the new state of Mexico was on the verge of bankruptcy and revolution, and this forced the Mexican Government to shed much of its northern frontier. After the Mexican – American War of 1846-1848, the Treaty of Guadalupe Hidalgo was signed (in 1849), and Alta California (this territory included California, Nevada, Arizona, Colorado, and a portion of Wyoming) plus additional territory was ceded to the United States plus a credit of $15,000,000 in Mexican debt. Flirting with independency for a few months, California was admitted to the union in 1850.

During the early historic period, the arid environment of the Mojave Desert and Antelope Valley made the region inhospitable for homesteading or cattle ranching. However, the area did serve as an important transportation corridor between the California coast and the Colorado River to the east. One of these early routes, the Mojave Road, was located near the Mojave River at Needles Crossing and followed paths along the river some six miles northeast of the Project. Originally a Native American trail complex, the early Spanish explorers Pedro Fages and Francisco Garcés followed the route in the late 1700s. Later, the Mexican then the American militaries established outposts along the trail and eventually named it the Mojave Road and the Old Government Road (Hoover et al. 1990).

In the late 1860s and 1870s, railroad companies took advantage of legislation crafted by Congress to survey and construct a series of routes into southern California. What would become the town of Barstow was founded by Mormons near a bend in the Mojave River in the 1840s as “Waterman,” the town was in 1888 renamed Barstow in honor of William Barstow Strong, President of the Santa Fe Railroad. In 1885 a subsidy of the Santa Fe, the Atlantic and Pacific Railroad, was extended across the Colorado River to Needles thence to Barstow to join with another Santa Fe subsidy, the California Southern Railroad, which had been recently built by crossing Cajon Pass from Colton. These linked railroads provided another direct connection between Los Angeles and Chicago, and allowed the products of mining (gold, silver, borax) to be transported to these key commercial hubs.

In the first half of the twentieth Century, the state of California slowly expanded its all-weather road system, building US 395 from San Diego through Cajon Pass and reaching north to the Owens Valley through Adelanto and Randsburg in the early 1930s. Each of these events allowed commerce to expand and small communities in desert areas to slowly develop.

Between 1936 and 1940, LADWP constructed three high voltage transmission lines from the powerhouses at Boulder Dam to a substation at Mojave Heights northwest of Victorville. Dice et al. (2011) reviewed the history of these lines and provided the following narrative:

> *“Review of various sources shows that three 287.5-kV transmission lines using the new 60-cycle AC line rate were built between Boulder Dam and the new switching station at Victorville between 1933 and 1940. The original configuration was a three-phase circuit with three*

individual lines sent from the powerhouse roof to a switching station at Silver Lake near Baker, 90 miles distant, then to another station 90 miles away at Victorville, and finally through the Cajon Pass to the Century Receiving station in East Los Angeles. Boulder Line 1 and Boulder Line 2 were built beginning in 1933 and completed in early 1936, with power being transmitted to the Century station in October 1936. With line losses about 5 percent of the original, 275.0-kV was received per line in Los Angeles. Boulder Line 3 was built 1939-1940 as additional turbines were completed in the Boulder Dam powerhouse and another run of 287.5-kV power was transmitted soon after completion. The original line towers were 90 feet tall, whereas the newer [#3] *line used 100-foot towers. This line followed the same path between Boulder Dam and Victorville, but after emerging from Victorville the power was sent to the Toluca Lake switching station using a different ROW* [ed note: through Adelanto]*. Just before 1942 some of the lines were switched between other towers, but the lines… remained unaltered. In 1940, this was the most powerful electrical transmission network in the world, a record that stood until 1952.*

In 1970-1973, the Silver Lake switching station was removed and a higher voltage station at McCullough Pass, Nevada was constructed. During this period Boulder Line 3 was converted to a 500-kV circuit, which was switched at McCullough. The towers of the new circuit were reinforced to support twice the weight of cable (2 lines per arm instead of one), certain towers were rebuilt/replaced and changes to the names of the line occurred to reflect the points between each switching station. The Boulder Line 3… became known as the McCullough-Victorville #1…

In 1980, the old 287.5-kV Boulder Line 2 was converted to a 500-kV circuit and was rerouted through the McCullough station before reaching Victorville. This became known as the McCullough-Victorville #2 and required retrofitting similar to that done several years before…"

2.3 Ethnographic Context: Serrano and Vanyume

Expanding Spanish colonization of coastal California in the 1770-1800 period subjected Native Americans to sweeping social and cultural shifts. The establishment of the Spanish mission system brought about dramatic and systemic change to social structures. The introduction of new diseases eventually decimated indigenous populations, particularly the smallpox epidemics of 1863 and 1870. Background research has shown that the desert branch of the Serrano, known as the Vanyume, lived in the Victorville area at the time of first contact with Europeans explorers.

The spoken language of the Serrano is of the Takic-Serran branch of the Uto-Aztecan language family. Their range was located in the inland mountainous areas, typically east of the Cajon Pass area of the San Bernardino Mountains, inclusive and north of San Timoteo Canyon, west of Twenty-nine Palms and south of Victorville (Bean and Smith 1978). A few Serranos in the more remote areas of their homeland were able to remain relatively unaffected by European incursions until the 1870s (Bean and Vane 2000).

Serrano populations studied by ethnographers were a remnant of their cultural form prior to contact with the Spanish Missionaries. Nonetheless, the Serrano are viewed as clan and moiety-oriented or local lineage-oriented group tied to traditional territories or use-areas. Typically, a "village" consisted of a collection of families centered about a ceremonial house, with individual families inhabiting willow-framed huts with tule thatching. Considered hunter-gatherers, the Serrano exhibited a sophisticated technology devoted to hunting small animals and gathering roots, tubers and seeds of various kinds. Like other California natives, smallpox epidemics killed many tribal members in the 1800s, and prior to 1840 most surviving tribal members had been missionized, further decimating the native lifestyle. Today, Serrano descendants are found mostly on the rolls of the Morongo and San Manuel reservations.

The desert branch of the Serrano known as the Vanyume (or *Beñemé*, as identified by the Franciscan friar and explorer Francisco Hermenegildo Tomás Garcés), lived along much of the length of the Mojave River in seasonal villages, from east of Barstow to at least the north Victorville/East Hesperia region. According to a synopsis by Bean and Smith (1978:570-574), the Vanyume were a small group speaking a dialect of Serrano or a separate Takic language who lived along the Mojave River, and they also appear to have lived in the southwestern Antelope Valley. Virtually all data associated with early Serrano culture was derived from Kroeber's seminal study on the Indians of California (1925), a type of work that is now known as "salvage ethnography" because many tribal members Kroeber interviewed during the period of his fieldwork (1905-1920) were born after conquest, tribal decimation, and partly assimilated into European culture. A very small word list (Bean and Smith 1978) appears to have linked the Vanyume with other Serrano speakers. These ethnographic interpretations were compounded upon Kroeber's basic work using records associated with early travelers in California, it is the only academic record ethnographers, archaeologists and Native American tribes alike have that described how Native Americans might have lived before European diseases and politics took their toll.

The trail linking Mohave villages on the Colorado River with southern California tribes and Chumash territory on the coast (the Mohave Trail or later the Mojave Road), ran west the Colorado River to Soda Lake near Baker, California, then paralleled the river channel from its mouth on Soda Lake to Hesperia. The trail was crucial to prehistoric trade and used by all regional tribes and, once horses were introduced, used by Mohave raiders to take horses and cattle from newly developed towns in the San Bernardino area during the 1800s. Native Americans used this trade route for millennia because surface water and springs were very reliable. Garcés explored the length of the Mojave River in early 1776. He named the river Arroyo de los Mártires ("river of the martyrs") but later explorers called it *Río de las Ánimas*. In 1826, Jedediah Smith was the first known American to travel overland to California by following this trail. The Mojave River is typically a trickle during most of the year as its flow is mostly underground, but during El Nino years could become a raging torrent. During 1938/1939 and 1969 flooding events, the Mojave washed out roads, bridges and railroad tracks, then filled Silver and Soda Lakes.

Francisco Garces entered several Vanyume and Serrano villages along the River in 1776 but did not note the placement of the villages with reference to nearby topographic landmarks. Garces was reported to have been given acorn porridge at one of the Vanyume rancherias. Other Mohave Trail travelers (Zalvidea in 1806; Jedediah Smith in 1826 and 1827; Wilson in 1845) and especially Father Nuez of the Moraga Expedition (1819) recorded a few basic facts and locations about the few Indians they met that allowed later historians to better recreate pre-conquest ethnography history (see Chapman 1921). Father Nuez does not state the ethnographic affiliation of villages he encountered during the 1819 Moraga Expedition, nor does he identify exact places of other rancherias he went to—including *Cacaument*, *Sisugina*, and *Angayaba*—except by distance from the previous stopping place.

Gifford (1918) and Strong (1929) argued that the Serranos were organized on the basis of independent but interacting village communities, a concept reinvigorated by Altshul et al. (1989). The desert Serranos living in the Mojave Forks region were known to belong to the *Kaiwiem* clan, while the territory associated with this clan (known as *Kayuwat*) ran north and downstream to at least Victorville. A village located at the west end of Summit Valley (CA-SBR-93) was known as *Guapiabit*. *Guapiabit* probably served as the main village for the entire clan, and was visited several times by the Spanish, and later by various American traders. *Guapiabit* is located at the arrival point for persons traveling from the Mohave villages along the Colorado. Another village three miles north of *Guapiabit* was *Atongabit* (PSBR-15) Finally, Altshul notes that in a J.P. Harrington set of Serrano field notes (presumably dating from the 1920s-1930s) the *Maviatum* clan (either Serrano or Vanyume) inhabited the areas known as *Maviat* between Victorville and Barstow.

Garces mentions that the Mohaves and Chemeheuvis were on good terms with the Vanyume, but not with the Serranos. In 1776, Garces encountered two villages, one abandoned, between Daggett and an area several leagues to the east. There is a possible village site known for the Daggett area in state records

(CA-SBR-1961: Dice et al. 2011). This site has apparently has not been investigated by archaeologists except for a cursory site description from 1940, and at this time it may have been lost to the plow. This may have been the village Garces identified near the Daggett area. A few leagues further east, Garces noted a village site CA-SBR-85 at Afton Canyon, which is a large lithic reduction campsite investigated by Schneider (1989). Malcolm J. Rogers field notes from the 1930s may have identified two additional "village" sites located to west of the Cady Springs site (Rogers n.d.). The Cady Springs site was located along the River, due south of the original fort. Rogers believed this to be a two-mile long Chemehuevi site with Mojave pottery elements. A second similar site is located at a rockshelter near the western entrance to Afton Canyon, and both had been looted by Rogers' time.

In sum, archaeological, historical and ethnographic investigations along the Mojave River have identified numerous places that may have been visited by early explorers and carry substantive deposits, but all of them are located near the Mojave floodplain and are located within a few hundred yards of the current river floor. Few substantive sites are known for lands located far from the Mojave, which places the Project area in a zone of very low prehistoric site potential.

3.0 RECORDS SEARCH AND CONSULTATION

3.1 Known Cultural Resources

A literature and records search were conducted at the South Central Coastal Information Center (SCCIC) by SCCIC Research Assistant Isabela Kott on July 2, 2020. Records consulted at the SCCIC included the inventory of the National Register of Historic Places, the CRHR, the California Historic Landmarks list, topographic maps showing the locations of sites and surveys, and historic topographic maps. Because of the limited potential impacts assumed by the Project, a one-mile search radius was utilized.

This research effort indicated that several cultural resources were located within one mile of the Project area (see Table 1), while few surveys in this region have occurred (see Figure 4). The most recent and only SCCIC-filed survey on the Project site was conducted in 1985 for the last major LADWP transmission project: the Mead-Adelanto Project: most of the station parcel was surveyed by Dames and Moore (1985) archaeological staff in support of that Project. Although the SCCIC files show that the rest of the Project area has not been surveyed previously and that no cultural resources have been detected inside the footprint of the Adelanto Switching Station, POWER archaeologists did survey the footprint of the solar panel installations in 2010 as part of an LADWP-sponsored initial study (POWER 2010).

The records search also shows that few of the parcels near the Project have been surveyed by professional archaeologists in the last 40 years as part of CEQA-related compliance efforts.

The peripheral area has not been plowed by farmers for agriculture due to a lack of ground water, but home development has been on the rise for the last 30 years, and home construction would have typically required CEQA-mandated cultural resource surveys. Given that few cultural resources are known for this area and the site has been previously graded and/or otherwise disturbed due to recent utility development within and adjacent to the LADWP and Southern California Edison easements and along Rancho Road, the potential for the discovery of cultural resources is considered low to moderate.

TABLE 1 KNOWN CULTURAL RESOURCES LOCATED WITHIN ONE MILE OF THE PROJECT

P NUMBER	TRINOMIAL	PERIOD AND TYPE
36-006532	CA-SBR-006532H	Historic trash scatter
36-007561	CA-SBR-007561H	Historic trash scatter
36-007562	CA-SBR-007562H	Historic trash scatter
36-010392	CA-SBR-010392/H	Prehistoric site/Historic road
36-012463	CA-SBR-012255H	Historic trash scatter
36-012464	CA-SBR-012256H	Historic trash scatter
36-026763	None	Prehistoric site
36-026829	None	Prehistoric isolate
36-061239	None	Prehistoric isolate
36-061240	None	Prehistoric isolate
36-061241	None	Prehistoric isolate

3.2 Historic Aerial Photographs and Maps

Historic maps of the Victorville area have been produced by the USGS since the early twentieth century and are available for review on the Historicaerials.com website (Nationwide Environmental Title Research 2018) as well as the USGS Historical Topographic Map collection site (https://ngmdb.usgs.gov/topoview/). In addition, the on-line Bureau of Land Management's General Land Office (GLO) website was accessed in order to determine if any early historic-era homesteading records for the Project area have been stored within the archives of the Bureau of Land Management.

Aerial photos taken between 1938 and about 1982, as shown on the University of California – Santa Barbaras' *Framefinder* website (http://mil.library.ucsb.edu/ap_indexes/FrameFinder/) show that the Project site had not been actively farmed or developed at all between those years. Development of the Adelanto station occurred in the 1980s with completion of the station in 1986 and prior to this the only regional development was in the form of roads, LADWP transmission lines, and buried high pressure natural gas lines. Cattle ranches were rare and highly separated because the only water available was along the Mojave River. Prior to this, Line 3 from the Boulder powerhouse passed through the Project area (built 1939-1940) after connecting with a substation overlooking the Mojave River at Victorville.

The GLO website showed that the northeast quarter (160 acres) of Section 6 in T5N/R5W, was patented by one Raymond Green on November 22, 1923 in Los Angeles. A historical background review of this landholder revealed no significant historical notes. Most of the parcels in this area were claimed by individuals between 1910 and 1929 under the Desert Land Act, which had been passed by Congress on March 3, 1877 with the purpose to encourage and promote the economic development of the arid and semiarid public lands of the Western states. Through the Act, individuals could apply for a desert-land entry to irrigate and reclaim the land, but in this area the economic viability of land was almost nonexistent. The Southern Pacific Railroad held title to most of the odd-numbered sections in this area officially as of 1918 but sold their properties once the railroad right of ways became established.

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FIGURE 4

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3.3 Native American Consultation

LADWP has engaged in AB 52 consultation for the Project with local tribes as part of the pre-planning phase. In support of this effort, prehistory, history, and ethnographic information of the region has been provided in Chapter 2.0 of this report and the results of the records search has been provided in Section 3.0 of this report. These data can be passed onto local tribal entities.

The San Manuel Band of Mission Indians began consultations with LADWP in May 2020 and requested specific cultural resources information pertaining to the Project. The Band indicated that the proposed project area exists within Serrano ancestral territory and the lands are of cultural interest to the Tribe. Upon issuance of this Report to the Band for review, the Band may provide comment on the results.

4.0 FIELD METHODOLOGY AND RESULTS

4.1 Methodology

The field survey was conducted by POWER archaeologist Michael H. Dice, MA/RPA on June 11, 2020. The survey area included portions of the Adelanto station property that could have conceivably been used for construction and staging (see Figure 3). Because the exact locations of the Project impacts were not known, a large amount of area was examined for buffering purposes.

Fieldwork consisted of a combination of intensive visual inspection of the ground surface plus a series of transects spaced 10 to 15 meters apart throughout the entire Project area. Direct soil observation was good with about 30 to 40 percent visible throughout the entire survey area.

4.2 Results

The survey revealed a single isolated artifact: one granitic hammerstone with battering on one edge (see Appendix B for survey photographs and Appendix C for the single DPR523 isolate form). The reddening of the granite hammerstone suggests that it may have been heated in a fire, but there are no other artifacts nor hearth features in this area. Due to the more recent historical activities in the area, the likelihood of uncovering buried prehistoric archaeological materials is considered very low for this Project site.

5.0 CONCLUSIONS AND RECOMMENDATIONS

POWER has conducted a Phase I cultural resource survey on several individual segments of relatively undisturbed sections of land in support of construction of the proposed Project. The fieldwork resulted in the detection of one prehistoric isolate and no sites inside the Project area. Isolates are not considered historic properties by California State Historic Preservation Office.

The lack of encountered prehistoric and historic-era resources reinforces the fact that the potential for such resources should be considered low. The fact that no archaeological or historic-era sites were observed suggests that the chance that any will be found during construction is unlikely.

Because the Project will not result in an impact to any known significant cultural resources, and because the potential for impacting buried historic properties is considered low, POWER does not recommend any further cultural resources research on this Project. In addition, POWER does not recommend that archaeological monitoring take place during construction.

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APPENDIX A RESUME OF MICHAEL H. DICE

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MICHAEL DICE, M.A. RPA

SENIOR ARCHAEOLOGIST

YEARS OF EXPERIENCE

31

EDUCATION

- M.A., Anthropology, Arizona State University, 1993
- B.A., Anthropology, Washington State University, 1986

AREAS OF EXPERTISE

> Historic and Prehistoric Archaeology
> Native American Coordination and Consultation
> Section 106 and CEQA Compliance
> Architectural History
> Environmental Compliance Inspection and Monitoring
> Independent Contracting

SPECIAL TRAINING

> Completed Section 106 and Historic Architecture Seminar, City of Los Angeles (SWCA staff), April 2012.
> Completed County of Riverside archaeological training/permitting program. 2005, 2010.
> Completed County of San Diego archaeological training/permitting program. 2008, 2012.

AFFILIATIONS

> Register of Professional Archaeologists (RPA), 2002-now.
> Society for American Archaeology (SAA), 1999-now.
> BLM-California Statewide Permitted PI: 2014-now.
> BLM-Arizona Permitted Field Director: 2017-now.
> State of Oregon Registered Archaeologist. 2014-now.
> State of Washington Registered Archaeologist with WISAARD access. 2017-now.

EXPERIENCE SUMMARY

Mr. Dice is a Registered Professional Archaeologist specializing in archaeology and cultural resource management. He has conducted more than 200 cultural resource survey, testing, monitoring, data recovery, and inspection/monitoring/restoration projects in the desert southwest including California, Arizona, Utah, Colorado and New Mexico. He has participated in a wide range of projects for local, state, and federal agencies, as well as for major utilities and project developers. Very active in the field as the primary archaeologist during field research, his studies have involved housing tracts, commercial tracts, high voltage transmission lines, natural gas pipelines, telecommunications facilities, and transportation projects. His experience includes projects on BLM lands in California, Arizona and New Mexico.

Mr. Dice has experience managing projects with budgets of over $500,000 and involving multiple jurisdictions. As a project manager he has been responsible for maintaining project schedules involving numerous tasks, coordination of multidisciplinary project teams and subcontractors, and ensuring the quality and completeness of project deliverables.

PREVIOUS WORK HISTORY – PRINCIPAL INVESTIGATOR, Desert Southwest, Southern California, and Southeast California. Partial list of projects completed.

Ormat-Nevada 3-D Geotechnical Project. Imperial County, California. 2016-2019. POWER Engineers, Inc.

Lead Project Archaeologist responsible for developing and writing a Class III Archaeological Survey of the Truckhaven 3-D Seismic Project, Imperial County, California. Acted as Field Director and Principle Investigator. Draft Class III prepared for Ormat-Nevada, Inc. and the Bureau of Land Management, El Centro Field Office with concurrence from the California State Parks Department. Two BLM FWA permits, and two California State Parks survey permits were required. Finalization expected in Spring, 2019.

Los Angeles Department of Water and Power, The Barren Ridge Renewable Transmission Project. -Los Angeles and Kern Counties. California 2014-2017. POWER Engineers, Inc.

Lead Project Archaeologist responsible for providing rapid response cultural resource services in support of the Barren Ridge EIR/EIS, PA and Monitoring projects with LADWP as the project Proponent. Acted as Field Director and Principle Investigator. Managed all archaeological technical staff, designed procedures for Phase 2 testing, Phase 3 excavation and the daily construction Monitoring procedures. Angeles National Forest multi-year ARPA permits, and a BLM-Ridgecrest FWA permit were required.

Kaliber Group, Inc: Archaeological Excavations at CA-ORA-556. Orange County, California 2003-2007. MBA, Inc.

Lead Project Archaeologist responsible for providing cultural resource services in support of the Santiago Hills II residential development in the City of Orange. Acted as Field Director and Principle Investigator. Managed all archaeological technical staff, designed procedures for Phase 2 testing, Phase 3 excavation and the daily construction Monitoring procedures.

Secured Equities, LLC: Archaeological Excavations at the Mission Lane (Mission Glen West) Project Tract #16323. Riverside County, California 2006-2007. MBA, Inc.

Lead Project Archaeologist responsible for providing cultural resource services in support of the Mission Lane residential development in the City of Loma Linda. Acted as Field Director and Principle Investigator. Managed all archaeological technical staff, designed procedures for Phase 2 testing, Phase 3 excavation and the daily construction Monitoring procedures.

PREVIOUS WORK HISTORY – FIELD DIRECTOR, Desert Southwest and Southeast California. Partial list of projects completed.

Ten West Link Geotechnical Project. La Paz and Maricopa Counties, Arizona. 2019. POWER Engineers, Inc.

Lead Project Archaeologist currently managing the California portion of this project (California survey not yet undertaken). In concert with POWER Lead Archaeologist Josh McNutt, Mr. Dice lead one of two crews surveying geotechnical testing areas under the auspices of two BLM-AZ FWA permits, one BOR ARPA permit, and one AZ State Museum survey permit. Finalization of the Class III report is anticipated for March, 2019.

LADWP Powerline Road Maintenance Project. San Bernardino County, California. 2011. MBA, Inc.

Lead Project Archaeologist for the Los Angeles Department of Water and Power Class III Cultural Resource Survey of the Powerline Road Maintenance Project, (Path 46) Baker to Victorville Segment. BLM FWA permit received from the Barstow Field Office

Colgreen Energy North Salton Sea Passive Solar Farm Project, Mecca, California. 2011-2013

Director of all cultural resource studies and co-project coordinator for two proposed solar power stations in southeast California. Colgreen Energy of El Centro, CA initiated development of two proposed 480 acre passive solar power stations, one near the Salton Sea at 70th and Cleveland and another northwest of the Quechan Reservation in Felicity, California. Mr. Dice led the archaeological surveys with a team of archaeological technicians, and then Phase 2 tested several archaeological sites in the project area. Completed reports were provided to the Counties of Riverside and Imperial, California for their review and use.

Data Recovery at Six Sites on Williams Field Services' Trunk S Pipeline, East Segment, Farmington, New Mexico region. (1995-1998). CRMC, Inc.

Served as Crew Chief under CRMC FWA from Farmington NM BLM District. Undertook data recovery at six sites on Williams Field Services' Trunk S Pipeline, East Segment. Rio Arriba and San Juan County, NM. Draft report submitted to CRMC, Inc. 1998.

PREVIOUS WORK HISTORY – FIELD ARCHAEOLOGIST AND TECHNICAL ANALYST, ARIZONA AND NEW MEXICO PROJECTS.

National Park Service, Pipe Spring National Monument, Fredonia, Arizona (1998)

Served as a temporary project scientist and archaeologist for a Section 106-level review of archaeological testing documents produced at the Mormon Fort within the confines of Pipe Spring National Monument. Database and text were written for review by the overseeing archaeologist in the NPS system. Also produced a draft plan for treatment any future archaeological mitigation at the Monument.

Fruitland Coal Gas Recovery Project, Rio Arriba and San Juan Counties, New Mexico (1992-1994). LaPlata Archaeological Consultants, Dolores, CO.

Served as a field archaeologist for block transect and watershed surveys on many thousands of acres in northwest New Mexico and southwest Colorado, then assisted in the testing and excavation of 12 cultural resource sites in the gas fields of San Juan and Rio Arriba Counties, New Mexico.

Bioarchaeological Analyst, Towaoc Canal Project and the Hansen Pueblo Projects, Montezuma County, CO (1993). CASA, Inc. Cortez, CO. and Woods Canyon Archaeological Consultants, Cortez, CO.

Served as the analyst of a series of disarticulated deposits of human remains for a mitigative project sponsored by the BOR (Towaoc Canal) and Private ownership (Hansen Pueblo).

Phase I Survey, Phase II evaluation and Phase III data collection for various projects in and near Phoenix, Arizona (1988)

Mr. Dice undertook fieldwork with three different archaeological contractors based in Phoenix as well as the historic preservation laboratory of Arizona State University. Surveys took place in Tucson, Apache Junction, Mesa, north Phoenix, Avondale and in the Tonto Basin. Data collection efforts took place on Runway #4 of the Sky Harbor Airport Expansion. Fieldwork was undertaken for Cory Breternitz at SSI and Glen Rice at ASU-OCRM.

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APPENDIX B SURVEY PHOTOS

View toward the northwest corner of the Adelanto Switching Station and a planned temporary use area near existing high voltage transmission lines. Image #3487. June 11, 2020.

View toward the west from the southeast corner of the Adelanto Switching Station and a planned temporary use area near existing high voltage transmission lines. Image #3505. June 11, 2020.

View toward the northeast near the center of the Adelanto Switching Station and a planned temporary use area near existing high voltage transmission lines. Image #3510. June 11, 2020.

View toward the south from the northeast corner of the Adelanto Switching Station and a planned temporary use area near existing high voltage transmission lines. Image #3515. June 11, 2020.

APPENDIX C RECORDED ISOLATE DPR FORM SET

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APPENDIX D

D1: GEOHAZARD REPORT

D2: GEOTECHNICAL DESIGN REPORT

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Revision 0

GEOHAZARD REPORT

IPP Renewal Project
Adelanto, California

B&V Project No. 196137
B&V File No. 42.4315

REGISTERED PROFESSIONAL ENGINEER
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Exp. 12/31/21
07/Aug/2020
CIVIL
STATE OF CALIFORNIA

PREPARED FOR

IPA
Intermountain Power Agency
Energy for Today & Tomorrow

CERTIFIED ENGINEERING GEOLOGIST
BRANDON GOMER
2626
8/7/2020
STATE OF CALIFORNIA

Intermountain Power Agency

07 AUGUST 2020

BLACK & VEATCH

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1.0 Introduction

This report presents a summary of the geology, seismology, and geologic hazards for Intermountain Power Agency (IPA) Adelanto Converter Station (Adelanto) project located near Adelanto, California. This report and its format follow the information outlined in California Geological Survey (C S) Note 48 – *Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings* (2019). Information required in both this report and the Black & Veatch Geotechnical Design Report is presented in only one of the reports, with reference to the information in the other report without repeating the information.

These principal findings of this report are:

- The geology near the site is suitable for development.
- The site is not in an Alquist-Priolo (AP) Earthquake Fault Zone.
- Large seismic events have occurred in the geologic region near the site.
- The site is seismic Site Class C.
- The site-specific ground motions for structural design in accordance with CBC are consistent with ground conditions near the boundary of Site Class C and D.
- No active faults are identified at the site and risk of fault rupture is low.
- Soil liquefaction is not a hazard at the site due to the deep occurrence of groundwater, but seismic compaction of up to 0.3 inches may occur.
- Landslide hazards are low.
- Regional land subsidence due to groundwater withdrawal occurs near the site.

Subsurface investigations were performed by Ertec Western, Inc. in 1981; CH2M Hill and URS/John A. Blume & Associates in 1982 and 1983; Kleinfelder in 2009; and Black & Veatch in 2020 to provide geotechnical data at the project site. During the 2020 subsurface investigation, Black & Veatch prepared detailed geologic logs of select borings drilled at the site. The site-specific stratigraphy, geotechnical engineering properties for the subsurface soils, and geotechnical recommendations and considerations were developed by Black & Veatch using the subsurface investigation data and are provided in the Black & Veatch Geotechnical Design Report associated with this project.

The contractual design basis for this report is the California Building Code of 2016 (CBC 2016); however, CBC 2019 took effect on January 1, 2020, and C S Note 48 references CBC 2019. Therefore, this report considers both CBC 2016 and CBC 2019. When one version of the CBC is more stringent, the parameters that meet the more stringent code are applied.

1.1 LIMITATIONS

The analysis, conclusions, and design recommendations in this report were based on geotechnical data provided by IPA, site conditions existing at the time of the investigations, and on the assumption that the information obtained from the investigations is representative of the subsurface conditions throughout the site. Unanticipated conditions may be encountered during construction because of variations that were not detected during the investigation program. The construction process may also alter ground conditions. Therefore, experienced geotechnical engineering and/or engineering geologist personnel are required to observe and document the conditions encountered and ensure that proper construction procedures are used. If, during construction, conditions differ as a result of natural or manmade causes, this report should be reviewed by qualified geotechnical engineers and/or engineering geologists to determine the applicability of the conclusions and recommendations concerning the differences in conditions.

This report was prepared solely for the benefit of IPA by Black & Veatch Corporation ("Black & Veatch") under the terms and conditions of the written agreement dated June 6, 2017 between IPA and Black & Veatch ("the Agreement") and is based on information not within the control of IPA or Black & Veatch. This report is being prepared per the requirements of Task Order 3.16 which was executed on November 13, 2019, per the terms of the agreement referenced above. Neither IPA nor Black & Veatch has made an analysis, verified data, or rendered an independent judgment of the validity of the information provided by others. WHILE IT IS BELIEVED THAT THE IN ORMATION, DATA, AND OPINIONS CONTAINED HEREIN WILL BE RELIABLE UNDER THE CONDITIONS AND SUBJECT TO THE LIMITATIONS SET ORTH HEREIN, IPA AND BLACK & VEATCH DO NOT GUARANTEE THE ACCURACY THEREO . EXCEPT AS OTHERWISE ALLOWED BY THE A REEMENT, THIS REPORT MAY NOT BE USED BY ANYONE WITHOUT THE EXPRESS WRITTEN AUTHORIZATION O BLACK & VEATCH, AND SUCH USE SHALL CONSTITUTE A REEMENT BY THE USER THAT ITS RI HTS, I ANY, ARISIN ROM THIS REPORT SHALL BE SUBJECT TO THE TERMS O THE BLACK & VEATCH AUTHORIZATION, AND IN NO EVENT SHALL USER'S RIGHTS, IF ANY, EXCEED THOSE OF IPA UNDER THE A REEMENT.

2.0 Project Location

This section provides basic site information for the Adelanto Project.

2.1 SITE LOCATION MAP, STREET ADDRESS, COUNTY NAME

The site is located at 16800 Aster Road southwest of Adelanto, California, in San Bernardino County. Figure 2-1 presents a site locations map.

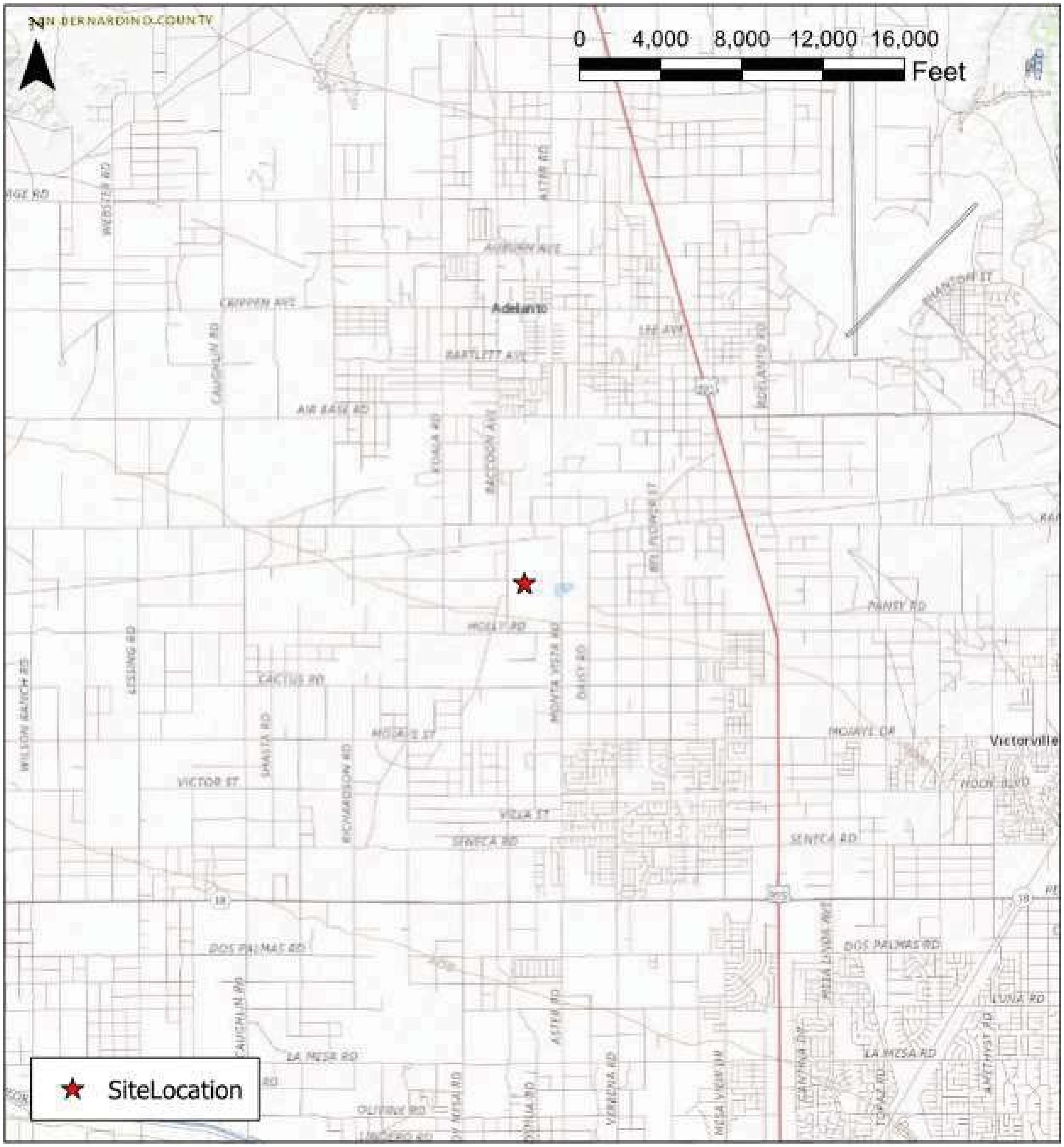

Figure 2-1 Site Location Map on USGS 7.5-Minute Map for Adelanto, CA

2.2 PLOT PLAN WITH EXPLORATION DATA AND BUILDING FOOTPRINTS

igure 2-2 presents a plot plan of the site with the 2020 subsurface investigation locations by Black & Veatch, past investigation locations by CH2M Hill, ERTEC, and Kleinfelder, and the anticipated structure footprints for the project. Figure 2-3 presents only the 2020 subsurface investigation locations by Black & Veatch.

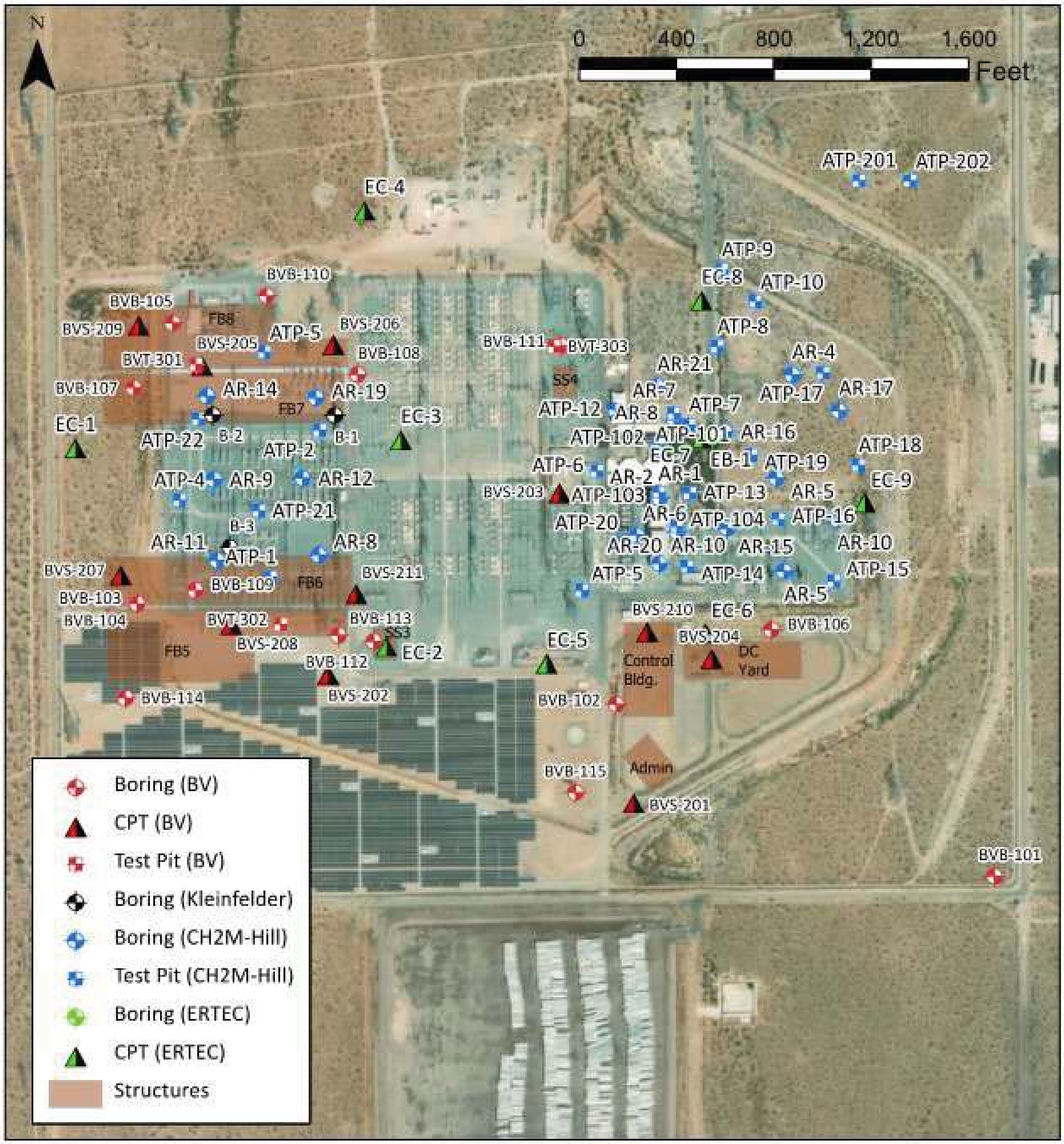

Figure 2-2 Plot Plan with Subsurface Investigation Locations and Structure Footprints

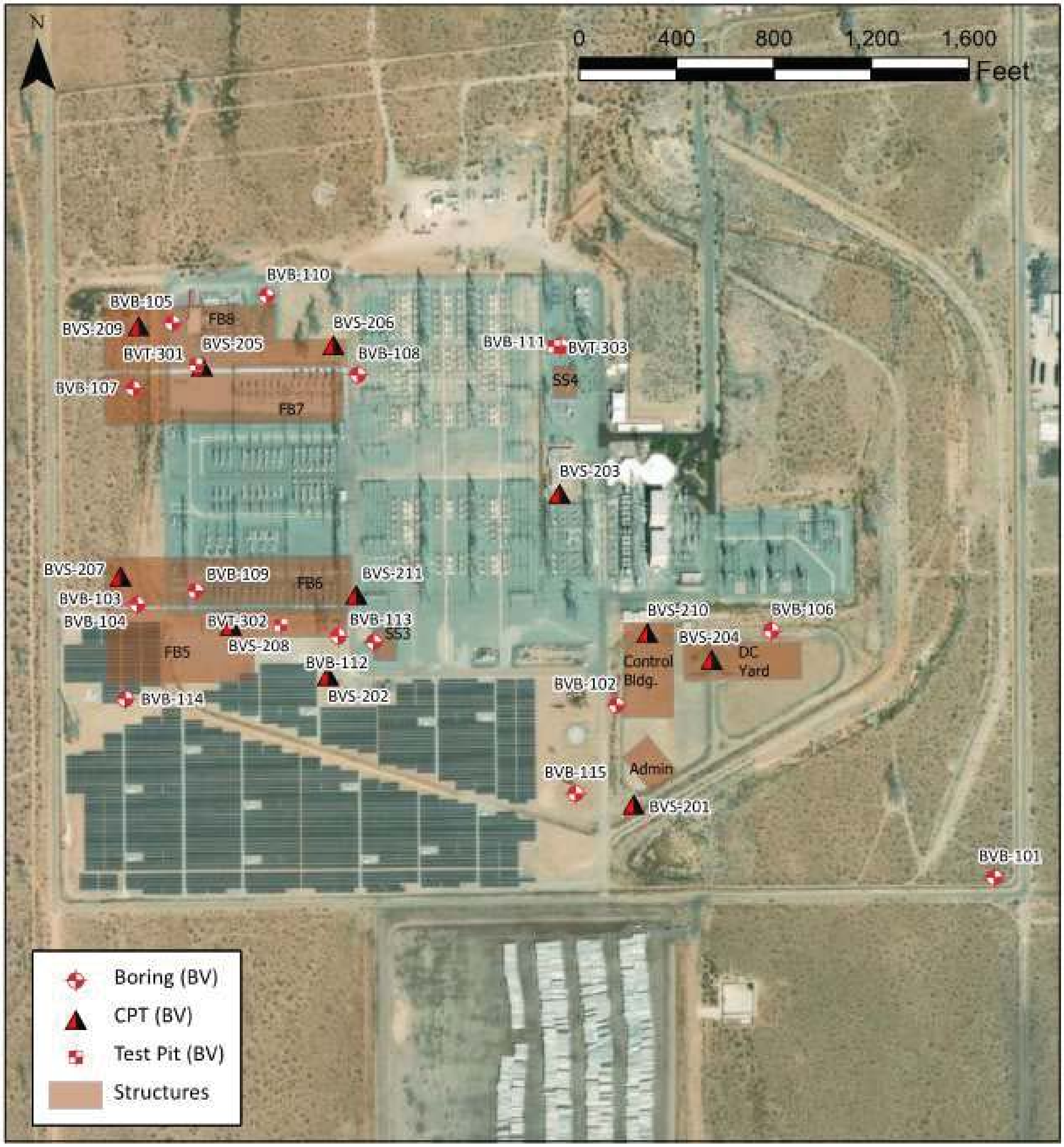

Figure 2-3 Plot Plan with 2020 Subsurface Investigation Locations and Structure Footprints

2.3 SITE COORDINATES

The site is located at about latitude 34.55 degrees and longitude -117.44 degrees.

3.0 Engineering Geology/Site Characterization

The section provides basic engineering geology and site characterization for the Adelanto Project. This information should be used in conjunction with the Geotechnical Design Report (Black & Veatch, 2020).

3.1 REGIONAL GEOLOGY AND REGIONAL FAULT MAP

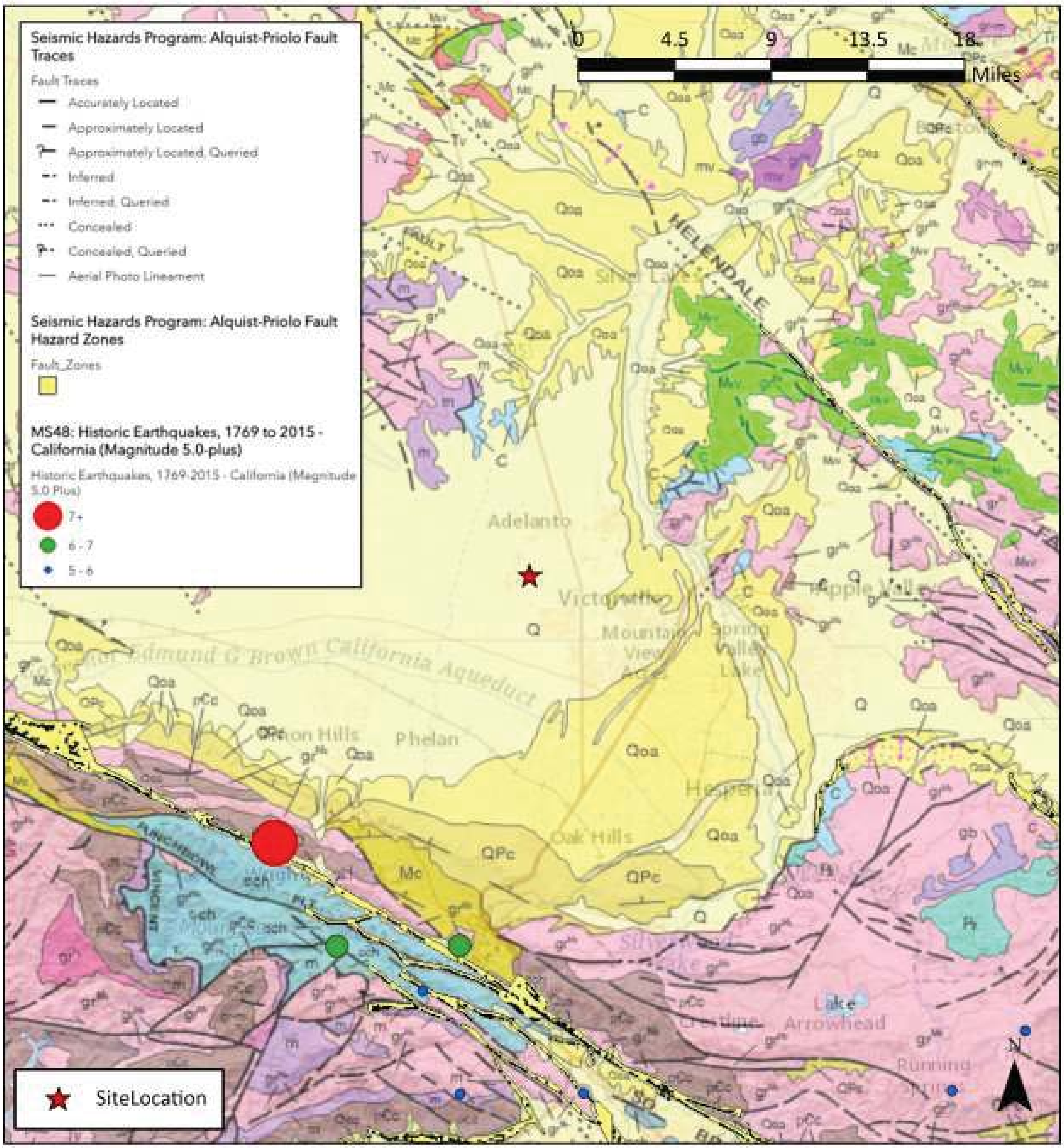

Figure 3-1 Regional Geology and Fault Map with Site Location (Jennings et al., 2010)

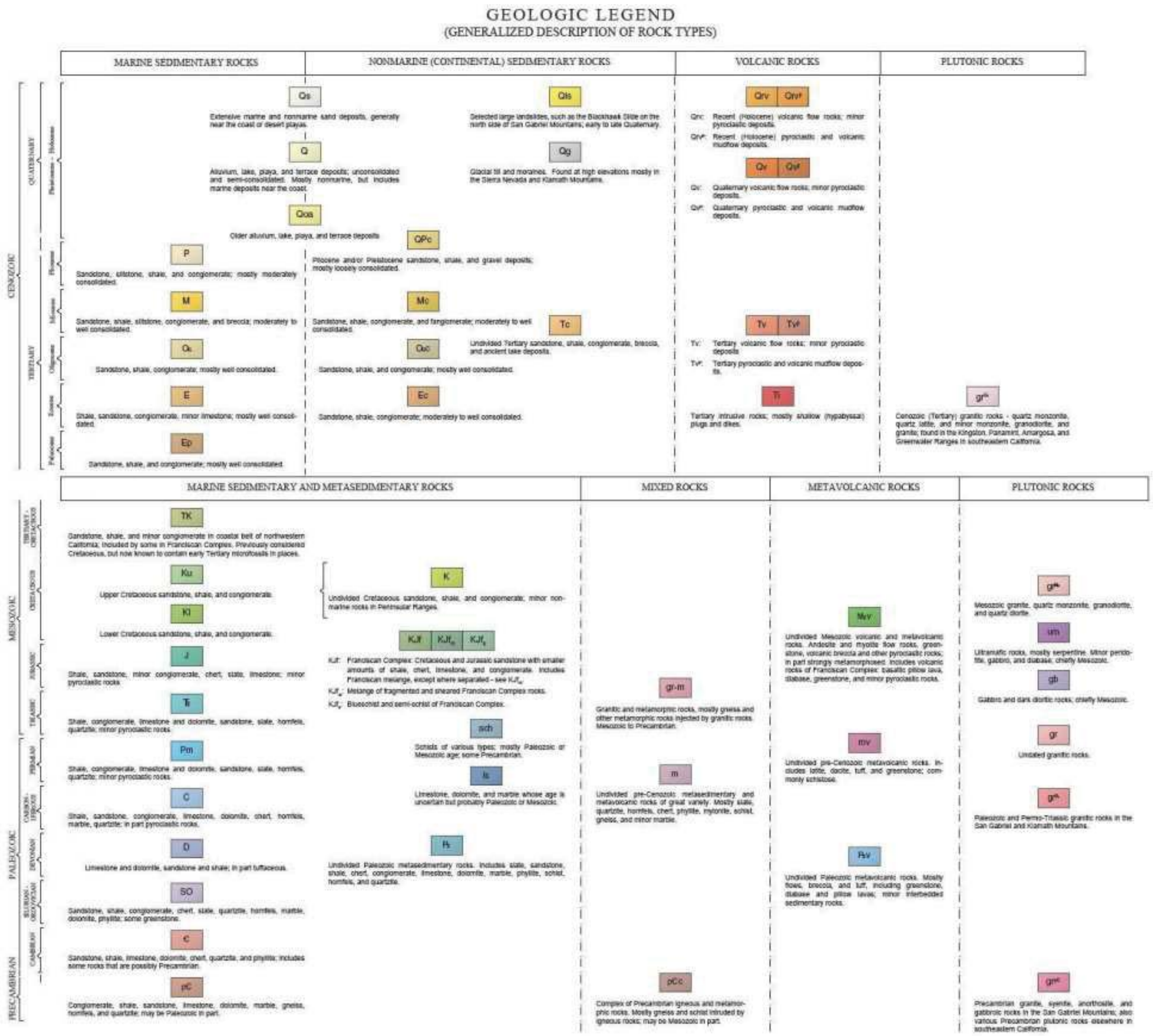

Figure 3-2 Legend for Regional Geologic Units in Figure 3-1 (From Jennings et al., 2010)

3.2 GEOLOGIC MAP OF SITE

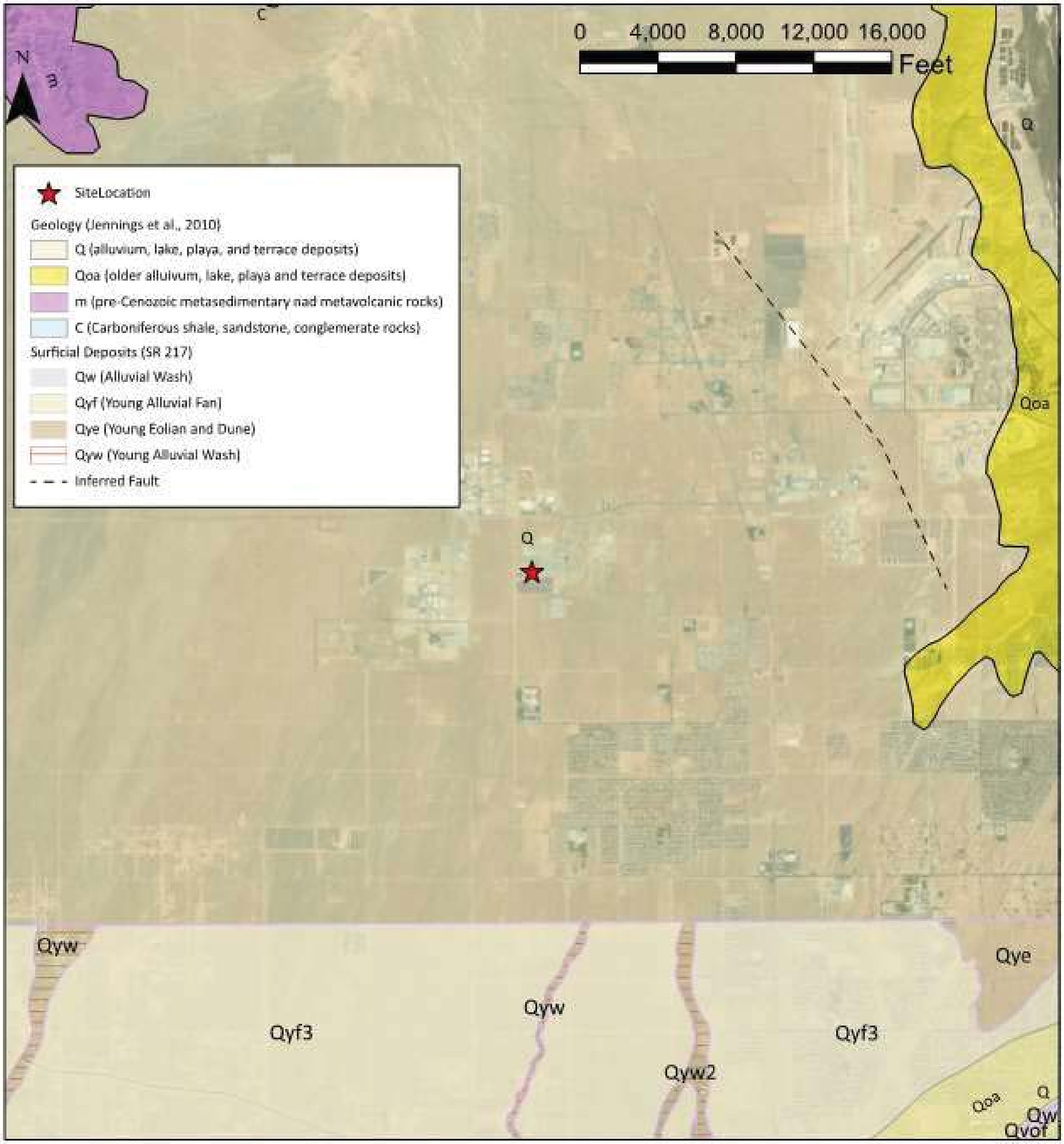

Figure 3-3 Geologic Map of Site (Jennings et al., 2010; Special Report 217; Cox and Hillhouse, 2000)

3.3 GEOLOGIC HAZARD ZONES

ITEM	DISCUSSION
Fault Rupture	The site is not located in an AP Ear hq ake Faul Zone (CA P blic Reso rce Code, Division 2, Chapter 7.5). Figure 3-1 presents the AP fault traces and fault zones from the CGS EQ Zapp application. Additional evaluation of the fault rupture hazard is provided in Section 5 of this report.
Liquefaction	The site is in an uneval ated area for liq efaction by the C S seismic hazards program. Additional evaluation of liquefaction and seismic compaction is provided in Section 6 of this report.
Landslide	The site is in an uneval ated area for landslides by he C S seismic hazards program. Additional evaluation of landslide hazard is provided in Section 7 of this report.

3.4 SUBSURFACE GEOLOGY

ITEM	DISCUSSION
eomorphic Province	Mojave Desert (C S, 2002) – Isolated mountain ranges separated by desert plains. Two primary fault sets that control the topography within the province include northwest-to-southeast faults with secondary east-west trending faults. The shape of the province is controlled by the Garlock Fault to the north and the San Andreas Fault to the south and west. The Garlock Fault separates the Mojave Desert and the Basin-and-Range provinces. The San Andreas Fault separates the
Tec nic Setting	The age of rock units in the Mojave Desert rovince inc ease in age from west to east and reach a maximum of up to 1.7 billion years old in the eastern Mojave Desert. The San Andreas and arlock faults for the western and northern boundary of the province, but multiple faults internal to the Mojave Desert province are also known and include active faults (Glazner et al., 2002). The primary set of northwest-to-southeast trending fault zones – subparallel to the San Andreas Fault Zone – include the: • Helendale • Lenwood-Locakhart • Camp Rock-Emerson-Copper Mountain • Black water • Calico-Hildago The secondary set of east-west trending fault zones include the: • Manix • North rontal System • Pintio Mountain

ITEM	DISCUSSION
Regional eology	Prior o about 50 to 70 million years ago, he geologic history of the Moja e Desert was similar to the adjacent Basin and Range province (lazner et al., 2002). However, around 50 to 70 million years ago the Mojave Desert province experienced a period of intrusive volcanic activity, like the Sierra Nevada province. and formation of the Garlock Fault. After development of the Garlock Fault, the province experienced an extended period of uplift that resulted in significant erosion until about 20 million years ago (lazner et al., 2002). Since that time, subsidence of the Mojave Desert province resulted in the modern basin and associated sub-basins that have been filled with nonmarine sediments climate change during the Pleistocene (2.6 million to 11,700 years ago) resulted in widespread areas of breccias, tuffs, cinder cones and dry lakes and playas in the Mojave Desert province.
Site Geology	The site is on a series of alluvial fan deposi s hat are primarily formed from sediments from the San Gabriel Mountains to the south (lazner et al., 2002). These sediments, primarily derived from volcanic and metamorphic rocks, were eroded from the mountains and transported by intermittent streams down the mountain slopes and into the valley. The alluvial fans formed at the edge of the mountains where the intermittent streams would deposit much of their sediment load. Over time, this process built up the alluvial fans and extended the intermittent stream networks further into the valley. The stream channels are relatively shallow and meander across the alluvial fans with time; thus, creating a wide deposit of sediments. Sediments in alluvial fans may be highly variable due to the deposition of coarse sediments near the stream channels and finer sediments in over-bank deposits outside of the channels (Cox and Hillhouse, 2000). As the channels meander across the alluvial fan, coarse deposits may be placed adjacent to, above, and below finer grained deposits (Cox and Hillhouse, 2000). More recent deposits. within the past few thousand years, near the site are primarily associated with erosion from sedimentary bedrock units near Cajon Canyon and mobilization of older alluvial fan deposits near Baldy Mesa south of the site. A network of washes/arroyos were the primary routes for sediment transport near the site during periods of more precipitation in the Victorville Fan (Cox and Hillhouse, 2000). The site is currently located outside of the flood plain of the Mojave River, but paleo-deposits associated with the Mojave River have been identified in the Adelanto area (Cox and Hillhouse, 2000). A large, modern alluvial fan deposit associated with discharge from Sheep Creek is present west of the site but does not impact the site directly. Cox and Hillhouse (2000) identified three primary depositional layers northeast of the Adelanto Project: • An upper fluvial unit that is 150 to 175 feet thick. • A 25 to 83 feet thick middle lacustrine unit. • A lower alluvial unit that is more than 165 feet thick. The subsurface investigations (e.g., CHM2Hill 1983, Black & Veatch 2020) likely reached the two upper layers. The test wells from CH2M Hill (1983) potentially intersected all three layers.

A detailed description of the site-specific subsurface investigation data and results; detailed geotechnical boring and test pit logs, results from cone penetration test (CPT) soundings; seismic CPTs and downhole seismic tests; and the engineering properties of the subsurface soils are provided in the associated Geotechnical Design Report (Black & Veatch , 2020). Cross sections displaying the subsurface investigation data are presented in the associated Geotechnical Design Report (Black & Veatch , 2020).

3.5 GEOTECHNICAL TESTING OF REPRESENTATIVE SAMPLES

Results from the laboratory testing of representative samples from the site are provided in the associated Geotechnical Design Report (Black & Veatch , 2020).

3.6 CONSIDERATION OF GEOLOGY IN GEOTECHNICAL ENGINEERING RECOMMENDATIONS

Geotechnical engineering recommendations based on the subsurface investigations, laboratory testing, and geologic conditions at the site are provided in the associated Geotechnical Design Report (Black & Veatch , 2020).

3.7 CONDITIONAL GEOTECHNICAL TOPICS

Conditional geotechnical engineering design, including design of basement and retaining walls, deep foundations, and the potential construction effects on adjacent structures, should reflect the geotechnical parameters and requirements of the associated Geotechnical Design Report (Black & Veatch , 2020) and the appropriate CBC.

In accordance with CBC 1807A.2 and Chapter 11.8.3 of ASCE 7, the site-specific spectral acceleration of 0.363g at 0.01 seconds (see Section 4.4) may be used as the design peak ground acceleration (PGA) for determining dynamic seismic lateral earth pressures on basement and retaining walls.

4.0 Seismology & Calculation of Earthquake Ground Motion

This section provides a discussion of the seismology and anticipated earthquake ground motions for the Adelanto project. This section also includes an evaluation of the general earthquake ground motions and a site-specific evaluation to be compliant with both CBC 2016 and CBC 2019. The site-specific evaluation meets the minimum requirements of both CBC 2016 and CBC 2019.

The historical seismicity evaluation considers earthquakes greater than magnitude 5 from the Southern California Earthquake Data Center (CalTech, 2012) and identifies multiple historical events that would have caused ground shaking at the site. The corresponding fault that generated the earthquake is identified when known or suspected. Figure 3-1 presents the locations of historical seismic events and known fault traces with the AP Earthquake Fault Zones.

4.1 EVALUATION OF HISTORICAL SEISMICITY NEAR SITE

EVENT	FAULT	DATE	M	DISTANCE (MILES)
Wrightwood/San J an Capistrano	San Andreas	12/08/1812	7.5	17.3
Fort Tejon Aftershock	San Andreas	01/16/1857	6.3	34.1
Lyte Creek	Unnamed	07/30/1894	6.2	19.4
Wrightwood	San Andreas	07/22/1899	6.4	17.6
Manix	Manix	04/10/1947	6.5	63.4
Lande s	J ns n Va ey, Landers, Homestead Valley, Emerson, & Camp Rock	06/28/1992	7.29	62.2
Big Bear (Landers Aftershock)	Unnamed	06/28/1992	6.49	42.4
Hec r Mine	Lavic Lake & Bullion	10/16/1999	7.12	66.5

4.2 CLASSIFICATION OF THE GEOLOGIC SUBGRADE (SITE CLASS)

ITEM	DISCUSSION
Site Classification	Site Class C
Basis for Site Classification	Measured Average Shear Wave Velocity o 100 fee ($\bar{v}_s$) at: • BVB-109: 1,303 feet per second (downhole testing). • BVS-211: 1,401 feet per second (seismic CPT). No Site Class E Conditions, which are: • 10 feet or more of soft clay. No Site Class F Conditions, which are: • Soils vulnerable to failure or collapse under seismic loading. • 10 feet or more of peats and/or highly organic clays. • 25 feet or more of high plasticity clays in Site Class D or E profile.

4.3 GENERAL PROCEDURE GROUND MOTION ANALYSIS

ITEM	VALUE	
Seismic evaluation per	CBC 2016	CBC 2019
Building Code Design Ground Motion Parameters[1]		
S_S – Mapped MCE_R short period spectral response accelerations (5 percent damped) (g)	1.448	1.178
S_1 – Mapped MCE_R 1 second period spec ral response accelerations (5 percent damped) (g)	0.583	0.460
Seismic Site Class	C	C
S_{DS} – Design short period spectral response accelerations (5 percent damped) (g)	0.965	0.943
S_{D1} – Design 1 second period spectral response accelerations (5 percent damped) (g)	0.506	0.460
T_L – Long-Period Transition Period (seconds)	12	12
PGA_M – MCE peak ground acceleration adjus ed for site effects (g)	0.5	0.6
C_V – Vertical Coefficien	Not Applicable	1.136
Seismic Design Ca egory	D	D
Risk category	IV	IV
Notes: Values are determined using the ASCE 7 Hazard Tool (https://asce7hazardtool.online/) based on Latitude		

4.4 SITE-SPECIFIC GROUND MOTION HAZARD ANALYSIS

Site-specific ground motions were developed following CBC 2016/CBC 2019 and Chapter 21 of ASCE 7-16. Specifically, the results of the 2014 U.S. Geological Survey (USGS) National Seismic Hazard Mapping Program (NSHMP) were used as the probabilistic seismic hazard analysis (PSHA) to determine the ground motions at the Site Class B/C boundary ($\bar{v}_s$ of 2,500 feet per second) in accordance with Chapter 21.2 of ASCE 7-16. Use of the 2014 USGS NSMP as the site-specific PSHA was acceptable since:

- The 2014 USGS NSHMP (Petersen et al., 2014) would form the basis for a site-specific analysis completed between 2014 and the 2018 USGS NSHMP (Petersen et al., 2020).
- The 2014 USGS NSHMP forms the basis for CBC 2019 and ASCE 7-16.
- The closest calculation point is about 2,850 feet west from the site and will accurately model the ground motions at the site.

- No fault sources are present near the site in the Uniform California Rupture orecast, version 3.3 (UCER 3), that could create significant variations in ground motions over small distances.
- The UCRE 3 (Field et al. 2013) has not been revised or updated for the 2018 US S NSHMP (Petersen et al., 2020).
- The Adelanto project is outside of the Los Angeles Basin where greater long-period amplification is applied in the 2018 USGS NSHMP (Petersen et al., 2020).

or these reasons, the 2014 US S NSHMP (Petersen et al., 2014) represents a current state of the practice PSHA for the Adelanto project. Comparison of the PSHA results from the 2014 USGS NSHMP with the deterministic lower limit on the MCE_R response spectrum from Figure 21.2-1 of ASCE 7-16 demonstrate a deterministic seismic hazard analysis (DSHA) is not required since the PSHA is below the deterministic lower limit. Based on this comparison the 2014 USGS NSHMP PSHA forms the basis for the site-specific MCE_R base ground motions at the Site Class B/C boundary. The 2014 USGS NSHMP PSHA results represent geometric mean ground motions from the online USGS Unified Hazard Tool. The MCE_R spectrum was developed using the recommended scaling factors from Chapter 21.2 of ASCE 7-16 to estimate the maximum horizontal response from the geometric mean response (MAX/GEO) and risk coefficients (C_R) using Method 1 from Chapter 21.2.1.1 of ASCE 7-16. Table 4-1 summarizes the spectral acceleration (Sa) ordinates and additional factors used to develop the MCE_R spectrum.

Table 4-1 Development of Site Class B/C Spectral Ordinates

PERIOD (S)	USGS B/C Sa (g)	MAX/GEO	C_R	USGS B/C MCE_R Sa (g)
0	0.509	1.1	0.93	0.521
0.1	1.129	1.1	0.93	1.155
0.2	1.190	1.1	0.93	1.217
0.3	0.999	1.125	0.928	1.042
0.5	0.727	1.175	0.923	0.787
0.75	0.528	1.238	0.916	0.598
1	0.400	1.3	0.91	0.473
2	0.198	1.35	0.91	0.243
3	0.133	1.4	0.91	0.170
4	0.102	1.45	0.91	0.135
5	0.085	1.5	0.91	0.117

A total stress-nonlinear (TS-NL) site response analysis (SRA) was then completed using DEEPSOIL (Hashash et al., 2020) to determine site-specific amplification functions from the Site Class B/C boundary to the ground surface at the Adelanto site. ifteen (15) time histories from the Pacific Earthquake Engineering Research (PEER) NGA-West2 Strong Motion Database (Ancheta et al., 2013) were scaled to match, on average, the site-specific MCE_R base ground motions between 0.01 and 2 seconds and applied to the base of the site response profile. These time histories were selected to have magnitudes, fault distances, and ground conditions (Site Class B/C boundary) similar to the site-specific MCE_R base ground motions. The site response profile was based on site-specific data that included four shear wave velocity (V_S) measurements from the site grade to depths between 102 and 145 feet (URS, 1983; Black & Veatch, 2020). The site response profile was extended to the Site Class B/C boundary following the profile developed for similar site conditions about 6.4 miles to the west-southwest (Turner et al., 2017). The variation in the V_S value for the site response profiles considered a 50 percent increase and decrease in the low-strain shear modulus (G_0) of the average (Best Estimate [BE]) profile to develop the lower bound (LB) and upper bound (UB) profiles following the recommendation of ASCE 7-16 and different depths to the Site Class B/C boundary. The three-point approximation of a normal distribution weights of 0.4, 0.3, and 0.3 for the BE, LB, and UB profiles, respectively, were used to combine the results (EPRI, 2013). Figure 4-1 presents the measured V_S profiles with the V_S profile from Turner et al. (2017) and the LB and UB V_S profiles.

The TS-NL SRA used the Generalized Quadratic/Hyperbolic (GQH) model with shear strength control (Groholski et al., 2016) based on discrete points from the modulus reduction and damping curves from EPRI (1993; 2013) and site-specific measurements from recovered samples (URS, 1983). Both sets of modulus reduction and damping curves were considered with equal weighting to evaluate uncertainty in the nonlinear models. The average surface-to-base response spectral ratios were calculated and applied to the site-specific MCE_R base ground motions at the Site Class B/C boundary on a period-by-period basis. In accordance with Chapter 21.3 of ASCE 7-16, the spectral ordinates were increased when the site-specific MCE_R surface ground motions fell below 80 percent of the Site Class C ground motion spectrum. Figure 4-2 presents the site-specific design-level surface ground motions, with and without adjustments for the minimum CBC requirements, with the CBC 2019 Site Class C and 80 percent of CBC 2016 and CBC 2019 Site Class C spectra. Table 4.0-2 provides the site-specific response spectrum for select periods presented in Figure 4-2.

Table 4-2 Site-Specific Response Spectrum at Ground Surface (5 Percent Damped)

PERIOD (S)	Sa (g)	PERIOD (S)	Sa (g)	PERIOD (S)	Sa (g)	PERIOD (S)	Sa (g)
0.010	0.363	0.069	0.620	0.224	0.950	0.825	0.618
0.015	0.412		0.640	0.253		1.000	0.521
0.020	0.457	0.078	0.662	0.287	0.914	1.197	0.421
0.025	0.507	0.083	0.685	0.300	0.908	1.443	0.318
0.031	0.559	0.088	0.709	0.325	0.894	1.738	0.248
0.035	0.595	0.094	0.736	0.368	0.883	2.000	0.208
0.039	0.604	0.100	0.754	0.416	0.867	2.372	0.170
0.044	0.600	0.120	0.772	0.471	0.839	2.858	0.141
0.050	0.609	0.136	0.772	0.500	0.785	3.000	0.135
0.054	0.633	0.145	0.772	0.534	0.771	3.444	0.117
0.057	0.623	0.174	0.865	0.604	0.733	4.000	0.101
0.061	0.626	0.197	0.939	0.684	0.691	4.699	0.088
0.065	0.611	0.200	0.942	0.750	0.658	5.000	0.084

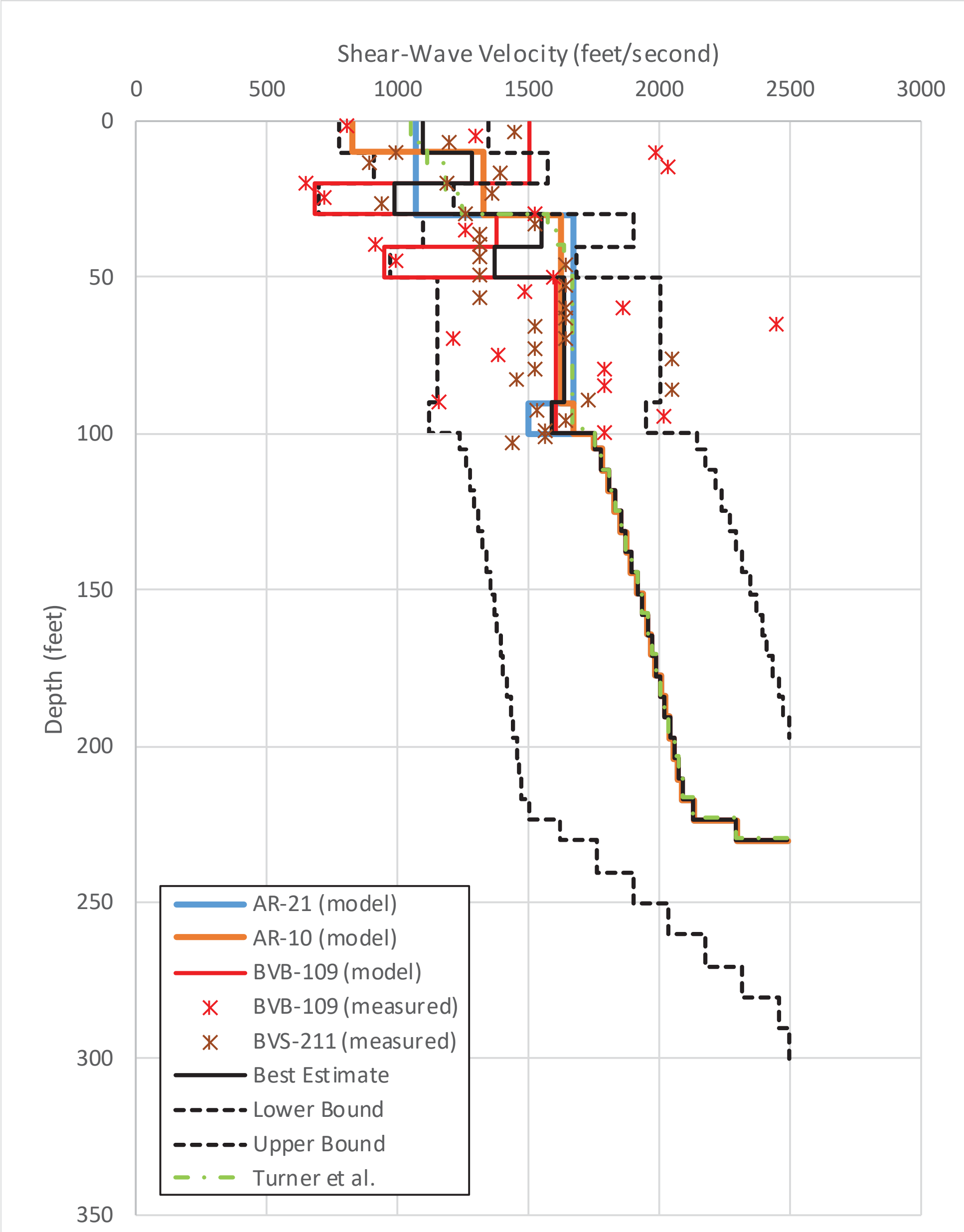

Figure 4-1 **Measured Shear Wave Velocities from BVB-109 and BVS-211 (Black & Veatch, 2020) Compared with Profile Models for AR-10 (URS, 1983), AR-21 (URS, 1983), BVB-109 (Black & Veatch, 2020) and Turner et al. (2017) with the Best Estimate, Lower Bound and Upper Bound Shear Wave Velocity Profiles used in the Site Response Analysis**

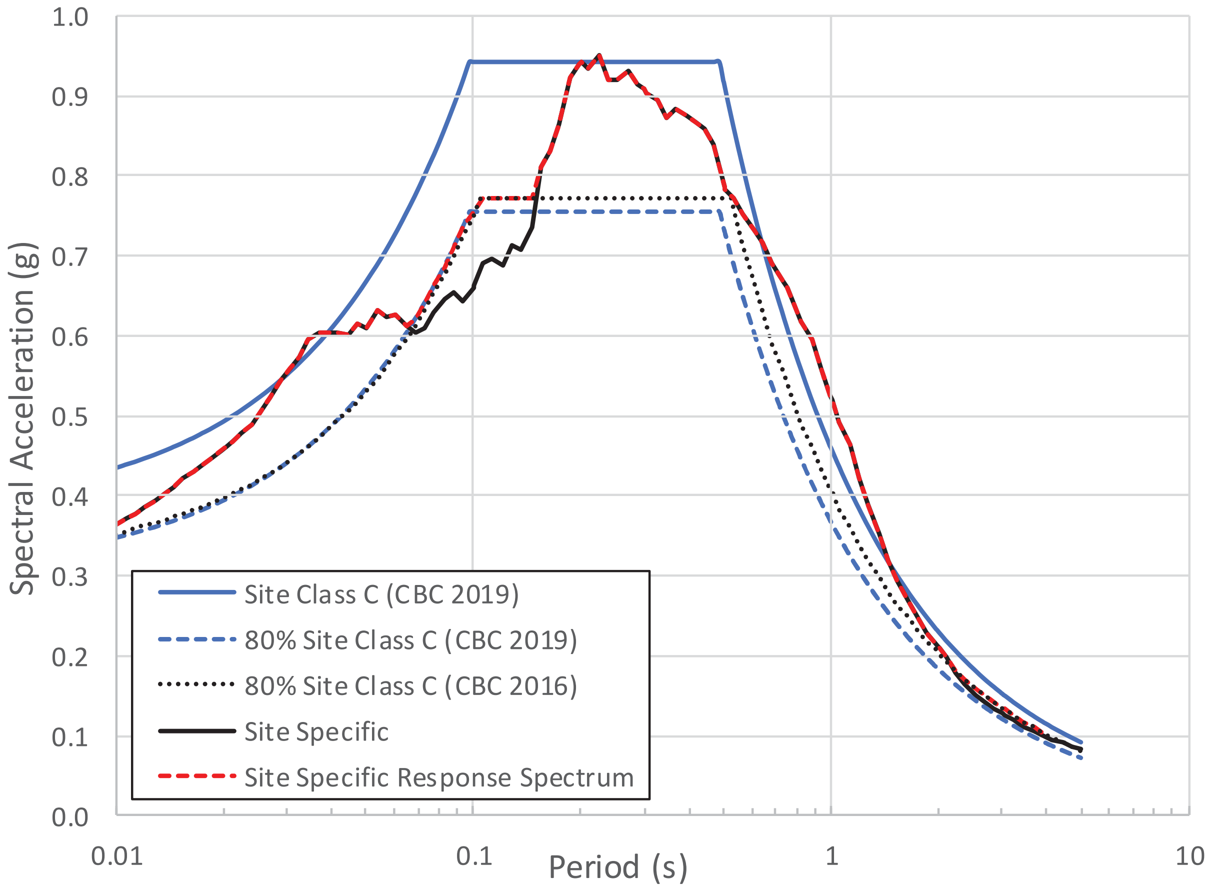

Figure 4-2 **CBC 2019 Site Class C Spectrum and 80 Percent Minimum Requirements of CBC 2016 and CBC 2019 with Site-Specific Response Spectrum with (red line) and without (black line) Adjustments for Minimum Requirements**

inally, the site-specific design acceleration parameters, S_{DS} and S_{D1}, were determined in accordance with Chapter 21.4 of ASCE 7-16. Table 4-3 provides the site-specific design acceleration parameters. The site-specific values represent an 11 percent decrease in S_{DS} and a 3 percent increase in S_{D1} compared to CBC 2016 and a 9 percent decrease in S_{DS} and a 13 percent increase in S_{D1} compared to CBC 2019, respectively. This is considered appropriate for the Adelanto site where $\bar{v}_s$ (1,301 to 1,401 feet per second) is slightly greater than the Site Class C/D boundary at 1,200 feet per second.

Table 4-3 Site-Specific Ground Motion Analysis

ITEM	VALUE
Seismic evaluation per	CBC 2016/CBC 2019 (ASCE 7-16 Chapter 21)
Site-Specific Design Ground Motion Parameters	
Closest USGS NSHMP Calculation Point	about 2,850 feet
Seismic Site C ass	C
S_{DS} – Site-specific design shor period spectral response accelerations (5 percent damped) (g)	0.855
S_{D1} – Site-speci ic design 1 second period s ectral res nse accelerations (5 percent damped) (g)	0.521
T_L – Long-Period Transition Period (seconds)	12
Seismic Design Category	D
Risk category	IV

4.5 DE-AGGREGATED SEISMIC SOURCE PARAMETERS

ITEM	DISCUSSION
Modal Magnitude	7.9
Modal Distance	17.5 miles (28.2 kilometers)
Fault Source	San Andreas
Contrib ion to Site Hazard	Approximately 60 percent
De-aggregation Source	USGS Unified Hazard Tool (v4.2.0)

4.6 TIME HISTORIES OF EARTHQUAKE GROUND MOTION

ITEM	DISCUSSION
Time Histories	Time his ories for linear or nonlinear response history analysis ha e not been de his design. The time histories should be developed in accordance with the applicable design code and the requirements for the selected modeling method(s).

5.0 Fault Rupture Hazard Evaluation

This section presents the fault hazard evaluation for the Adelanto Site.

5.1 ACTIVE FAULTING & CO-SESIMIC DEFORMATION ACROSS SITE

ITEM	DISCUSSION
Active Faults at the Site	No ac ive faults or lineamen s orien ed with regional fault trends have been identified at the Adelanto Project.
Mapped Faults and Alq ist-Priolo Fault Hazard Zones (FHZ)	As presen ed in Figure 3-1, here are no mapped faults within abo 6 miles of the Adelanto Project and the closest AP HZ is 16 miles from the site. The closest fault is the Mirage Valley fault (6 miles to the northwest). The Mirage Valley fault is a right-lateral strike-slip fault with Late Quaternary (less than 130,000 years) surface rupture (USGS Quaternary Fault and Fold Database). At the east end of the Mirage Valley fault, the end closest to the Adelanto Project, the faulting becomes complex and the orientations of the faulting begin to diverge from the northwest-to-southeast trend along most of the fault. This northwest-to-southeast trend of the Mirage Valley fault would roughly project towards the Adelanto Project.
Descrip ion of Closest Alquis - Priolo FHZ	The closes AP FHZ is the Helendale-Sou h Lockhar fault zone located about 15.8 miles to the northeast from the Adelanto Project. The Helendale-South Lockhart fault zone is a right-lateral strike-slip fault that has produced Holocene (less than 15,000 years) rupture with an estimated slip rate between 0.2 and 1.0 mm/year and probable magnitudes between 6.5 and 7.3 (USGS Quaternary Fault and Fold Database). The most recent paleoseismic event is estimated to have occurred in the past 1,000 to 2,000 years but is constrained to be younger than 2,300 years based on carbon dating (US S Quaternary ault and Fold Database).
Other Evidence of Faults Near the Site	Review of p blicly available data (i.e., Williams and Bryan , 2010) in the area identified additional faults in bedrock outcrops that are pre-Quaternary (older than 2.6 million years) in age and located away from the Adelanto Project (i.e., near Quartzite Mountain or the southern end of the Shadow Mountains). One study of the area near eorge Air Force Base, about 4.5 miles northeast from the Adelanto Project, identified potential tectonic arching and inferred a possible fault in the sedimentary deposits from lineament analysis and four deep boreholes (See igure 3-3; Cox and Hillhouse, 2000). This inferred fault runs parallel to, but offset laterally from, the Mirage Valley fault. Evaluation of the fault indicates possible syn-depositional faulting that has accumulated about 125 feet of relative displacement over the past 65,000 years (Cox and Hillhouse, 2000). The preliminary geologic map of the Victorville 7.5-minute quadrangle has identified the inferred fault from Cox and Hillhouse (2000) as a lineament (Hernandez et al., 2008). Additionally, the preliminary geologic map has identified other lineaments in the Victorville quadrangle that run sub-parallel to the inferred fault.

6.0 Liquefaction/Seismic Settlement Analysis

Soil liquefaction can occur mostly in loose to medium dense, saturated sands and nonplastic silts that are subject to ground vibration. Younger soils (less than 15,000 years old) are generally more susceptible to soil liquefaction. For preliminary screening of the Adelanto Project, the depth of the highest historical groundwater and the occurrence of low-density, non-plastic and low plasticity alluvium at the Adelanto Project was evaluated in accordance with CGS Note 48 (CGS, 2019).

6.1 GEOLOGIC SETTING FOR OCCURRENCE OF LIQUEFACTION

ITEM	DISCUSSION
Soil Liquefaction Screening	
roundwater Basin/Subbasin	South Lahontan/Upper Mojave River Valley (6-042)
Observed Water Table at Site	Observed in es wells and deep boings from 140 to 154 fee below grade (CH2M Hill, 1983; Black & Veatch, 2020)
Regional Water Table	• Da a fr m Mendez and sen (1997) and the CA Department of Water Resources (DWR) Sustainable roundwater Management Act (S MA) Data Viewer • Mojave River aquifer (included for completeness) ○ Highest historical water table of about 5 feet below grade ○ Present within about 1 mile of Mojave River ○ Aquifer not present at Adelanto Project since it is 6 miles from the Mojave River • Regional aquifer ○ Highest historical water table of 110 feet below grade based on discontinuous observation well records from 1949 to 2020 near Adelanto Project (e.g., State Wells No. 05N05W04C001S, 05N05W05A001S, 05N06W12E002S, 06N05W32R001S) ○ Aquifer present at Adelanto Project
Soil Strength Data	A erage s andard pene ration test (SPT) N_{60} val es of 15 blows per foot in the upper 10 feet and 30 blows per foot from 10 to 30 feet below grade
Soil Liquefaction Potential	None – even though the soil is loose enough to liq efy, the highest historical water table is more than 50 feet below grade
Seismic Compaction Potential	

6.2 SEISMIC SETTLEMENT CALCULATIONS

ITEM	DISCUSSION
Soil Data	Ele en CPT soundings with total depths of 53 to 105 fee below grade (Black & Veatch, 2020) were considered in the evaluation.
Seismic Compaction Inputs	PGA_M: 0.6 g (CBC 2019 value – not site-s ecific ge mean a e) Modal Magnitude: 7.9 Water Table Depth: reater than total depth of CPT soundings Cut or ill: None
Software and Methods	Software: eologismiki CLiq CPT Evaluation Method: Robertson (2009; 2009)
Seismic Compaction Results	• Tota se emen s from seismic compaction less an 0.1 to 0.3 inches with a factor of two for bidirectional shaking included • Seismic compaction of 0.3 inches would mean the differential settlement threshold in Table 12.13-3 of ASCE 7-16 would apply to lengths (L) of 13 feet and less using 0.002L for Risk Category IV.

6.3 OTHER LIQUEFACTION EFFECTS

ITEM	DISCUSSION
Other Liquefaction Effects	None

6.4 MITIGATION OPTIONS FOR LIQUEFACTION/SEISMIC SETTLEMENT

ITEM	DISCUSSION
Mitigation Options	None required

7.0 Slope Stability Analysis

The following sections discuss the potential for slope stability issues at the Adelanto Project. Slope stability analyses, if necessary, shall be completed during detailed design when the final site grading and the configuration of any construction or permanent slopes are known.

7.1 GEOLOGIC SETTING FOR OCCURRENCE OF LANDSLIDES

ITEM	DISCUSSION
On-Site Potential	The risk of on-site landslides is considered limi ed d e to the absence of any significant constructed slopes at the site. The site slopes gently from about Elevation 2,979 feet N VD29 on the south end of the site to about Elevation 3,000 feet (about 1 percent slope). Locally, slopes along existing ponds on the southeast side of the site are the only existing constructed slopes. These ponds will be removed as part of the Adelanto Project.
Off-Site Po en ial	risk o off-site ands ides is conside ed imited due o the absence significant topography near the site. The Adelanto Project is in a large valley of the Mojave Desert that has been primarily filled by material from alluvial fan deposits from the bounding mountain ranges. Willis et al. (2011) do not indicate susceptibility for deep-seated landslides near the site. In the Adelanto area, deep-seated landslide risks are primarily associated with local topographic changes near drainage features.

7.2 DETERMINATION OF STATIC AND DYNAMIC STRENGTH PARAMETERS

ITEM	DISCUSSION
Static Parameters	S atic strength parame ers are pro ided in he Geo echnical Design Repor (Black & Veatch, 2020).
Dynamic Parameters	Specific dynamic s ength val es for slope stabili y are not provided. In accordance with Special Publication 117A (CGS, 2008), peak strength values or reductions from the peak strength values may be considered given the lack of liquefiable soils and deep groundwater table. Strength values used for dynamic slope stability analyses should be appropriate for the selected analysis method.

7.3 DETERMINATION OF PSEUDO-STATIC COEFFICIENT (k_{eq})

ITEM	DISCUSSION
Pseudo-s atic coefficient (k_{eq})	• Using CGS Note 48, with the site P A_M/1.5, results in k_{eq} of 0.33/0.4 for CBC 2016/2019, respectively. • The method of Bray and Macedo (2019) should be considered for slope stability evaluations in place of Special Publication 117A (C S, 2008) with C S discussion.

7.4 IDENTIFICATION OF CRITICAL SLIP SURFACES FOR STATIC AND DYNAMIC ANALYSES

ITEM	DISCUSSION
Critical slip surfaces	None identified because there are no slopes to evaluate

7.5 DYNAMIC SITE CONDITIONS

ITEM	DISCUSSION
Site response analysis	A site-specific site response analysis for MCE_R ground motions is provided in Section 4.4. The project site is generally flat, and the topographic effect is

7.6 MITIGATION OPTIONS FOR LANDSLIDING/OTHER SLOPE FAILURE

ITEM	DISCUSSION
Mitigation Options	None required because there are no slopes.

8.0 Other Geologic Hazards or Adverse Site Conditions

These geologic hazards and adverse site conditions do not occur statewide but are evaluated for the Adelanto Site to determine what hazards are potentially applicable to design.

8.1 EXPANSIVE SOILS

Evaluation of laboratory testing for representative samples from the site for expansive soils are provided in the associated Geotechnical Design Report (Black & Veatch , 2020).

8.2 CORROSION/REACTIVE GEOCHEMISTRY OR GEOLOGIC SUBGRADE

Results from the laboratory testing of representative samples from the site for corrosion are provided in the associated Geotechnical Design Report (Black & Veatch , 2020).

8.3 CONDITIONAL GEOLOGIC ASSESSMENT

ITEM	DISCUSSION
Hazardous Materials	None identified.
Volcanic Eruption	Low – closest hazard is Coso volcanic field abo 100 miles nor h of the Adelanto Project (Mangan et al., 2019).
Flooding	o p https://msc.fema.gov/portal/home). The site is outside of the 100-year floodplain.
Tsunami and Seiche Inundation	None
Radon-222 Gas	Low - in San Bernardino Coun y, elevated Radon-222 le els would be associated with uranium deposits in mestasomatic zones around intrusive granite deposits (Churchill, 1991).
Naturally Occurring Asbestos	Low – absence of geologic ma erials associa ed with na rally occurring asbestos (Van Gosen and Clinkenbeard, 2011)
Hydrocollapse	Eval ation of laboratory testing for represen a i e samples from he site for collapse of soils are provided in the associated Geotechnical Design Report (Black & Veatch, 2020).
Regional Subsidence	Moderate– significan land subsidence has been observed near the site (i.e., Brandt and Sneed, 2017) due to groundwater level declines and the distribution of fine-grained deposits across the Mojave Desert.
Clays and Cyclic Softening	o o o o q f

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Revision 0

GEOTECHNICAL DESIGN REPORT

IPP Renewal Project
Adelanto, California

B&V Project No. 196137
B&V File No. 42.4315

PREPARED FOR

Intermountain Power Agency
Energy for Today & Tomorrow

Intermountain Power Agency

07 AUGUST 2020

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1.0 Introduction

This report presents a summary of the subsurface conditions, geotechnical data, laboratory results, and geotechnical design recommendations for the Intermountain Power Agency (IPA) Adelanto Converter Station and Switchyard Expansion project (part of the IPP Renewal Project) which is located south of Adelanto, California.

To support geotechnical recommendations presented in this report, a subsurface investigation was performed by Black & Veatch from February 25 to May 1, 2020. Previous subsurface investigations were performed by Ertec Western, Inc. in 1981; CH2M-Hill and URS/John A. Blume & Associates in 1982 and 1983; and Kleinfelder in 2009. This report provides site-specific stratigraphy, geotechnical engineering properties for the subsurface soils, and geotechnical recommendations and considerations developed by Black & Veatch using the subsurface investigation data. This report includes the following information:

- Site location and description.
- Project description.
- Geotechnical engineering recommendations.
- Geotechnical field and laboratory data provided in appendices.

1.1 LIMITATIONS

The analysis, conclusions, and design recommendations in this report were based on geotechnical data provided by IPA and site conditions existing at the time of the investigations and on the assumption that the information obtained from the investigations is representative of the subsurface conditions throughout the site. Unanticipated conditions may be encountered during construction because of variations that were not detected during the investigation program. The construction process may also alter ground conditions. Therefore, experienced geotechnical engineering personnel are required to observe and document the conditions encountered and ensure that proper construction procedures are used. If, during construction, conditions differ as a result of natural or manmade causes, this report should be reviewed by qualified geotechnical engineers to determine the applicability of the conclusions and recommendations concerning the differences in conditions.

This report was prepared solely for the benefit of IPA by Black & Veatch Corporation ("Black & Veatch") under the terms and conditions of the written agreement dated June 6, 2017 between IPA and Black & Veatch ("the Agreement") and is based on information not within the control of the IPA or Black & Veatch. This report is being prepared per the requirements of Task Order 3.16 which was executed on November 13, 2019, per the terms of the agreement referenced above. Neither the IPA nor Black & Veatch has made an analysis, verified data, or rendered an independent judgment of the validity of the information provided by others. WHILE IT IS BELIEVED THAT THE IN ORMATION, DATA, AND OPINIONS CONTAINED HEREIN WILL BE RELIABLE UNDER THE CONDITIONS AND SUBJECT TO THE LIMITATIONS SET ORTH HEREIN, IPA AND BLACK & VEATCH DO NOT UARANTEE THE ACCURACY THEREO . EXCEPT AS OTHERWISE ALLOWED BY THE A REEMENT, THIS REPORT MAY NOT BE USED BY ANYONE WITHOUT THE EXPRESS WRITTEN AUTHORIZATION O BLACK & VEATCH, AND SUCH USE SHALL CONSTITUTE A REEMENT BY THE USER THAT ITS RI HTS, IF ANY, ARISIN FROM THIS REPORT SHALL BE SUBJECT TO THE TERMS O THE BLACK & VEATCH AUTHORIZATION, AND IN NO EVENT SHALL USER'S RI HTS, IF ANY, EXCEED THOSE O IPA UNDER THE AGREEMENT.

2.0 Summary

ITEM	DISCUSSION
Suitable for planned development	Yes, the site is suitable for development with implementation of recommendations provided herein.
Subsurface investigati ns	S il borings, c ne penet meter s undings, downhole seismic testing, and test pits were performed at the site and laboratory testing including soil index properties, strength testing, and deformation testing was performed on soil samples.
Site elevation	The existing site grade in the areas addressed by this report varies from approximately Elevation 2,957 to 2,979 feet N VD29. In all areas addressed by this report, the planned grade is approximately equal to the existing grade.
eologic conditions	The site is underlain by series of alluvial fan deposits that are
roundwater	Recent and past geotechnical investigations at the site have not identified a water table in the upper 100 feet at the site. CH2M Hill (Reference 3) subsurface investigation indicated potential groundwater at a depth of 140 to 154 feet below the site grade.
eologic hazards	The risks of geologic hazards related to the swelling soils and collapsible soils are found to be low for the Adelanto Converter Station site as discussed in Sections 5.4.1 and 5.4.2. The other types of geologic hazards are evaluated and addressed in the Adelanto Converter Station eohazard Report (Reference 1).
Design building code	California Building Code (CBC) 2016
Seismic site class	C
Seismic design category	D
Site development requirements	The site is already developed; therefore, significant site development activity is not required. In general, the planned grades are understood to correspond to the existing grade.

ITEM	DISCUSSION
Foundations	The subsurface soils are generally suitable for shallow foundation supported structures; therefore, settlement charts are presented to allow sizing moderately sized shallow foundations in Figures 6-1 and 6-2. In switch yards and substations, shallow foundations will be therefore, design parameters for deep foundations are provided in Section 6.
Design frost depth	The approximate extreme frost penetration depth for this project location is approximately 5 inches (Reference 14).
OSHA excavation soil type	Type C soils.
Additional investigation requirements	None

3.0 Site Conditions

3.1 SITE LOCATION

ITEM	DISCUSSION
State	California
County	San Bernardino County
Nearest city	Adelanto (located about 3 miles northeast of the site)
Site access via	Aster Road
eographic coordinates	Latitude 34.55 degrees, Longitude -117.44- degrees
Site location map	Shown on Figure 3-1

3.2 SITE DESCRIPTION

ITEM	DISCUSSION
eneral site conditions	Existing Adelan o Converter Station operated by the Los Angeles Department of Water and Power (LADWP)
Bounding site features	is bounded by Daisy R ad on e east, Rancho R ad on north, Racoon Avenue on the west, the existing solar farm and Pansy Road on the south.
round surface elevation	The exis ing site grade in he areas addressed by his report varies from approximately Elevation 2,957 to 2,979 feet (NGVD29). Figure 4-1 provides ground surface elevations at investigation locations across the project site during the Black & Veatch 2020 subsurface investigation.
Existing vegetation	The area is arid, in ernally-drained, and gen ly sloping towards he north to nearly flat. Vegetation at the site consists of sagebrush, scattered Joshua trees, and various types of arid and semiarid grasses and weeds.
Other existing site features	o breakers, reactors, filters, transmission lines, and dead-end

3.3 PLANNED FACILITY

ITEM	DISCUSSION
DC Switchyard	As shown on Figure 4-2, the DC switchyard is located on the east end of the Adelanto Converter Station south of the existing control service building.
Con er er Station Con rol Building and Valve Halls	The new Converter Sta ion Control Building is located to the west of the proposed DC Switchyard in the area of an existing evaporation pond.
Con er er Station Service/Administration Building	The new Converter Sta ion Service/Administration Building is located south of the proposed Converter Station Control Building.
Switchyard Structures	New switchyard struc es, if e i e be ocated within e boundaries of the existing switchyard.
Filter Bank Structures	The nk structures re l d on the wes side of the bank structures.
Transformers and Transmission Towers	New transformers are located in the middle of the site and the proposed transmission towers are located along Pansy Road south of the existing solar farm.

4.0 Subsurface Investigations

Geotechnical investigation programs were performed for the existing facilities by Ertec Western, Inc. in 1981; CH2M-Hill and URS/John A. Blume & Associates (URS/Blume) in 1982 and 1983; and Kleinfelder in 2009. An additional investigation was performed from February to May of 2020 by Black & Veatch at the locations specific to the planned development to provide location specific geotechnical data for the replacement of the Adelanto HVDC converter station and the expansion of the Adelanto AC switchyard as part of IPP Renewal Project. The previous investigations are summarized in Sections 4.1 through 4.3. The geotechnical investigation report by Ertec Western, Inc. in 1981 is not available; therefore, it is not included in the summary. The Black & Veatch 2020 investigation is summarized in Section 4.4 with logs and testing results for the investigation included in the appendices of this report.

4.1 CH2M HILL (1983) GEOTECHNICAL INVESTIGATION

ITEM	DISCUSSION
Investigation type	Borings, test pits, in situ and laboratory soil testing.
Performed by	CH2M Hill
Investigation date	1983
Borings	21 b ings drilled to depths of 40 o 203 feet.
Test pits	22 est pi s to a maxim m depth of 10 feet.
Test wells	2 tes wells to de h
Fault study	Desk study.
	Classification and strength testing performed.
In-Situ testing	S andard pene ration tests, plate load tests, and in-place soil
Report generated	CH2M Hill, In ermoun ain Power Projec , Adelanto Conver er Station Site, Adelanto, California, prepared for ASEA, Inc., March 1983.

4.2 URS/BLUME (1983) INVESTIGATION OF DYNAMIC SOIL PROPERTIES

ITEM	DISCUSSION
Investigation type	S dy for he dynamic soil properties and secondary seismic hazards.
Performed by	URS/John A. Blume & Associates, Engineers.
Investigation date	1983
Borings	Two borings were drilled to a depth of 203 fee as par of the field work by CH2M Hill (1983). The borings were cased to depths of 145 and 155 feet to facilitate downhole seismic testing.
In-Situ testing	Downhole seismic tests.
Laboratory testing	Moisture content tes s, nit weight ests, resonan column ests and cyclic triaxial tests.
Report generated	URS/John A. Blume & Associates, Engineers, In estigation of Dynamic Soil Properties at the Converter Station Sites Near Delta, Utah, and Adelanto, California (DRAFT), prepared for ASEA, Inc., May 1983.

4.3 KLEINFELDER (2009) GEOTECHNICAL INVESTIGATION

ITEM	DISCUSSION
In es iga ion type	eotechnical subs rface in estiga ion.
Performed by	Kleinfelder.
Investigation date	2009
Borings	3 borings d illed to depths f 21.5 to 51.5 eet.
Laboratory Testing	Soil index, strength and chemical testing performed.
Report Generated	Kleinfelder, Geo echnical In estigation Report, lntermountain Power Project HVDC Upgrade, LADWP Converter Station, Adelanto, California, File No. 102251, May 28, 2009.

4.4 BLACK & VEATCH (2020) GEOTECHNICAL INVESTIGATION

ITEM	DISCUSSION
Investigation type	eotechnical subsurface investigation.
Performed by	Black & Veatch.
Investigation date	February to May 2020.
Subcont actors	Terracon Cons tants, Inc. r borings, test its, and labo atory testing. Martini Drilling Corporation subcontracted to Terracon for borings, Gregg Drilling & Testing, Inc. subcontracted to Terracon for cone penetrometer testing (CPT) soundings and seismic cone penetrometer testing (sCPT), and Southwest eophysics, LLC subcontracted to Terracon for the downhole seismic testing and soil electrical resistivity testing.
Investigation locations	The investigation locations are shown on Figure 4-1.
Borings	Borings were drilled at 15 locations to dep hs of 51 to 105 feet. Fourteen borings were drilled by Martini Drilling Corporation using a CME75HT truck-mounted rig using hollow stem augers. Boring BVB-109 was drilled by Terracon using a Diedrich D90 track-mounted rig and tricone roller bit with bentonite mud as drilling fluid. Schedule 80 PVC casing was installed to a depth of 105 feet and grouted in place at BVB-109 in accordance with ASTM Method D7400 for downhole seismic testing. The boring logs provide drilling details for each boring. The boring logs are included in Appendix A.
Sampling	S andard split barrel samples, 3-inch ring-lined split barrel samples, and 3 inch thin-walled tube samples were collected.
Sampling hammer	it ba e sam es were driven a 140-pound a to hammer for both drill rigs. The hammer efficiencies were calibrated offsite following ASTM D4633 and determined to be 78.7 percent for the CME75HT and 94.8 percent for the Diedrich D90. The hammer energy calibrations reports are included in Appendix B.
Cone penetrometer soundings	w r o Shear wave velocities were measured at 3.3 foot intervals at with low tip resistance materials.
Downhole seismic survey	Performed at BVB-109 o a depth of approxima ely 100 feet in accordance with ASTM D7400. Three-inch PVC casing was installed to facilitate the testing. The casing was grouted in accordance with ASTM D7400 using the grout mix for soil. Downhole testing results are included in Appendix D.

ITEM	DISCUSSION
Test pits	Three tes pits were excava ed in the Fil er Bank and Swi chyard to depths of approximately 12 feet. The test pits were logged by Terracon and the logs are included in Appendix A.
Soil electrical resistivity	Soil electrical resistivity tes ing was performed at se en specified test locations in pairs of orthogonal resistivity survey lines. The results of the electrical resistivity testing are included in Appendix D.
Laboratory Testing	Soil index, strength, compac ion, California Bearing Ratio (CBR), and chemical testing performed. Laboratory testing results are

5.0 Subsurface Conditions

5.1 REGIONAL GEOLOGY

Discussion of the regional geology for the project site is provided in the Geologic Hazard Report for the Adelanto Converter Station (Reference 1).

5.2 SITE-SPECIFIC GEOLOGY

Discussion of the local geology for the project site is provided in the Geologic Hazard Report for the Adelanto Converter Station (Reference 1).

5.3 SEISMICITY

The seismic hazard and the design ground motion parameters for the Adelanto site is provided in Reference 1.

5.4 GEOLOGICAL HAZARDS

Potential geologic hazards for the project site are discussed in the following subsections, with several described in detail in Reference 1.

5.4.1 Swelling Soils

Swelling or expansive soils refer to soils and some bedrock that undergoes significant volume changes as the moisture content varies. Repetitive wetting and drying of these soils create cyclic volume expansion and contraction, which leads to differential settlement of shallow foundations and possible structural damage. Swelling soils are generally identified based on published plasticity index and liquid limit correlations or determined by laboratory testing.

ITEM	DISCUSSION
Developed site	S rficial soils on the site are primarily granular soil of all ial origin, consisting of medium dense to very dense silty sand and poorly graded sand with some silt.
Laboratory swell testing	None performed
Building code requirement	CBC 2016 provides the following four criteria: • *Plasticity index of 15 or greater*: The cohesive samples have a of 13 percent (Figure 5-7). • *More than 10 percent of the soil passes the No. 200 sieve*: Samples tested for Atterberg limits and percent passing the • *More than 10 percent of the soil particles are less than 5 micrometers in size:* Hydrometers were performed on 9 samples and all 9 samples have more than 10 percent of the soil particles that are less than 5 micrometers in size (igure 5-8). • *Expansion index greater than 20:* This test was not performed.
Swelling potential	In accordance with the expansi e soil hazard assessmen map developed by Waterways Experiment Station (WES) in Reference 6 (Figure 5-6), the soils at the Adelanto site potentially have low expansive character and/or low frequency of occurrence of expansive soils. Based on the measured liquid limit (LL) and plasticity index (PI), the soils at the Adelanto site are rated as low swelling potential soils based on the WES classification of potential swell provided in Reference 6 that is reproduced in Table 5-1. Figure 5-7 plots the measured LL and PI of the soil samples collected during the Black & Veatch 2020 investigation.
Swelling soil mitigation	None req ired as the soils found at the Adelan o site ha e low swelling potential.

Table 5-1 WES Classification of Potential Swelling Soil (Reproduced from Reference 6 Table 4-1)

Classification of potential swell	Potential swell S_p percent	Liquid limit LL percent	Plasticity index PI percent	Natural soil suction τ^{o}_{nat} tsf
Low	<0.5	<50	<25	<1.5
Marginal	0.5–1.5	50–60	25–35	1.5–4.0
High	>1.5	>60	>35	>4.0

5.4.2 Land Subsidence

Land subsidence hazard for the Adelanto site is addressed in Reference 1.

5.4.3 Collapsible Soils

In the arid and semiarid parts of the Western United States, unsaturated deposits of loose silt, silty clay, or lean clay can exhibit a potential to collapse upon wetting. These deposits include wind-deposited loess and loess-like soils and colluvial and alluvial soils deposited by flash flood runoffs, often in the form of mudslides. In these deposits, soils have never been completely wetted or worked to allow breakdown and consolidation of the loose depositional structure. Generally, these soils have relatively high dry strength created by well dispersed clay binder. However, upon wetting, strength is essentially lost and the soil structure can collapse, resulting in slope and foundation failures (Reference 7).

ITEM	DISCUSSION
Collapsible soil testing	A total of 19 samples collected with 3 inch ring-lined split barrel D5333 (Reference 8). Figure 5-9 plots the measured collapse index versus sample elevation with the classification of the level of collapse potential based on collapse index according to ASTM Atterberg limits and in situ dry density tests were measured to evaluate the soil collapse potential in accordance with the United States Bureau of Reclamation (USBR) Earth Manual (Reference 7). that is used to assess collapse potential of soils.
Collapse potential	The soil samples tested during the Black & Veatch 2020 investigation at the Adelanto site showed slight collapse potential based on the measured collapse index in accordance with ASTM D5333. The in-situ dry density and liquid limit criterion result in collapse potential being classified as Case III on Figure 5-9 of the USBR Earth Manual, which corresponds to soil that will not collapse.
Collapsible soil mitigation	None required as the soils found at the Adelanto site have slight collapse potential.

5.4.4 Soil Liquefaction Potential

Soil liquefaction hazard for the Adelanto site is addressed in Reference 1. Traditional soil liquefaction is not a hazard due to groundwater at the site deeper than 100 feet; however, Reference 1 indicates that the seismic compaction (dry sand settlement) can be as high as 0.3 inches during a seismic event.

5.4.5 Ground Rupture

Ground rupture hazard for the Adelanto site is addressed in Reference 1.

5.4.6 Flooding

lood hazard for the Adelanto site is addressed in Reference 1.

5.4.7 Landslides

Landslide hazard for the Adelanto site is addressed in Reference 1.

5.5 SITE-SPECIFIC GROUND CONDITIONS

igure 4-2 shows the subsurface investigation locations including the current and previous subsurface investigations performed at the site. Figure 5-1 is a plot of N_{60} values from Standard Penetration Tests (SPT) with elevation (NGVD29) for borings performed during the Black & Veatch 2020 investigation and previous investigations outlined in Sections 4-1 through 4-4. The SPT N_{60} value represents the field SPT N value corrected to a 60 percent hammer energy efficiency. For borings, the SPT N value is the sum of the blows from a 140 pound hammer falling 30 inches to drive a standard split barrel sampler the last 12 inches of an 18 inch sample interval. The blow counts for 3 inch samplers were converted to be equivalent to standard N_{60} values in accordance with Reference 13. Figure 5-2 provides the measured N_{60} values from borings and the correlated N_{60} values from CPT sounding data. The measured N_{60} values are rather scattered but show a general trend of increased values with depth. The correlated N_{60} values from CPT soundings show a drop in N_{60} values below Elevation 2,910 feet, particularly in BVS-205 and BVS-205A, which corresponds with a cohesive layer at depth that is less stiff. This deep cohesive layer is assumed across the site for geotechnical design purpose. igures 5-3 through 5-5 provide subsurface stratigraphy cross sections along three cross sections alignments identified on Figure 4-2. The cross sections provide the soil types, measured SPT-N values, and CPT sounding tip resistance and friction ratio. The cross sections are as follows:

- Cross section A-A’ is at the Control Building, Administration Building, and DC Yard and includes investigation locations: BVB-102, BVB-106, BVB-115, BVS-201, BVS-204 and BVS-210.
- Cross section B-B’ is at the south side of Filter Banks B5 & 6, and Switchyard Structure SS3 and includes investigation locations: BVB-114, BVB-104, BVB-103, BVS-207, BVB-109, BVS-208, BVS-202, BVB-112, BVB-113, BVS-211, AR-11 and AR-8.
- Cross section C-C’ is at the north side Filter Banks FB7 & 8, and Switchyard Structure SS4 and includes investigation locations: BVB-107, BVS-209, BVB-105, BVS-205, BVB-110, BVS-206, BVB-108, BVB-111, BVS-203, AR-14 and AR-19.

5.5.1 Subsurface Stratigraphy

The following sections describe site stratigraphy based on the findings of the subsurface investigations.

5.5.1.1 Layer 1: Silty/ Clay Sand

The surficial layer consists of medium dense to dense poorly-graded fine-grained silty sand or clayey sand with measured SPT-N values ranging from 7 to 89 blows per foot (bpf) with an average of about 33 bpf. Fill was encountered at Borings BVB-102, BVB-105, BVB-106, BVB-110, BVB-111, BVB-112, BVB-113 and BVB-114, and consists of sandy silt or clayey silt that is sometimes overlain by a thin layer of gravel. The fill is 2.5 feet thick at all but Boring BVB-106 where it is 3.2 feet thick. No material or compaction information was available concerning the fill, requiring it to be considered undocumented fill. Since the fill material is only found at isolated areas and is generally only 2.5 feet thick, the fill and the native soils are considered as one layer. Additionally, based on recommendations in Section 6.3.1 and a general fill thickness of 2.5 feet, fill material will be either removed and/or improved as part of construction for shallow foundations.

High blow counts found in isolated borings in this surficial layer suggest this layer has moderate to high cementation. The suggested cementation is consistent with CPT normalized soil behavior type (SBT) charts generated by the CPT interpretation software CPeT-IT Version 3.0.3.2 based on Reference 9 in Appendix C. As noted in Section 5.4.3, testing indicates the collapse potential is slight; however, the cementation bonds can break when the soil is wetted or saturated as indicated by the plate load test results presented in Reference 3 on site soil at the natural moisture content and after wetting the shallow soil by flooding the test location overnight.

5.5.1.2 Layer 2: Sand/Silty Sand/Sandy Silt/Silt

This layer consists of interbedded medium dense to dense fine-grained and poorly-graded sand, silty sand, sandy silt, and silt with measured SPT-N values ranging from 7 to 120 bpf with an average of about 38 bpf. Thin interlayers of coarse- and fine-grained soil layers can be identified based on the normalized SBT charts from the CPT soundings in Appendix C. Moderate to high cementation is also suggested by the SBT charts and the isolated high SPT-N values.

5.5.1.3 Layer 3: Sand/Silty Sand/Sandy Silt/Silt/Silty Clay

This layer consists of interbedded medium dense to dense fine-grained and poorly-graded sand, silty sand, sandy silt, silt, and silty clay with measured SPT-N values ranging from 14 to 94 bpf with an average of about 56 bpf. Thin interlayers of coarse- and fine-grained soil layers can be identified based on the normalized SBT charts from the CPT soundings in Appendix C. Based on the SBT charts, this layer has less cementation but more fine-grained soil.

5.5.1.4 Layer 4: Deep Cohesive Layer

The deep cohesive layer is generally composed of silt and silty clay with interbedded silty sand and sand. This layer is generally below Elevation 2,910 feet as identified in the deep boring log for BVB-109 and CPT sounding logs BVS-205, BVS-205A, BVS-210 and BVS-211. One boring, BVB-109, was drilled into the deep cohesive layer with the measured SPT-N values ranging from 48 to

81 bpf and an average of about 61 bpf. The CPT sounding data indicate the correlated SPT-N_{60} values could be as low as 20 to 30 bpf based on BVS-205 and BVS-205A. The deep cohesive layer in BVS-205 is relatively uniform compared with more interbedded cohesive and cohesionless layers at similar depths in BVB-109, BVS-210, BVS-211 and the more cohesionless soils at shallower depths; however, interpretation of this layer as a cohesive material across the site is considered conservative for determining the geotechnical engineering properties.

No thin-wall tube samples were obtained in the deep cohesive layer as this layer is heavily overconsolidated and has a hard consistency. Therefore, undrained shear strength testing such as unconsolidated undrained (UU) triaxial testing or unconfined compressive strength testing could not be performed on the deep cohesive layer. The design undrained shear strength for the deep cohesive layer is conservatively estimated to be 5 ksf based on CPT correlations in accordance with Reference 9.

The measured liquid limit (LL) is in the range from 28 to 34 percent while the measured plasticity index (PI) is in the range from 11 to 14 percent for the deep cohesive layer. Two measurements of fines content in the deep cohesive layer show 38 and 43 percent of the material passing a No. 200 sieve.

Because of the deep groundwater table, the deep cohesive layer is not considered saturated and the settlement due to the foundation load will be not involve any long-term consolidation settlement. The Young's modulus of the deep cohesive layer is estimated with the consideration of the CPT correlated constrained modulus, shear wave velocity, and the correlation of undrained shear strength and the elastic modulus in accordance with References 9 through 11.

5.5.2 Groundwater Conditions

Groundwater table was not encountered in any of the borings drilled during the Black & Veatch 2020 subsurface investigation. Based on the previous subsurface investigations by Ertec Western, Inc. (1981) and CH2M Hill (1983), groundwater was observed at a depth of about 140 feet and 154 feet below grade in deep test wells.

The CPT results presented in Appendix C assumed a groundwater table depth of 50 feet. No pore pressure dissipation tests were performed during the Black & Veatch 2020 subsurface investigation due to the absence of groundwater in the soil borings and previous investigations. A groundwater table depth of greater than the investigation depth was used for all analyses in this report based on the results from the current and previous subsurface investigations.

6.0 Geotechnical Design Recommendations

The design recommendations provide geotechnical design properties for the soils, geotechnical design criteria, and foundation recommendations for detailed foundation design. Engineering parameters and design recommendations were developed using the results of the field investigations and the laboratory testing results. The following are foundation design criteria recommendations:

ITEM	DISCUSSION
Maximum allowed settlement	1.5 inches.
Maximum differential settlement	0.1 percent slope between adjacent concentrated load points or loaded area.
Maximum allowed tank	inches. Connections to tanks gned to toler large settlements.
Shall w foundations	3.0 minimum fact f safety against bea ing ca acity failure.
Deep foundation axial compression	Minimum factor of safety of 3.0 if no load testing is performed, 2.0 if static load testing is performed.
Deep foundation axial uplift	Minimum factor of safety of 3.0 i no oad testing is e rmed, or 2.0 if static load testing is performed.
Deep foundation lateral deflection	0.25 inch for fixed head and 0.50 inch for free head condition

6.1 ENGINEERING DESIGN PROPERTIES

Based on the geotechnical information, a design soil profile was generated for the Adelanto site. The design soil profile and design soil parameters are provided in Table 6-1 including the soil input parameters for the following pile and pier lateral capacity design software:

- LPile by Ensoft, Inc.
- Moment Foundation Analysis and Design software (MFAD) by FAD Tools International, LLC.

Table 6-1 Design Soil Profile

PROPERTIES	SAND	SAND	SAND	CLAY
Depth below final grade, feet(1)	0 to 10	10 to 30	30 to 70	70 to 100
SPT N_{60} alue, bpf	15	30	65	25
Total Unit weight, pcf(2)	120	105	115	115
Angle of internal friction, degrees	35	35	36	NA
Elastic modulus, ksf	500	1,500	3,000	1,000
K_h, pci (LPile Parameter)	290	330	382	NA
e_{50} (LPile Parameter)	NA	NA	NA	0.0043
Undrained shear strength, psf	NA	NA	NA	5,000
Soil pressuremeter modulus (MFAD parameter), kci	0.83	1.67	3.61	3.13
S i n fac (MFAD parameter)	1	1	0.98	0.4

(1) inal grade elevation to be determined. The design soil profile was developed based on the existing site grade varying from approximately Elevation 2,957 to 2,979 feet (NGVD29);

Abbreviations:
NA – not applicable
SPT – standard penetration test
bpf – blows per foot
pcf – pounds per cubic foot
psf – pounds per square foot
pci – pounds per cubic inch
ksf – kips per square foot
kci – kips per cubic inch
LPile – Software by Ensoft, Inc.
M AD – Moment Foundation Analysis and Design software by AD Tools International, LLC.

6.2 SLOPE STABILITY

There are no slopes planned at this time; therefore, slopes are not addressed. If slope evaluations are needed, they will be performed on a case-by-case basis. Potential pseudo-static coefficients for evaluating seismic slope stability are discussed in Reference 1.

6.3 STRUCTURE FOUNDATIONS

Shallow and deep foundations are addressed herein. For structures with minimal overturning, mat or spread footings shallow foundations should be suitable. For pole or tower structures, deep foundations are likely the most efficient foundation alternative. Section 6.3.1 addresses shallow foundations and Section 6.3.2 addresses deep foundations.

6.3.1 Shallow Foundations

This section addresses shallow foundations and provides settlement charts for strip and square shallow foundations. The settlement charts provide allowable gross bearing pressures at various settlement limits for foundations with widths up to 20 feet. The settlement and allowable gross bearing pressure for mat foundations with width larger than 20 feet can be evaluated accounting for foundation flexibility and non-uniform bearing pressure on the soil case-by-case if loads and dimensions are provided.

igures 6-1 and 6-2 provide settlement charts for square and strip footings with gross bearing pressure versus footing width resulting in a settlement of 0.1 inch, 0.25 inch, and 0.5 inch for strip and square footings. Figures 6-1 and 6-2 do not include the potential 0.3 inches of seismic compaction settlement estimated in Reference 1. The seismic compaction settlement should not be included for subgrade modulus calculation. The net bearing pressure for the footings can be calculated from the gross bearing pressure by subtracting the overburden pressure at the foundation level, i.e., the effective soil unit weight multiplied by the footing embedment depth.

The following limitations apply to the shallow foundations:

- The minimum footing width is 2.0 feet for both square and strip footings.
- The minimum depth of foundation embedment below finished grade is 1 foot.
- No shallow foundation should be founded on any topsoil, debris, undocumented fill, loose soil, or organic material. If undocumented fill or loose soil is encountered, it should be removed and replaced with backfill as recommended in Section 7.
- The following are recommended to reduce the risk of potential differential settlement caused by softening of the native materials immediately below the foundations due to the loss of cementation upon wetting in any man-made or natural events such as pipe leakage, and to align with the general approach that was used for existing foundations that have performed well:
  - Over excavate to 1 foot below the bottom of the foundation concrete.
  - Moisture condition the soil to 8 inches below the bottom of the over excavation depth. Compact the soil to 8 inches below the bottom of the

excavation to 98 percent of the standard Proctor maximum dry density at plus to minus 2 percent of the optimum moisture content.
- Backfill to the bottom of the concrete with material meeting the Structural ill requirements in Table 7-3 and compact the material using the criteria for Structural Fill in Table 7-2.

- Larger foundations or excavations anticipated to be left open for longer periods should use a mud mat to protect the prepared foundation level.
- Subgrades should be firm and stable prior to footing construction. Subgrades that are disturbed or subject to excess water or softening should be over excavated and recompacted to remove the softer soil. For suitable materials and proof rolling requirements refer to Section 7.2 Earthwork.
- A strip footing is defined as having a ratio of length (L) to width (B) greater than 10. A square footing is defined as having L/B = 1. To estimate the footing settlement with 1 < L/B < 10, the following should be accomplished:
  - Obtain settlements from the design charts for both a square and a strip footing using the actual footing width, B.
  - Interpolate the settlements for the actual L/B ratio, assuming L/B =1 for a square footing and L/B = 10 for a strip footing.
  - The interpolated settlement from Figures 6-1 and 6-2 and the corresponding gross bearing pressure can be used to calculate the subgrade modulus for structural design of the shallow foundation.
- Acceptable footing pressure is controlled by either allowable settlements or allowable bearing capacities of the subgrade soils. It is recommended that individual column footing adjacent to strip footings be proportioned so that settlements of the two foundations minimize potential differential settlement.
- or resisting lateral loads, a sliding resistance between the base of the foundation concrete and the soil may be used. A coefficient of friction of 0.45 is recommended for the clean coarse-grained structural fill compacted to 98 percent of the standard Proctor maximum dry density at plus to minus 2 percent of the optimum moisture content.
- The settlement values presented are for rigid foundation systems.
- The effect of adjacent foundations on foundation settlement resulting from stress overlap is not included in the settlement analyses.

6.3.2 Deep Foundations

Drilled pier foundations may be needed to support pole type transmission structures. The soil design parameters for the axial and lateral capacity designs are provided in Tables 6-1 and 6-2. Table 6-2 includes the ultimate unit side shear and end bearing resistance values to determine the geotechnical axial capacity of drilled piers using the Federal Highway Administration Drilled Shaft Manual, Beta Method for granular soil and Alpha Method for cohesive soil. A factor of safety should be applied to the ultimate axial load capacity in accordance with the governing design code CBC 2016 (Reference 12) and based on load testing as recommended in the beginning of Section 6.0. Soil input parameters are provided in Table 6-1 that are specifically tailored for transmission tower foundation lateral capacity design using software MFAD (Moment oundation Analysis and Design) developed by FAD Tools International, LLC.

Table 6-2 Ultimate Unit Resistance Values for Drilled Pier Axial Capacity Design

PARAMETERS[2]	SAND	SAND	SAND	CLAY
Depth below final grade, feet[1]	0 to 10	10 to 30	30 to 70	70 to 100
Ultimate side resistance in compression, psf	700	2,000	3,100	2,300
Ultimate side resistance in tension, psf	500	1,500	2,300	2,300
Ultimate end bearing resistance, psf	18,000	36,000	78,000	45,000

Notes:

(1) inal grade Elevation to be determined. The design soil profile was developed based on the existing site grade varying from approximately Elevation 2,957 to 2,979 feet NGVD29.

(2) Appropriate factor of safety shall be applied to the ultimate axial load capacity in accordance with the governing design code CBC 2016 (Reference 12).

Abbreviation:

psf – kips per square foot

The allowable lateral pier capacity using LPile and/or MFAD software should consider both the geotechnical lateral capacity and the structural lateral capacity. For the free head condition where the top of the pier is allowed to rotate, the recommended allowable deflection at the top of the pier is 0.5 inch. If the top of the pier is restrained from rotating, the recommended allowable deflection at the top of the pier is 0.25 inch.

If pier groups are required with a spacing of less than six pier diameters, the lateral capacity of a single pier should be reduced by a group efficiency factor (P-Multiplier). Table 6-3 provides recommended values for P-Multipliers based on the position of the pier in the pier group and the spacing between adjacent pier.

Table 6-3 Recommended Values for P-Multipliers

PIER POSITION	PIER SPACING IN THE DIRECTION OF LOAD					
	1 DIAMETER	2 DIAMETERS	3 DIAMETERS	4 DIAMETERS	5 DIAMETERS	6 DIAMETERS
Leading Row	0.70	0.75	0.82	0.87	0.94	1.00
Second Row	0.45	0.56	0.67	0.78	0.88	1.00
Third Row	0.30	0.43	0.57	0.72	0.86	1.00
Fourth Row	0.20	0.36	0.52	0.67	0.84	1.00

6.4 CORROSION POTENTIAL

ITEM	DISCUSSION
Eval ation basis for s ructural concrete	American Concrete Insti te (ACI) guidelines for s ructural concrete (ACI 318-14).
Eval ation basis f r bel w grade steel	Federal Highway Adminis ration (1998), Design and Construction of Driven Pile Foundations, FHWA HI 97-013, US Department of Transportation, November 1998.
Soil chemical testing performed	Yes, see Appendices E for results.
Electrical resis i ity testing performed	Yes, see Appendix D for results.
ACI concrete durability exposure categories	The actions for the ACI exposure ca egories are addressed in Table 6-5 based on the chemical testing results and anticipated site
Federal Highway Adminis ration criteria	See Table 6-6. The res l s of he soil elec rical resis i ity esting are available in Appendix E. If buried steel components or steel piles are used, a corrosion protection specialist should be consulted.

Table 6-4 Soil Chemical Test Results

BORING	SAMPLE DEPTH, FEET	PH IN WATER	PH IN CALCIUM CHLORIDE	WATER SOLUBLE SULFATE (SO4), PPM	WATER SOLUBLE CHLORIDE ION, PPM	OXIDATION REDUCTION POTENTIAL, MV
BVB-102	2.5 to 4.0	8.23	5.65	200	<100	+684
BVT-301	1.0 to 3.5	7.99	5.61	100	<100	+683
BVT-302	1.0 to 3.5	7.77	5.80	200	<100	+688
BVT-303	3.5 to 6.0	7.98	5.49	200	<100	+682
ppm = parts per million, which is equivalent to milligrams per kilogram (mg/kg) or 0.0001 % weight						

Table 6-5 ACI Concrete Durability Exposure Categories and Classes

EXPOSURE CATEGORY	ACI EXPOSURE CLASS	ACTUAL ANTICIPATED SITE CONDITIONS	MINIMUM REQUIREMENTS
Freezing and thawing	F2	Concrete exposed to freezing-and-thawing cycles with frequent exposure to water.	Air entrained, $f'_c \geq 4{,}500$ psi; $w/cm \leq 0.45$
Sulfate	S0	0.1% wt< Water sol ble sulfate in soil	No restriction on cement type; $f'_c \geq 2{,}500$ psi
In contact with water	W0	Concrete dry in service; Concrete in contact with water and low permeability is not required	$f'_c \geq 2{,}500$ psi
Corrosion protection of reinforcement	C1	Concrete exposed to moisture b not to external source of chlorides	Maximum wa er-soluble chloride ion (Cl) content in concrete is 0.30% wt; $f'_c \geq 2{,}500$ psi
i r o r of 3 inches is req ired for cast-in-place concre e permanen ly exposed to soil or rock. % wt = percent by mass w/cm = water/cement ratio			

Table 6-6 Federal Highway Administration General Guidelines for Below Grade Steel Corrosion

AGGRESSIVE SUBSURFACE SOIL CONDITION(1)	PH	SOIL ELECTRICAL RESISTIVITY (OHM-CM)	SULFATE CONTENT (PPM)	CHLORIDE CONTENT (PPM)
Condition 1	Below 4.5	NC(2)	NC(2)	NC(2)
Condition 2	NC(2)	Less than 2,000	NC(2)	NC(2)
Condi ion 3	NC(2)	Be ween 2,000 and 5,000	Grea er han 200	NC(2)
Condition 4	NC(2)	Between 2,000 and 5,000	NC(2)	Greater than 100

Notes:
(1) Each condition listed should be considered independently. If any of Conditions 1 through 4 exist, the subsurface environment is considered aggressive.
(2) NC – This characteristic is not considered in the given condition, i.e., Condition 1 only considers the pH.

6.5 ELECTRICAL RESISTIVITY

In situ electrical resistivity testing was performed at seven specified test locations in pairs of orthogonal resistivity survey lines for grounding design (RL-1 through RL-7 as indicated on igure 4-1). The results of the electrical resistivity testing are included in Appendix D.

6.6 THERMAL RESISTIVITY

Thermal resistivity testing was performed on samples from the test pits. The samples were compacted to 95 percent of the maximum dry density at the optimum moisture content per the standard Proctor, ASTM D698 and then the testing was performed. The Thermal dry out curves are provided in Appendix E

6.7 CALIFORNIA BEARING RATIO

The CBR test results are provided in Appendix E

6.8 LATERAL EARTH PRESSURES

The Mononobe-0kabe method was used to calculate the dynamic earth pressure coefficients for yielding walls. The method by Wood (1973) was used for non-yielding walls. Lateral earth pressures against buried structures should be evaluated in accordance with igure 6-3 for yielding and non-yielding walls. Non-yielding walls are generally internally supported, so that deflection cannot occur, such as basement walls.

7.0 Geotechnical Construction Considerations

The following sections discuss geotechnical construction considerations for development of the site. These considerations include site preparation, earthwork including compaction and material usage, temporary and permanent excavations and dewatering.

7.1 SITE PREPARATION

ITEM	DISCUSSION
Site preparation requirements	Strip topsoil, surface vegetation, and any existing surfacing. Soft areas, clay soil, or areas of unsuitable material (such as brush, stumps, logs, roots, debris, loose soil, undocumented fill, and organic or other deleterious materials) should be over excavated to firm soil and backfilled with general fill.

7.2 EARTHWORK

Earthwork will consist of excavation, subgrade preparation, structural fill, structure backfill, and general fill placement. If imported fill is required, Table 7-1 provides material property requirements for the imported fill.

Table 7-1 Imported General Fill Material Requirements

FILL MATERIAL (*)	USCS CLASSIFICATION	MATERIAL REQUIREMENTS
Fine grained soil	CL	Liquid Limit <40 Plastic Index <15
Coarse grained soil	SW, M- W	15 ercent ines
Notes: *Material shall be clean fill, free of rocks or stones larger than 6 inches in their greatest dimension, brush, stumps, logs, roots, debris, and organic or other deleterious materials. Particles greater than 3 inches but		

Table 7-2 provides recommended compaction requirements for subgrade preparation and fill placement.

Table 7-2 Compaction Recommendations

ITEM	BASIS OF MAXIMUM DENSITY	COMPACTION REQUIREMENTS	WATER CONTENT REQUIREMENTS
eneral fill and embankments	ASTM D698, (Me hod C)	95 percent of the maximum dry density	±2 percent of the optimum water content
Foundation subbase	ASTM D698, (Method C)	8 percent of the maximum dry density	±2 percent of the optimum water content
Structural fill	ASTM D698, (Method C)	98 percent of the maximum dry density	±2 percent the optimum water content
Structure backfill	ASTM D698, (Method C)	95 percent o nsity	±2 percent e optimum water content

All subgrades for foundations or fill should be moisture conditioned and proof-rolled. All identified loose or soft zones should be removed and backfilled with moisture conditioned material and compacted in-place. Subgrades should be scarified and rolled to provide for bonding of overlying lifts.

Over excavate to 1 foot below the bottom of the foundation concrete. Moisture condition the soil to 8 inches below the bottom of the over excavation depth. Compact the soil to 8 inches below the bottom of the excavation to 98 percent of the standard Proctor maximum dry density at plus to minus 2 percent of the optimum moisture content. Backfill with structural fill to the bottom of the concrete. Compact the structural fill as recommended in Table 7-2.

Structural fill is material placed beneath foundations to provide a stable and uniform bearing surface. Structural fill should consist of granular material with less than 3 inches maximum size. The structural fill should be well graded with fines content of 5 percent or less. Recommended gradations that meet these requirements are in Table 7-3.

To the maximum extent available, earth materials obtained from excavations should be used for the construction of fills. General fill is material placed as required across the project site to achieve the final grade design elevation. General fill material should be earth only and should meet the requirement of the note in Table 7-1.

Table 7-3 Structural Fill Gradation Recommendations

PARTICLE SIZE	GRADATION 1 PERCENT PASSING	GRADATION 2 PERCENT PASSING
1/2 inch	100	--
3/8 inch	90 to 100	100
No. 4 sieve	30 to 60	95 to 100
No. 8 sieve	0 to 10	75 to 90
No. 30 sie e	--	30 o 50
No. 100 sie e	--	2 to 10
No. 200 sie e	0 to 5	0 to 5

Structure backfill is material placed against foundations and pile caps. Structure backfill should consist of material with less than 3 inches maximum size and have fines content of 85 percent or less. Structure backfill classified as cohesive material should have a liquid limit less than 40 and plasticity index less than 15.

All fill materials should be placed in uniform, horizontal loose lifts limited to 8 inches or less in uncompacted lift thickness. The use of thicker lifts is subject to confirmation during construction that compaction can be achieved for the full lift thickness.

7.3 TEMPORARY/PERMANENT EXCAVATIONS

ITEM	DISCUSSION
Occupational Safe y and Health Adminis ration (OSHA) Soil Type	C
Trench and excavati n side sl es	1.5 h izontal to 1.0 ertical (1.5H:1V) slope flatter, not to exceed a maximum depth of 20 feet without registered engineer design.
Excavation Support	S ppor or shield systems extending a minimum of 18 inches above the vertical side of excavations are required for vertical sided portions of excavations.

7.4 DEWATERING

ITEM	DISCUSSION
Depth of roundwater	reater than planned excavations.
Potential for perched groundwa er	Unlikely due to arid conditions.
Anticipa ed dewatering	None. S mp may be required to remove any surface wa er

8.0 References

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9. P. K. Robertson and K.L. Cabal, Guide to Cone Penetration Testing for Geotechnical Engineering, 6th Edition, 2015;
10. HWA, NHI-16-072, Geotechnical Engineering Circular No.5, Geotechnical Site Characterization, 2017;
11. Kulhawy, F.H. and P.W. Mayne, EPRI EL-6800 Final Report: Manual on Estimating Soil Properties for Foundation Design, 1990;
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13. California Geological Survey (CGS), Recommended Procedures for Implementation of DM Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction In California, March 1999;
14. US Navy. NAV AC design manual DM-7.2, oundations and earth structures, Washington, D.C., 1982;
15. ACI 318-14, Building Code Requirements for Structural Concrete;
16. ederal Highway Administration (FHWA), Design and Construction of Driven Pile oundations, FHWA HI 97-013, US Department of Transportation, November 1998

Figures

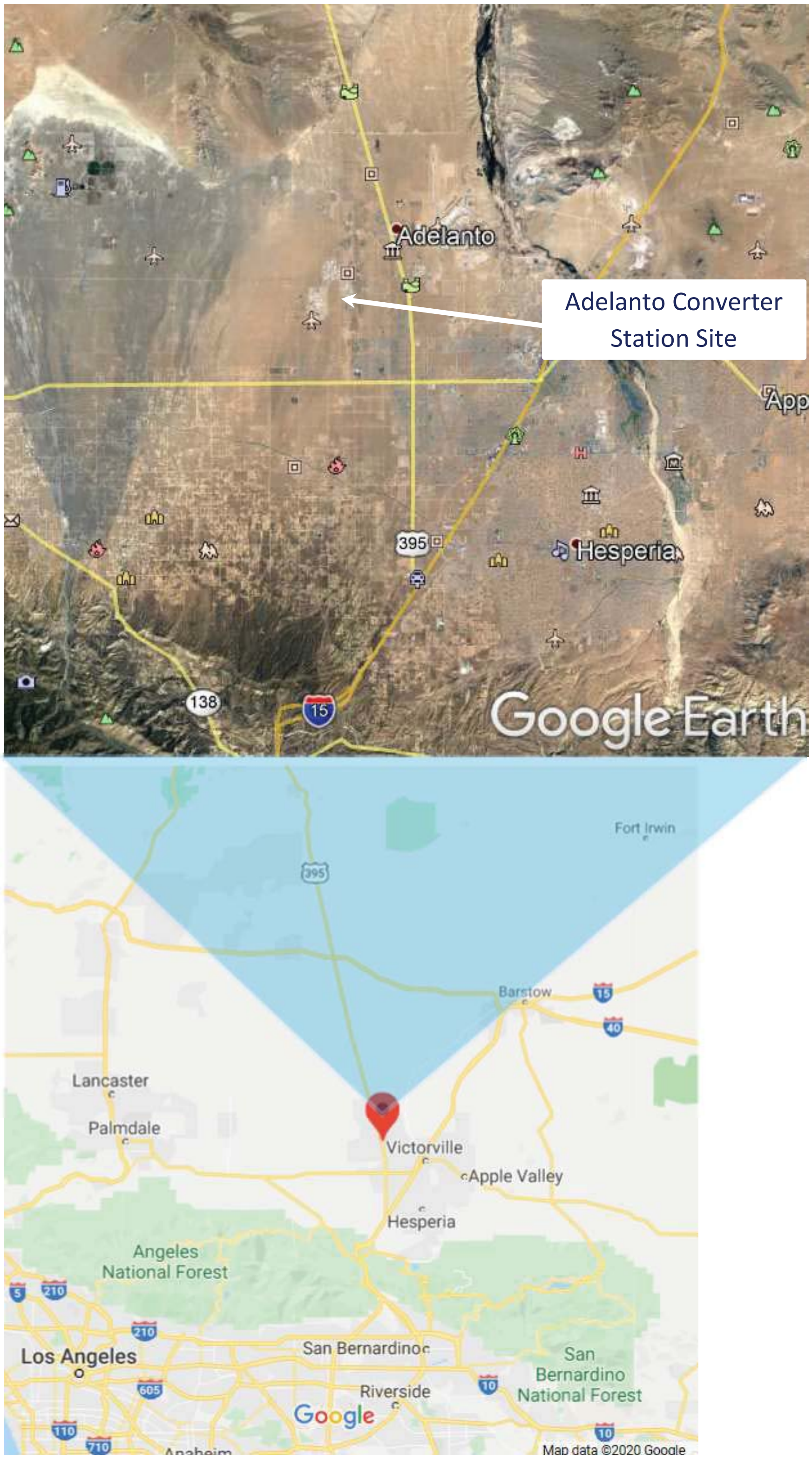
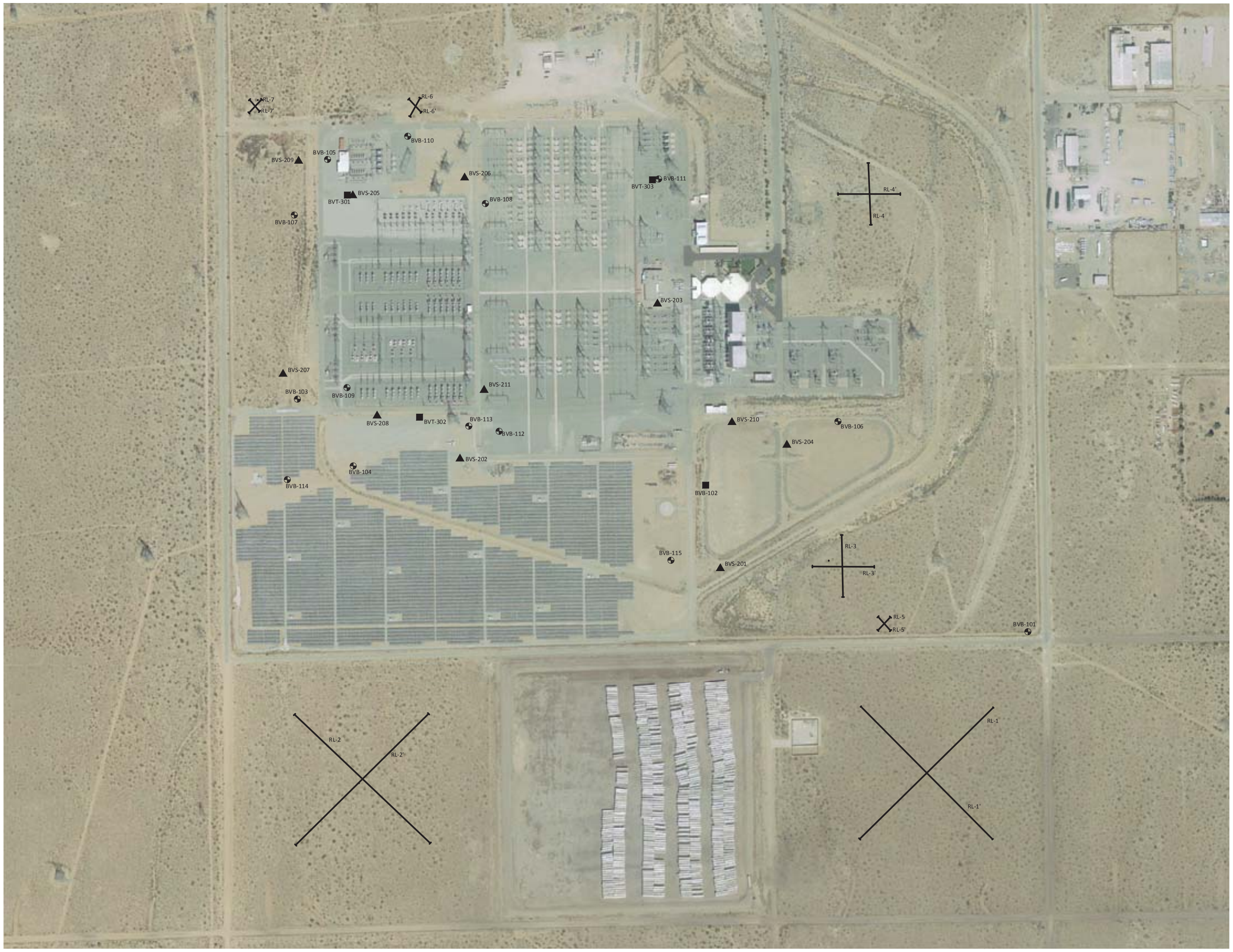


Figure 3-1 Site Location Map



AS-BUILT SOIL TESTING LOCATIONS					
LOCATION NO.	STATE PLANE		ELEVATION (FT)	DEPTH	NOTES
	EASTING	NORTHING		(FT)	
BVB-101	6733121.8	2021870.2	2977.4	51.5	
BVB-102	6731568.3	2022577.2	2978.4	51.5	
BVB-103	6729600.4	2022991.0	2968.8	51.5	
BVB-104	6729869.3	2022669.2	2976.1	51.5	
BVB-105	6729745.8	2024146.3	2959.4	56.5	
BVB-106	6732206.0	2022883.6	2977.1	51.3	
BVB-107	6729585.2	2023878.3	2961.0	51.5	
BVB-108	6730506.6	2023933.6	2961.9	51.5	
BVB-109	6729839.5	2023046.5	2969.2	107.0	DOWNHOLE SEISMIC TEST
BVB-110	6730132.1	2024258.0	2957.1	51.5	
BVB-111	6731341.6	2024052.0	2958.4	51.5	
BVB-112	6730572.6	2022836.3	2973.6	51.0	
BVB-113	6730426.5	2022861.0	2971.4	51.5	
BVB-114	6729551.5	2022603.1	2975.0	51.5	
BVB-115	6731401.0	2022214.4	2976.8	51.5	
BVS-201	6731639.9	2022175.4	2978.7	65.7	
BVS-202	6730384.2	2022702.9	2974.8	61.5	
BVS-203	6731335.4	2023450.9	2967.3	54.0	
BVS-204	6731960.1	2022768.9	2977.9	55.6	
BVS-205	6729866.6	2023973.2	2959.9	104.5	
BVS-206	6730406.0	2024060.0	2960.6	62.3	
BVS-207	6729532.1	2023111.3	2968.8	56.3	
BVS-208	6729985.4	2022909.6	2970.1	63.9	
BVS-209	6729606.4	2024139.3	2957.6	53.0	
BVS-210	6731695.6	2022878.9	2977.9	88.0	
BVS-211	6730499.6	2023035.4	2971.8	104.0	Seismic CPT
BVT-301	6729842.2	2023975.1	2959.8	12.0	
BVT-302	6730189.8	2022906.0	2968.4	12.5	
BVT-303	6731313.4	2024049.4	2959.6	11.5	

AS-BUILT SOIL ELECTRICAL RESISTIVITY TESTING LOCATIONS			
LOCATION NO.	STATE PLANE		REMARKS
	EASTING	NORTHING	
RL-1	6732954.8	2021505.1	Note 3
RL-1	6732310.9	2020871.8	Note 3
RL-1'	6732951.6	2020870.7	Note 3
RL-1'	6732316.5	2021510.1	Note 3
RL-2	6729592.2	2020842.5	Note 3
RL-2	6730232.6	2021475.3	Note 3
RL-2'	6729586.4	2021471.6	Note 3
RL-2'	6730240.6	2020851.8	Note 3
RL-3	6732230.3	2022037.5	Note 2
RL-3	6732224.0	2022336.7	Note 2
RL-3'	6732082.8	2022184.5	Note 2
RL-3'	6732381.2	2022183.3	Note 2
RL-4	6732364.8	2023831.2	Note 2
RL-4	6732352.6	2024129.2	Note 2
RL-4'	6732206.5	2023979.7	Note 2
RL-4'	6732506.8	2023979.6	Note 2
RL-5	6732398.6	2021876.8	Note 1
RL-5	6732459.1	2021941.2	Note 1
RL-5'	6732399.4	2021942.6	Note 1
RL-5'	6732459.6	2021876.0	Note 1
RL-6	6730142.9	2024353.4	Note 1
RL-6	6730192.0	2024442.5	Note 1
RL-6'	6730137.4	2024437.6	Note 1
RL-6'	6730197.2	2024373.7	Note 1
RL-7	6729366.8	2024370.6	Note 1
RL-7	6729428.3	2024435.9	Note 1
RL-7'	6729369.7	2024434.1	Note 1
RL-7'	6729417.9	2024378.0	Note 1

LEGEND

- BORING
- CPT
- TEST PIT
- SOIL ELECTRICAL RESISTIVITY TEST LOCATION

NOTES

1. "a" SPACINGS: 1/2/3/6/10/20/30 FEET.
2. "a" SPACINGS: 1/2/3/6/10/20/30/60/100 FEET.
3. "a" SPACINGS: 1/2/3/6/10/20/30/60/100/200/300 FEET.
4. STATE PLANE COORDINATES REPRESENT CALIFORNIA STATE PLANE SYSTEM ZONE 5 VALUES REFERENCED TO NAD83 DATUM.
5. ELEVATIONS ARE BASED ON NGV29 SYSTEM.

NOT TO BE USED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	19/JUN/20	CONFORM TO AS-BUILT CONDITIONS	CNS	WCW	AMB	MEH	MED
2	27/JAN/20	GENERAL REVISIONS	CDC	JL		MEH	MED
1	17/JAN/20	GENERAL REVISIONS	CDC	JL		MEH	MED
0	10/JAN/20	ISSUED FOR RFP	CDC	JL		MEH	MED

N

200' 100' 0 200' 400'
1"=200'

I HEREBY CERTIFY THAT THIS DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CALIFORNIA.
SIGNED
DATE REG NO.

BLACK & VEATCH
DESIGNER JL DRAWN CDC
CHECKED DATE

INTERMOUNTAIN POWER RENEWAL PROJECTS
ADELANTO SWITCHING STATION
SOIL TESTING LOCATION PLAN
PROJECT 196137 DRAWING NUMBER SS-0004 REV 3
CODE
AREA

sam60033 06/02/2020 11:53 PM Full Size 1 = 1
AECOsim Building Designer v10.11.0.38

Figure 4-1 B&V 2020 Subsurface Investigation (Section 4.4) Location Plan

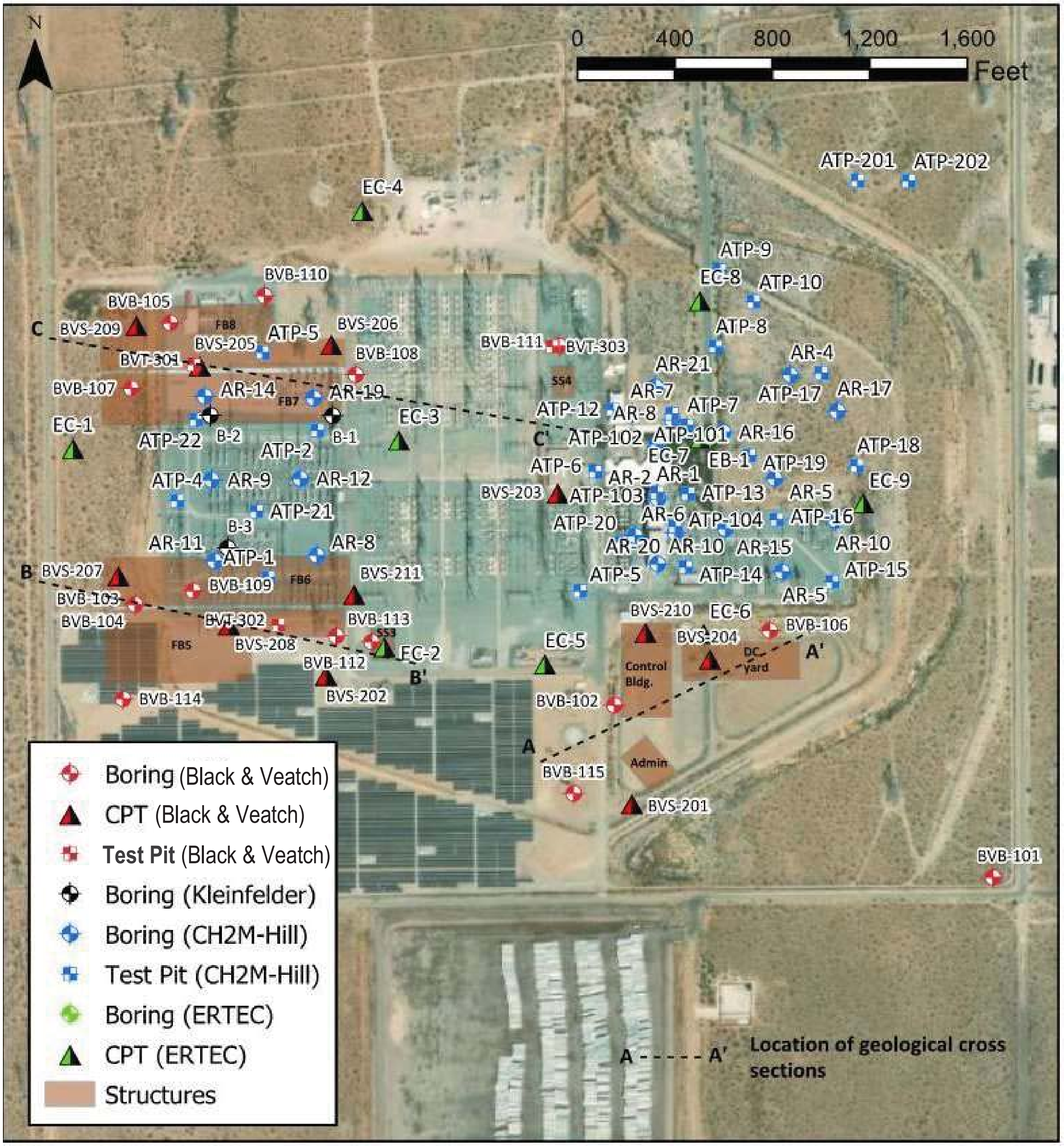


Figure 4-2 **Subsurface Investigations Locations from Current and Previous Investigations including Geological Cross Section Locations**

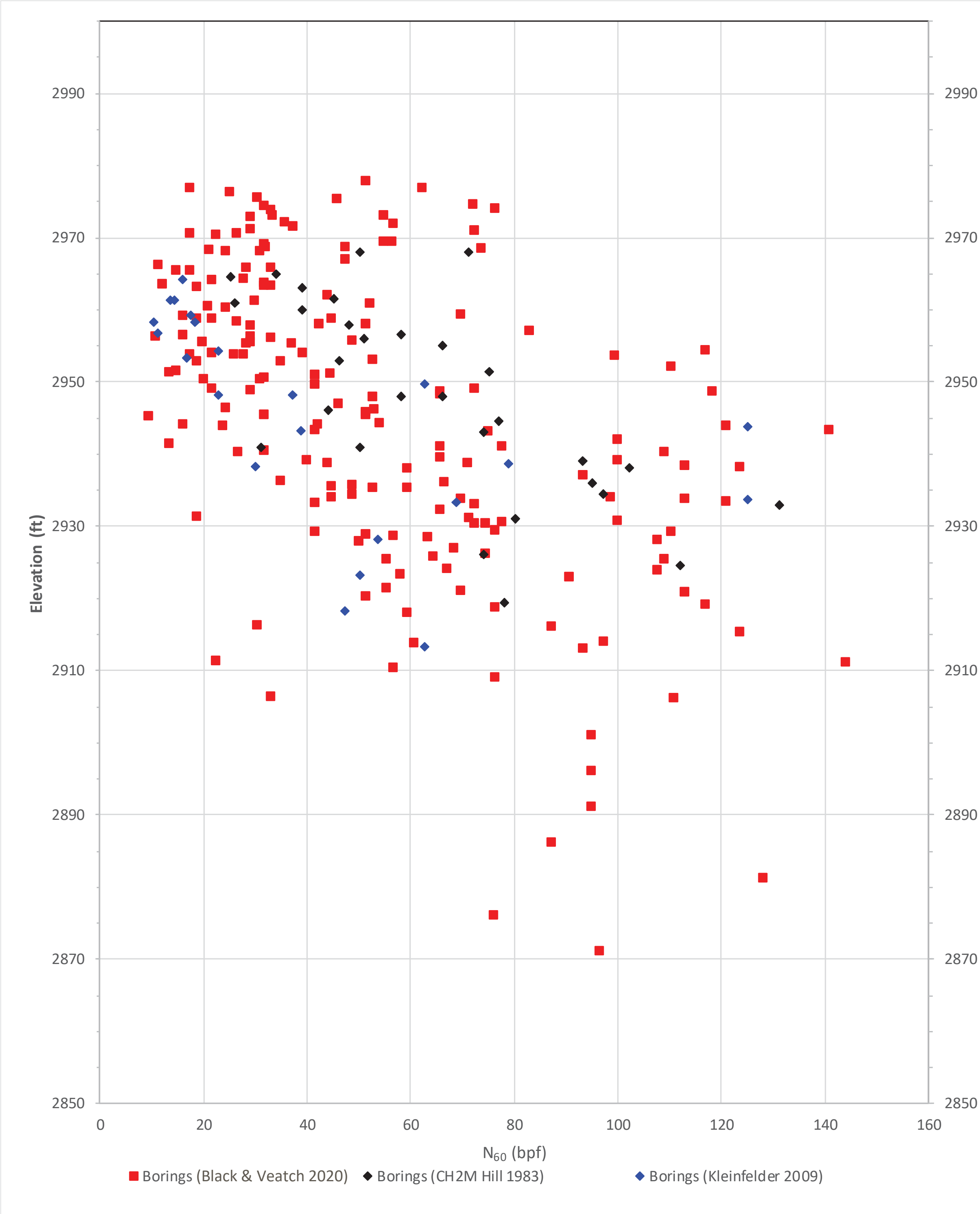


Figure 5-1 **N_{60} Values from Standard Penetration Testing (SPT) Investigation Borings in Sections 4.1 through 4.4**

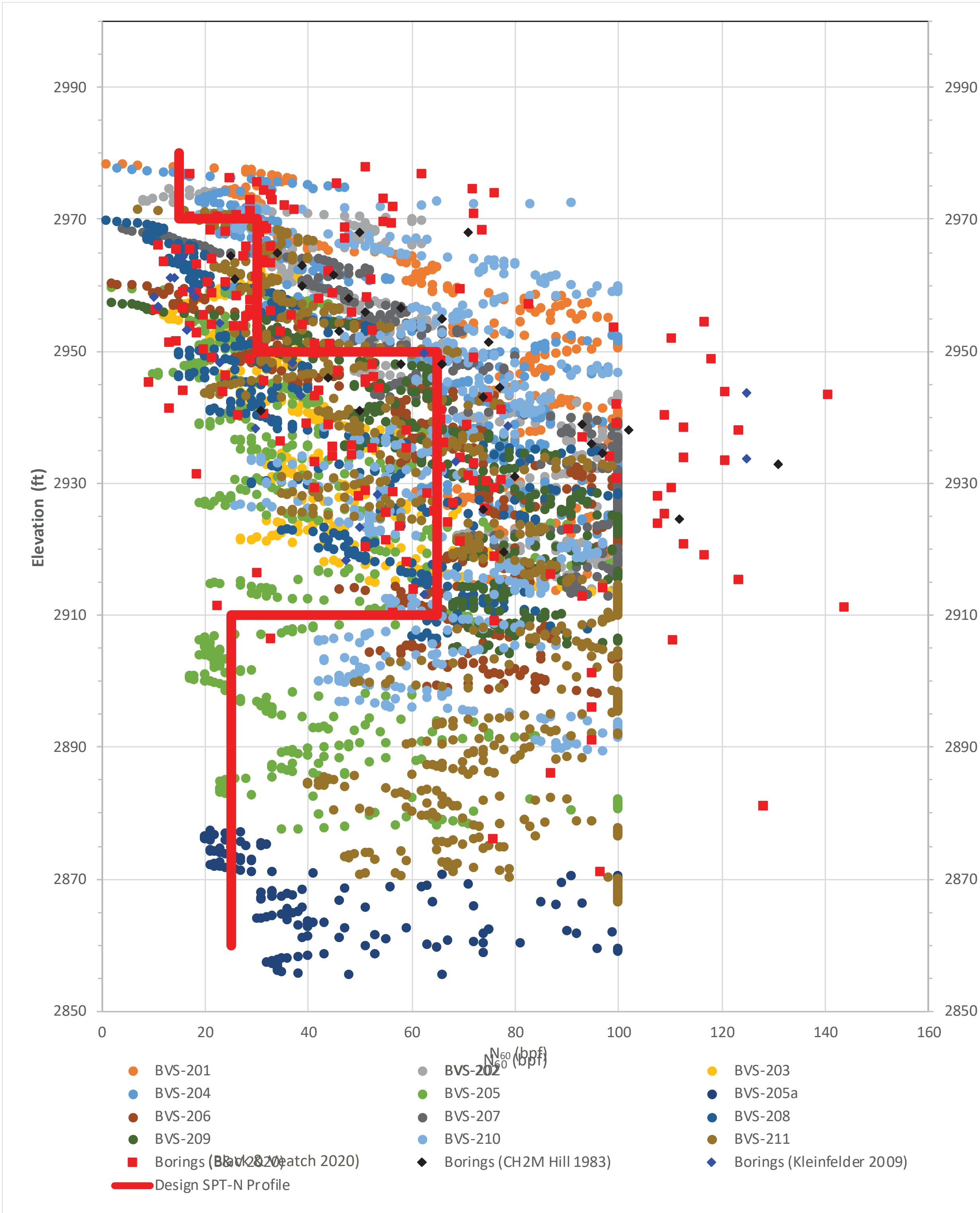


Figure 5-2 **N_{60} Values from Standard Penetration Testing (SPT) and CPTs for Sections 4.1 through 4.4**

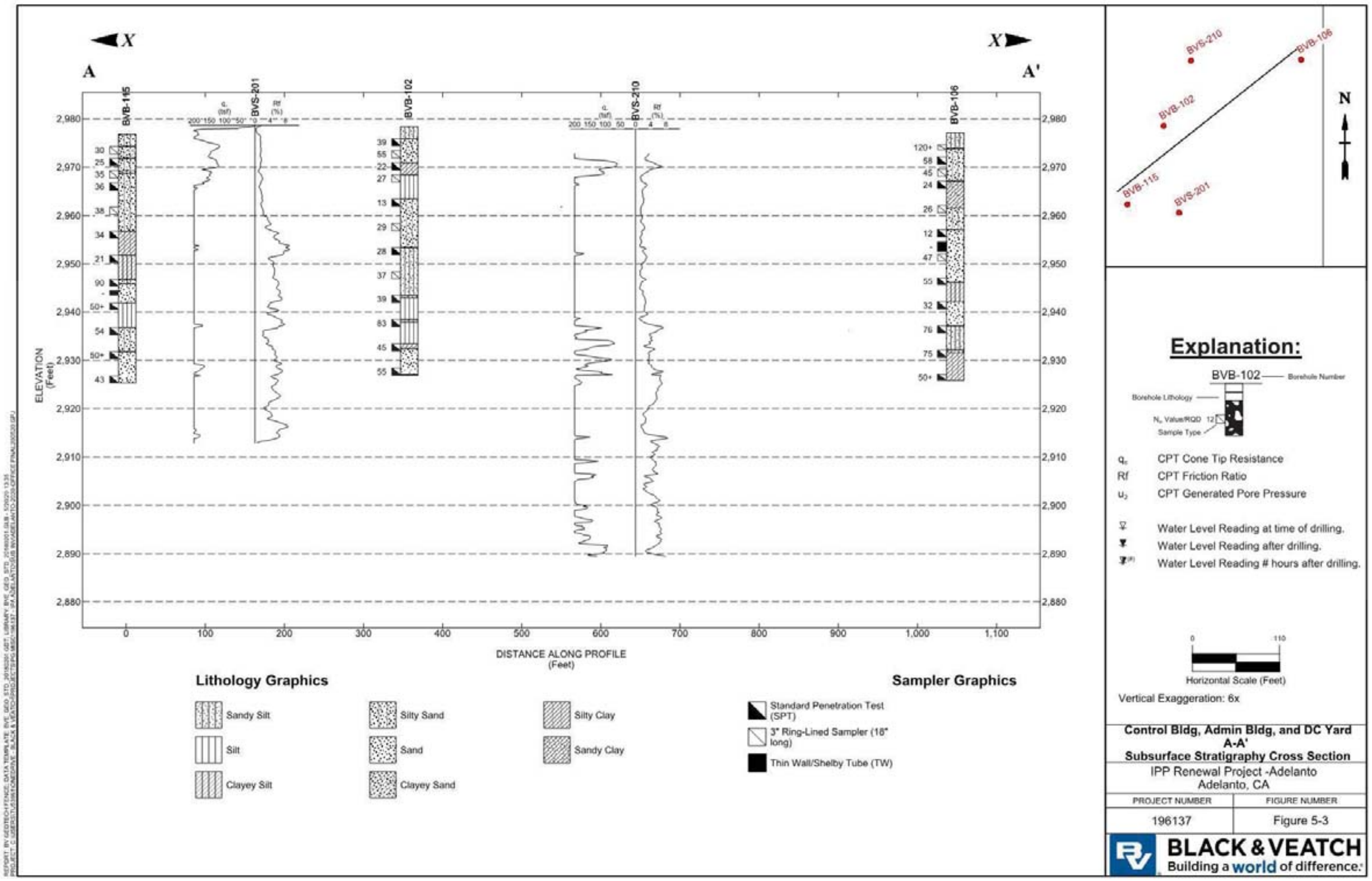


Figure 5-3 **Subsurface Stratigraphy Cross Section A-A' (See Figure 4-2 for location plan)**

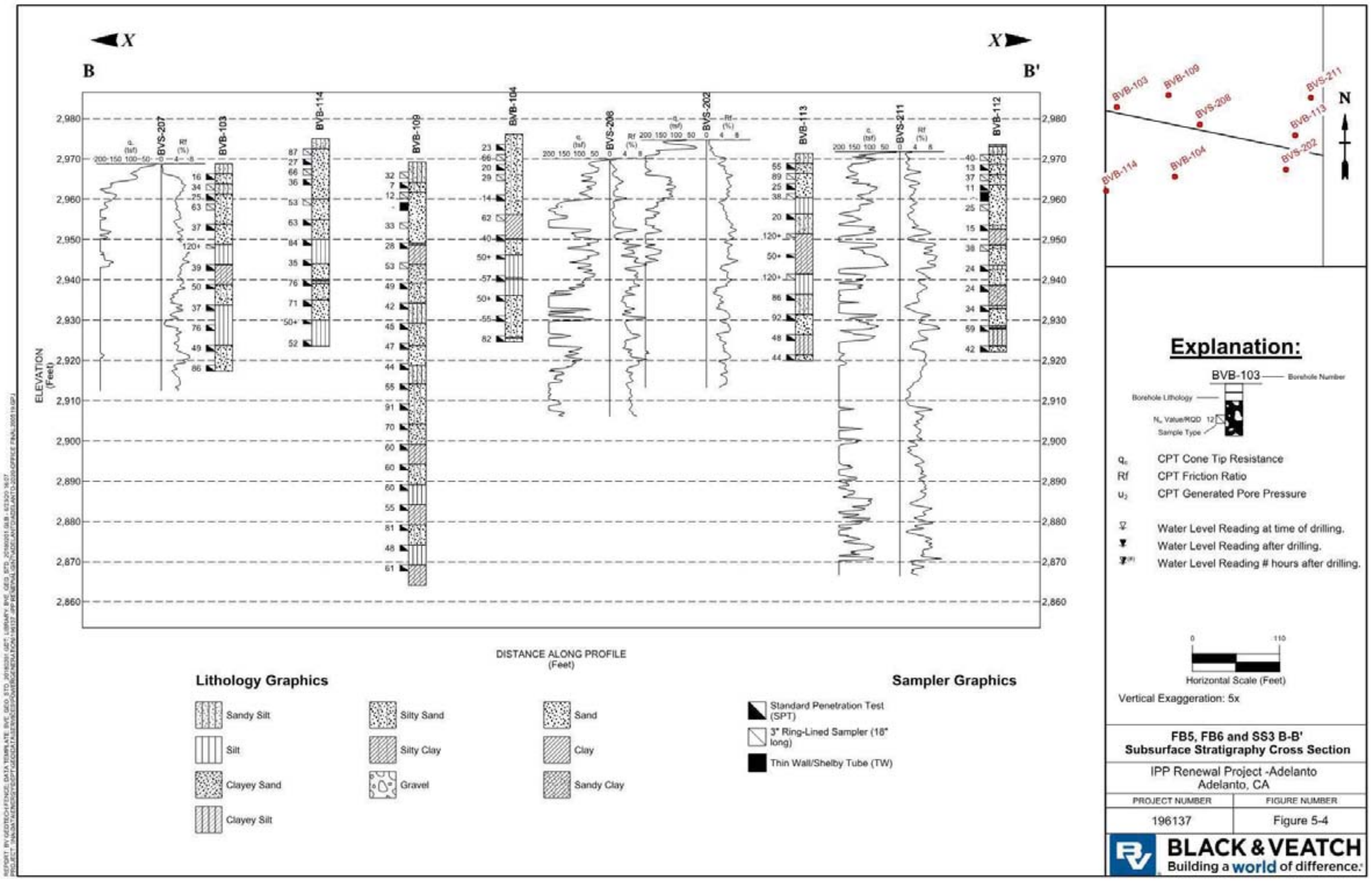


Figure 5-4 **Subsurface Stratigraphy Cross Section B-B' (See Figure 4-2 for location plan)**

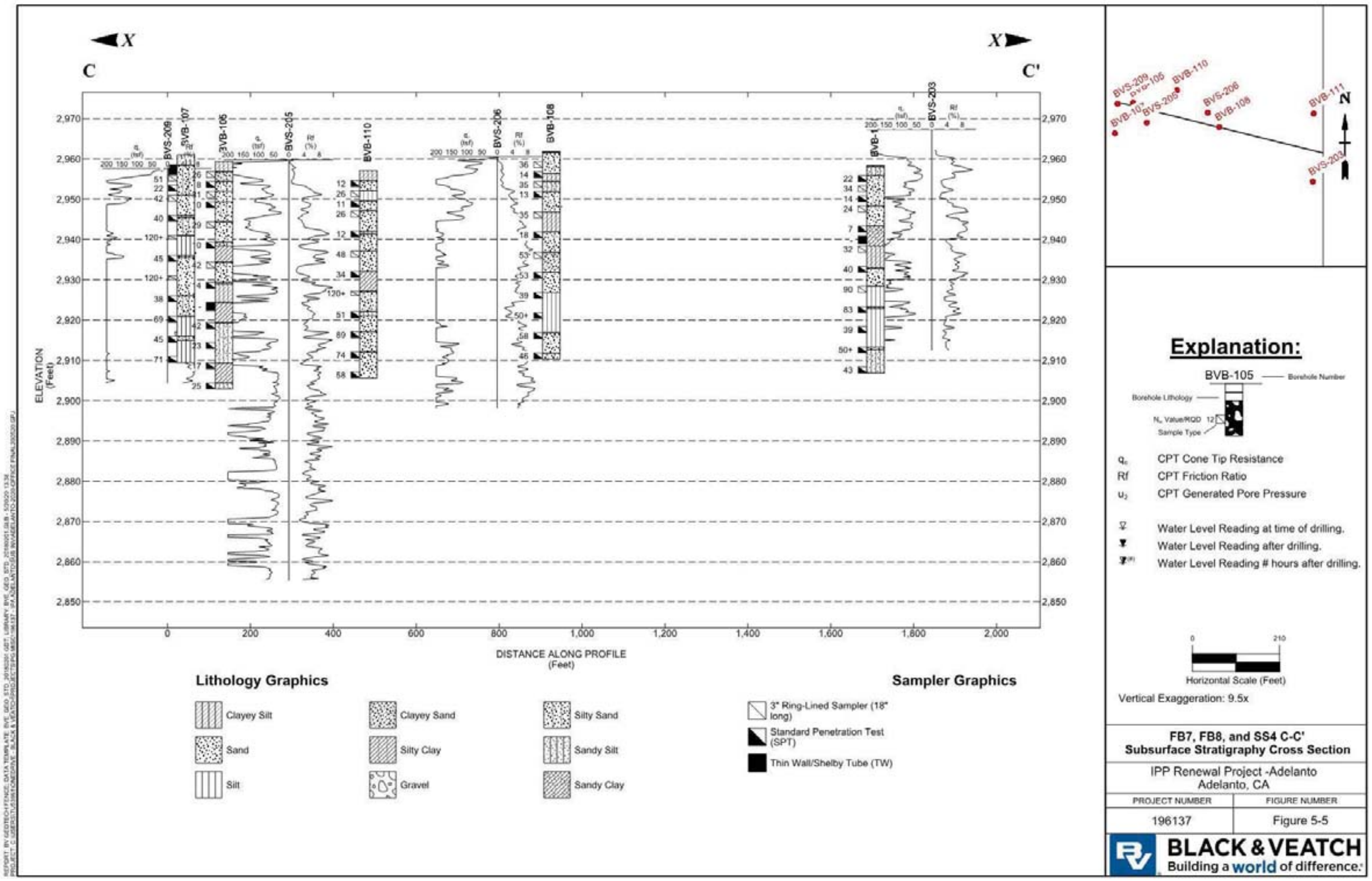


Figure 5-5 Subsurface Stratigraphy Cross Section C-C' (See Figure 4-2 for location plan)

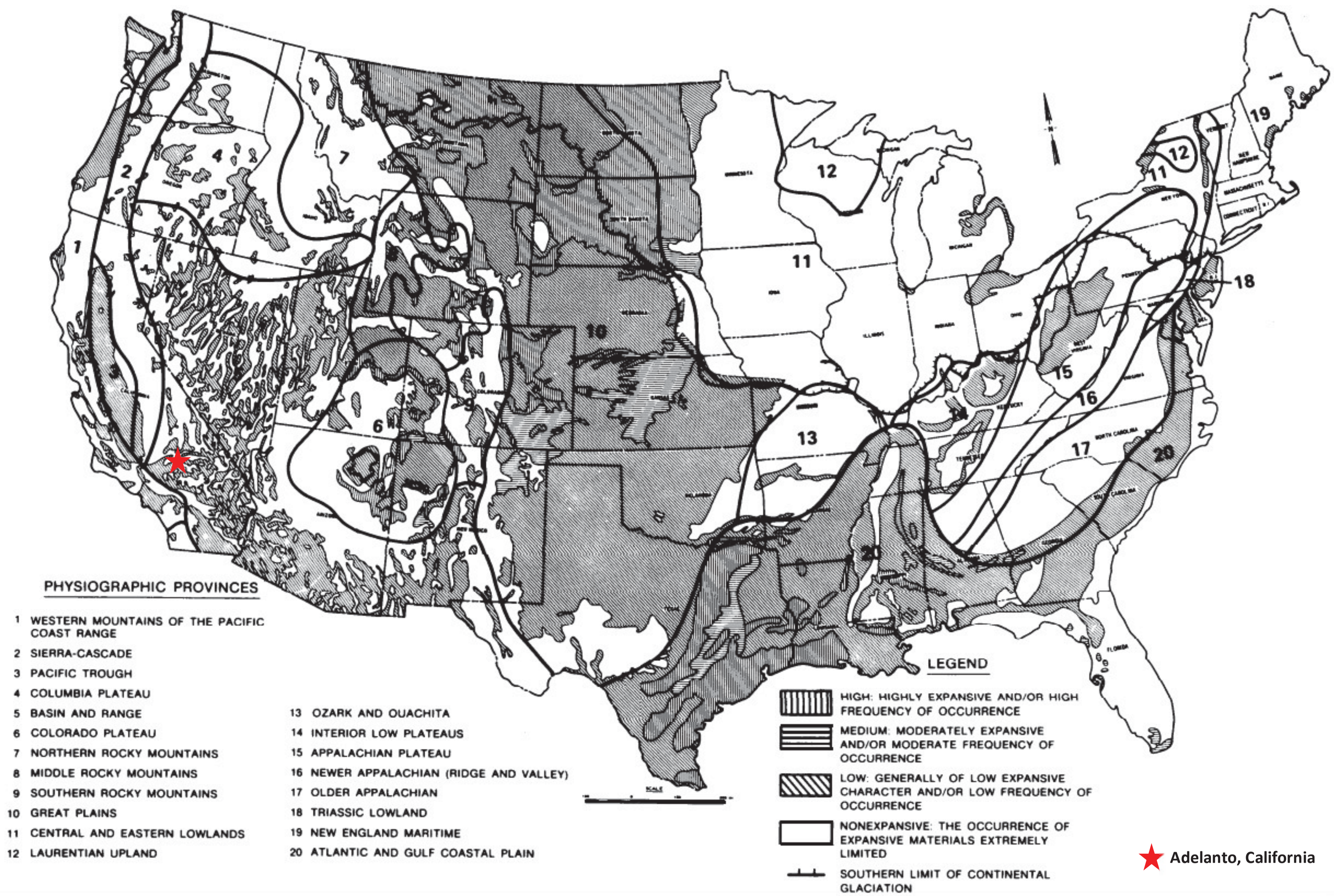


Figure 5-6 **Expansive Soil Assessment Hazard Map (Reference 6)**

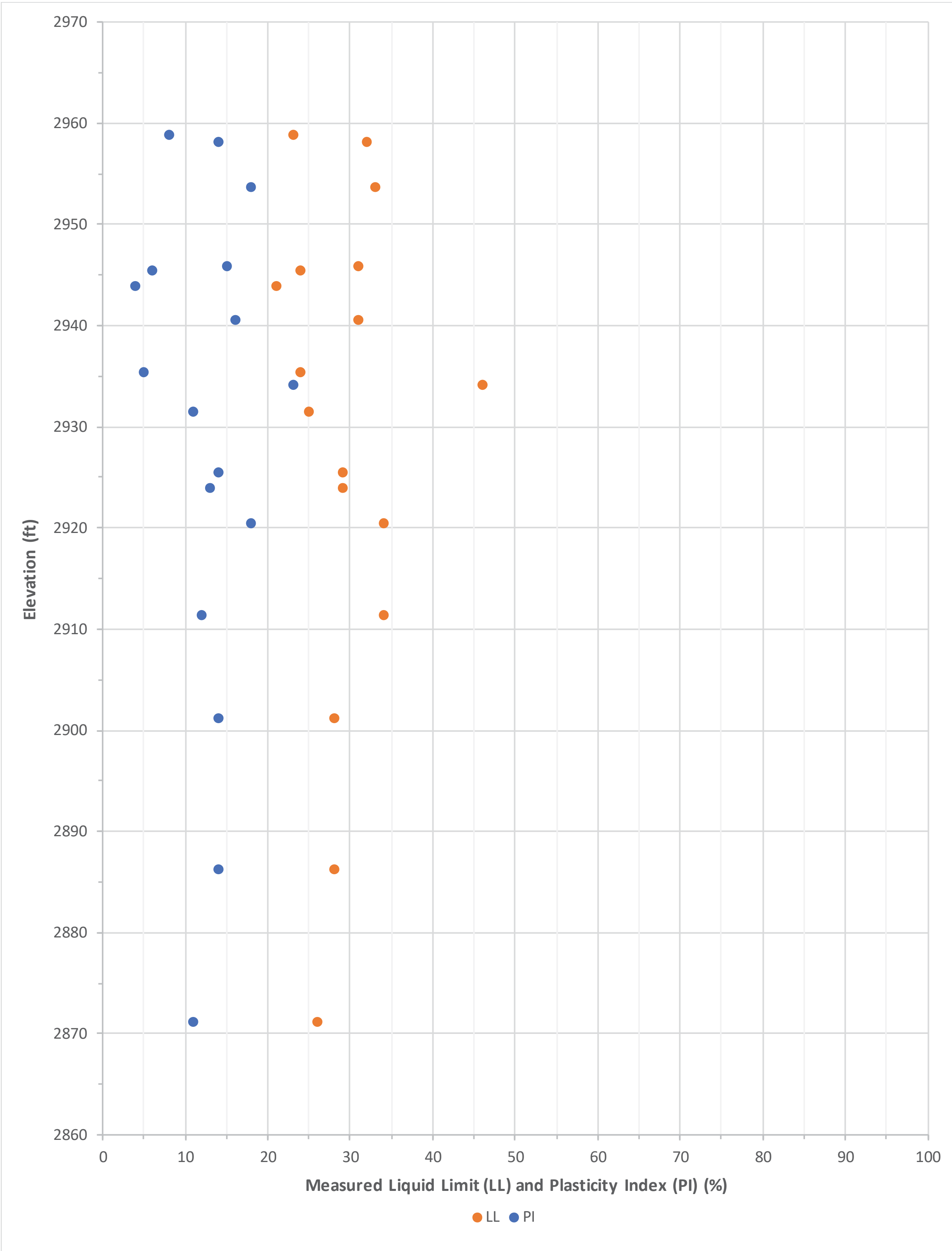


Figure 5-7 Measured Liquid Limit and Plasticity Index versus Sample Elevation (NGVD29)

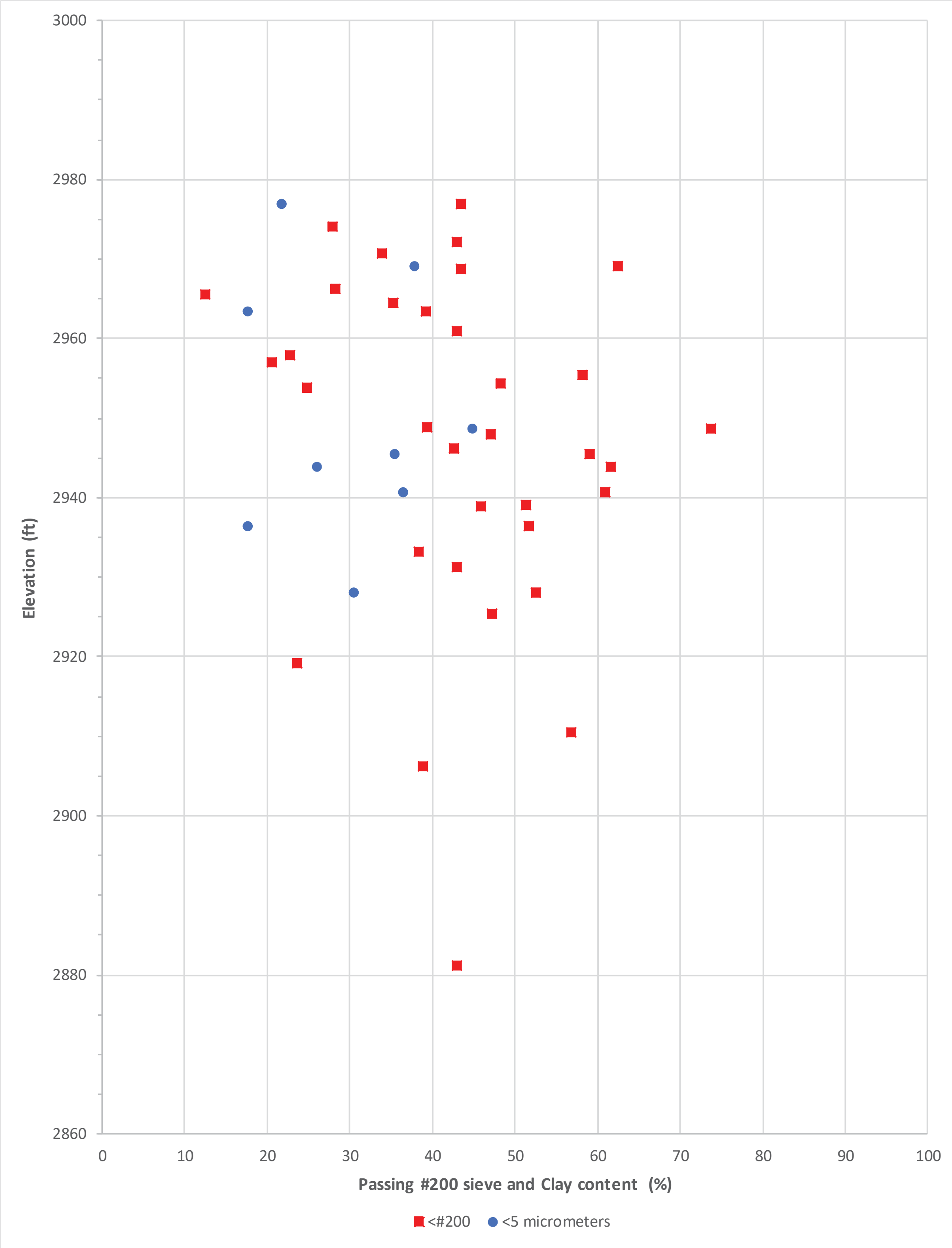


Figure 5-8 **Measured Percent Passing No. 200 Sieve and Particle Size Less than 5 Micrometers in Size versus Sample Elevation (NGVD29)**

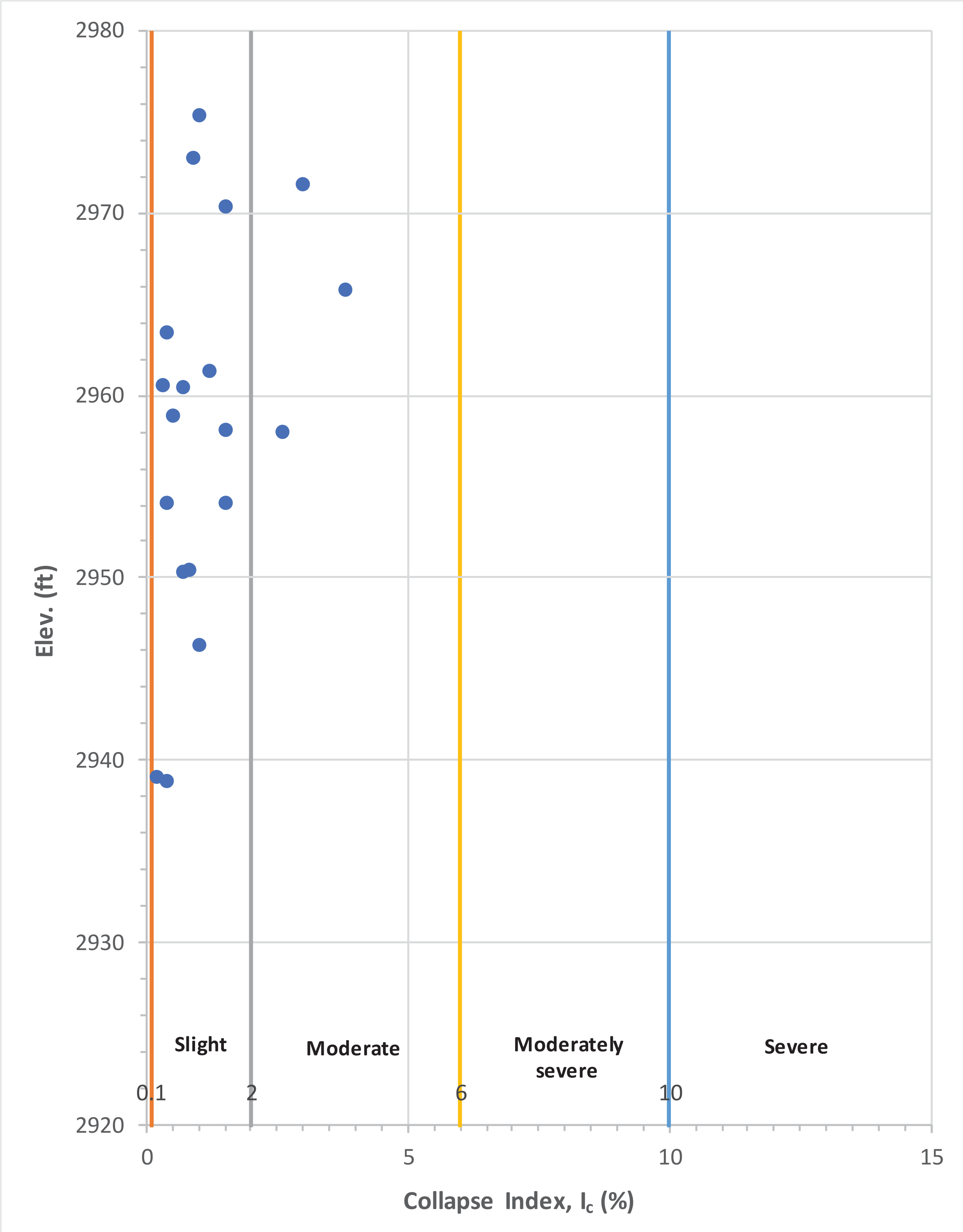


Figure 5-9 **Measured Collapse Index in Accordance with ASTM D5333 versus Sample Elevation (NGVD29)**

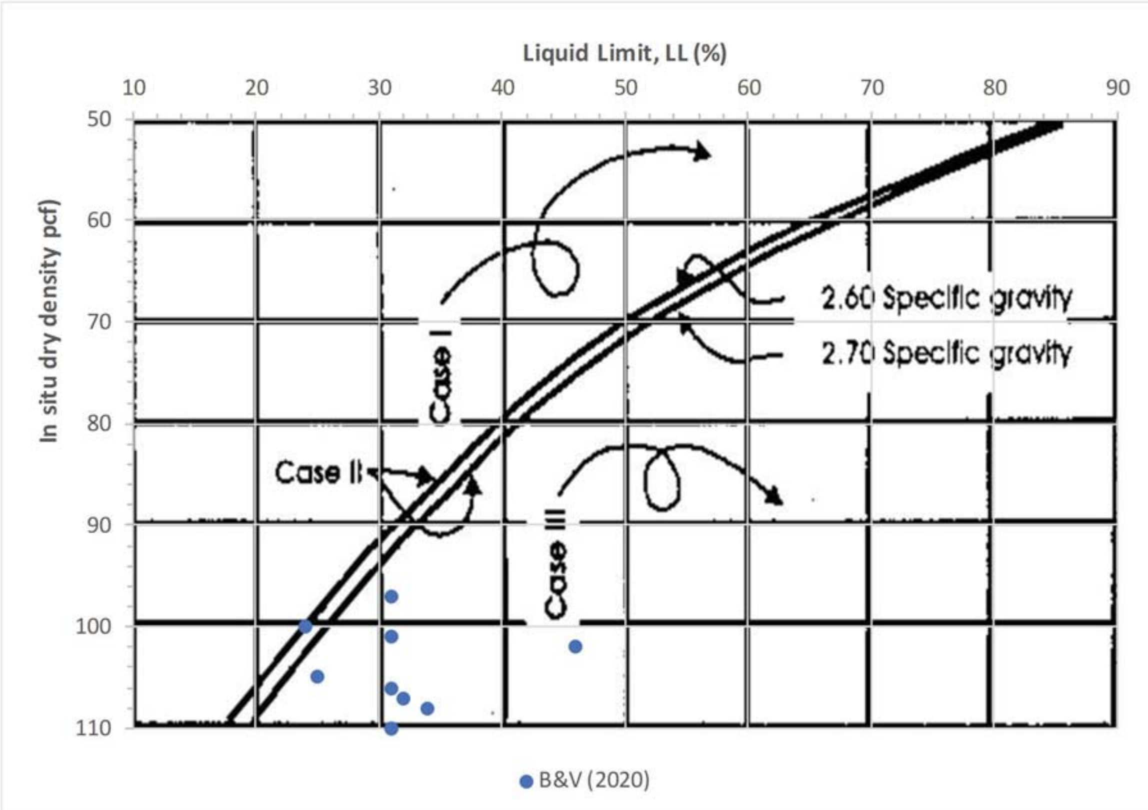


Figure 5-10 Evaluation of Collapse Potential per USBR Earth Manual Criterion (Reference 7)

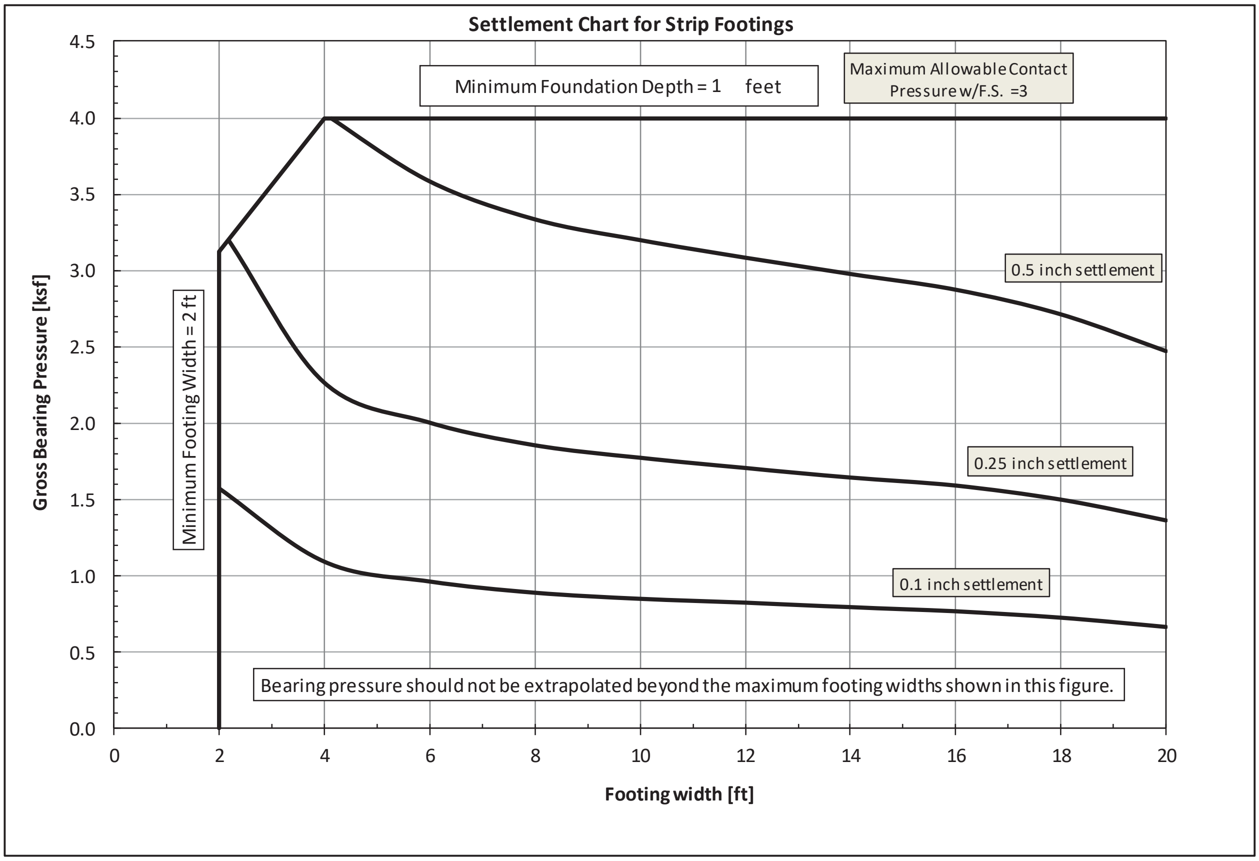


Figure 6-1 Shallow Foundation Settlement Chart– Strip Footings

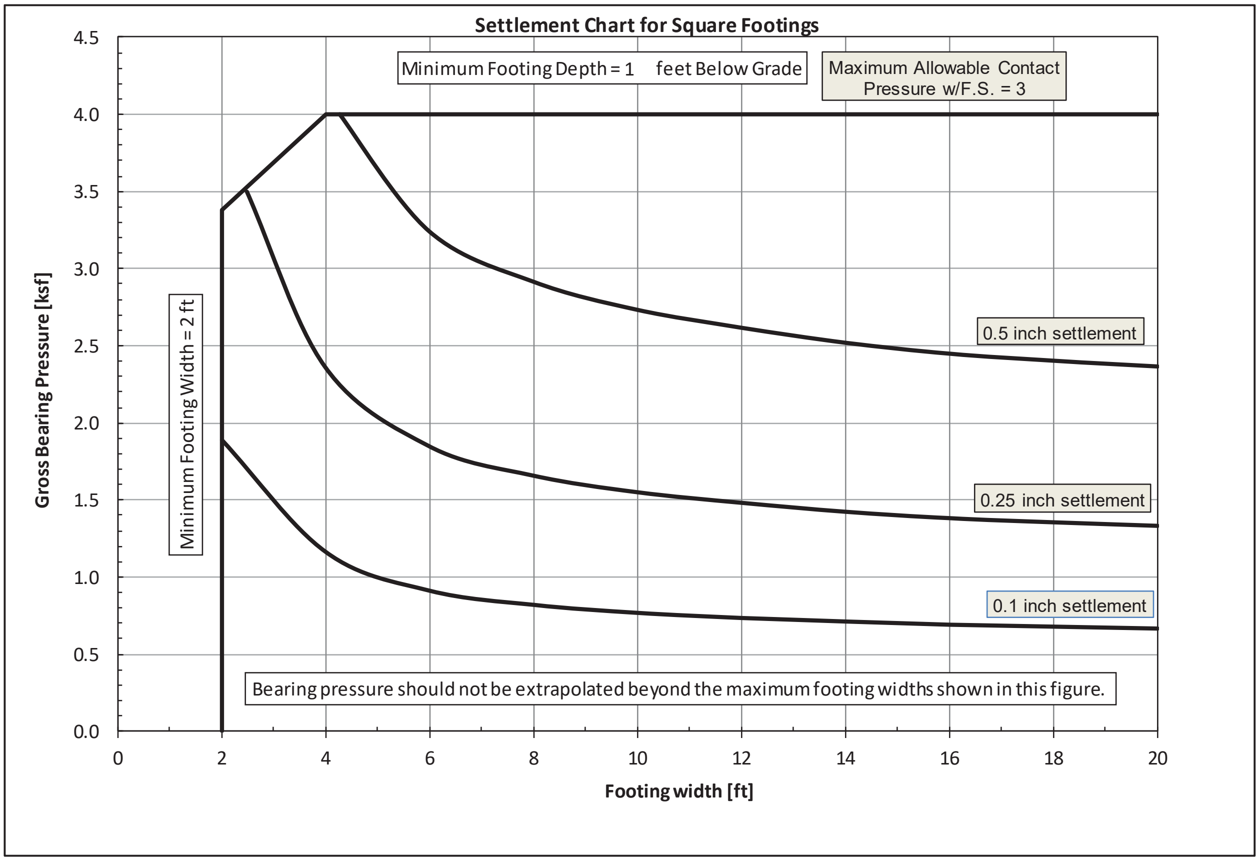
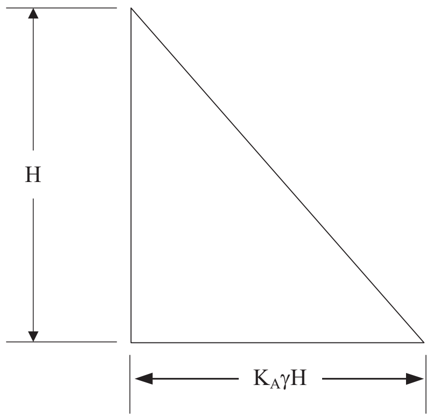
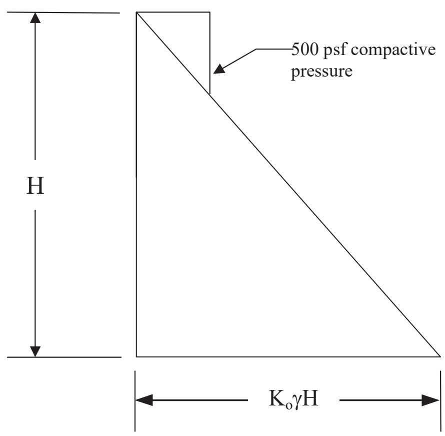


Figure 6-2 Shallow Foundation Settlement Chart– Square Footings

YIELDING WALLS



NON-YIELDING WALLS



NOTES:

1. Surcharge loads (psf) add to static effect and rectangular pressure diagram of K_oS for non-yielding walls of K_AS for yielding walls.
2. The subsurface profile varies across the site.
3. Seismic loads:
   For yielding walls add seismic load equal to : $\Delta P_{AE} = \frac{1}{2}\, \Delta K_{AE}\gamma H^2$ applied at 0.6 H above the base of the wall

   For non-yielding walls add seismic load equal to: $\Delta P_{EQ} = a_h\gamma H^2$ applied at 0.63 H above base of the wall

LEGEND:

H	total depth of wall
h	depth below grade
γ	moist unit weight
K_A	coefficient of active earth pressure
K_P	coefficient of passive earth pressure
K_o	coefficient of at-rest earth pressure
ΔP_{AE}	seismic incremental load yielding walls
ΔK_{AE}	seismic incremental active earth pressure coefficient yielding walls
ΔK_{PE}	seismic incremental passive earth pressure coefficient yielding walls
ΔP_{EQ}	seismic incremental load non-yielding walls
a_h	peak ground acceleration

	Material Properties						
Material	γ (pcf)	K_A	K_P	K_o	ΔK_{AE}	ΔK_{PE}	a_h
Engineered Fill[1]	125	0.271	3.69	0.426	0.136	0.386	0.363

Note:
1. The native excavated materials can be used as backfill for the wall compacted in accordance with the general fill requirements in Table 7-2.

Figure 6-3 Lateral Earth Pressures

Appendix A. Boring and Test Pit Logs 2020 Geotechnical Investigation

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LEGEND & KEY TO SYMBOLS
SOIL SAMPLES & TESTING

CLIENT The Intermountain Power Agency (IPA)

PROJECT NAME IPP Renewal Project -Adelanto

PROJECT NUMBER 196137

PROJECT LOCATION Adelanto, CA

STRATIGRAPHY SYMBOLS

- Clay
- Silty Clay
- Gravel
- Silt
- Clayey Silt
- Sandy Silt
- Sand
- Clayey Sand
- Silty Sand

SOIL SAMPLER SYMBOLS

- 3" Ring-Lined Sampler (18" long)
- Standard Penetration Test (SPT)
- Thin Wall/Shelby Tube (TW)

IN SITU TEST SYMBOLS

SOIL MODIFIERS

Main (e.g., SAND)	Primary constituent by percent weight
Adjective (e.g., Silty)	20+ percent by weight (but not main constituent)
Some	10 to 20 percent by weight
Trace	5 to 10 percent by weight

PARTICLE SIZES

Boulders	9+ inches in diameter
Cobbles	3 to 9 inches in diameter
Gravel	0.25 to 3 inches in diameter
Coarse	0.75 to 3 inches in diameter
Fine	0.25 to 0.75 inches in diameter
Sand	0.0029 to 0.25 inches in diameter
Coarse	0.08 to 0.25 inches in diameter
Medium	0.017 to 0.08 inches in diameter
Fine	0.0029 to 0.017 inches in diameter
Silt	<0.0029 inches in diameter, low to nonplastic, cohesionless when dry
Clay	<0.0029 inches in diameter, cohesion and plasticity at all moisture contents

STRATIFICATION & FREQUENCY TERMS

Parting	< 1/8 inches thick
Seam	1/8 to 3 inches thick
Layer	> 3 inches thick
Pocket	Small erratic deposits less than 12 inches thick
Laminated	Alternating partings or seams of different soil types thinner than 0.25 inches
Stratified	Alternating partings or seams of different soil types thicker than 0.25 inches
Interlayered	Layers of soil lying between or alternating with other layers of soil
Intermixed	Random mixture of soil types
Occasional	One per 6 inches or more of sample thickness
Frequent	More than one per 6 inches of sample thickness

ADDITIONAL ABBREVIATIONS & SYMBOLS

Date Started	Date boring was started
Date Finished	Date boring backfilled or completed as piezometer/well
SPT	Standard Penetration Test
TW	Thin Walled Sample
CA	California Sample (3 inch split spoon sampler)
PP	Pocket penetrometer reading (tsf)
TV	Torvane reading (tsf)
N_m Value	Measured number of blows required to drive a standard split spoon sampler 12 inches with a 140-pound weight falling 30 inches
- - - - - - -	Approximate or gradational change in material classification
@	At
w/	With
&	And
WOR	Weight of rods
WOH	Weight of hammer
I.D.	Inside diameter
O.D.	Outside diameter
N/A	Not applicable
N/R	Not recorded
———	Change in material classification observed in sample

∇	Water Level at Time Drilling
▼	Water Level at End of Drilling
▼	Water Level After 24 Hours, or as Shown
LL	Liquid limit
PI	Plasticity Index
W	Moisture content (%)
DD	Dry unit weight (pcf)
NP	Nonplastic
Fines	Percent passing a No. 200 sieve

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BORING NO. BVB-101
SHEET 1 OF 2

BORING LOG

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2021870.2 E 6733121.8	2977.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; uneven surface	02/26/2020	02/26/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING / CORING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	RQD
SPT	1	3	6	7	13	-
CA	2	8	15	23	38	-
SPT	3	8	30	13	43	-
CA	4	16	30	38	68	-
SPT	5	5	10	11	21	-
CA	6	14	34	50	84	-
SPT	7	15	39	50	89	-

(Coring columns: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD; SAMPLE RECOVERY)

DEPT (FEET)	LASSIFI ATION OF MATERIALS
0 – 2.5	Silty SAND light reddish tan; dry; fine grained; poorly graded
2.5 – 7.5	Clayey SAND light grayish brown; medium dense; dry; fine grained; poorly graded; w/some silt grading light reddish-brown; very stiff
7.5 – 10.0	Silty SAND light gray; dense; dry; fine grained; poorly graded
10.0 – 11.0	SILT; light gray; hard; dry; non plastic
11.0 – 20.0	Silty SAND light gray; medium dense; dry; fine grained poorly graded
20.0 – 25.0	SILT; light tan; hard dry; low plasticity; micaceous
25.0 – 30.0	Silty SAND light brown; very dense; dry; fine grained; poorly graded @26.0' grading light gray

Depth ticks: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
ELEV. (FEET): 2976, 2974, 2972, 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948

REMARKS

Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.

Unless identified as Fill, soil origin is considered native.
Sample recoveries not recorded; however, most were close to full recovery.

BLACK & VEATCH
Building a world of difference.

BORING LOG

BORING NO. BVB-101
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2021870.2 E 6733121.8	2977.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; uneven surface	02/26/2020	02/26/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
CA	8	23	50/6"	-	50	-	30		Sandy SILT; light grayish brown; hard; dry; non plastic (to 30.7)	
							30.7		Silty SAND light gray; very dense; dry; fine grained; poorly graded	
SPT	9	10	18	23	41	-	35	2942	grading light reddish-brown; dense (to 36.0)	
							36.0		SILT; light gray; hard; dry; non plastic; w/trace cemented sand fragments <1/4" diameter	
SPT	10	22	50/6"	-	50+	-	40.0		Silty SAND light brown; very dense; dry; fine grained; poorly graded	
SPT	11	9	17	20	37	-	45.0		SILT; light gray; hard; dry; non plastic; micaceous	
SPT	12	11	21	37	58	-	50			
							51.5			Bottom of boring at 51.5' on 02/26/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/26/2020.

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale: 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918

BLACK & VEATCH
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BORING LOG

BORING NO. BVB-102
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022577.2 E 6731568.3	2978.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
op of berm; level s rface	03/03/2020	03/03/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
A tomatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	1	12	20	19	39	1.5
CA	2	30	29	26	55	1.5
SPT	3	7	11	11	22	0.2
CA	4	9	12	15	27	1.5
SPT	5	3	6	7	13	1.5
CA	6	6	11	18	29	1.5
SPT	7	7	12	16	28	1.5

DEPT (FEET) | SAMPLE | ELEV. (FEET) | GRAPHIC LOG | LASSIFI ATION OF MATERIALS | REMARKS

DEPTH (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0	2978	Sandy SILT; reddish brown; moist; low plasticity (Fill)	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5	2976	Silty SAND dark reddish brown; dense; moist; fine to medium grained; poorly graded; angular; w/trace fine gravel-sized angular fragments	Unless identified as Fill, soil origin is considered native.
	2974	grading medium dense	
7.5	2970	Silty CLAY; light gray; very stiff; dry; high plasticity	
10.0	2968	SILT; light gray; very stiff; dry; low plasticity	
15.0	2962	Silty SAND light gray; medium dense; dry; fine grained poorly graded subangular	
25.0	2954	Sandy SILT; light gray; very stiff; dry; low plasticity	

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale: 2978, 2976, 2974, 2972, 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950

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BORING LOG

BORING NO. BVB-102
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022577.2 E 6731568.3	2978.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
op of berm; level s rface	03/03/2020	03/03/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
A tomatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE | SAMPLE NUMBER | 1ST 6 INCHES | 2ND 6 INCHES | 3RD 6 INCHES | N_m VALUE | SAMPLE RECOVERY

CORING: CORE SIZE | RUN NUMBER | RUN LENGTH | RUN RECOVERY | RQD RECOVERY | PERCENT RECOVERY | RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
CA	8	7	15	22	37	1.5	30	2948		
SPT	9	11	17	22	39	1.5	35.0		Silty SAND light greenish gray; dense; dry; fine grained; poorly graded subangular	
							35.5		SILT; light greenish tan hard dry; low plasticity	
SPT	10	29	39	44	83	1.5	40.0		Sandy SILT; light reddish tan; hard dry; non plastic	
							40.5		SILT; light reddish tan; hard dry; non plastic	
SPT	11	17	22	23	45	1.5	45.0		Silty CLAY; light greenish tan hard dry; high plasticity	
							46.0		SAND light brownish tan; dense; dry; fine grained; poorly graded; subangular	
SPT	12	14	23	32	55	1.5			grading very dense	
							51.3		Silty SAND light gray; very dense; dry; fine grained; poorly graded subangular	Bottom of boring at 51.5' on 03/03/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 03/03/2020.

Depth scale (ft): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale (ft): 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920

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BORING LOG

BORING NO. BVB-103
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022991.0 E 6729600.4	2968.80 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; sloping surface	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	1	4	7	9	16	1.3
CA	2	7	14	20	34	1.5
SPT	3		12	13	25	1.5
CA	4	11	25	38	63	1.5
SPT	5	10	17	20	37	1.3
CA		22	50/5"	-	120+	0.9
SPT	7	10	16	23	39	1.5

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS
0 – 2.5		Sandy SILT; reddish brown; moist; low plasticity
2.5 – 5.0		Silty SAND light reddish brown; medium dense; moist; fine grained; poorly graded
5.0 – 7.5		Sandy SILT; light reddish brown; very stiff; moist; non plastic @6.0' grading light gray; blocky
7.5 – 15.0		Silty SAND light grayish brown; medium dense; dry; fine grained; poorly graded; w/some clay grading light tan
15.0 – 20.0		SAND light grayish tan; dense; dry; fine grained; poorly graded
20.0 – 25.0		SILT; light grayish tan; hard; dry; non plastic; micaceous
25.0 – 30.0		Silty CLAY; light grayish tan; hard; dry; low plasticity

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (feet): 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940

REMARKS

Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.

Unless identified as Fill, soil origin is considered native.

REPORT: BV ENERGY BORING; DATA TEMPLATE: BVE_GEO_S_D_20180201.GDT; LIBRARY: BVE_GEO_S_D_20180201.GLB - 6/4/20 11:40
PROJECT: \\NA\DATA\ENERGY\DEPT\GEO\DATA\SERVICES\POWERGENERATION\19 137 -IPP RENEWAL\GIN \ADELANTO\ADELAN O-2020-OFFICE FINAL200519.GPJ

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BORING LOG

BORING NO. BVB-103
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022991.0 E 6729600.4	2968.80 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; sloping surface	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	8	16	50/6"	-	50	0.8	30	Silty SAND light reddish brown; very dense; dry; fine grained; w/trace weakly cemented fragments	
							35.0	SILT; light tan; hard dry; low plasticity; micaceous	
SPT	9	9	16	21	37	1.5	35.5		
SPT	10	12	32	44	76	1.3	40.5	grading light gray	
SPT	11	19	22	27	49	1.5	45.0	Silty SAND light reddish brown; dense; dry; fine grained poorly graded	
SPT	12	24	43	43	86	1.5	50.5	grading light gray very dense	
							51.5		Bottom of boring at 51.5' on 02/27/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/27/2020.

Depth scale (feet): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale (feet): 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912, 2910

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BORING LOG

BORING NO. BVB-104
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, A	N 2022669.2 E 6729869.3	2976.10 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped level surface adjacent to solar panel field	02/26/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
							0	2976	Silty SAND light reddish tan; moist; fine grained; poorly graded	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger. Unless identified as Fill, soil origin is considered native.
							2	2974		
SPT	1	6	11	12	23	1.5			grading light reddish-brown; medium dense; moist; w/trace fine gravel-sized fragments	
							4	2972		
CA	2	16	31	35	66	1.5			grading dark reddish brown; sub-angular	
							6	2970		
SPT	3	6	11	9	20	1.5	8	2968	grading light reddish-tan; fine gravel-sized fragments grade out	
CA	4	7	12	17	29	1.5	10	2966	grading light gray dry	
							12	2964		
							14	2962		
SPT	5	4	5	9	14	1.5	16	2960		
							18	2958		
CA	6	9	21	41	62	1.5	20	2956	20.0 CLAY; light grayish brown; very stiff; dry; low plasticity	
							22	2954		
							24	2952		
SPT	7	10	18	22	40	1.5	26	2950	26.0 Silty SAND light gray; dense; dry; fine grained; poorly graded	
							28	2948		
									30.0	

REPORT: BV ENERGY BORING; DATA TEMPLATE: BVE_GEO_STD_20180201.GDT; LIBRARY: BVE_GEO_STD_20180201.GLB - 6/4/20 11:40
PROJECT: \\NA\DATA\ENERGY\ EPT\GEO\DATA\SERVICES\POWERGENERATION\196137 -IPP RENEWAL\GINT\A ELANTO\A ELANTO-2020-OFFI E FINAL200519.GPJ

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BORING LOG

BORING NO. BVB-104
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, A	N 2022669.2 E 6729869.3	2976.10 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped level surface adjacent to solar panel field	02/26/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75HT

HAMMER TYPE: Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	ELEV. (FEET)	CLASSIFICATION OF MATERIALS	REMARKS
SPT	8	21	50/5"	-	50+	0.6	30	2946	SILT; light gray; hard; dry; non plastic	
							35.5		grading micaceous	
							35.5–36.0		Sandy SILT; light gray; hard; dry; non plastic	
SPT	9	17	25	32	57	1.5	36.0		SILT; light grayish brown; hard; dry; non plastic; w/trace <1/4" diameter angular mineral fragments	
SPT	10	16	44	50/5"	50+	1.5	40.0		Silty SAND light grayish brown; very dense; dry; fine grained; poorly graded	
SPT	11	15	22	33	55	1.5			grading w/trace <1/4" diameter cemented sand fragments	
SPT	12	13	37	45	82	1.2	50.5		SAND light gray; very dense; dry; fine grained; poorly graded	
							51.5			Bottom of boring at 51.5' on 02/27/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/27/2020.

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale: 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918

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BORING NO. BVB-105
SHEET 1 OF 2

BORING LOG

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024146.3 E 6729745.8	2959.40 ft	56.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	02/28/2020	02/28/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	LASSIFI ATION OF MATERIALS
							0	Clayey SILT; reddish brown; moist; low plasticity (Fill)
CA	1	8	9	17	26	1.5	2.5	Clayey SAND; light reddish brown; loose; moist; fine grained; poorly graded; subangular
SPT	2	5	5	3	8	1.3	5.0	Silty SAND; light reddish tan; loose; moist; fine grained; poorly graded; subangular
CA	3	11	13	18	31	0.3	7.5	SAND; light reddish tan; medium dense; moist; fine grained; poorly graded; subangular
SPT	4	4	5	5	10	1.5	10.0	Silty SAND; reddish brown; loose; moist; ine grained; poorly graded; subangular
CA	5	2	11	18	29	1.5	15.0	SAND; light reddish brown; medium dense; dry; fine grained; poorly graded; subangular
SPT	6	2	5	5	10	1.5	20.0	Silty SAND; light brown; loose; dry; fine grained; poorly graded; subangular
							21.0	Silty CLAY; light grayish brown; stif ; moist; high plasticity
CA	7	6	17	25	42	1.5	25.0	Sandy SILT; light grayish brown; very stiff; moist; micaceous, w/some clay
							30.0	

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (feet): 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930

REMARKS

Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.

Unless identified as Fill, soil origin is considered native.

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BORING LOG

BORING NO. BVB-105
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024146.3 E 6729745.8	2959.40 ft	56.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	02/28/2020	02/28/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	8	3	6	8	14	1.5
TW	9	-	-	-	-	-
SPT	10	4	16	26	42	1.5
SPT	11	6	9	14	23	1.5
SPT	12	4	6	11	17	1.5
SPT	13	6	11	14	25	1.5

DEPT (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
30	Silty CLAY; reddish brown; stif ; moist; high plasticity	
30.5	Clayey SILT; reddish brown; stif ; moist; low plasticity	
35.0	Silty CLAY; reddish brown; moist; low plasticity	Shelby tube sampler damaged; collected grab sample of contents
40.0	Sandy SILT; light grayish brown; hard; moist; low plasticity	
	grading very stiff; micaceous	
50.0	Silty CLAY; light grayish brown; very stiff; moist; low plasticity	
55.0	Sandy SILT; light grayish brown; very stiff; moist; low plasticity	
56.5		Bottom of boring at 56.5' on 02/28/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/28/2020.

DEPTH (FEET) scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
ELEV. (FEET) scale: 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912, 2910, 2908, 2906, 2904, 2902, 2900

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BORING LOG

BORING NO. BVB-106
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022883.6 E 6732206.0	2977.10 ft	51.3 ft

SURFA E CONDITIONS	START DATE	END DATE
op of berm; level surface	03/03/2020	03/03/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE: Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	34	75/6"	-	75	0.8
SPT	2	18	27	31	58	1.5
CA	3	13	20	25	45	1.5
SPT	4	10	13	11	24	1.5
CA	5	10	12	14	26	1.3
SPT	6	4	5	7	12	1.5
TW	7	-	-	-	-	2.0
CA	8	12	17	30	47	1.5

DEPT (FEET): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
ELEV. (FEET): 2976, 2974, 2972, 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948

DEPTH	LASSIFI ATION OF MATERIALS
0	Sandy SILT; reddish brown; moist (Fill)
	grading very dense
3.2	Silty SAND light brown; very dense; moist; poorly graded angular
	grading fine to medium grained; dry
	grading light reddish-brown; medium dense; trace fine gravel
10.0	Sandy CLAY; light grayish tan; very stif dry; low plasticity; w/some silt
15.5	Silty SAND light gray; loose; dry; fine grained; poorly graded; angular
20.0	SAND light grayish tan; medium dense; dry; fine grained poorly graded subangular
	grading light grayish brown

REMARKS

Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.

Unless identified as Fill, soil origin is considered native.
CA-1: Sampler terminated on coarse gravel fragment.

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BORING NO. BVB-106
SHEET 2 OF 2

BORING LOG

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022883.6 E 6732206.0	2977.10 ft	51.3 ft

SURFA E CONDITIONS	START DATE	END DATE
op of berm; level surface	03/03/2020	03/03/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	9	8	22	33	55	1.3
SPT	10	9	13	19	32	1.5
SPT	11	25	40	36	76	1.0
SPT	12	9	35	40	75	1.5
SPT	13	17	34	50/3"	50+	1.0

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
30		grading light tan; very dense	
31.0	2946	Clayey SILT; light grayish tan; hard; dry; high plasticity	
35.0	2942	SAND light grayish tan; dense; dry; fine grained; poorly graded; subangular	
40.0	2937	Sandy SILT; light grayish tan; hard; dry; low plasticity	
45.0	2932	Silty SAND light reddish tan; very dense; dry; fine grained; poorly graded; subangular	
45.5		Silty CLAY; light grayish tan; hard; dry; high plasticity	
51.3	2926		Bottom of boring at 51.3' on 03/03/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 03/03/2020.

Depth scale (feet): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale (feet): 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918

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BORING LOG

BORING NO. BVB-107
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023878.3 E 6729585.2	2961.00 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; uneven surface	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
TW	1	-	-	-	-	-
CA	2	13	25	26	51	1.5
SPT	3	9	11	11	22	1.5
CA	4	10	17	25	42	1.5
SPT	5	11	19	21	40	1.5
CA	6	23	50/5"	-	50+	0.9
SPT	7	16	21	24	45	1.5

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0		Clayey SILT; reddish brown; moist; low plasticity	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger. Unless identified as Fill, soil origin is considered native. Shelby tube sampler damaged; collected grab sample of contents
2.5		Silty SAND; light reddish brown; moist; poorly graded; subangular	
		grading tan; medium dense; fine to coarse grained; well graded; subangular	
		grading fine grained; poorly graded	
10.0		SAND; light grayish tan; medium dense; dry; fine grained; poorly graded; subangular	
15.0		SILT; light grayish tan; hard; dry; non plastic	
15.5		Silty SAND; light reddish tan; dense; dry; poorly graded; subangular	
20.0		SILT; light reddish tan; hard; dry; non plastic	
25.0		Clayey SAND; light grayish brown; dense; dry; fine grained; poorly graded; subrounded	
25.5		SAND; light tan; dense; dry; fine grained; poorly graded; subrounded	

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (feet): 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932

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BORING LOG

BORING NO. BVB-107
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023878.3 E 6729585.2	2961.00 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; uneven surface	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE / SAMPLE NUMBER / 1ST 6 INCHES / 2ND 6 INCHES / 3RD 6 INCHES / N_m VALUE / SAMPLE RECOVERY
CORING: CORE SIZE / RUN NUMBER / RUN LENGTH / RUN RECOVERY / RQD RECOVERY / PERCENT RECOVERY / RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPTH (FEET)	ELEV. (FEET)	CLASSIFICATION OF MATERIALS	REMARKS
CA	8	18	50/6"	-	50+	1.0	30		grading very dense	
SPT	9	8	15	23	38	1.5	35.0	2926	Sandy SILT; light grayish tan; hard; dry; non plastic; w/some clay	
SPT	10	13	23	46	69	1.1	40.0		SILT; light grayish tan; hard; dry; non plastic; micaceous	
SPT	11	22	28	17	45	1.5	45.0	2916	Silty SAND; light reddish brown; dense; dry; fine to coarse grained; well graded; subangular	
							46.0		SILT; light gray; hard; dry; low plasticity; micaceous	
SPT	12	12	25	46	71	1.5	50		grading non-plastic	
							51.5			Bottom of boring at 51.5' on 02/27/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/27/2020.

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale: 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912, 2910, 2908, 2906, 2904, 2902

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BORING LOG

BORING NO. BVB-108
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023933.6 E 6730506.6	2961.90 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/02/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	8	20	16	36	1.5
SPT	2	5	7	7	14	1.5
CA	3	9	14	21	35	1.5
SPT	4	5	7	6	13	1.5
CA	5	5	11	24	35	1.5
SPT	6	3	7	11	18	1.5
CA	7	19	23	30	53	1.5

CORING: CORE SIZE | RUN NUMBER | RUN LENGTH | RUN RECOVERY | RQD RECOVERY | PERCENT RECOVERY | RQD

DEPT (FEET): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
ELEV. (FEET): 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934

LASSIFI ATION OF MATERIALS	Bottom depth
GRAVEL; light gray	0.3
Silty SAND; redd sh brown; moist; subangular grading medium dense	5.5
Clayey SILT; light grayish tan; stif ; moist; low plastic ty	7.5
Sandy SILT; light grayish tan; very stiff; moist; low plasticity	10.0
Silty SAND; light grayish tan; medium dense; moist; fine grained; poorly graded; subangular	15.0
Clayey SILT; light greenish brown; very stiff; moist; low plasticity	20.0
Sandy SILT; greenish brown; very stiff; moist; low plasticity; w/some clay	25.0
Clayey SAND; dark grayish brown; medium dense; moist; fine grained; poorly graded; angular	30.0

REMARKS

Bor ng advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.

Unless identif ed as Fill, soil origin is considered native.

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BORING LOG

BORING NO. BVB-108
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023933.6 E 6730506.6	2961.90 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/02/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	8	10	23	30	53	1.5	30		SAND; redd sh brown; very dense; dry; fine grained; poorly graded; subangular	
							32	2930		
							34	2928		
							35.0		SILT; light grayish tan; hard; dry; low plastic ty	
SPT	9	12	18	21	39	1.5	36	2926		
							38	2924		
							40	2922	grading light tan	
SPT	10	16	32	50/5"	50+	0.7				
							42	2920		
							44	2918		
							45.0		SAND; light grayish brown; very dense; dry; fine to coarse grained; poorly graded; subangular	
SPT	11	19	29	29	58	1.5	46	2916		
							48	2914		
							50.0	2912	Silty SAND; light grayish tan; dense; dry; fine grained; poorly graded; subangular	
SPT	12	11	19	27	46	1.5				
							52	2910		Bottom of boring at 51.5' on 03/02/2020. Boring dry @ completion. Boring back ed w/ cement-benton te grout on 03/02/2020.
							54	2908		
							56	2906		
							58	2904		

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BORING LOG

BORING NO. BVB-109
SHEET 1 OF 4

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023046.5 E 6729839.5	2969.20 ft	105.0 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/05/2020	

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
erracon	Diedrich D90

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	3	15	17	32	1.0
SPT	2	3	4	3	7	1.3
CA	3	4	5	7	12	1.5
TW	4	-	-	-	-	2.0
CA	5	9	13	20	33	1.2
SPT	6	7	14	14	28	1.0
CA	7	16	20	33	53	1.3

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0		Sandy SILT; reddish brown; moist; low plasticity	Boring advanced w/4-1/4" tricone roller bit using bentonite mud as drilling fluid. Unless identified as Fill, soil origin is considered native.
		grading light grayish-brown; very stiff	
5.0	2964	Silty SAND light reddish brown; loose; moist; fine grained; poorly graded; subangular	
7.5	2962	SAND dark reddish brown; loose; moist; fine grained; poorly graded subangular	
			Sample recovery not recorded
		grading light reddish brown; dry; medium dense	
20.0		SILT; light grayish brown; very stiff; moist; low plasticity; micaceous	
20.5		Silty CLAY; light greenish tan very stiff; moist; high plasticity	
25.3		Clayey SAND dark reddish brown; medium dense; moist; fine to medium grained; well graded; angular	
30.0			

Depth scale (ft): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (ft): 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940

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BORING LOG

BORING NO. BVB-109
SHEET 2 OF 4

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023046.5 E 6729839.5	2969.20 ft	105.0 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/05/2020	

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
erracon	Diedrich D90

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	8	27	20	29	49	1.2	30.0		Silty SAND light reddish brown; dense; dry; fine grained poorly graded subangular	
SPT	9	21	24	18	42	1.3	35.0		Sandy SILT; light brownish tan; hard dry; low plasticity	
SPT	10	14	22	23	45	1.3	40.0		Silty SAND light grayish brown; dense; moist; fine grained; poorly graded; subangular	
SPT	11	13	23	24	47	0.8	45.5		SAND light brown; dense; dry; fine grained; poorly graded; angular	
SPT	12	16	18	26	44	1.3	50.5		Sandy SILT; light greenish brown; hard; dry; low plasticity	
SPT	13	20	26	29	55	1.0	55.0		Silty SAND light greenish gray; very dense; dry; fine grained; poorly graded; subangular	

Depth scale (feet): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale (feet): 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912, 2910

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BORING LOG

BORING NO. BVB-109
SHEET 3 OF 4

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023046.5 E 6729839.5	2969.20 ft	105.0 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/05/2020	

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
erracon	Diedrich D90

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	14	43	49	42	91	1.3	60			
							62	2908		
							64	2906		
SPT	15	23	30	40	70	1.3	65.0	2904	Clayey SAND light greenish gray; very dense; dry; fine grained; poorly graded; angular	
							66, 68	2902, 2900		
SPT	16	15	25	35	60	1.3	70.0	2898	Silty CLAY; reddish brown; hard; moist; low plasticity; micaceous	
							72, 74	2896		
SPT	17	29	29	31	60	1.5	75.0	2894	Silty SAND light reddish tan; very dense; dry; fine grained; poorly graded; subangular	
							76, 78	2892, 2890		
SPT	18	17	25	35	60	1.5	80.0	2888	SILT; grayish brown; hard; dry; low plasticity; micaceous	
							82, 84	2886		
SPT	19	20	25	30	55	1.5	85.0	2884	Silty CLAY; grayish brown; hard; moist; low plasticity; micaceous	
							86, 88	2882, 2880		
							90.0			

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BORING LOG

BORING NO. BVB-109
SHEET 4 OF 4

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2023046.5 E 6729839.5	2969.20 ft	105.0 ft

SURFA E CONDITIONS	START DATE	END DATE
Graveled lot; level surface	03/05/2020	

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
erracon	Diedrich D90

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	20	24	38	43	81	1.3	90		Silty SAND light grayish brown; very dense; dry; fine grained; poorly graded; subangular	
							95.0			
SPT	21	14	20	28	48	1.5	95.0		SILT; light reddish brown; hard; dry; low plasticity; micaceous	
							100.0			
SPT	22	31	32	29	61	1.5	100.0		Silty CLAY; light reddish brown; hard; moist; low plasticity	
							105.0	2864		Bottom of boring at 105.0' on 03/05/2020. Water level not recorded. Boring reamed to 107' w/5-7/8" tricone roller bit using bentonite mud as drilling fluid. Set 3-inch OD threaded Sch. 80 PVC casing to 105' for downhole testing in accordance with ASTM Method D7400. Casing backfilled with cement bentonite grout on 4/29/20.

Depth scale: 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118
Elevation scale: 2878, 2876, 2874, 2872, 2870, 2868, 2866, 2864, 2862, 2860, 2858, 2856, 2854, 2852, 2850

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BORING LOG

BORING NO. BVB-110
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024258.0 E 6730132.1	2957.10 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	02/28/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	1	4	6	6	12	1.5
CA	2	8	12	14	26	1.5
SPT	3	4	5	6	11	1.5
CA	4	6	11	15	26	1.5
SPT	5	2	5	7	12	1.5
CA	6	10	21	27	48	1.5
SPT	7	8	14	20	34	1.5

DEPTH (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0		Clayey SILT; dark gray; moist; low plasticity (Fill)	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger. Unless identified as Fill, soil origin is considered native.
2.5		Silty SAND; tannish brown; medium dense; moist; fine grained; poorly graded; subangular	
5.0		SILT; light grayish brown; very stiff; moist; low plasticity	
7.5		Silty SAND; light brown; medium dense; dry; fine grained; poorly graded; subangular	
10.0		SAND; light brown; loose; dry; fine grained; poorly graded; subangular	
15.0		Sandy SILT; light brown; stiff; dry; non plastic	
15.8		Silty SAND; light brown; medium dense; dry; fine grained; poorly graded; subangular	
20.0		SAND; light brownish tan; medium dense; dry; fine grained; poorly graded; subangular	
25.0		Silty CLAY; tan; hard; dry; low plasticity	
30.0			

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale: 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928

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BORING LOG

BORING NO. BVB-110
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024258.0 E 6730132.1	2957.10 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	02/28/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLE TYPE / CORE SIZE	SAMPLE NUMBER / RUN NUMBER	1ST 6 INCHES / RUN LENGTH	2ND 6 INCHES / RUN RECOVERY	3RD 6 INCHES / RQD RECOVERY	N_m VALUE / PERCENT RECOVERY	SAMPLE RECOVERY / RQD	DEPTH (FEET)	ELEV. (FEET)	CLASSIFICATION OF MATERIALS	REMARKS
CA	8	15	50/6"	-	50	1.0	30		Silty SAND; light grayish tan; very dense; dry; fine grained; poorly graded; subangular	
SPT	9	20	27	24	51	1.5	35.0		Sandy SILT; light grayish tan; hard; dry; low plasticity	
							36.0		SAND; light grayish tan; very dense; dry; fine grained; poorly graded; subangular	
SPT	10	21	39	50	89	1.5	40.0		Silty SAND; light reddish tan; very dense; dry; fine grained; poorly graded; subangular	
SPT	11	17	36	38	74	1.5	45.0		SAND; reddish brown; very dense; dry; fine grained; poorly graded; subangular	
SPT	12	17	26	32	58	1.5	50		grading fine to coarse grained; well graded; angular	
							51.5			Bottom of oring at 51.5' on 03/02/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 03/02/2020.

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale: 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912, 2910, 2908, 2906, 2904, 2902, 2900, 2898

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BORING LOG

BORING NO. BVB-111
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024052.0 E 6731341.6	2958.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	03/02/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY	DEPT (FEET)	ELEV. (FEET)
SPT	1	6	10	12	22	1.5	2.5–4.0	
CA	2	6	17	17	34	1.5	5.0–6.5	
SPT	3	3	7	7	14	1.5	7.5–9.0	
CA	4	4	9	15	24	1.5	10.0–11.5	
SPT	5	2	3	4	7	1.2	15.0–16.5	
TW	6	-	-	-	-	2.0	18.0–20.0	
CA	7	8	13	19	32	1.2	20.0–21.5	
SPT	8	8	18	22	40	1.0	25.0–26.5	

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD

DEPT (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0.3	GRAVEL; light gray; dry (Fill)	Bor ng advan ed w/3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5	Sandy SILT; reddish brown; moist; low plastic ty (Fill)	Unless identif ed as Fill, soil origin is onsidered native.
10.0	Silty SAND; redd sh brown; medium dense; moist; fine to coarse grained; well graded; subangular; w/tra e fine gravel grading dark reddish brown grading light greenish tan; subrounded	
15.0	SAND; light grayish tan; loose; moist; fine grained; poorly graded; subrounded	
20.0	Sandy CLAY; reddish brown; firm; moist; low plasticity; w/some silt	
25.5	Clayey SILT; light grayish brown; very stiff; moist; low plasticity grading light tan; dry	
30.0	SAND; light tan; dense; dry; fine grained; poorly graded; subrounded	

Depth scale (ft): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (ft): 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930

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BORING LOG

BORING NO. BVB-111
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2024052.0 E 6731341.6	2958.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	03/02/2020	03/02/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLE TYPE / CORE SIZE	SAMPLE NUMBER / RUN NUMBER	1ST 6 INCHES / RUN LENGTH	2ND 6 INCHES / RUN RECOVERY	3RD 6 INCHES / RQD RECOVERY	N_m VALUE / PERCENT RECOVERY	SAMPLE RECOVERY / RQD	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
CA	9	14	38	52	90	1.5	30	2928	SILT; light brownish tan; hard; dry; low plastic ty; m caceous	
							35.0–35.5		Clayey SAND; light grayish tan; very dense; dry; fine grained; poorly graded; subangular	
SPT	10	16	33	50	83	1.0	35.5		SILT; light grayish tan; hard; dry; low plastic ty	
SPT	11	9	16	23	39	1.5	40	2918	grading micaceous	
							45.0–45.8		Silty SAND; light tan; very dense; dry; fine grained; poorly graded; subangular	
SPT	12	28	44	50/5"	50+	1.3	45.8		Sandy SILT; light tan; hard; dry; low plastic ty	
SPT	13	14	18	25	43	1.5	50	2908		
							51.5			Bottom of boring at 51.5' on 03/02/2020. Boring dry @ completion. Boring backfilled w/ cement-benton te grout on 03/02/2020.

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BORING LOG

BORING NO. BVB-112
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022836.3 E 6730572.6	2973.60 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	03/04/2020	03/04/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	5	17	23	40	1.5
SPT	2	3	6	7	13	1.5
CA	3	8	17	20	37	1.5
SPT	4	3	5	6	11	1.5
TW	5	-	-	-	-	2.0
CA	6	7	11	14	25	1.5
SPT	7	6	8	7	15	1.5
CA	8	6	13	25	38	1.5

CORING: CORE SIZE | RUN NUMBER | RUN LENGTH | RUN RECOVERY | RQD RECOVERY | PERCENT RECOVERY | RQD

DEPT (FEET) | SAMPLE | ELEV. (FEET) | GRAPHIC LOG

Depth (ft)	LASSIFI ATION OF MATERIALS	REMARKS
0.5	GRAVEL; light gray; dry (Fill)	Bor ng advan ed w/3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5	Sandy SILT; reddish brown; moist; low plastic ty (Fill)	Unless identif ed as Fill, soil origin is onsidered native.
5.0	Silty SAND; redd sh brown; medium dense; moist; fine to coarse grained; well graded; subangular; w/tra e fine gravel-sized fragments	
7.5	SAND; light brown; medium dense; moist; fine to coarse grained; well graded; angular	
10.0	Silty SAND; light brown; medium dense; moist; fine grained; poorly graded; subangular	
20.0	SAND; light tan; medium dense; moist; fine grained; poorly graded; subangular; w/some silt grading light brown; loose; dry	
21.0	Silty SAND; light grayish tan; medium dense; moist; fine grained; poorly graded; subangular	
25.0	Silty CLAY; light grayish tan; stiff; moist; high plasticity	
25.8	Silty SAND; light grayish brown; medium dense; dry; fine grained; poorly graded; subangular	
30.0	SAND; light grayish brown; medium dense; dry; fine to medium grained; well graded; angular	

Elevations: 2972, 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944

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BORING LOG

BORING NO. BVB-112
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022836.3 E 6730572.6	2973.60 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Gravel pad; level surface	03/04/2020	03/04/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Dr ing	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLE TYPE / CORE SIZE	SAMPLE NUMBER / RUN NUMBER	1ST 6 INCHES / RUN LENGTH	2ND 6 INCHES / RUN RECOVERY	3RD 6 INCHES / RQD RECOVERY	N_m VALUE / PERCENT RECOVERY	SAMPLE RECOVERY / RQD	DEPT (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	9	4	9	15	24	1.5	30.0–31.0	SILT; light reddish brown; very stiff; dry; low plasticity; m caceous	
							31.0–35.0	Silty SAND; light reddish brown; medium dense; dry; fine grained; poorly graded; subangular	
SPT	10	4	9	15	24	1.5	35.0–40.0	Sandy CLAY; light grayish tan; very stiff; moist; low plasticity; w/some silt	
SPT	11	7	14	20	34	1.2	40.0–40.8	SILT; light grayish tan; hard; dry; low plastic ty; micaceous	
							40.8–45.0	SAND; light grayish tan; dense; dry; fine grained; poorly graded; subangular	
SPT	12	6	19	40	59	1.5	45.0–45.5	Silty CLAY; light reddish brown; hard; dry; high plastic ty	
							45.5–45.8	SAND; light reddish brown; very dense; dry; fine to medium grained; well graded; angular	
							45.8–50.0	Clayey SILT; light reddish brown; hard; dry; low plasticity	
SPT	13	14	19	23	42	1.5	50.0–51.5	SAND; light grayish tan; dense; dry; fine grained; poorly graded; subangular	Bottom of boring at 51.5' on 03/04/2020. Boring dry @ completion. Boring backfilled w/ cement-benton te grout on 03/04/2020.

Elevation scale (ft): 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914

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BORING LOG

BORING NO. BVB-113
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022861.0 E 6730426.5	2971.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Level ground	03/04/2020	03/04/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE / SAMPLE NUMBER / 1ST 6 INCHES / 2ND 6 INCHES / 3RD 6 INCHES / N_m VALUE / SAMPLE RECOVERY

CORING: CORE SIZE / RUN NUMBER / RUN LENGTH / RUN RECOVERY / RQD RECOVERY / PERCENT RECOVERY / RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	1	8	23	32	55	1.5
CA	2	25	50	39	89	1.5
SPT	3	9	13	12	25	1.5
CA	4	8	16	22	38	1.5
SPT	5	5	10	10	20	1.3
CA	6	34	120/6"	-	120+	1.0
SPT	7	21	50/5"	-	50+	0.8

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0		Sandy SILT; reddish brown; moist; low plasticity (Fill)	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5		Clayey SAND dark reddish tan; very dense; dry; fine to coarse grained; well graded; subangular	Unless identified as Fill, soil origin is considered native.
5.0		SAND light reddish brown; dense; dry; fine to medium grained; well graded; angular	
		grading grayish tan; medium dense; fine grained	
11.0		SILT; light grayish tan; very stiff; dry; low plasticity	
15.0		Sandy SILT; light grayish tan; very stiff; dry; low plasticity	
20.0		Silty CLAY; light grayish tan; hard; dry; low plasticity	
		grading light greenish gray; high plasticity; w/some sand	
30.0			

Depth scale (ft): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale (ft): 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948, 2946, 2944, 2942

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BORING LOG

BORING NO. BVB-113
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022861.0 E 6730426.5	2971.40 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Level ground	03/04/2020	03/04/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE / SAMPLE NUMBER / 1ST 6 INCHES / 2ND 6 INCHES / 3RD 6 INCHES / N_m VALUE / SAMPLE RECOVERY

CORING: CORE SIZE / RUN NUMBER / RUN LENGTH / RUN RECOVERY / RQD RECOVERY / PERCENT RECOVERY / RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	8	24	50	120/5"	120+	1.2
SPT	9	15	36	50	86	1.3
SPT	10	20	42	50	92	1.5
SPT	11	12	18	30	48	1.5
SPT	12	11	19	25	44	1.5

DEPTH (FEET)	CLASSIFICATION OF MATERIALS	REMARKS
30.0	SILT; light reddish tan; hard dry; low plasticity; micaceous	
35.0	Sandy SILT; light grayish tan; hard; dry; non plastic; w/trace coarse sand; angular	
40.0	SAND light tan; very dense; dry; fine grained; poorly graded; subangular	
45.0	Clayey SILT; light grayish tan; hard; dry; low plasticity	
50.0	SAND light grayish tan; dense; dry; fine to coarse grained; well graded; angular	
51.5		Bottom of boring at 51.5' on 03/04/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 03/04/2020.

DEPT (FEET): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
ELEV. (FEET): 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916, 2914, 2912

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BORING LOG

BORING NO. BVB-114
SHEET 1 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022603.1 E 6729551.5	2975.00 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped level surface adjacent to solar panel field	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	20	40	47	87	1.5
SPT	2	10	13	14	27	0.9
CA	3	10	23	43	66	1.5
SPT	4	10	16	20	36	1.5
CA	5	8	18	35	53	1.5
SPT	6	18	26	37	63	1.5
SPT	7	16	37	47	84	0.8

DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
0	2975	Sandy SILT; reddish brown; moist; (Fill)	Boring advanced w 3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5	2972.5	Silty SAND reddish brown; dense; moist; fine grained poorly graded	Unless identified as Fill, soil origin is considered native.
		grading medium dense; w trace <1/8" diameter angular mineral fragments	
		grading light reddish-brown; angular mineral fragments grade out	
		grading light gray dense; dry	
15.0	2960	SAND light grayish brown; medium dense; dry; fine grained; poorly graded	
20.0	2955	Silty SAND light gray; very dense; dry; fine grained; poorly graded	
25.0	2950	SILT; light gray; hard; dry; non plastic	

REPORT: BV ENERGY BORING; DATA TEMPLATE: BVE_GEO_S_D_20180201.GDT; LIBRARY: BVE_GEO_S_D_20180201.GLB - 6/4 20 11:43
PROJECT: \\NA\DATA\ENERGY\DEPT\GEO\DATA\SERVICES\POWERGENERATION\196137 -IPP RENEWAL\GIN \ADELANTO\ADELAN O-2020-OFFICE FINAL200519.GPJ

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BORING LOG

BORING NO. BVB-114
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
he Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022603.1 E 6729551.5	2975.00 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped level surface adjacent to solar panel field	02/27/2020	02/27/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75H

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
SPT	8	11	16	19	35	1.5
SPT	9	18	32	44	76	1.2
SPT	10	16	28	43	71	1.5
SPT	11	36	50/5"	-	50+	0.8
SPT	12	12	20	32	52	1.5

DEPTH (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
31.0	2944	SAND light gray; dense; dry; fine grained; poorly graded	
35.0	2940	Silty SAND light gray; very dense; dry; fine grained; poorly graded	
35.3		SILT; light gray; hard; dry; non plastic	
35.9		Silty SAND light gray; very dense; dry; fine grained; poorly graded	
40.0		SAND light grayish brown; very dense; dry; fine to coarse grained; well graded	
45.0	2930	SILT; light brownish gray; hard; dry; non plastic; micaceous	
51.5			Bottom of boring at 51.5' on 02/27/2020. Boring dry @ completion. Boring backfilled w cement-bentonite grout on 02/27/2020.

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58
Elevation scale: 2944, 2942, 2940, 2938, 2936, 2934, 2932, 2930, 2928, 2926, 2924, 2922, 2920, 2918, 2916

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BORING NO. BVB-115
SHEET 1 OF 2

BORING LOG

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022214.4 E 6731401.0	2976.80 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; une en surface	02/26/2020	02/26/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING

SAMPLE TYPE	SAMPLE NUMBER	1ST 6 INCHES	2ND 6 INCHES	3RD 6 INCHES	N_m VALUE	SAMPLE RECOVERY
CA	1	10	11	19	30	-
SPT	2	9	12	13	25	-
CA	3	7	13	22	35	-
SPT	4	10	18	18	36	-
CA	5	5	13	25	38	-
SPT	6	6	14	20	34	-
SPT	7	6	10	11	21	-

CORING

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD

DEPT (FEET) | SAMPLE | ELEV. (FEET) | GRAPHIC LOG

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28
Elevation scale: 2976, 2974, 2972, 2970, 2968, 2966, 2964, 2962, 2960, 2958, 2956, 2954, 2952, 2950, 2948

LASSIFI ATION OF MATERIALS	REMARKS
Silty SAND light tan; moist; fine grained; poorly graded	Boring advanced w/3-1/4" I.D.; 8" O.D. hollow stem auger.
2.5	Unless identified as Fill, soil origin is considered native.
Clayey SAND light reddish brown; medium dense; moist; fine grained; poorly graded	Sample recoveries not recorded; however, most were close to full recovery.
5.0	
Silty SAND light gray; medium dense; moist; fine grained poorly graded	
7.5	
SAND light brown; medium dense; dry; fine grained; poorly graded	
8.0	
Silty SAND light grayish brown; medium dense; dry; fine grained; poorly graded	
grading dense	
grading medium dense	
20.0	
Silty CLAY; light gray; hard; dry; low plasticity; micaceous	
25.0	
Clayey SILT; light tannish brown; very stiff; dry; low plasticity	
30.0	

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BORING LOG

BORING NO. BVB-115
SHEET 2 OF 2

CLIENT	PROJECT	PROJECT NO.
The Intermountain Power Agency (IPA)	IPP Renewal Project -Adelanto	196137

PROJE T LO ATION	OORDINATES (State Plane NAD83)	GROUND ELEVATION (NGVD29)	TOTAL DEPT
Adelanto, CA	N 2022214.4 E 6731401.0	2976.80 ft	51.5 ft

SURFA E CONDITIONS	START DATE	END DATE
Undeveloped area; une en surface	02/26/2020	02/26/2020

LOGGED BY	CHECKED BY	APPROVED BY
C. Wallace	A. Blanco	B. Christensen

DRILLING ONTRACTOR	DRILL RIG
Martini Drilling	CME75HT

HAMMER TYPE
Automatic hammer (140 lbs) using 30" drop

SAMPLING: SAMPLE TYPE, SAMPLE NUMBER, 1ST 6 INCHES, 2ND 6 INCHES, 3RD 6 INCHES, N_m VALUE, SAMPLE RECOVERY
CORING: CORE SIZE, RUN NUMBER, RUN LENGTH, RUN RECOVERY, RQD RECOVERY, PERCENT RECOVERY, RQD

CORE SIZE	RUN NUMBER	RUN LENGTH	RUN RECOVERY	RQD RECOVERY	PERCENT RECOVERY	RQD	DEPT (FEET)	ELEV. (FEET)	LASSIFI ATION OF MATERIALS	REMARKS
SPT	8	17	45	45	90	-	30	2946	Silty SAND light grayish brown; very dense; dry; fine grained; poorly graded (to 31.0)	
							31.0–32		SAND light grayish brown; very dense; dry; fine grained; poorly graded w/trace <1/4" diameter angular mineral fragments (to 35.0)	
TW	9	-	-	-	-	-	33	2944		TW-9 sampler damaged
							34	2942		
SPT	10	20	42	50/4"	50+	-	35.0–36	2940	SILT; light gray; hard; dry; non plastic; micaceous (to 40.0)	
							38	2938		
SPT	11	20	22	32	54	-	40.0	2936	Silty SAND light grayish tan; very dense; dry; fine grained; poorly graded (to 45.0)	
							42–44	2934, 2932		
SPT	12	22	36	50/5"	50+	-	45.0–46	2930	SAND light grayish tan; very dense; dry; fine grained; poorly graded	
							48	2928		
SPT	13	12	20	23	43	-	50	2926	grading dense; fine to coarse grained; w/trace fine gravel fragments	
							51.5			Bottom of boring at 51.5' on 02/26/2020. Boring dry @ completion. Boring backfilled w/ cement-bentonite grout on 02/26/2020.
							52–58	2924, 2922, 2920, 2918		

REPORT: BV ENERGY BORING; DATA TEMPLATE: BVE_GEO_STD_20180201.GDT; LIBRARY: BVE_GEO_STD_20180201.GLB - 6/4/20 11:43
PROJECT: \\NA\DATA\ENERGY\ EPT\GEO\DATA\SERVICES\POWERGENERATION\196137 -IPP RENEWAL\GINTA ELANTO\A ELANTO-2020-OFFICE FINAL200519.GPJ

TES P LOG NO. BV -301

PROJEC : IPP Renewal Project - Adelanto

CLIENT: Black & Veatch Corporation
Overland Park, KS

SI E: 16800 Aster Road
Adelanto, CA

LOCATION See Exploration Plan

Latitude: 34.550073° Longitude: -1 7 441461°

DEPTH	Description	DEPTH (Ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (tsf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.1	**GRAVEL**, 1.5" thickness											
	SIL Y SAND (SM), black with clay, light brown			Grab					6		NP	20
		5		Grab					5			
	tan and light brown	10										
12.0	***Test Pit Terminated at 12 Feet***											

Stratification lines are appro imate. In-situ, the transition may be gradual.

Advancement Method:
Backhoe

Abandonment Method:
Backfilled with trench cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for e planation of symbols and abbreviations.

Notes:

WA ER LEVEL OBSERVA ONS

Groundwater not observed

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

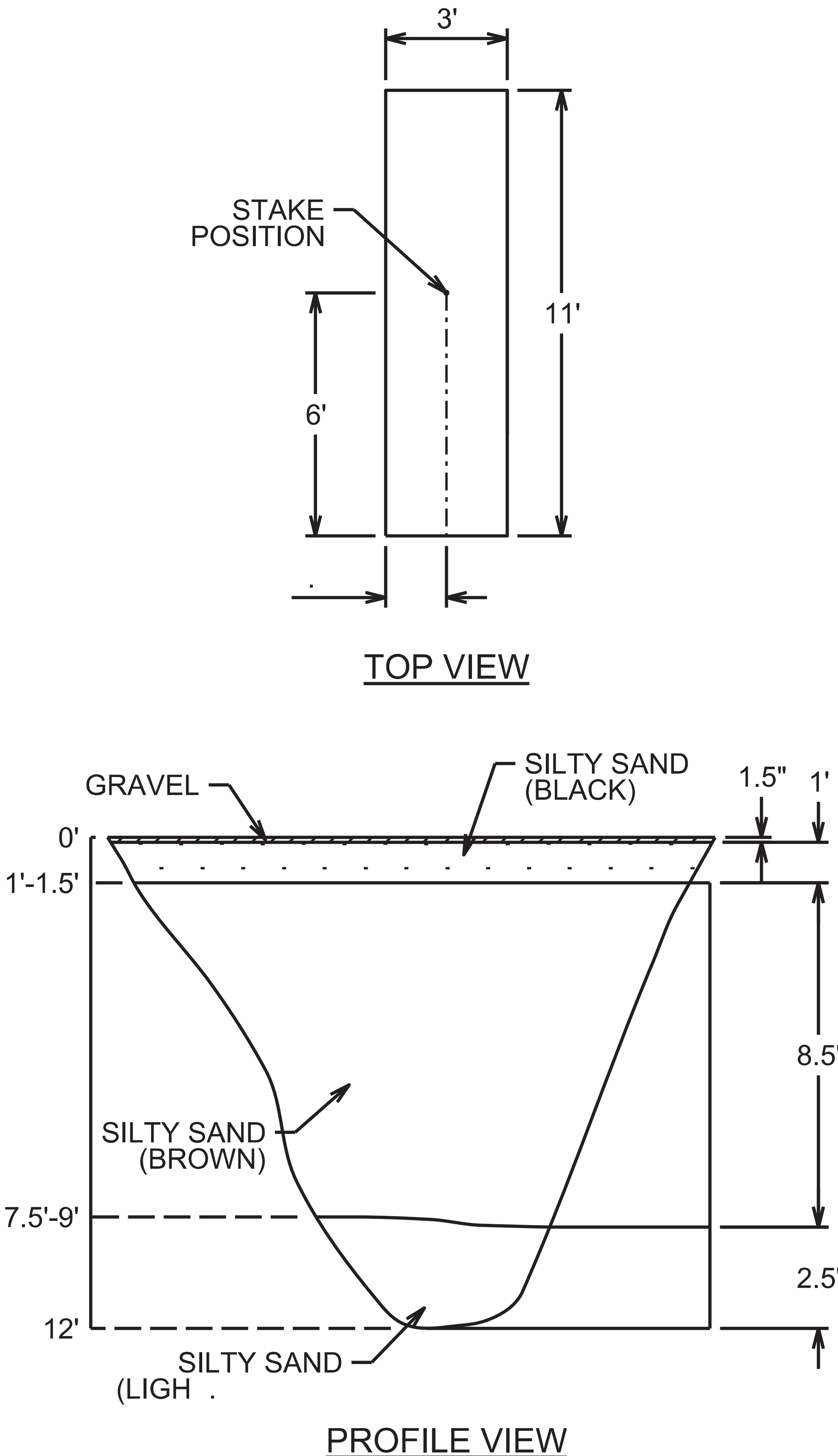
Test Pit Started:

Test Pit Completed:

Excavator:

Operator: LADWP

Project No.: 60205007



NORTH NOT TO SCALE	60205007 05/28/20 RCH JAE ile Nam BVT-301	Consul ing En ineers and S ien ists 600 SW 7TH STREET DES MOINES, IOWA 50309 FA	BVT-301 ADELANTO IPP RENEWAL BLACK & VEATCH COR .	EXHIBIT 1

IME SYSTEMDATE USERNAME DGNSPEC

TES P LOG NO. BV -302

PROJEC : IPP Renewal Project - Adelanto

**CLIENT: Black & Veatch Corporation
Overland Park, KS**

**SI E: 16800 Aster Road
Adelanto, CA**

LOCATION See Exploration Plan

Latitude: 34.549722° Longitude: -1 7 440326°

GRAPHIC LOG	DEPTH	DEPTH (Ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (tsf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SIL Y SAND (SM), brown											
				Grab (hand)					9		NP	13
	with clay	5		Grab (hand)								
	gray and olive green											
		10										
	12.0											
	Test Pit Terminated at 12 Feet											

Stratification lines are appro imate. In-situ, the transition may be gradual.

Advancement Method:
Backhoe

Abandonment Method:
Backfilled with trench cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for e planation of symbols and abbreviations.

Notes:

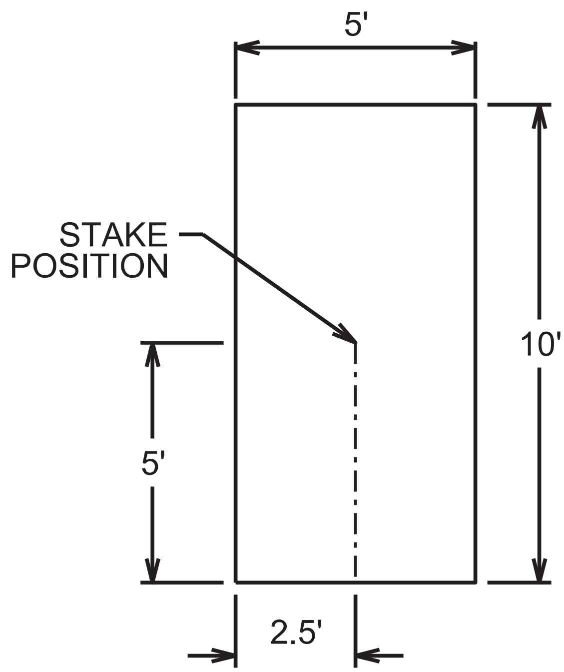
WA ER LEVEL OBSERVA ONS

Groundwater not observed

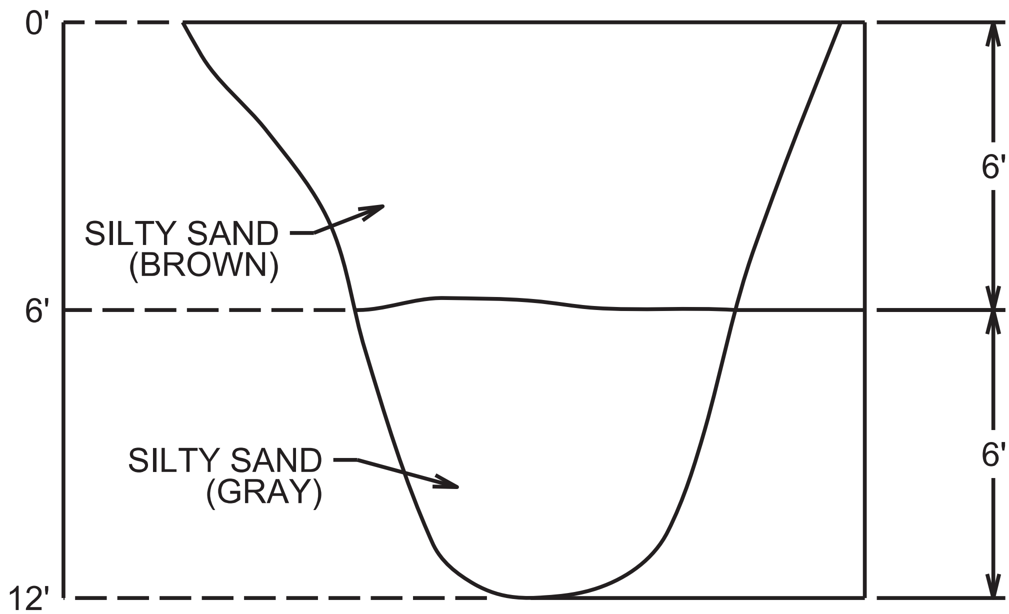
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Test Pit Started:	Test Pit Completed:
Excavator:	Operator: LADWP
Project No.: 60205007	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 5/21/20



TOP VIEW



PROFILE VIEW

DGNSPEC
USERNAME
SYSTEMDATE
SYSTEMTIME

NORTH NOT TO SCALE	60205007 Date: 05/28/20 RCH JAE ile Nam BV -	Consul ing En ineers and S ien ists 600 SW 7TH STREET DES MOINES, IOWA 50309 FA	BV - ADELANTO IPP RENEWAL BLACK & VEATCH COR . KANSAS	IBIT 2

TES P LOG NO. BV -303

PROJEC : IPP Renewal Project - Adelanto

CLIENT: Black & Veatch Corporation Overland Park, KS

SI E: 16800 Aster Road Adelanto, CA

LOCATION See Exploration Plan

Latitude: 34.552847° Longitude: -1 7 436574°

DEPTH	Description	DEPTH (Ft)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST: TEST TYPE	STRENGTH TEST: COMPRESSIVE STRENGTH (tsf)	STRENGTH TEST: STRAIN (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0.3	**GRAVEL**, 4" thickness											
	SIL Y SAND (SM), brown			Grab					8		NP	23
6.0		5		Grab					9			
.5	**SIL Y CLAYEY SAND (SC-SM)**, gray	10										

Test Pit Terminated at 11.5 Feet

Stratification lines are appro imate. In-situ, the transition may be gradual.

Advancement Method:
Backhoe

Abandonment Method:
Backfilled with trench cuttings upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for e planation of symbols and abbreviations.

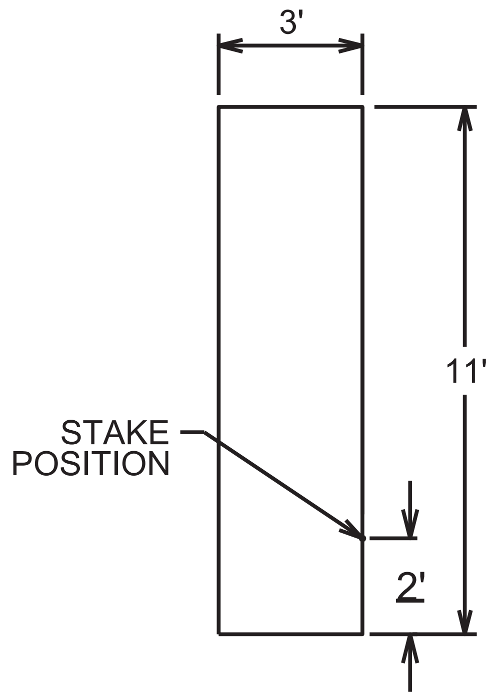
Notes:

WA ER LEVEL OBSERVA ONS

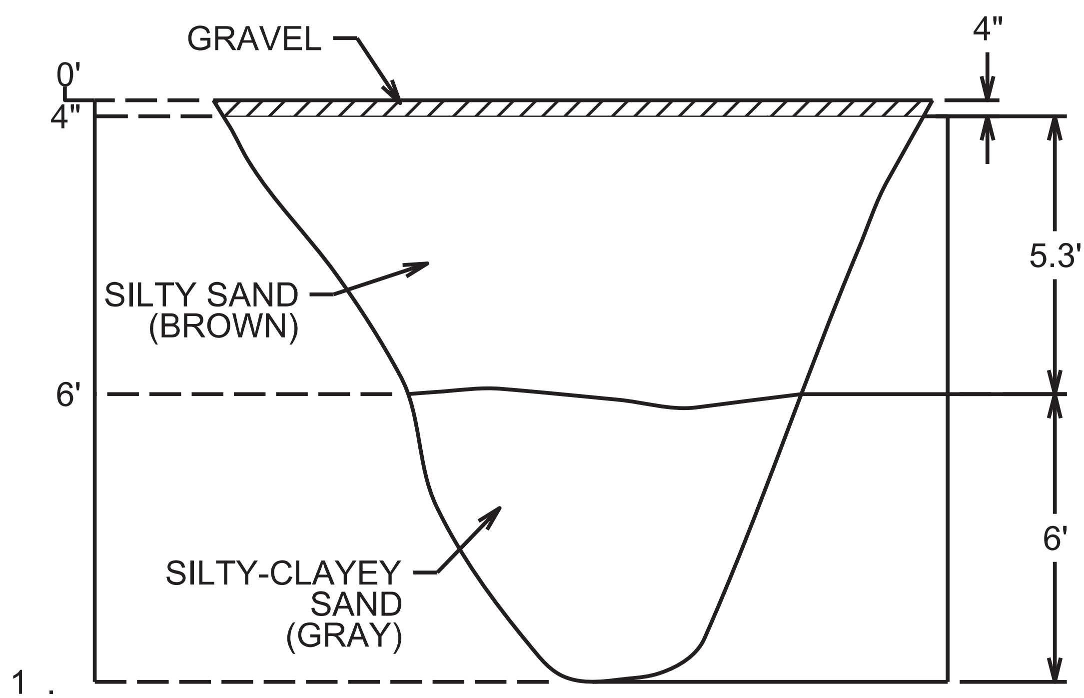
Groundwater not observed

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Test Pit Started:	Test Pit Completed:
Excavator:	Operator: LADWP
Project No.: 60205007	



TOP VIEW



PROFILE VIEW

DGNSPEC USERNAME SYSTEMDATE SYSTEMTIME

NORTH NOT TO SCALE	60205007 Date: 05/28/20 RCH JAE ile Nam BV -	Consul ing En ineers and S ien ists 600 SW 7TH STREET DES MOINES, IOWA 50309 FA	BVT-303 ADELANTO IPP RENEWAL BLACK & VEATCH COR . KANSAS	IBIT 3

Appendix B. Hammer Calibration 2020 Geotechnical Investigation

SPT CAL

SPT HAMMER ENERGY MEASUREMENTS

Prepared by;

SPT CAL
5512 Belem Dr
Chino Hills, CA 91709

909-730-2161
bc@sptcal.com

Martini Drilling Corp
15571 Chemical Ln.
Huntington Beach, CA 92649
714.715.2715

Project Title: HSA 2

Project Description: I-10 Ontario

Martini HSA 2 - Gene

Energy Transfer Ratio = 78.7% @ 56 blows per minute

Testing was performed on July 15, 2019 in Ontario, California

Hammer Energy Measurements performed in accordance to ASTM D4633 using an approved and calibrated SPT Analyzer from Pile Dynamics, Inc.

Depth	ETR%	BPM
5	78.2	52.7
10	75.4	54.7
15	79.0	55.3
20	77.0	55.8
25	79.7	56.7
30	76.5	57.0
35	80.9	56.9
40	79.9	57.2
45	81.9	57.5
Average	**78.7**	**56.0**

Thank you very much. It was a pleasure to work with you and your drill crews.Sincerely yours,

Brian Serl
Calibration Engineer
SPTCAL.COM

PRESENTATION OF SPT ANALYZER TEST DATA

1. Introduction

This report presents the results of SPT Hammer Energy Measurements recorded with an SPT Analyzer from Pile Dynamics carried out on July 15, 2019 in Ontario, California

52. Field Equipment and Procedures

The drill used was Martini Drilling's HSA 2. It has an attached SPT Automatic Hammer manufactured by Central Mine Equipment Company.

The CME Auto Hammer uses a 140 lb. weight dropped 30" on to an anvil above the bore hole. AWJ drill rod connects the anvil to a split spoon type soil sampler inside an 8" o.d. hollow stem auger at the designated sample depth. After a seeding blow the sampler is driven 18". The number of blows required to penetrate the last 12" is referred to as the "N value", which is related to soil strength.

The first recording was taken at 5' below ground surface and then every 5' to final recording at 45'.

3. Instrumentation

An SPT Analyzer from Pile Dynamics was used to record and the process the data. The raw data was stored directly in the SPT Analyzer computer with subsequent analysis in the office with PDA-W and PDIPlot software. The measurements and analysis were conducted in general accordance with ASTM D4945 and ASTM D6066 test standards.

The SPT Analyzer is fully compliant with the minimum digital sampling frequency requirements of ASTM D4633-05 (50 kHz) and EN ISO 22476-3:2005 (100 kHz), as well as with the low pass filter, (cutoff frequency of 5000 Hz instead of 3000 Hz) requirements of ASTM D4633-05. All equipment and analysis also conform to ASTM D6066.

A 2' instrumented section of AWJ rod, with two sets of accelerometers and strain transducers mounted on opposite sides of the drill rod, was placed below the anvil. It measured strain and acceleration of every hammer blow. The SPT Analyzer then calculates the amount of energy transferred to the rod by force and velocity measurements.

4. Observations

The drill rig motor is diesel fueled. The throttle was manually controlled. The blows per minute average was consistent at every sample interval.

5. Results

Results from the SPT Hammer Energy Measurements are summarized below. It shows the Energy Transfer Ratio (ETR) at each sampling depth. ETR is the ratio of the measured maximum transferred energy to rated energy of the hammer which is the product of the weight of the hammer times the height of the fall. 140 lb x 30” = 4200 lb-in = 0.350 kip-ft.

Energy Transfer Ratio = 78.7% @ 56 blows per minute

Depth	ETR%	BPM
5	78.2	52.7
10	75.4	54.7
15	79.0	55.3
20	77.0	55.8
25	79.7	56.7
30	76.5	57.0
35	80.9	56.9
40	79.9	57.2
45	81.9	57.5
Average	**78.7**	**56.0**

If you have any questions please do not hesitate to call or email.

Thank you,

Brian Serl
Calibration Engineer
SPT CAL
909-730-2161
bc@sptcal.com

SPT AUTOMATIC HAMMER ENERGY CALIBRATION REPORT

Drill Rig Model: Diedrich D90
Serial Number: DD-358
Terracon Drill Rig Asset Number: DR508
May 14, 2019

Prepared for:
Terracon Consultants, Inc.
Lodi Exploration Services

Prepared by:
Terracon Consultants, Inc.
Exploration Services Group

Terracon

May 14, 2019

Terracon Consultants, Inc.
902 Industrial Way
Lodi, CA 95240

Attn: Mr. Chris Congrave
E: chris.congrave@terracon.com

Re: SPT Automatic Hammer Energy Calibration Report
Terracon Drill Rig 508; Diedrich D-90
Terracon Project Number: BGXX0500

Mr. Congrave:

This report provides the Energy Transfer Ratio (ETR) for the SPT automatic hammer found on drill rig model Geoprobe; Terracon Drill Rig Asset Number DR508 (Serial Number: 358).

Table 1: Hammer Efficiency Summary

Drill Rig Model	Serial No.	Drill Rig Year	Drill Rig No.	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (C_E)
Diedrich D-90	358	2018	DR508	94.8% ± 4.5%	1.58

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Jim Smith Marie Maher

James Smith
National Exploration Manager

Marie A. Maher, P.G.
Regional Exploration Manager

Attachments:
Exhibit A: Calibration Information
Exhibit B: PDA SPT Analyzer Results

Exhibit A
CALIBRATION INFORMATION

CALIBRATION INFORMATION

ITEM	DESCRIPTION
Drill Rig Identification	Drill Rig Model: Diedrich D90; Drill Rig Year: 2018 Terracon Drill Rig Asset No.: DR508; Serial No. 358
Drill Rig Owner	Terracon Consultants, Inc. – Lodi, CA
Drill Rig Operator	Bill Bradberry; Lodi Exploration
Testing Date	May 08, 2019
Testing Location	Lathrop, CA
Boring Identification	B-1
Hammer Type	140 pounds (automatic)
Boring Method	Hollow-stem Auger
Drill Rods	■ AWJ ■ 1-¾” outside diameter ■ 3/16” wall thickness
Calibration Testing Equipment	■ 2 foot AWJ rod instrumented w/ 2 strain gauges and 2 accelerometers ■ Model SPT Analyzer™ (PDA)
ASTM Methods Used	**ASTM D1586-11**, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils **ASTM D4633-10**, Standard Method for Energy Measurement for Dynamic Penetrometers
SPT Calibration Personnel	Jim Smith– National Manager, Terracon Consultants, Inc.

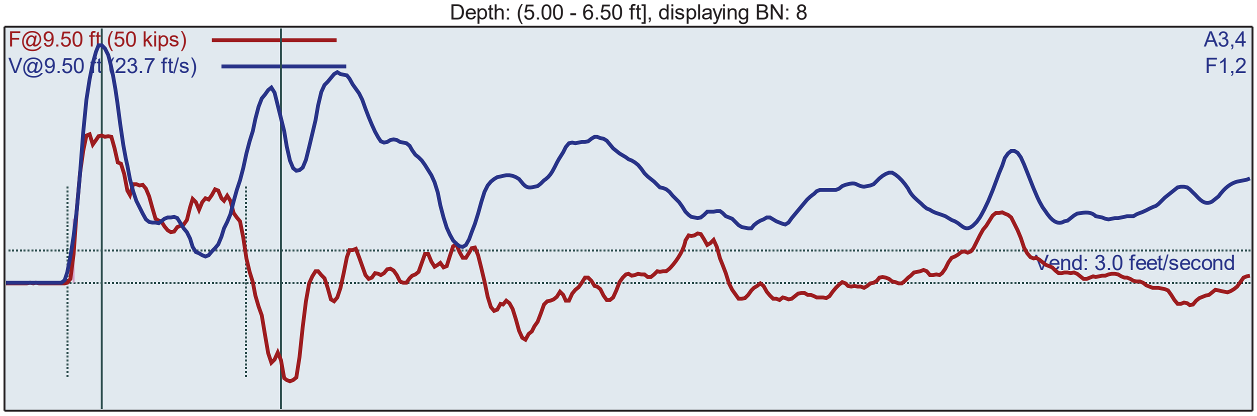
Exhibit B
PDA SPT ANALYZER RESULTS

Pile Dynamics, Inc. Page 1 of 4
SPT Analyzer Results PDA-S Ver. 2018.24 - Printed: 5/9/2019

BG-508-a 5-6.5
JPS Test date: 5/8/2019

AR: 1.18 in^2 SP: 0.492 k/ft3
LE: 9.50 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (5.00 - 6.50 ft], displaying BN: 8



F1 : [512AWJ1] 208.9 PDICAL (1) FF1
F2 : [512AWJ2] 207.84 PDICAL (1) FF1
A3 (PR): [K10491] 400 mv/6.4v/5000g (1) VF1
A4 (PR): [K10493] 402 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
1	2	31	22.3	1.9	291	83.0
2	2	33	23.1	54.2	326	93.2
3	4	33	23.7	54.4	322	91.9
4	4	33	23.2	54.2	335	95.8
5	4	30	22.5	54.1	338	96.5
6	4	30	22.1	54.4	315	90.1
7	5	31	22.8	55.4	329	94.0
8	5	29	22.0	53.8	317	90.6
9	5	31	23.3	53.5	336	96.0
10	5	31	23.3	54.3	339	96.9
	Average	31	22.8	54.3	329	94.0
	Std Dev	1	0.6	0.5	9	2.6
	Maximum	33	23.7	55.4	339	96.9
	Minimum	29	22.0	53.5	315	90.1

N-value: 8

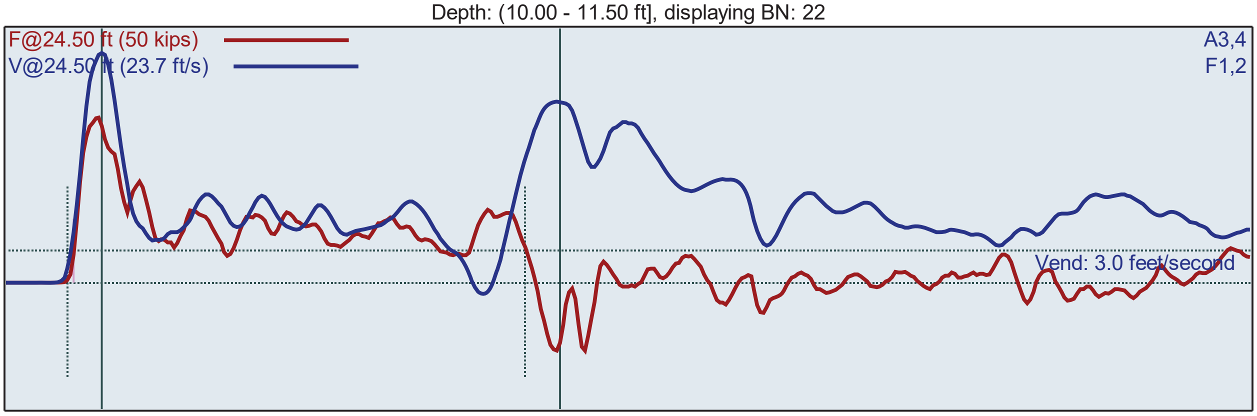
Sample Interval Time: 9.94 seconds.

Pile Dynamics, Inc.
SPT Analyzer Results

PDA-S Ver. 2018.24 - Printed: 5/9/2019

BG-508-a	5-6.5
JPS	Test date: 5/8/2019
AR: 1.18 in^2	SP: 0.492 k/ft3
LE: 14.50 ft	EM: 30000 ksi
WS: 16807.9 ft/s	

Depth: (10.00 - 11.50 ft], displaying BN: 22



F1 : [512AWJ1] 208.9 PDICAL (1) FF1
F2 : [512AWJ2] 207.84 PDICAL (1) FF1
A3 (PR): [K10491] 400 mv/6.4v/5000g (1) VF1
A4 (PR): [K10493] 402 mv/6.4v/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
11	3	32	20.8	1.9	252	72.0
12	3	34	21.9	54.2	288	82.3
13	3	35	22.5	53.9	323	92.2
14	3	34	22.6	54.2	325	92.8
15	3	33	22.7	54.2	347	99.1
16	3	31	22.6	54.8	342	97.7
17	3	30	22.5	55.1	326	93.2
18	3	31	23.2	53.9	332	94.9
19	3	30	22.6	55.0	338	96.7
20	3	31	20.5	1.9	282	80.5
	Average	32	22.7	54.5	335	95.7
	Std Dev	2	0.2	0.5	8	2.3
	Maximum	34	23.2	55.1	347	99.1
	Minimum	30	22.5	53.9	325	92.8

N-value: 6

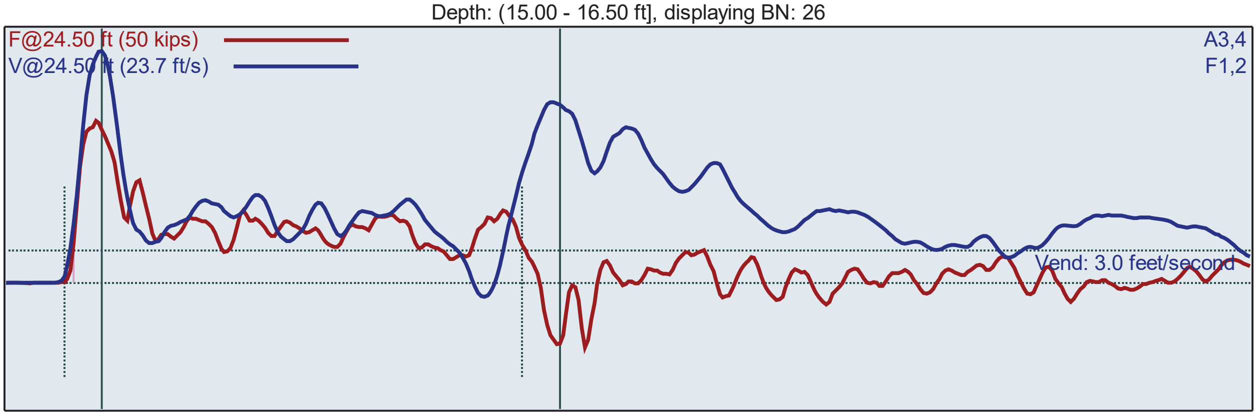
Sample Interval Time: 694.83 seconds.

Pile Dynamics, Inc. Page 3 of 4
SPT Analyzer Results PDA-S Ver. 2018.24 - Printed: 5/9/2019

BG-508-a 5-6.5
JPS Test date: 5/8/2019

AR: 1.18 in^2 SP: 0.492 k/ft3
LE: 24.50 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (15.00 - 16.50 ft], displaying BN: 26



F1 : [512AWJ1] 208.9 PDICAL (1) FF1
F2 : [512AWJ2] 207.84 PDICAL (1) FF1
A3 (PR): [K10491] 400 mv/6.4v/5000g (1) VF1
A4 (PR): [K10493] 402 mv/6.4v/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
26	4	32	21.5	55.2	335	95.6
	Average	32	21.5	55.2	335	95.6
	Std Dev	0	0.0	0.0	0	0.0
	Maximum	32	21.5	55.2	335	95.6
	Minimum	32	21.5	55.2	335	95.6

N-value: 1

Sample Interval Time: 0.00 seconds.

Pile Dynamics, Inc.
SPT Analyzer Results

PDA-S Ver. 2018.24 - Printed: 5/9/2019

Summary of SPT Test Results

Project: BG-508-a, Test Date: 5/8/2019

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
9.50	**2-4-5**	**9**	**14**	31	22.8	54.3	329	94.0
14.50	**3-3-3**	**6**	**9**	32	22.7	54.5	335	95.7
24.50	**3-4-3**	**7**	**11**	32	21.5	55.2	335	95.6
			Overall Average Values:	31	22.7	54.4	332	94.8
			Standard Deviation:	1	0.8	13.6	16	4.5
			Overall Maximum Value:	34	23.7	55.4	347	99.1
			Overall Minimum Value:	29	21.5	53.5	315	90.1

Certificate of Compliance

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model SPT

Serial Number: 4535 TB

has been tested and passed all final test procedures on 25 May 2018

Tested by:

Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

Appendix C. Cone Penetrometer Testing Results 2020 Geotechnical Investigation

GREGG DRILLING, LLC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

May 4, 2020

Terracon
Attn: Ryan Hankes

Subject: CPT Site Investigation
Adelanto Converter Station, 16800 Aster Rd.
Adelanto, California
GREGG Project Number: D1205045

Dear Mr. Hankes:

The following report presents the results of GREGG Drilling Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☐
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Pressuremeter Testing	(PMT)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 714-863-0988.

Sincerely,
Gregg Drilling, LLC.

CPT Reports Team
Gregg Drilling, LLC.

Note by Black & Veatch:
Estimated water tables presented are not consistent with the available subsurface information.

GREGG DRILLING, LLC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
BVS-201	4/29/2020	65.78	-	-	-
BVS-202	4/30/2020	61.52	-	-	-
BVS-203	4/29/2020	54.79	-	-	-
BVS-204	4/30/2020	55.61	-	-	-
BVS-205	5/1/2020	82.35	-	-	-
BVS-205a	5/1/2020	104.51	-	-	-
BVS-206	5/1/2020	62.34	-	-	-
BVS-207	5/1/2020	56.27	-	-	-
BVS-208	5/1/2020	63.98	-	-	-
BVS-209	5/1/2020	53.31	-	-	-
BVS-210	4/30/2020	88.42	-	-	-
BVS-211	4/30/2020	105.31	-	-	-

GREGG DRILLING, LLC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

Bibliography

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Campanella, R.G. and I. Weemees, "Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies", Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, "Reliability of Soil Gas Sampling and Characterization Techniques", International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, "Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT", 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, "Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers" BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

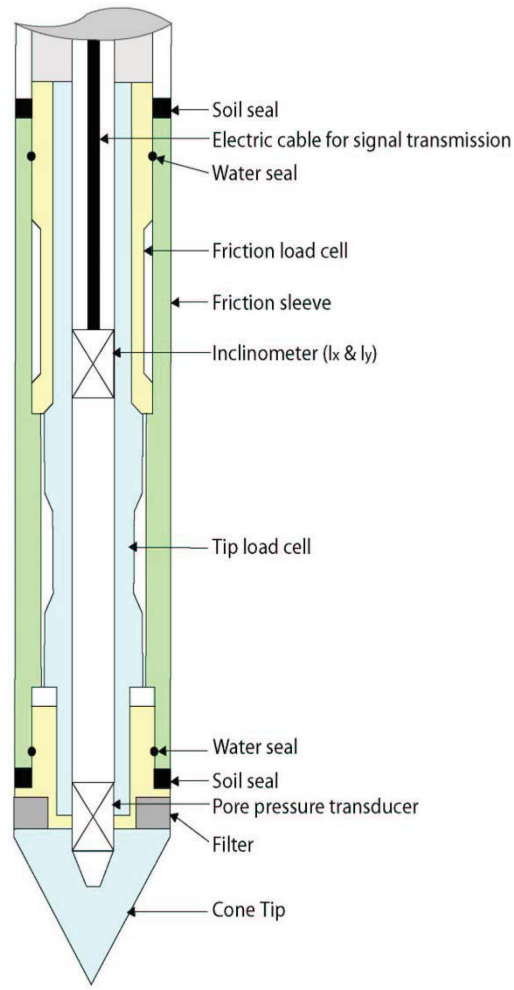


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

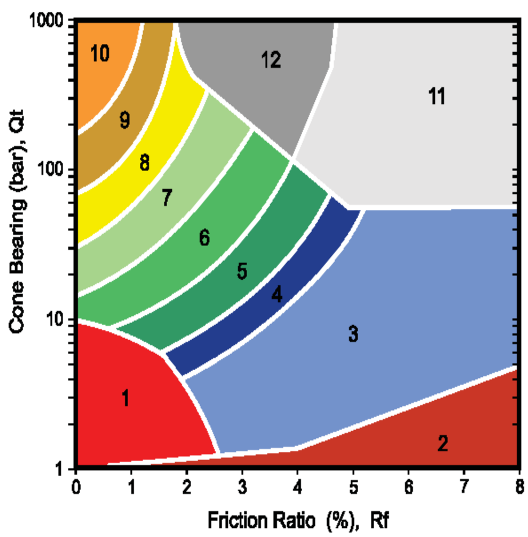
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		Sensitive, fine grained
2		Organic materials
3		Clay
4		Silty clay to clay
5		Clayey silt to silty clay
6		Sandy silt to clayey silt
7		Silty sand to sandy silt
8		Sand to silty sand
9		Sand
10		Gravely sand to sand
11		Very stiff fine grained*
12		Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3 Elevation of ground surface (ft or m)
4 Depth to water table, z_w (ft or m) – input required
5 Net area ratio for cone, a (default to 0.80)
6 Relative Density constant, C_{Dr} (default to 350)
7 Young's modulus number for sands, α (default to 5)
8 Small strain shear modulus number
   a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
   b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
11 Unit weight of water, (default to γ_w = 62.4 lb/ft^3 or 9.81 kN/m^3)

Column

1 Depth, z, (m) – CPT data is collected in meters
2 Depth (ft)
3 Cone resistance, q_c (tsf or MPa)
4 Sleeve resistance, f_s (tsf or MPa)
5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6 Other – any additional data
7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1-a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma\ z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1} = (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u - u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 - \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, n = 0.5 (clean sand)
When $I_c > 3.30$, n = 1.0 (clays)
When $1.64 < I_c < 3.30$, $n = (I_c - 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\,C_N$,
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$

Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go
a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*
b. $G_o = C_G\,q_t$ *For SBT_n 1, 2, 3& 4*
Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\,Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		**SBT_n Zones**	
1	sensitive fine grained	1	sensitive fine grained
2	organic soil	2	organic soil
3	clay	3	clay
4	clay & silty clay	4	clay & silty clay
5	clay & silty clay		
6	sandy silt & clayey silt		

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print ‘clays & silty clays’)

Estimated Permeability (see Lunne et al., 1997)

SBT_n	Permeability (ft/sec)	(m/sec)
1	$3x\ 10^{-8}$	$1x\ 10^{-8}$
2	$3x\ 10^{-7}$	$1x\ 10^{-7}$
3	$1x\ 10^{-9}$	$3x\ 10^{-10}$
4	$3x\ 10^{-8}$	$1x\ 10^{-8}$
5	$3x\ 10^{-6}$	$1x\ 10^{-6}$
6	$3x\ 10^{-4}$	$1x\ 10^{-4}$
7	$3x\ 10^{-2}$	$1x\ 10^{-2}$
8	$3x\ 10^{-6}$	$1x\ 10^{-6}$
9	$1x\ 10^{-8}$	$3x\ 10^{-9}$

Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u*) with time is measured behind the tip of the cone and recorded.

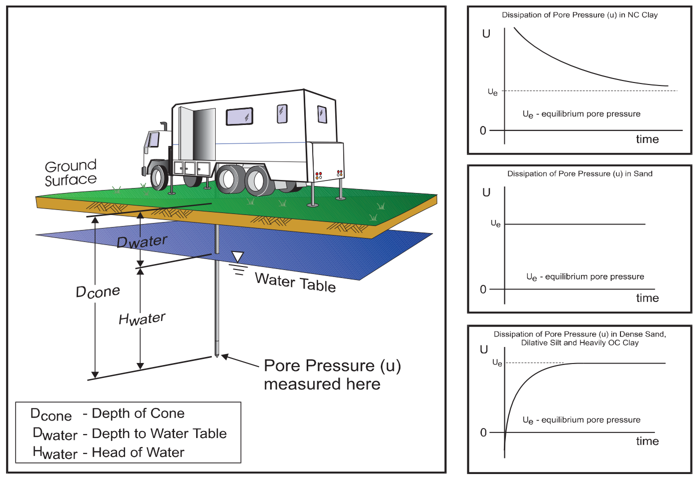
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors: 1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure PPDT

Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: v = Δd/Δt

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

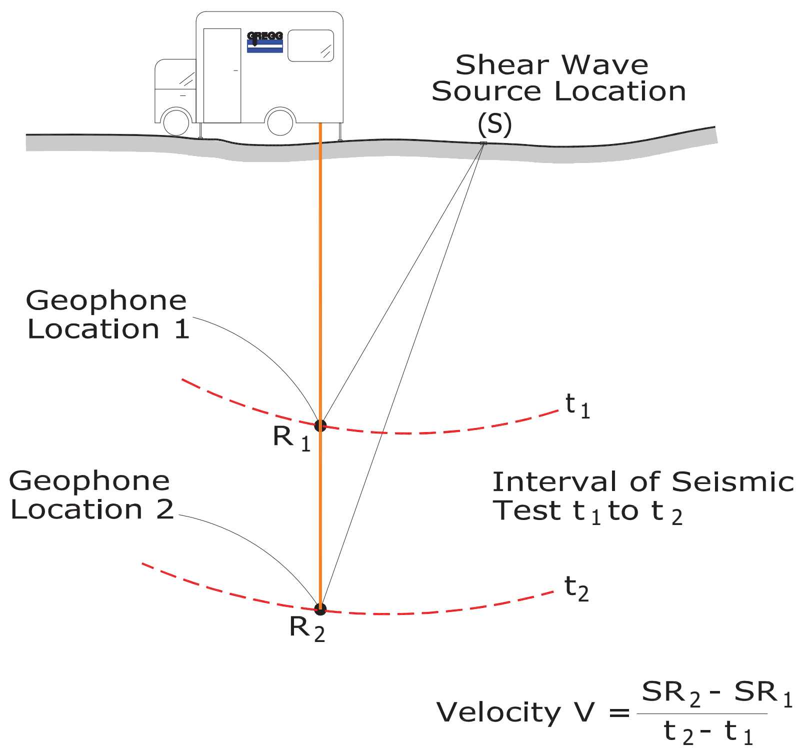


Figure SCPT

Groundwater Sampling

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

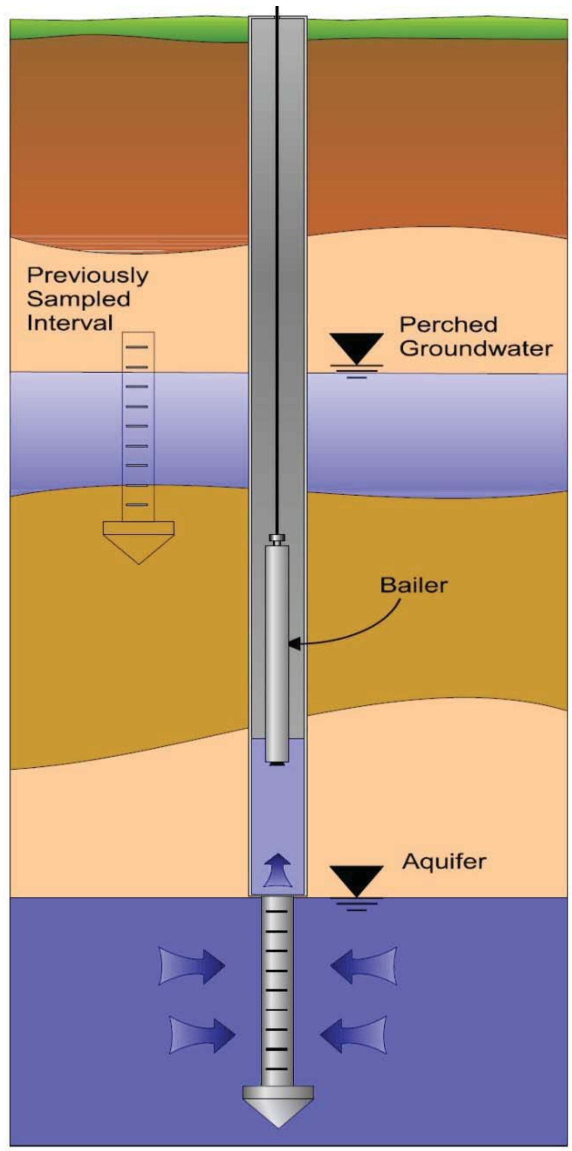


Figure GWS

Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

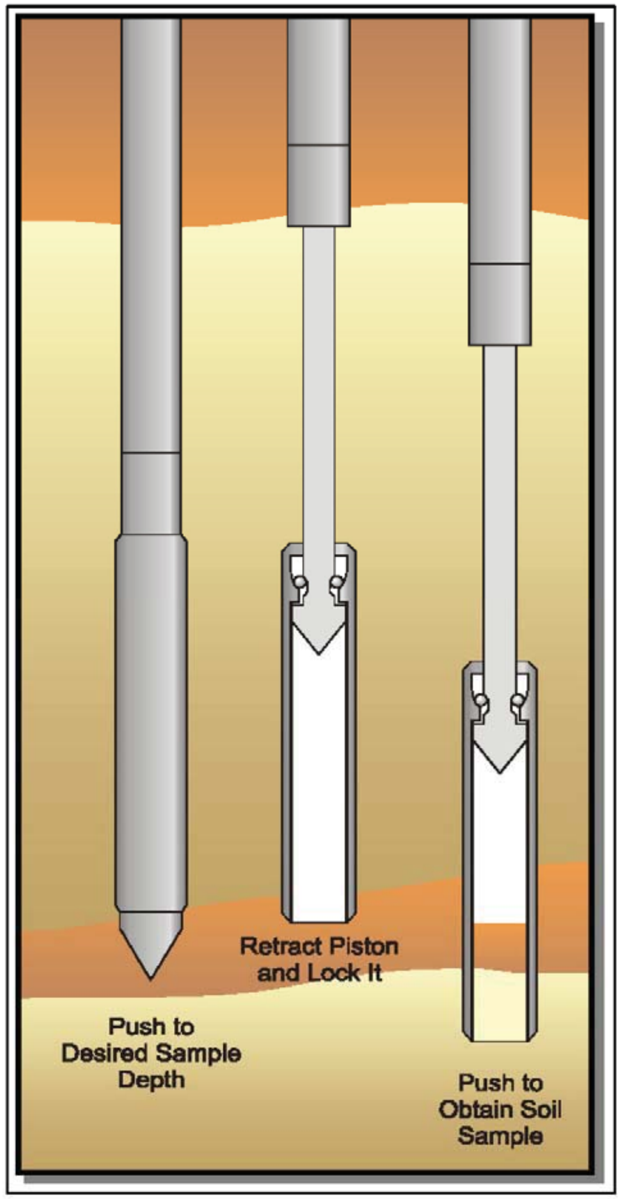


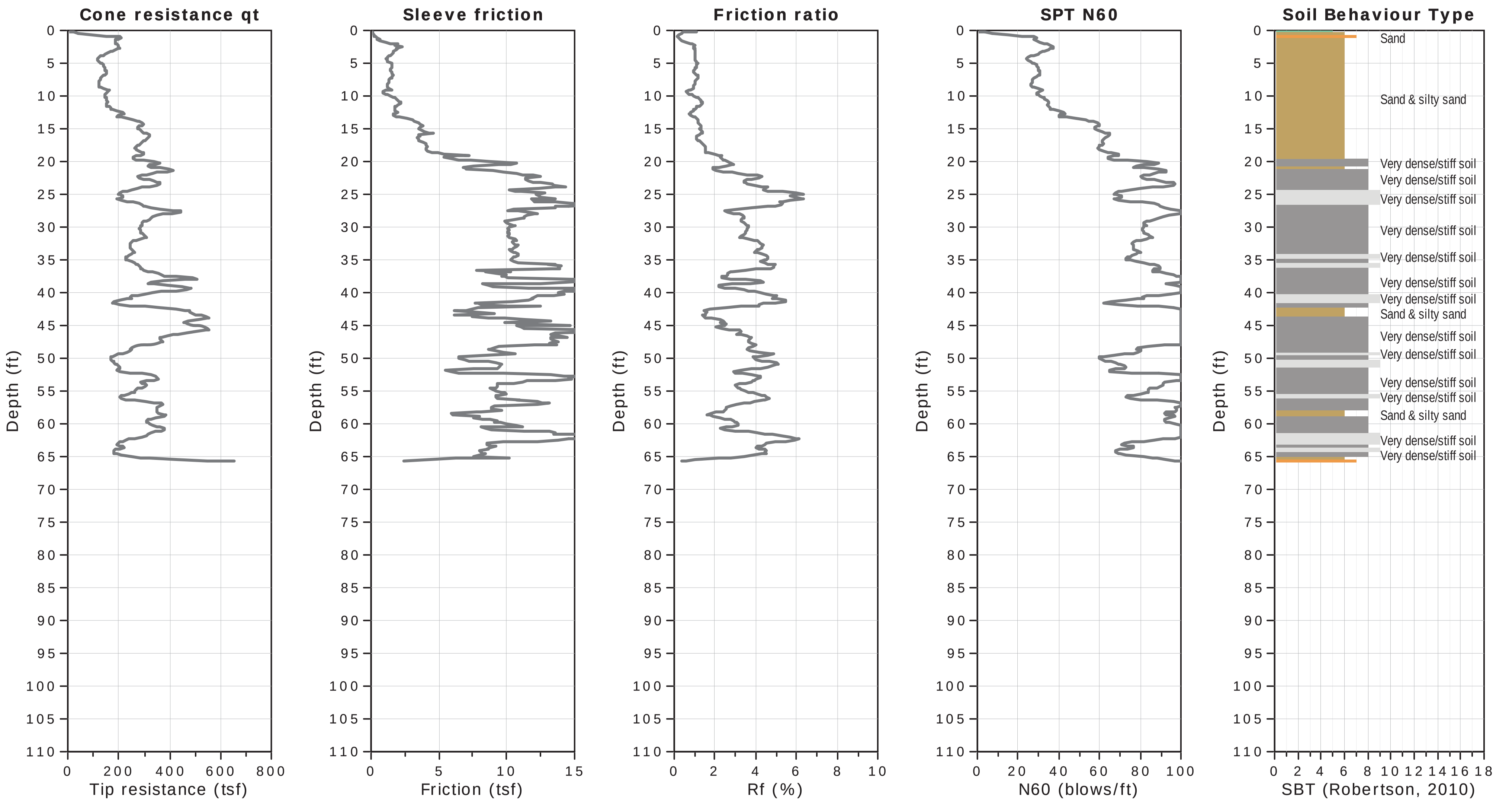
Figure SS

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-201

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 65.78 ft, Date: 4/29/2020



1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

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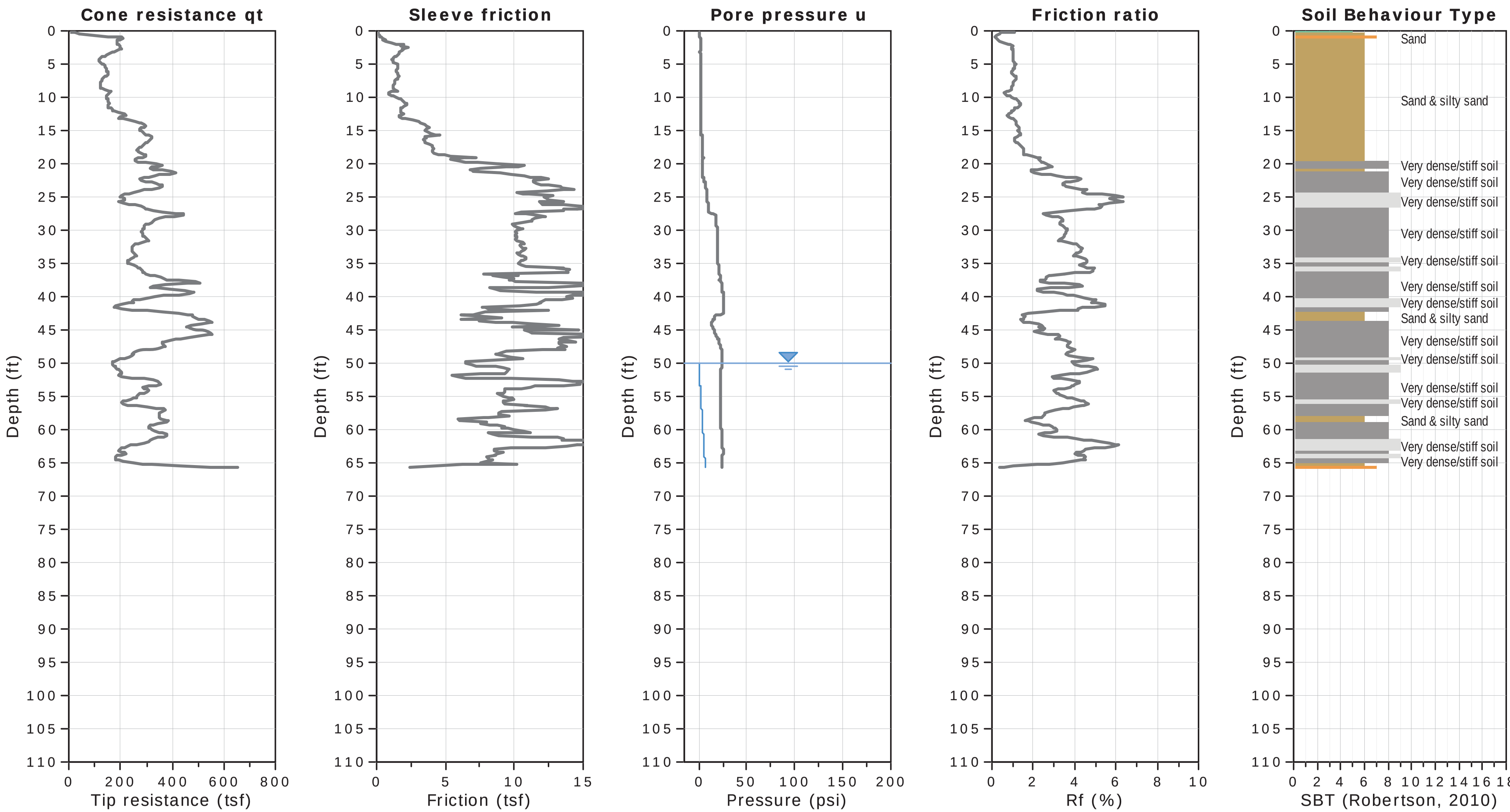
CPT: BVS-201

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 65.78 ft, Date: 4/29/2020



1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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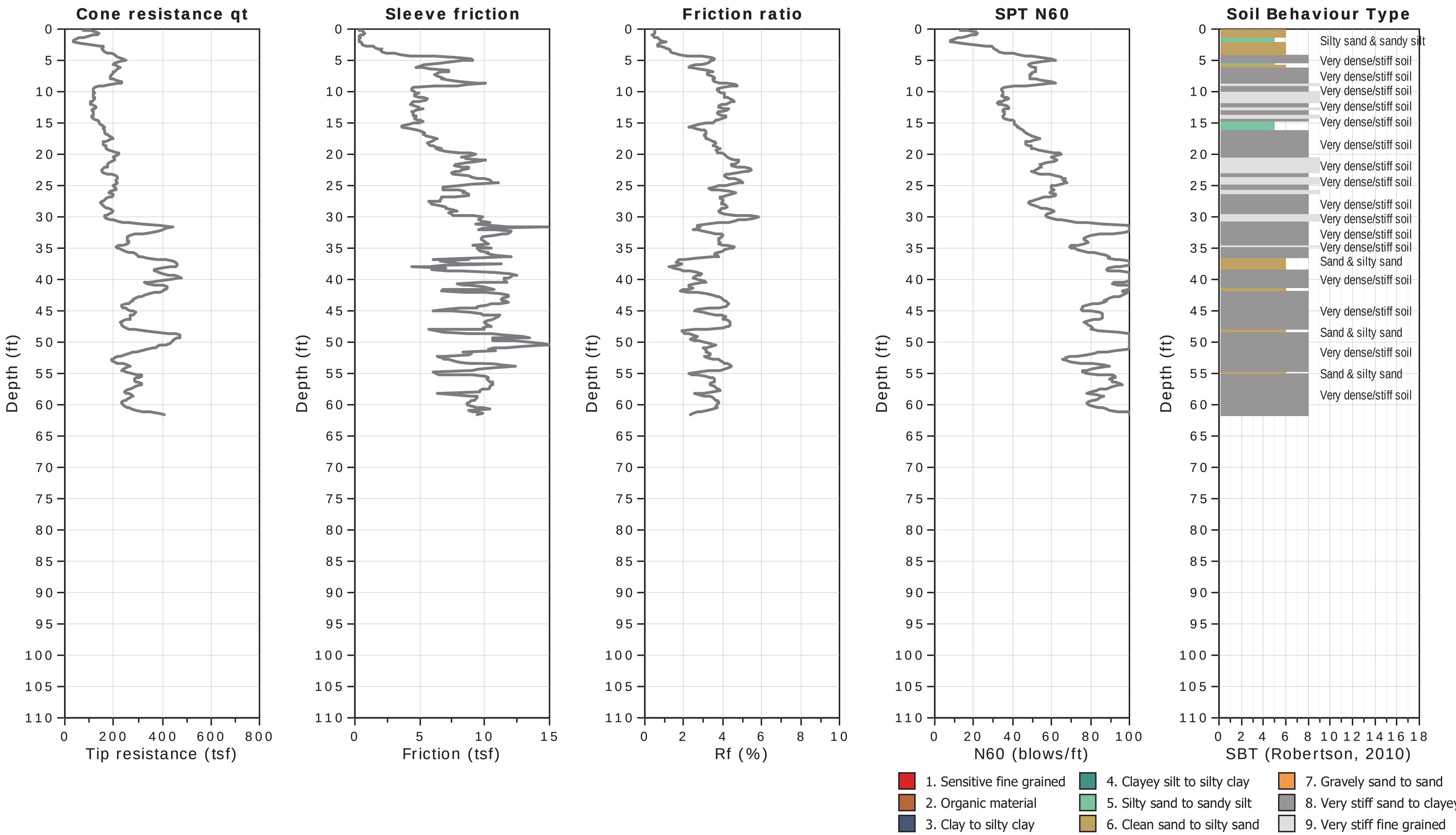
CPT: BVS-202

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 61.52 ft, Date: 4/30/2020

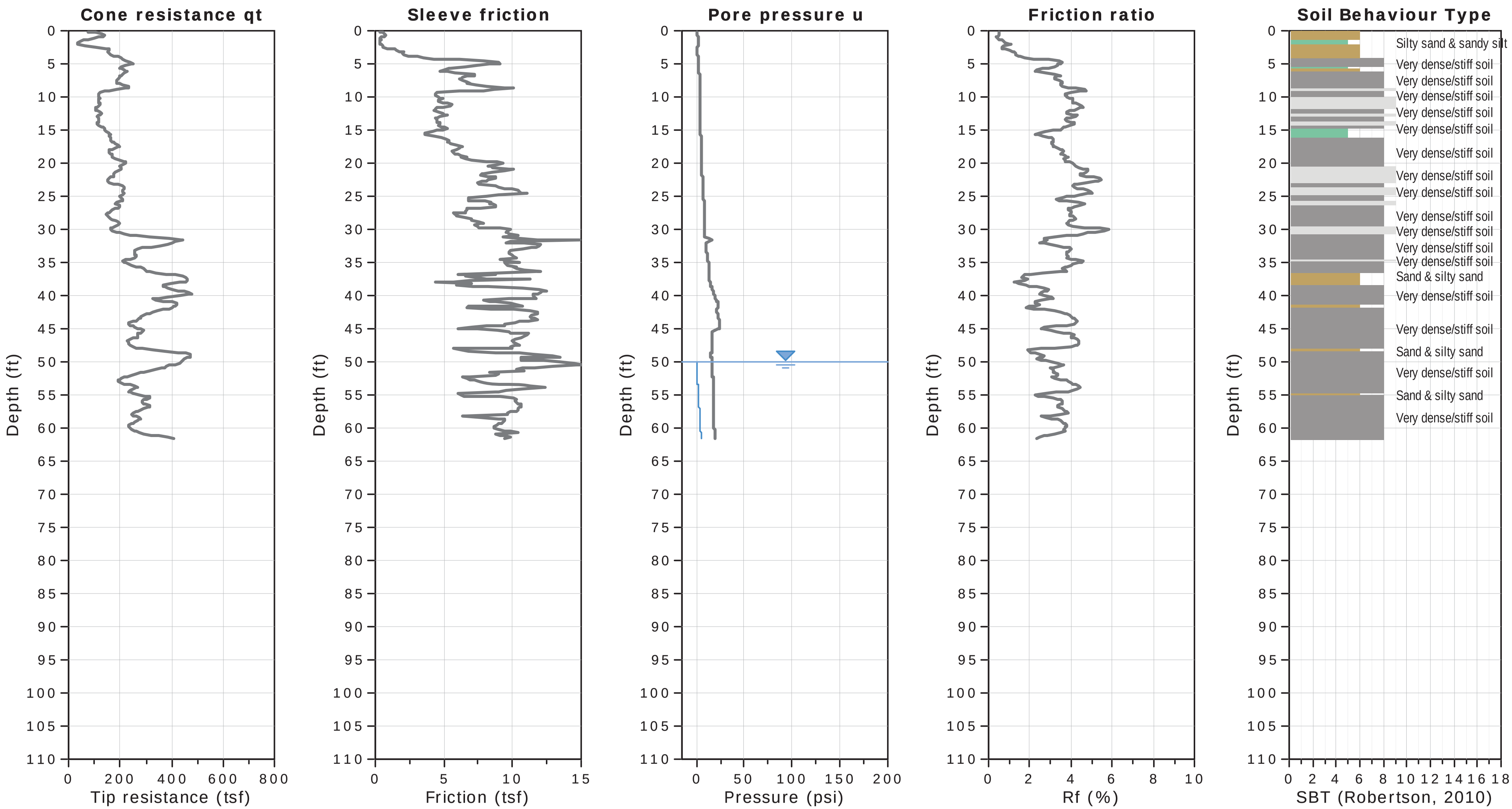


GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-202

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 61.52 ft, Date: 4/30/2020



1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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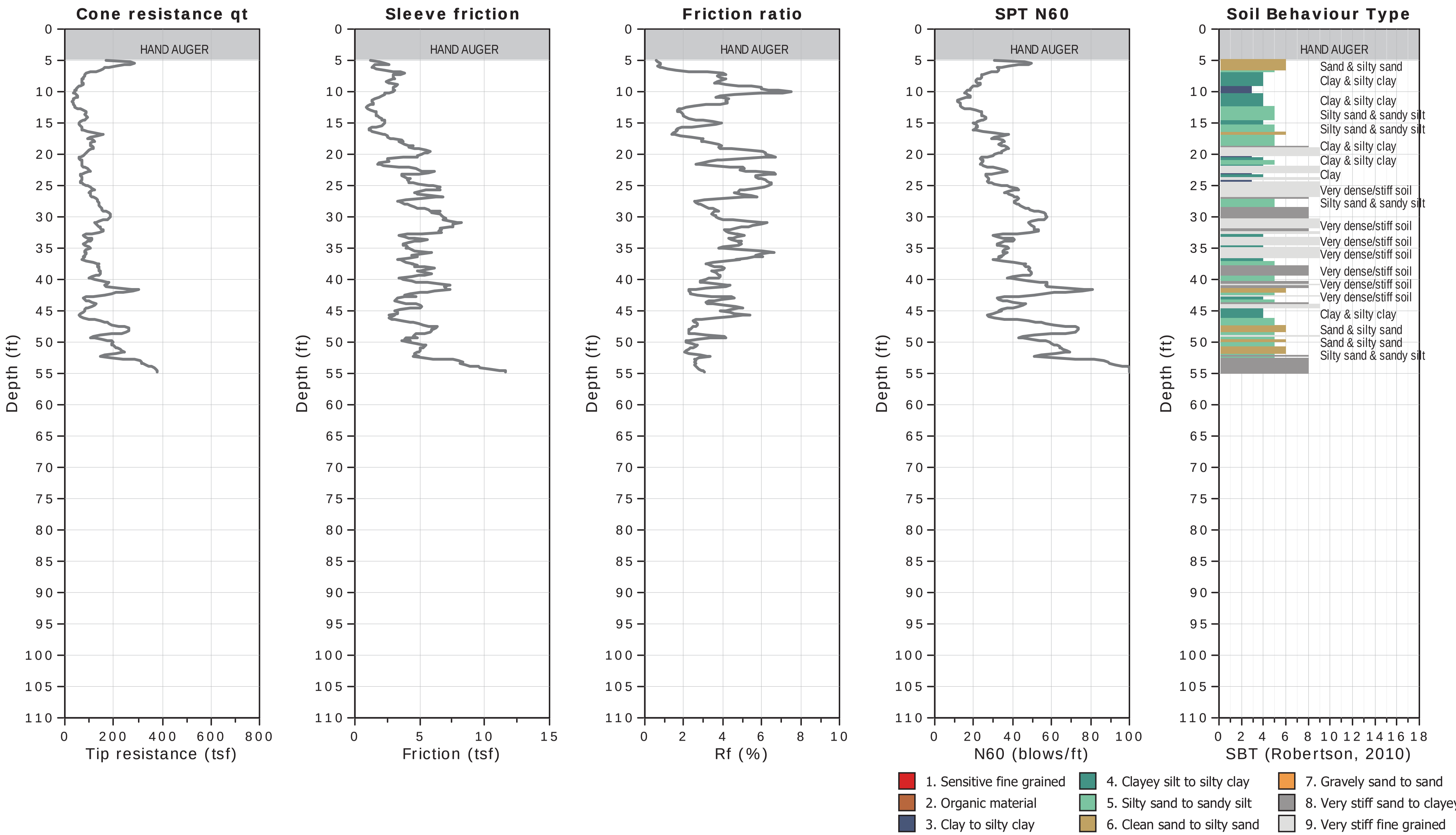
CPT: BVS-203

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 54.79 ft, Date: 4/29/2020

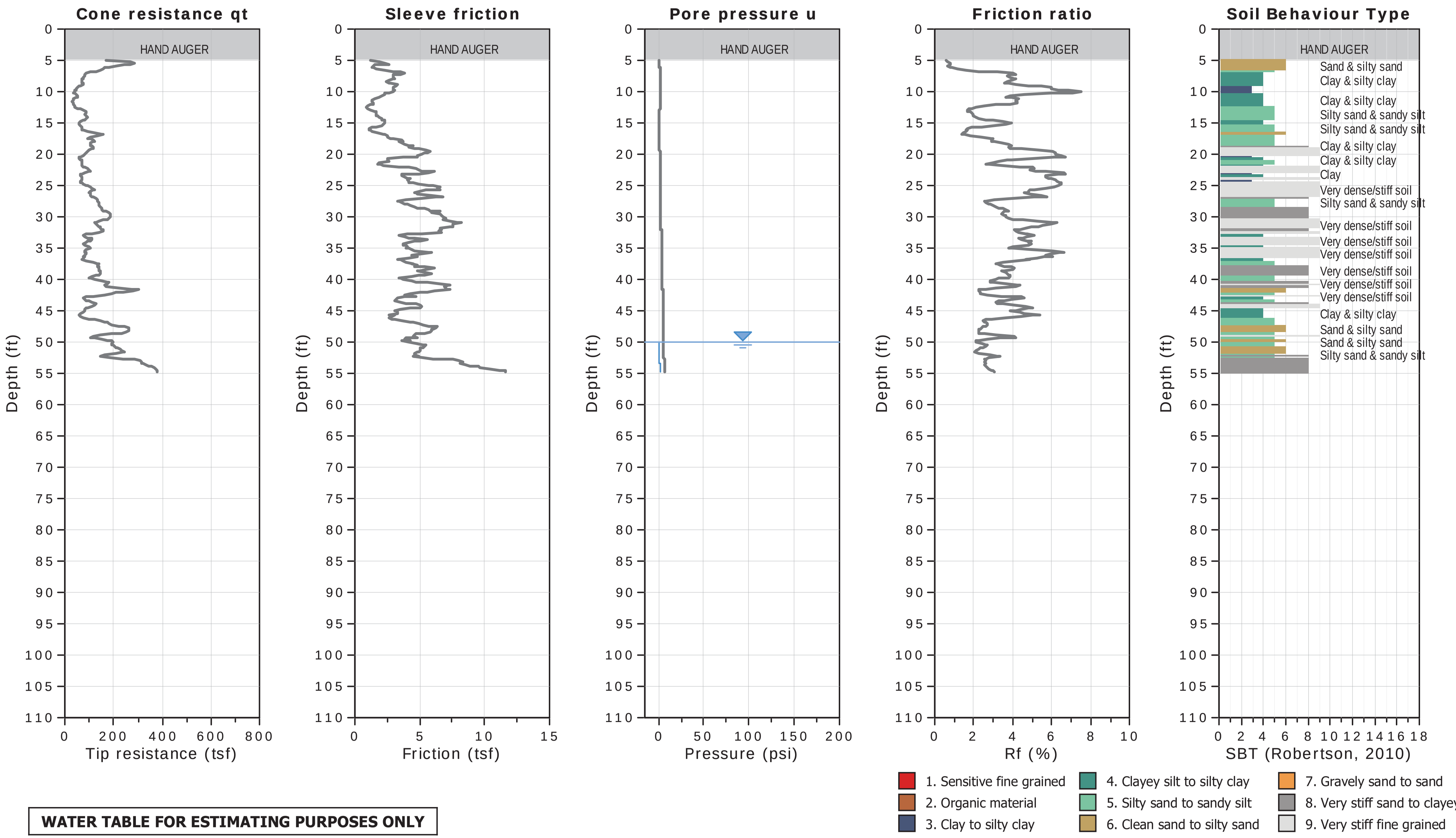


GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-203

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 54.79 ft, Date: 4/29/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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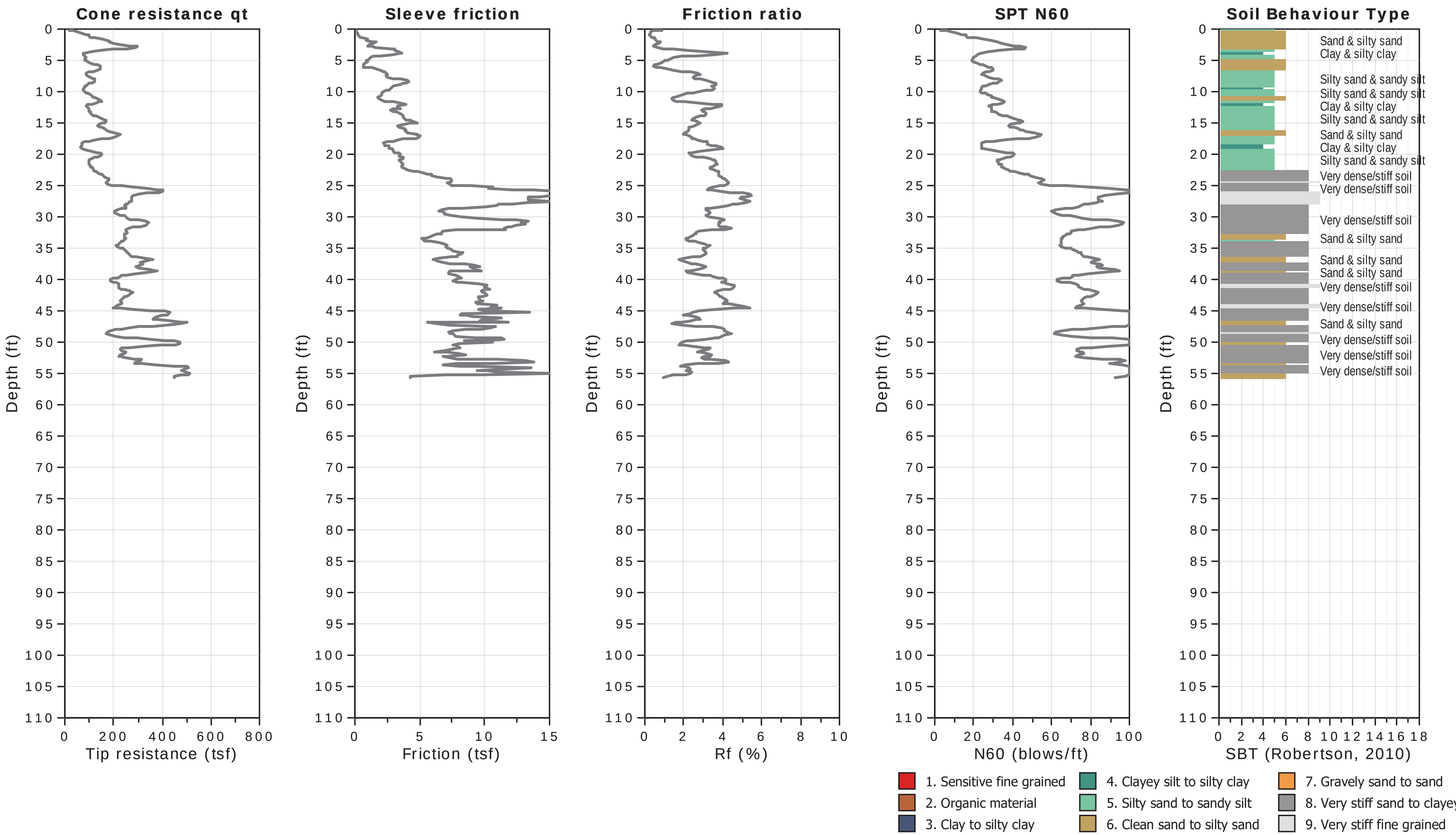
CPT: BVS-204

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 55.61 ft, Date: 4/30/2020



GREGG DRILLING, LLC
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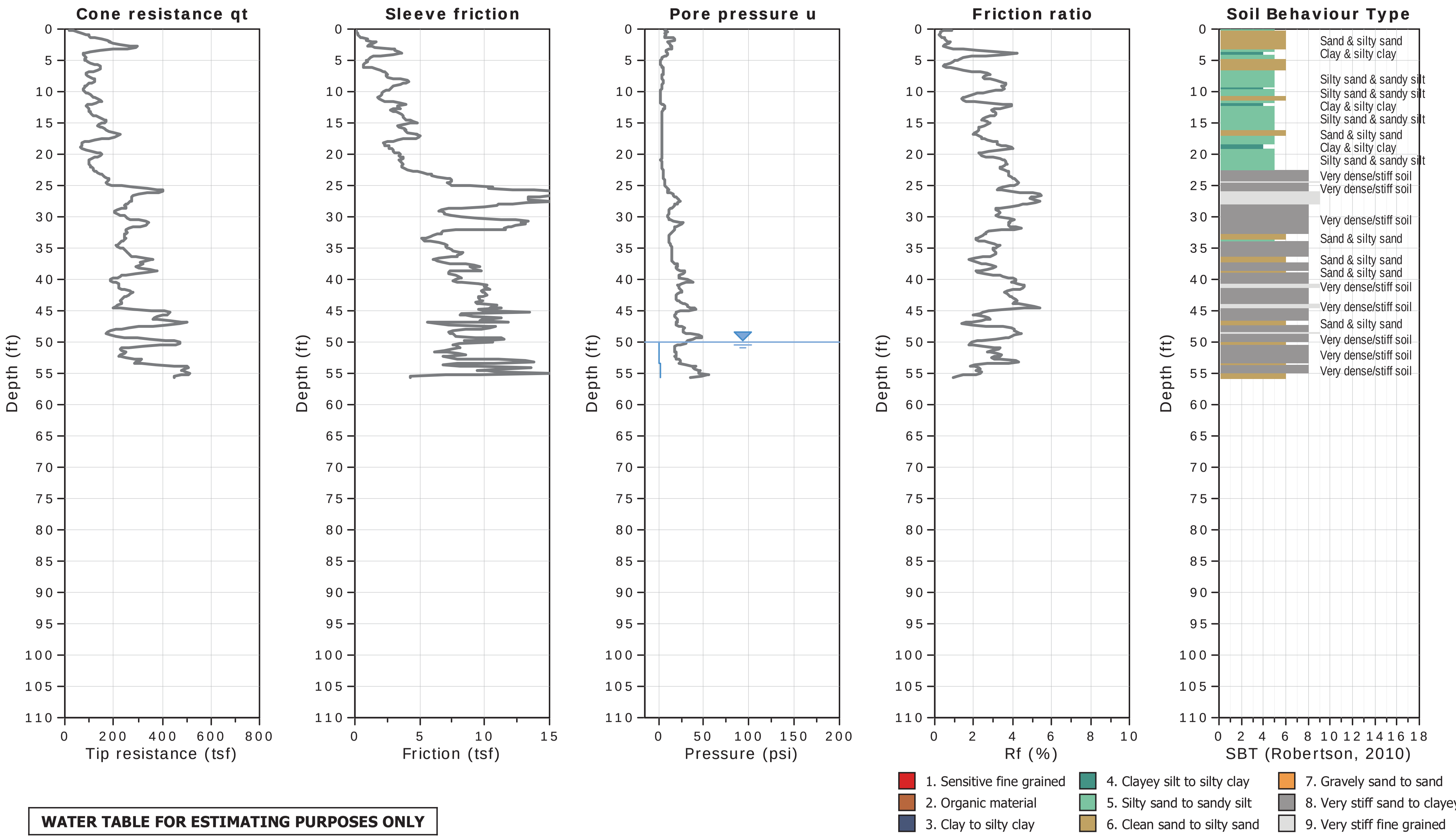
CPT: BVS-204

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 55.61 ft, Date: 4/30/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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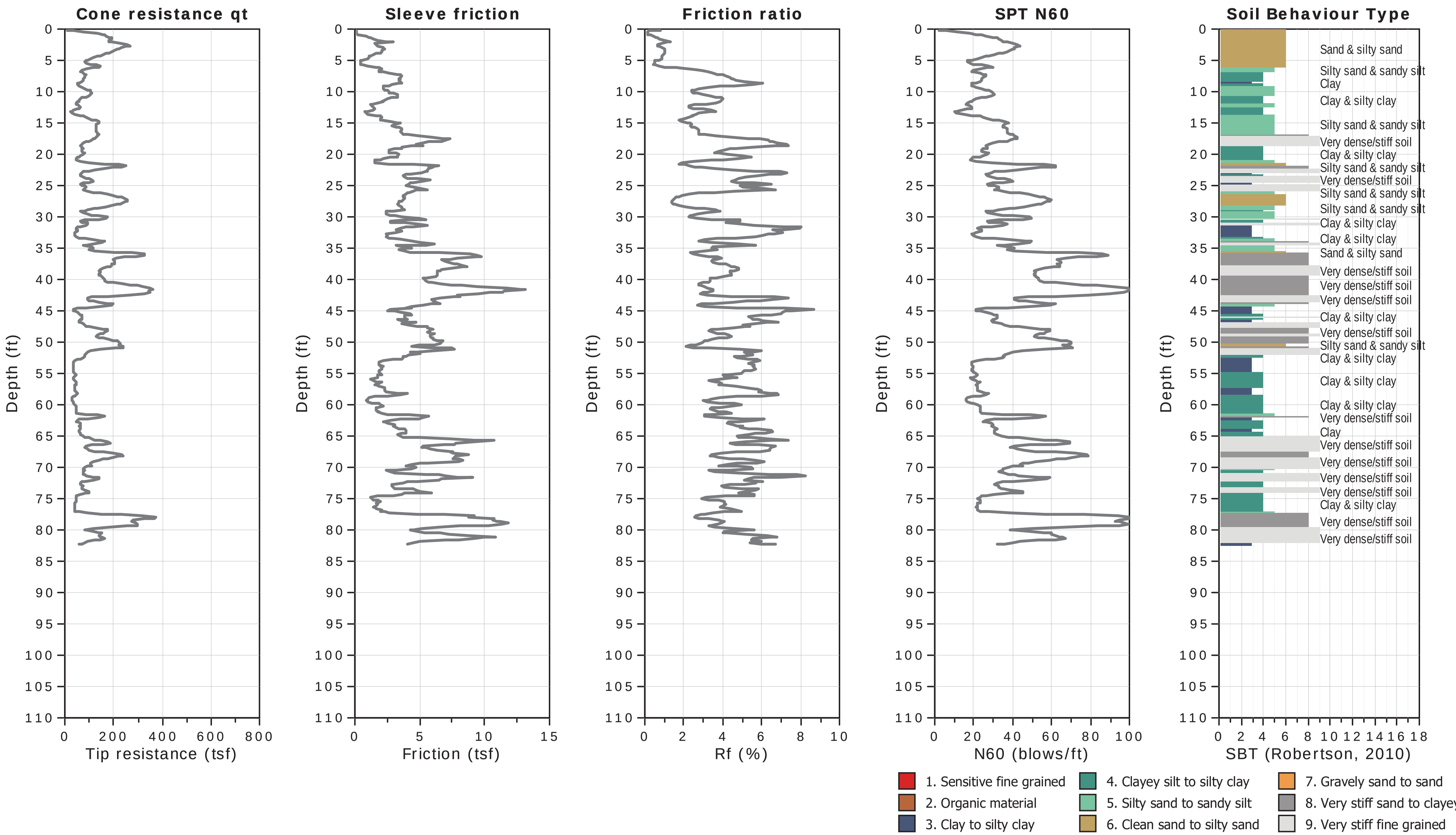
CPT: BVS-205

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 82.35 ft, Date: 5/1/2020



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

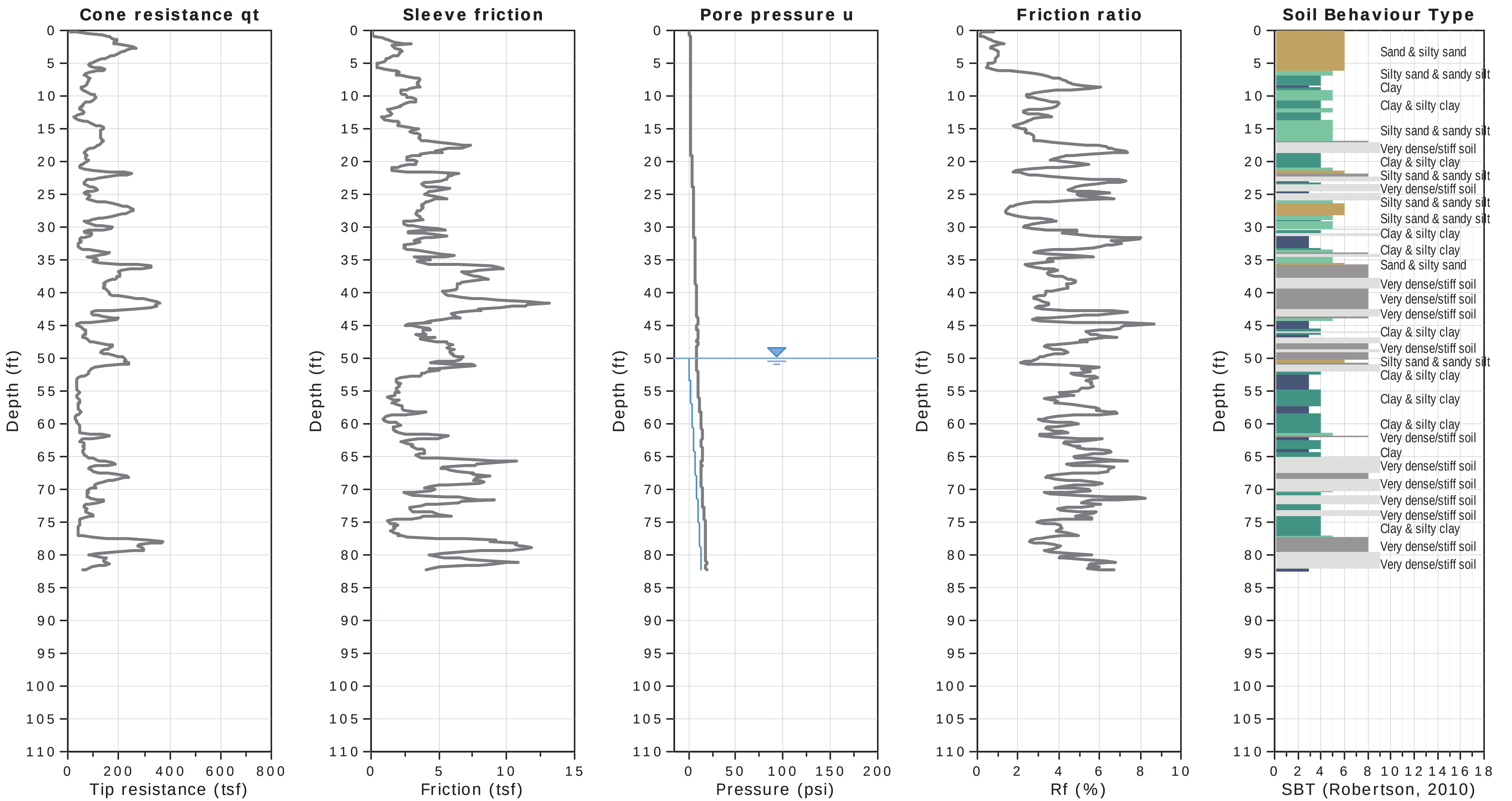
CPT: BVS-205

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 82.35 ft, Date: 5/1/2020



1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

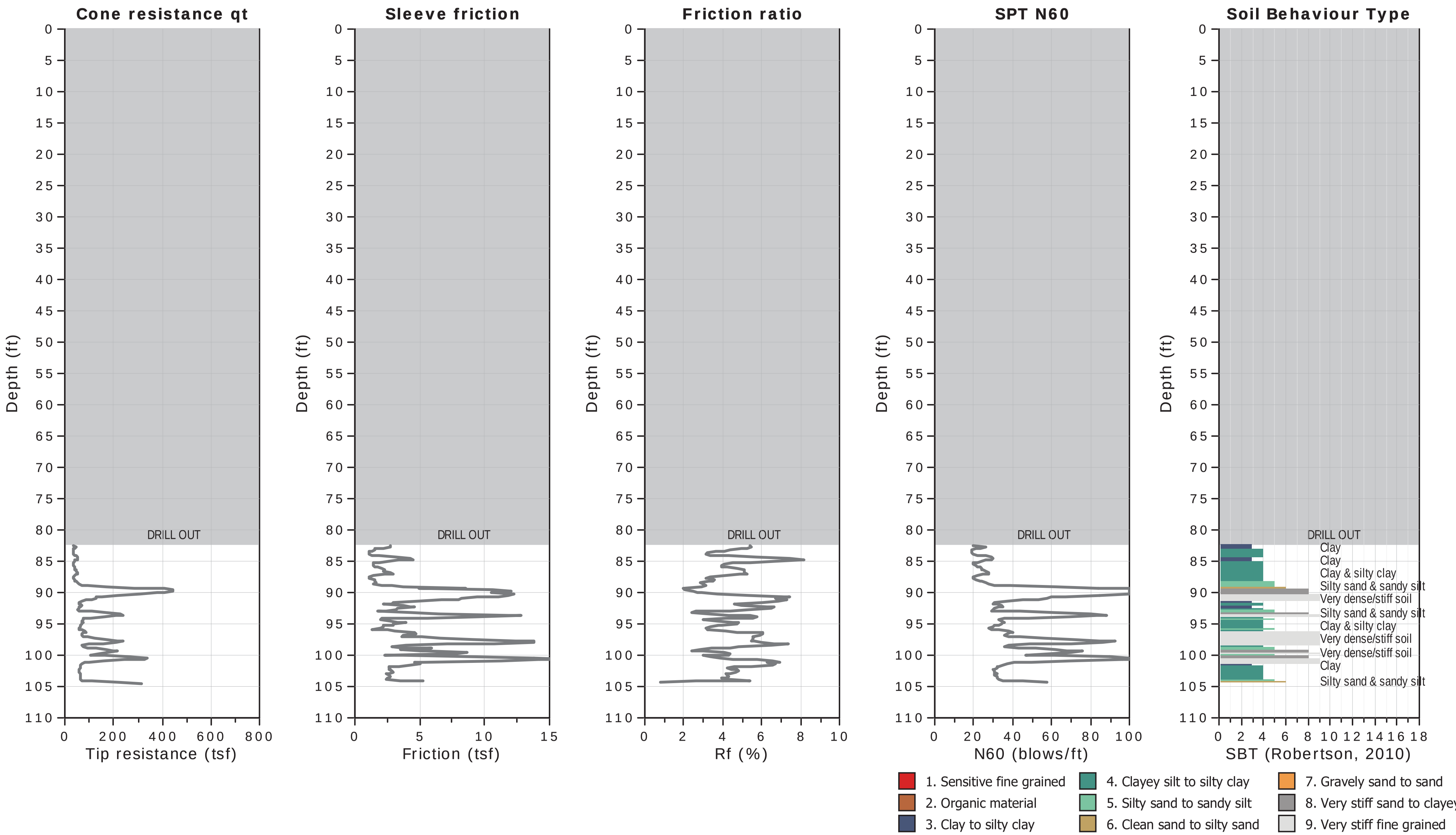
WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-205a

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP:
Total depth: 104.51 ft, Date: 5/1/2020



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

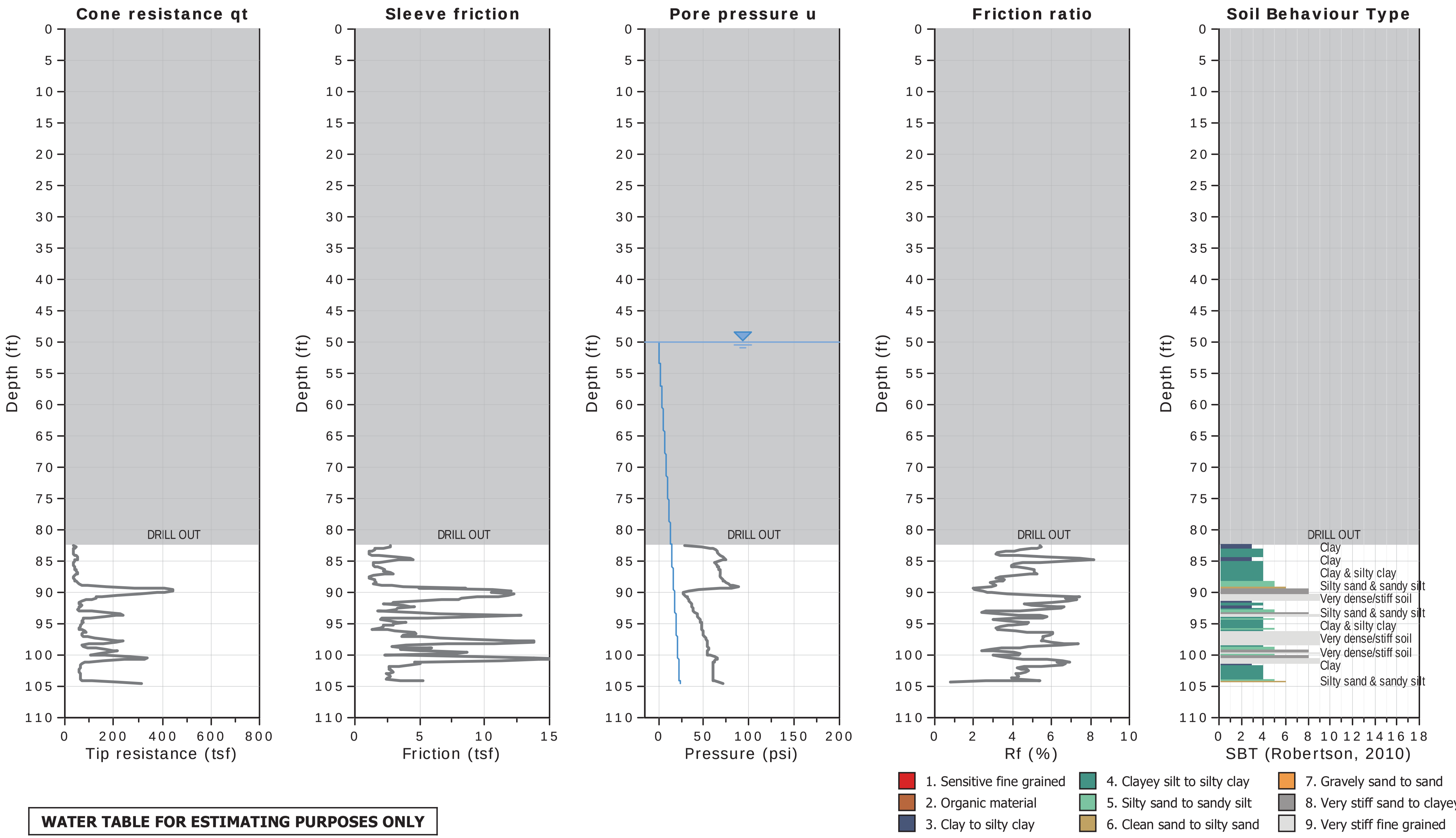
CPT: BVS-205a

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP:

Total depth: 104.51 ft, Date: 5/1/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

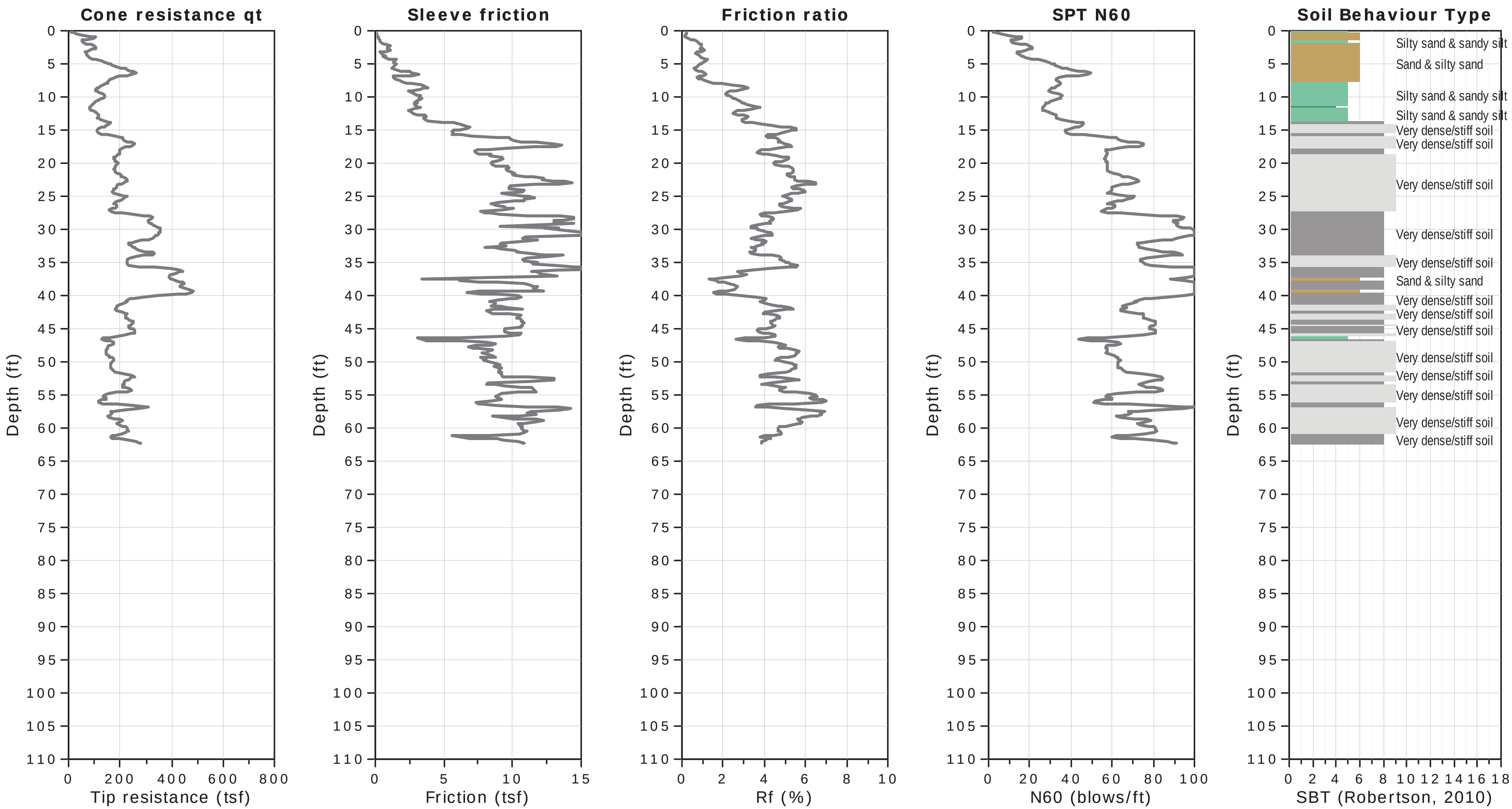
CPT: BVS-206

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 62.34 ft, Date: 5/1/2020



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2. Organic material
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4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

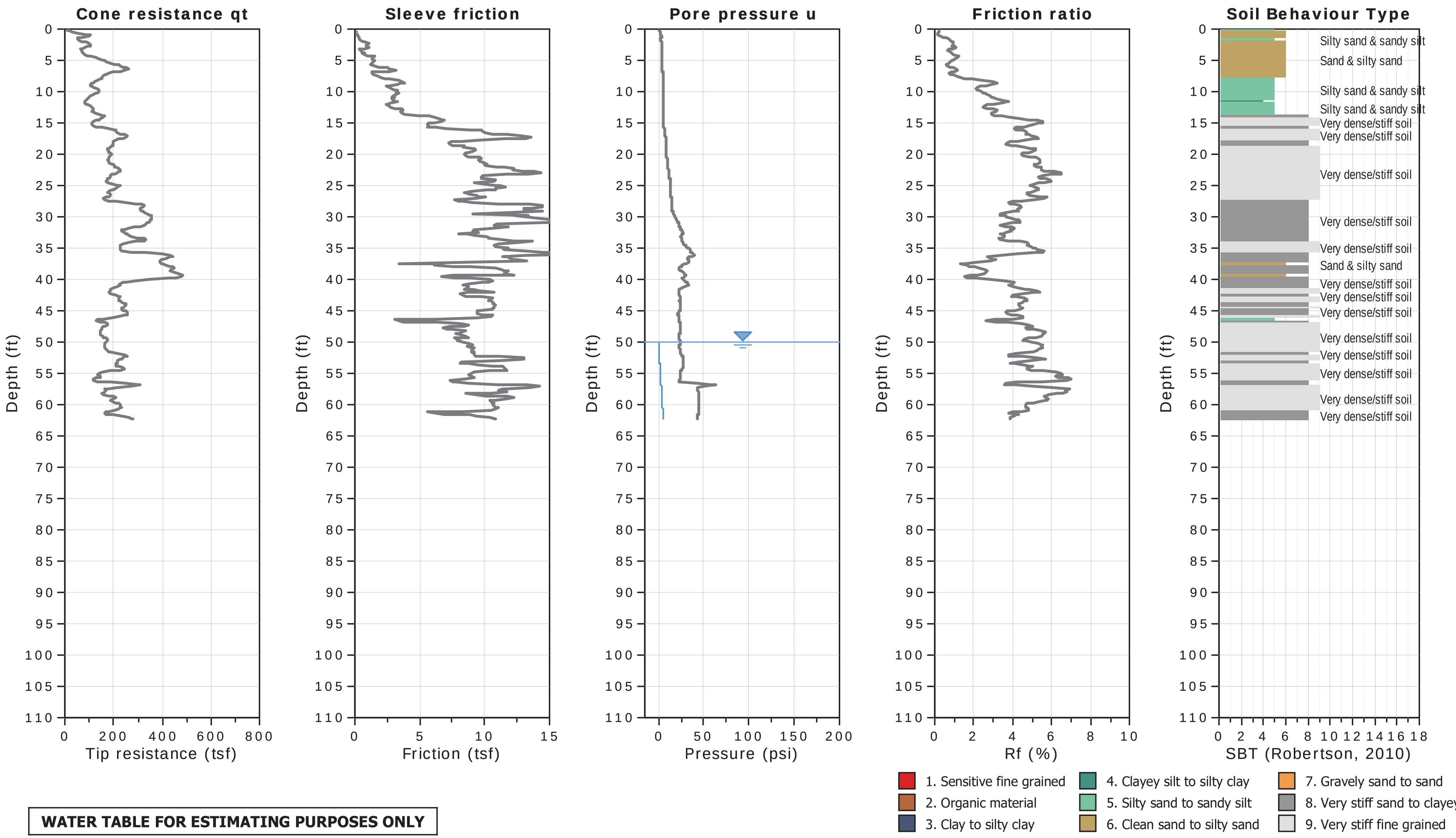
CPT: BVS-206

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 62.34 ft, Date: 5/1/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

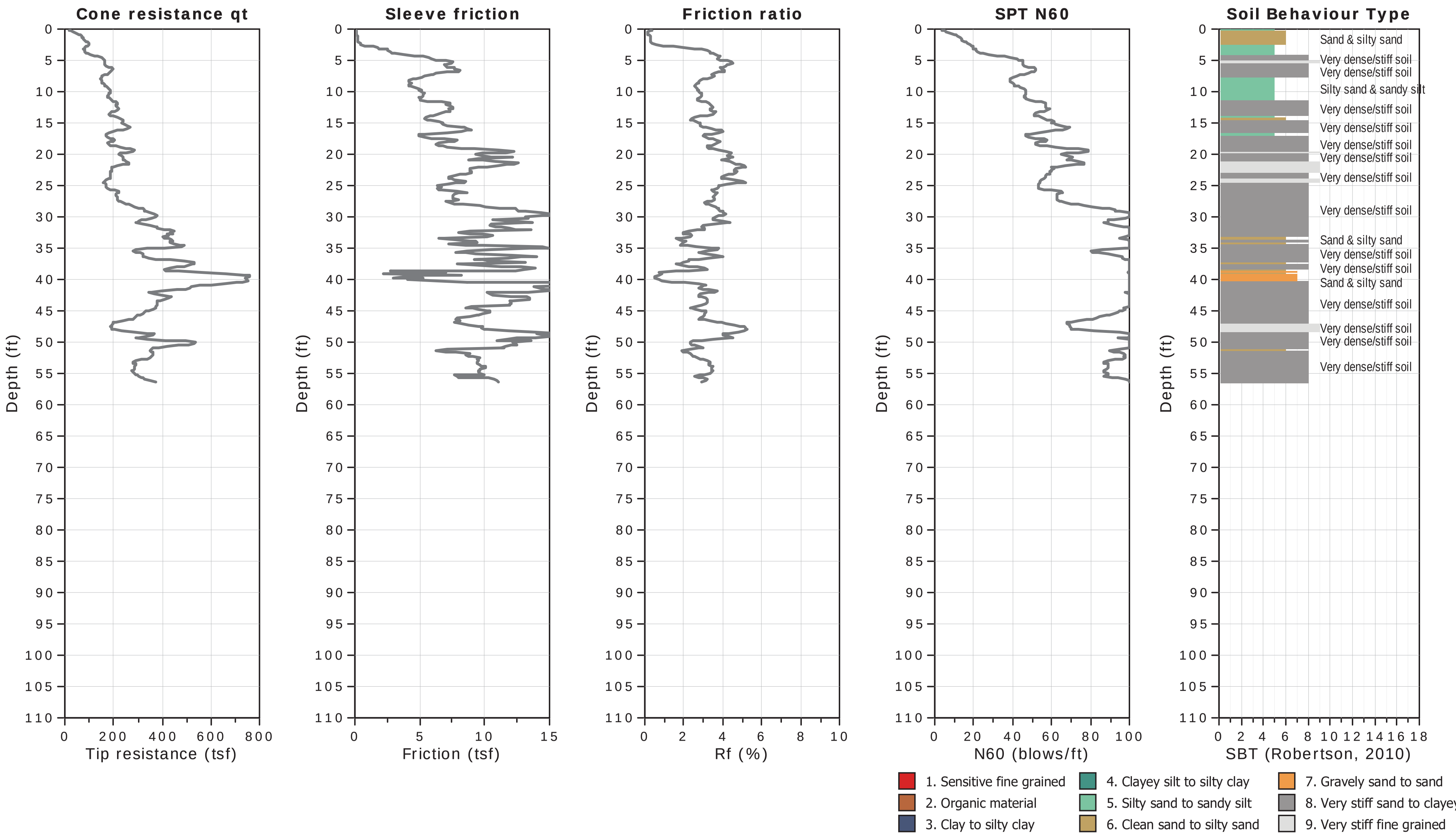
CPT: BVS-207

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 56.27 ft, Date: 5/1/2020



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

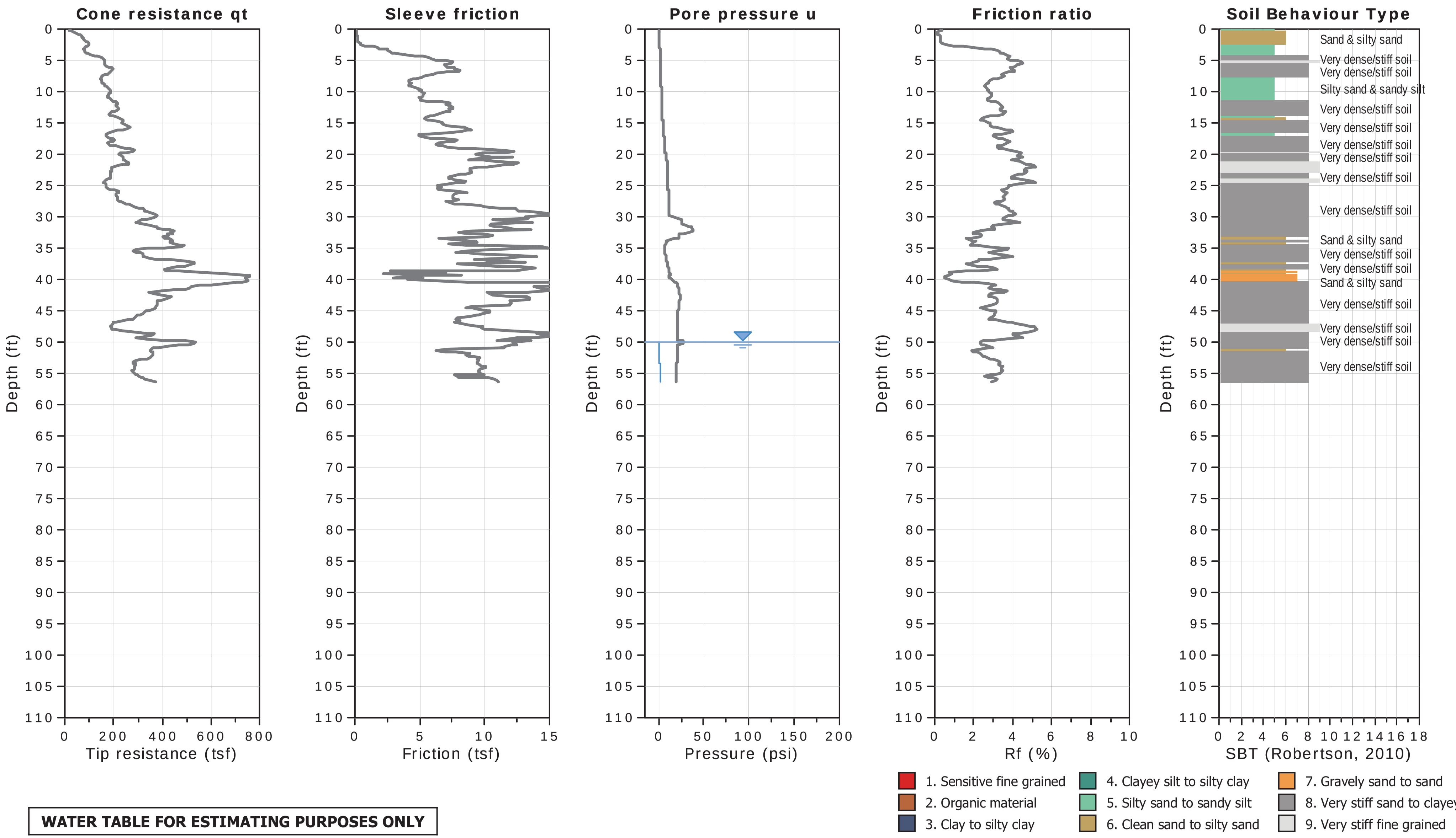
CPT: BVS-207

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 56.27 ft, Date: 5/1/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

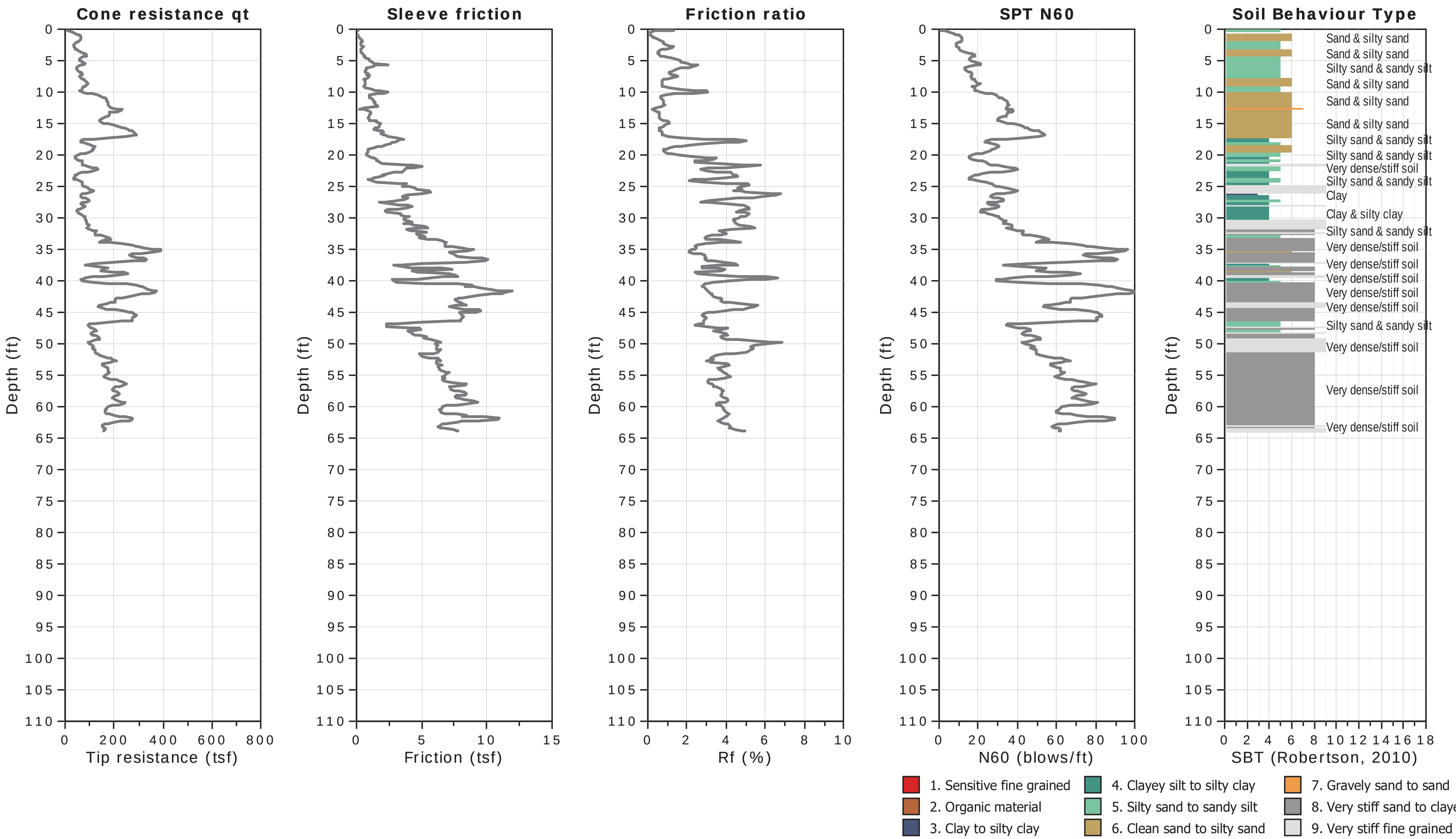
CPT: BVS-208

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 63.98 ft, Date: 5/1/2020

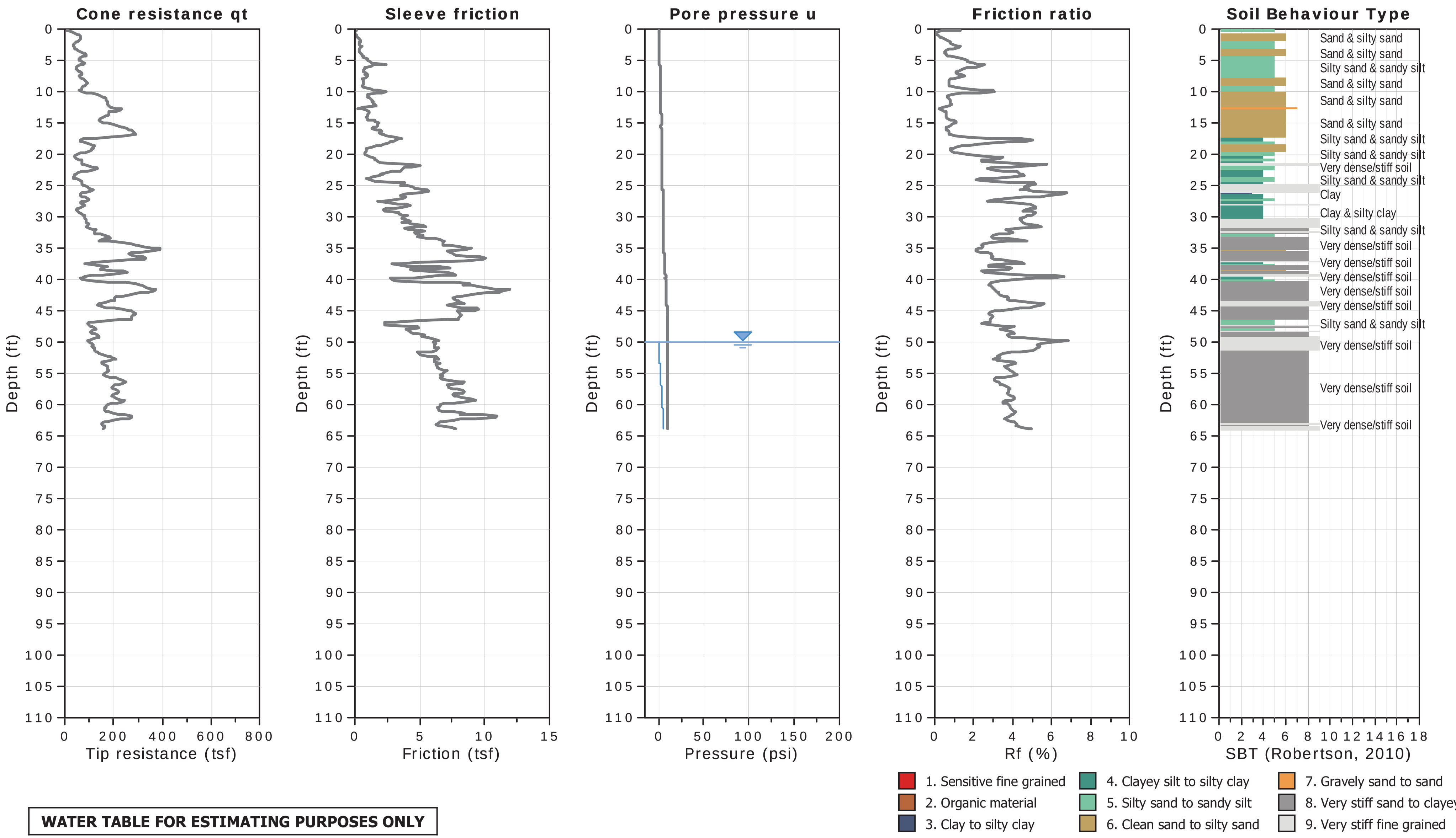


GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-208

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 63.98 ft, Date: 5/1/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

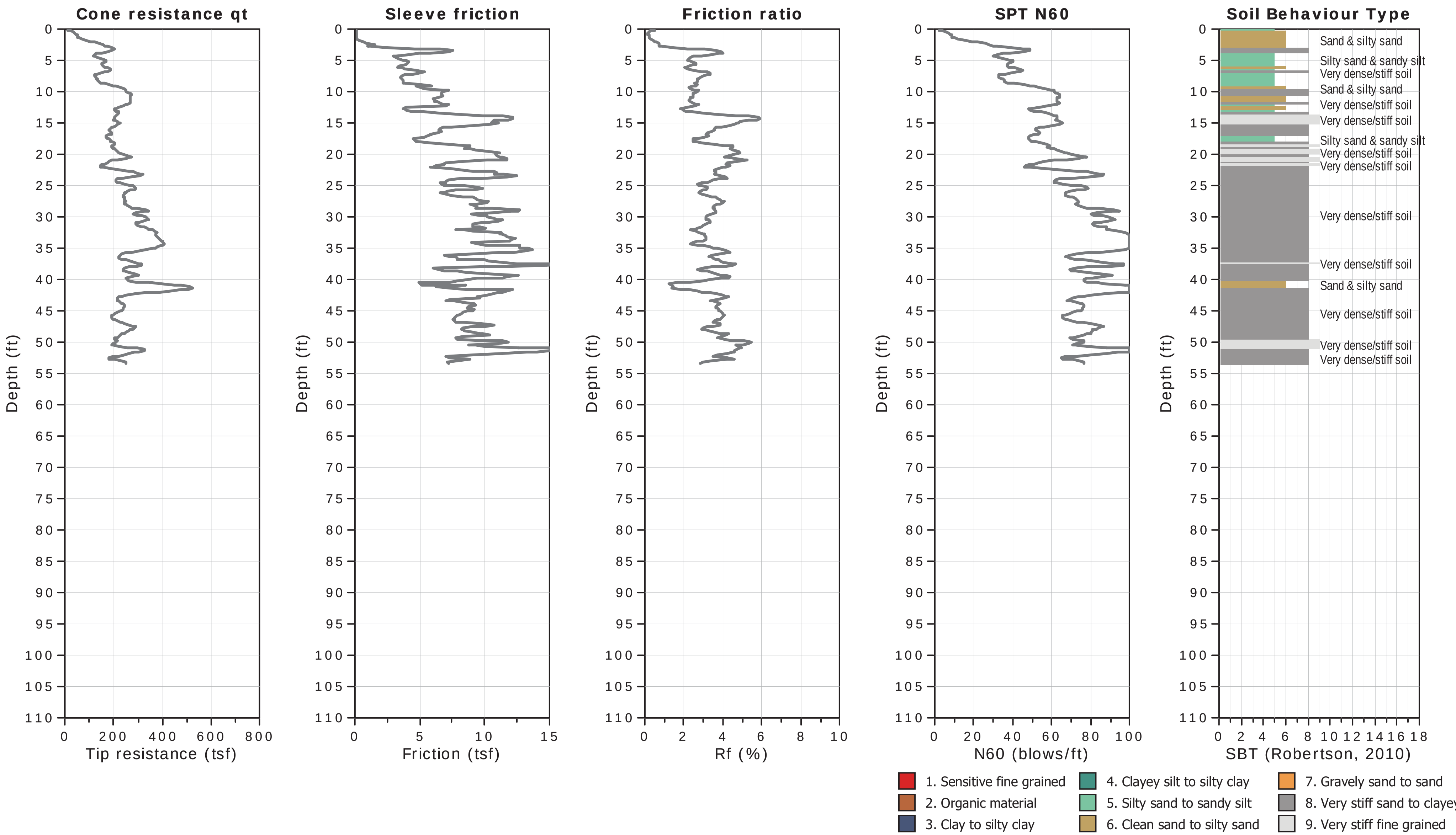
CPT: BVS-209

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 53.31 ft, Date: 5/1/2020

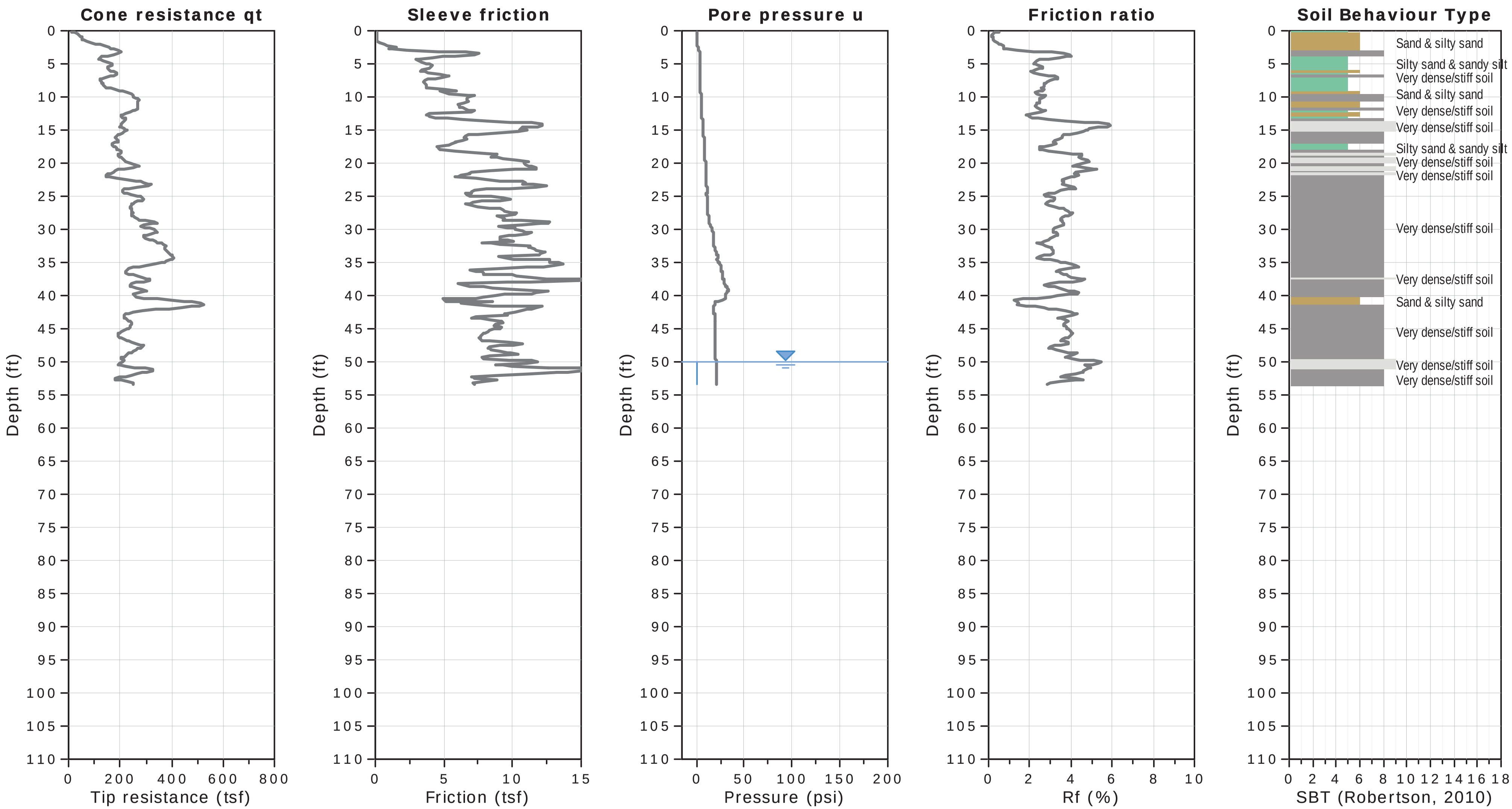


GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-209

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 53.31 ft, Date: 5/1/2020



1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

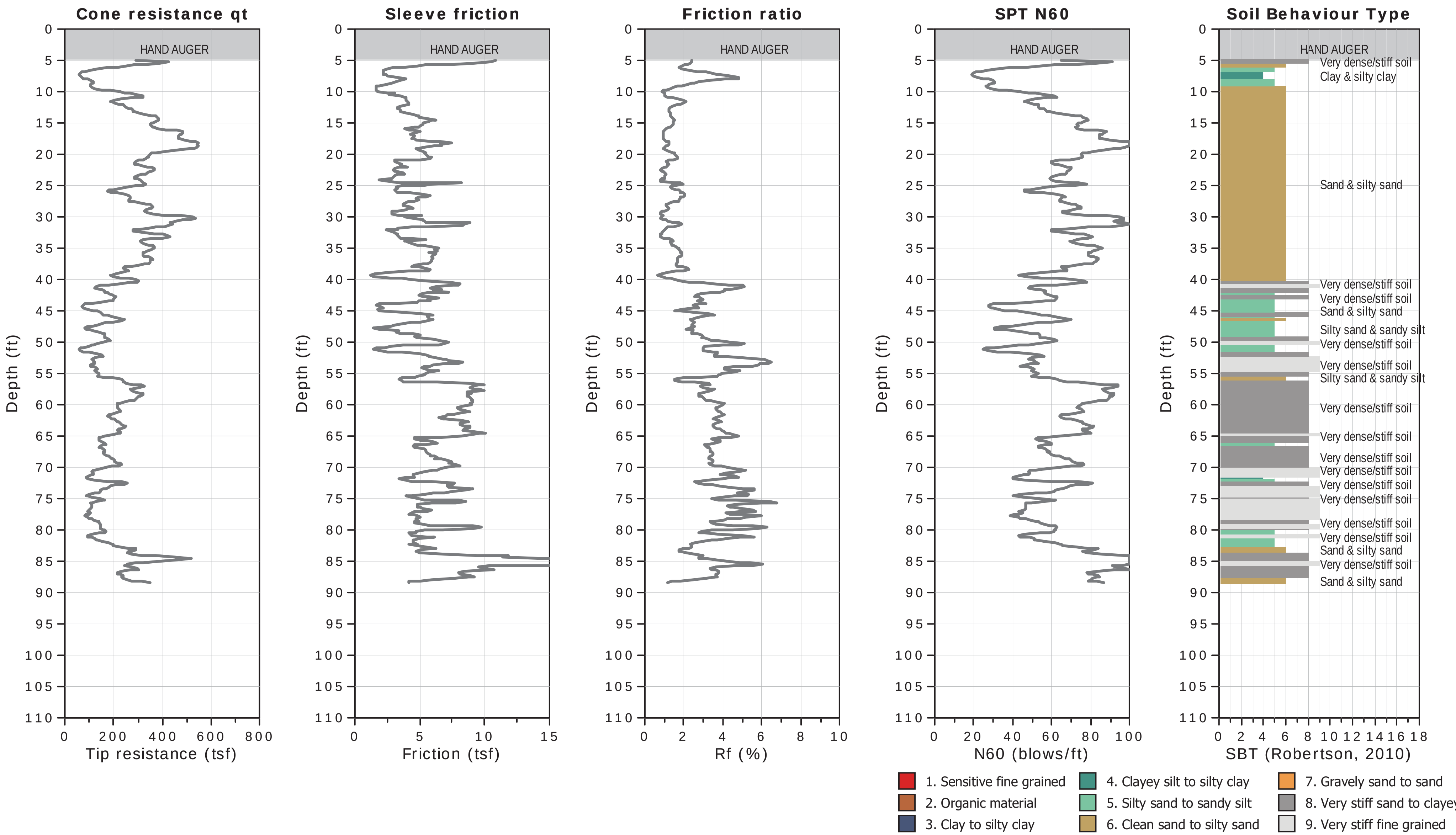
CPT: BVS-210

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 88.42 ft, Date: 4/30/2020

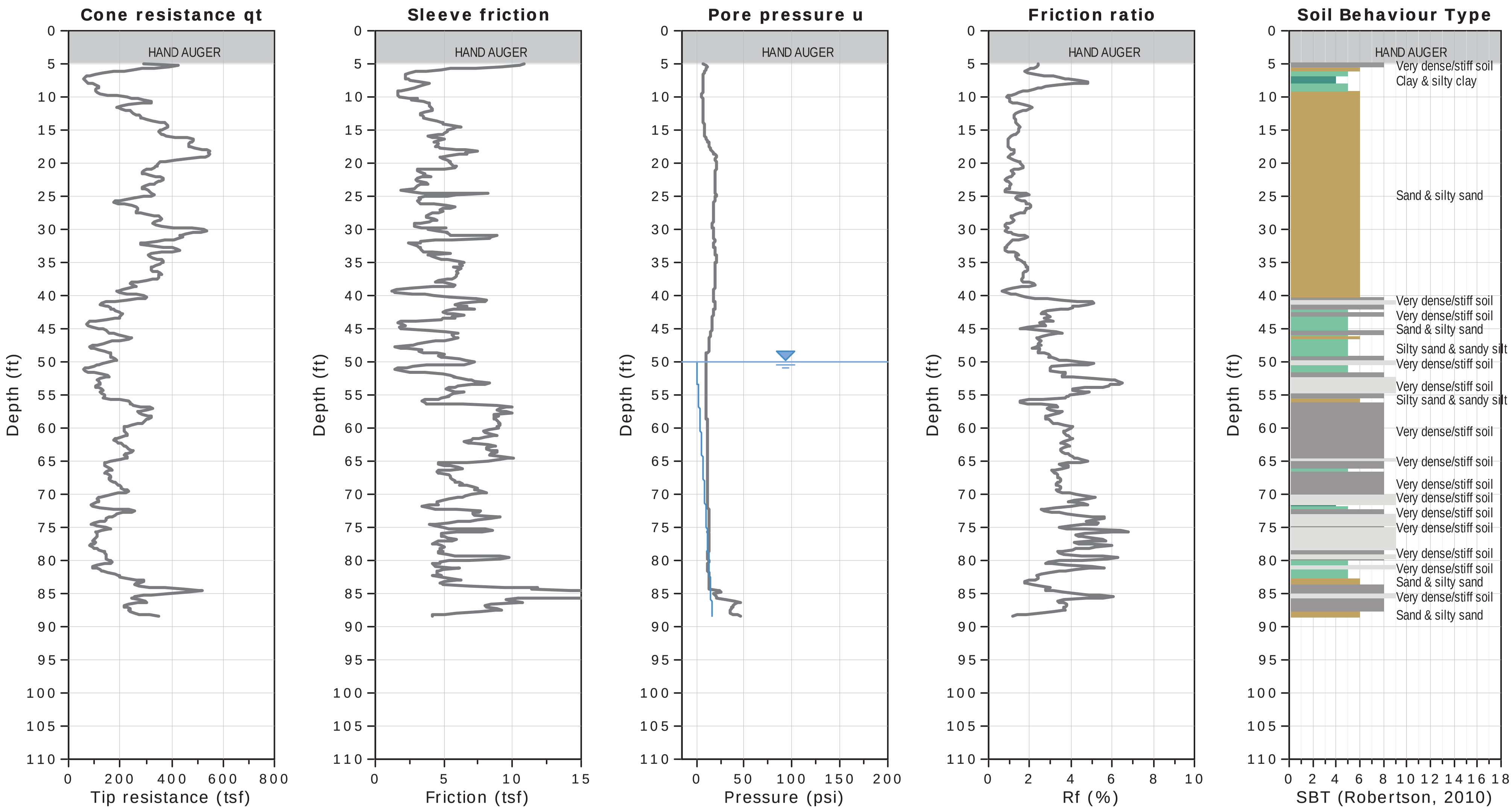


GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-210

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 88.42 ft, Date: 4/30/2020



1. Sensitive fine grained
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5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

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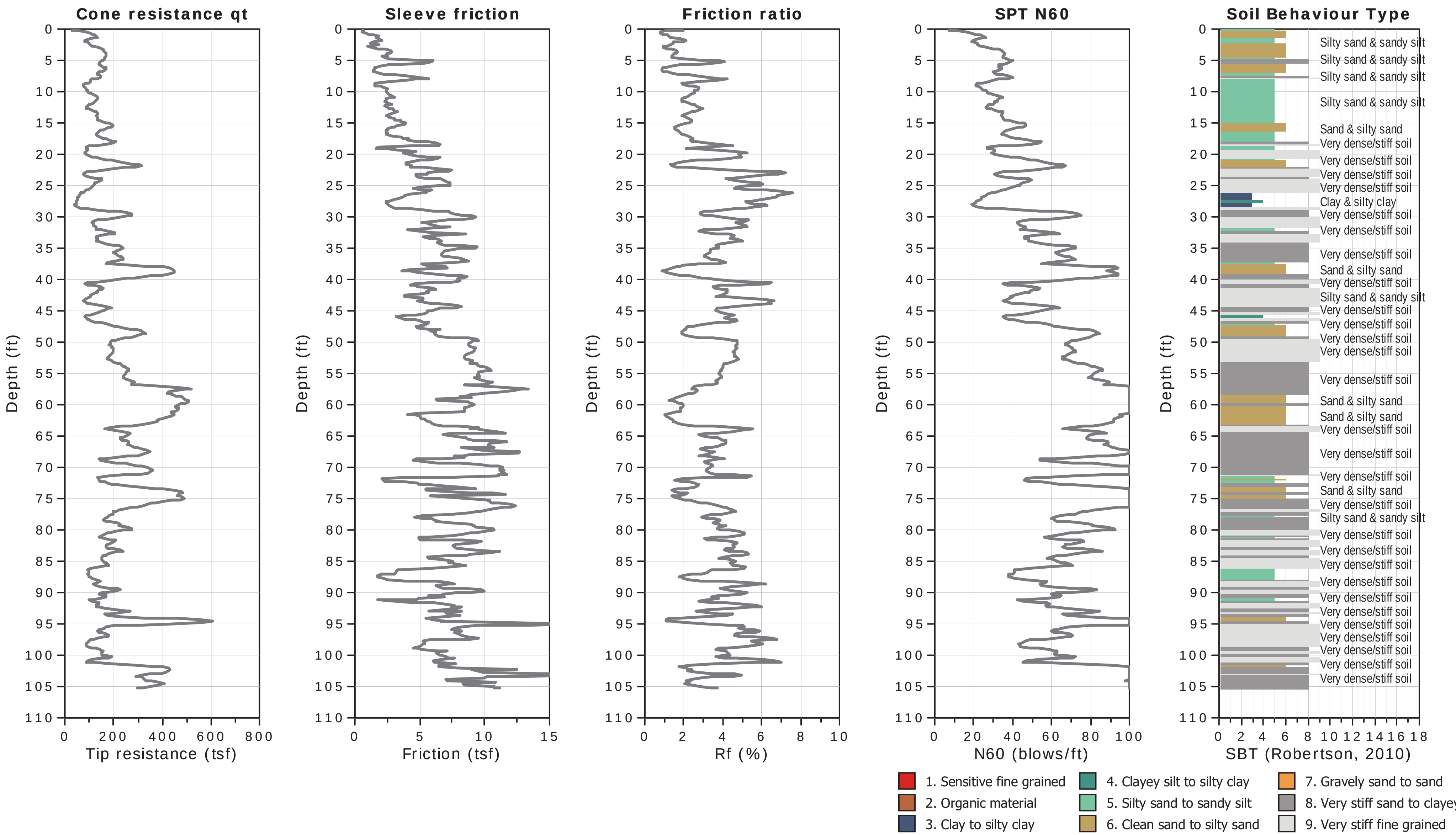
Project file: C:\CPT-2020\205045SH\REPORT\205045sh.cpt

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT: BVS-211

CLIENT: TERRACON
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H
Total depth: 105.31 ft, Date: 4/30/2020



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GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

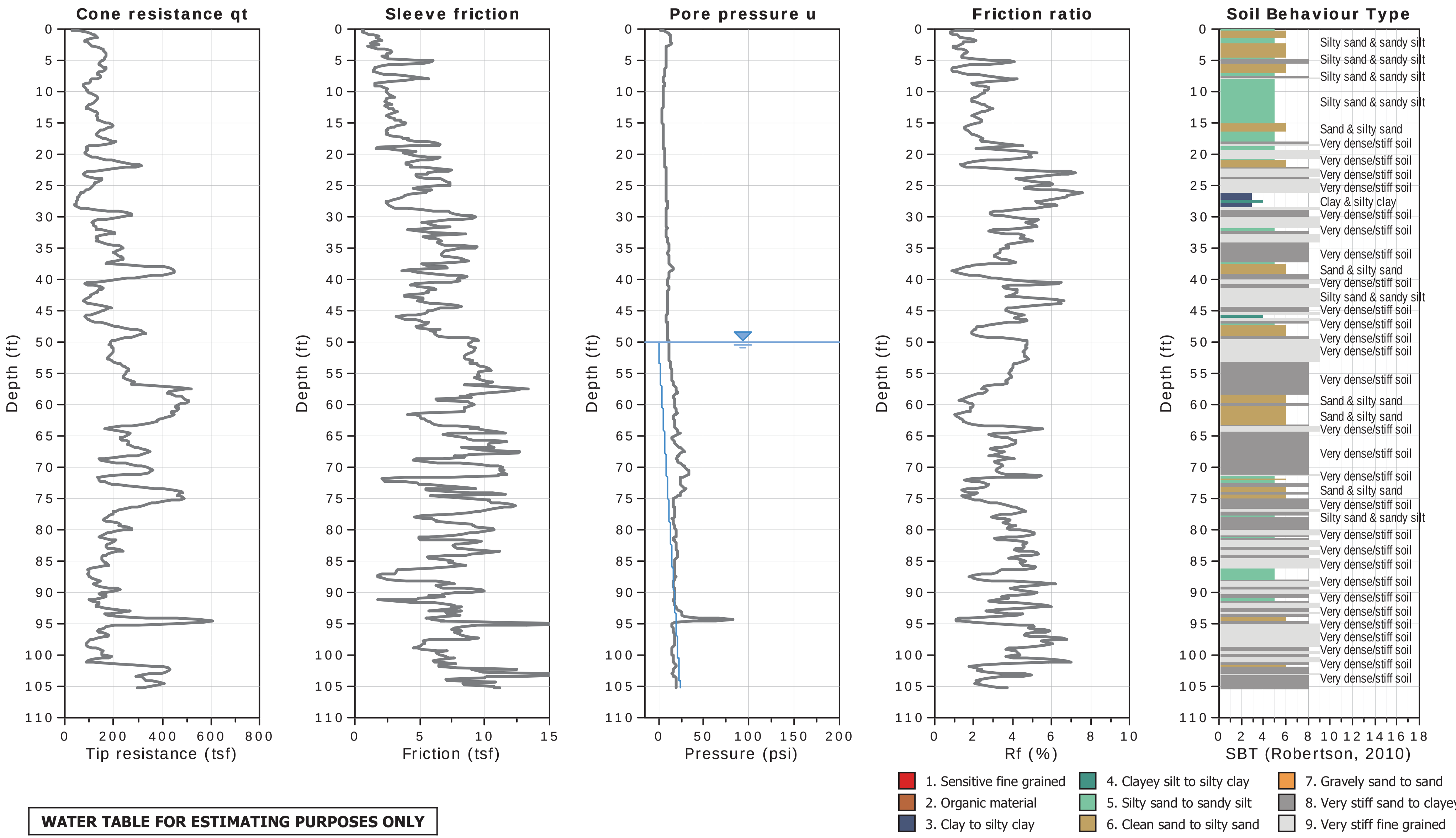
CPT: BVS-211

CLIENT: TERRACON

SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 105.31 ft, Date: 4/30/2020



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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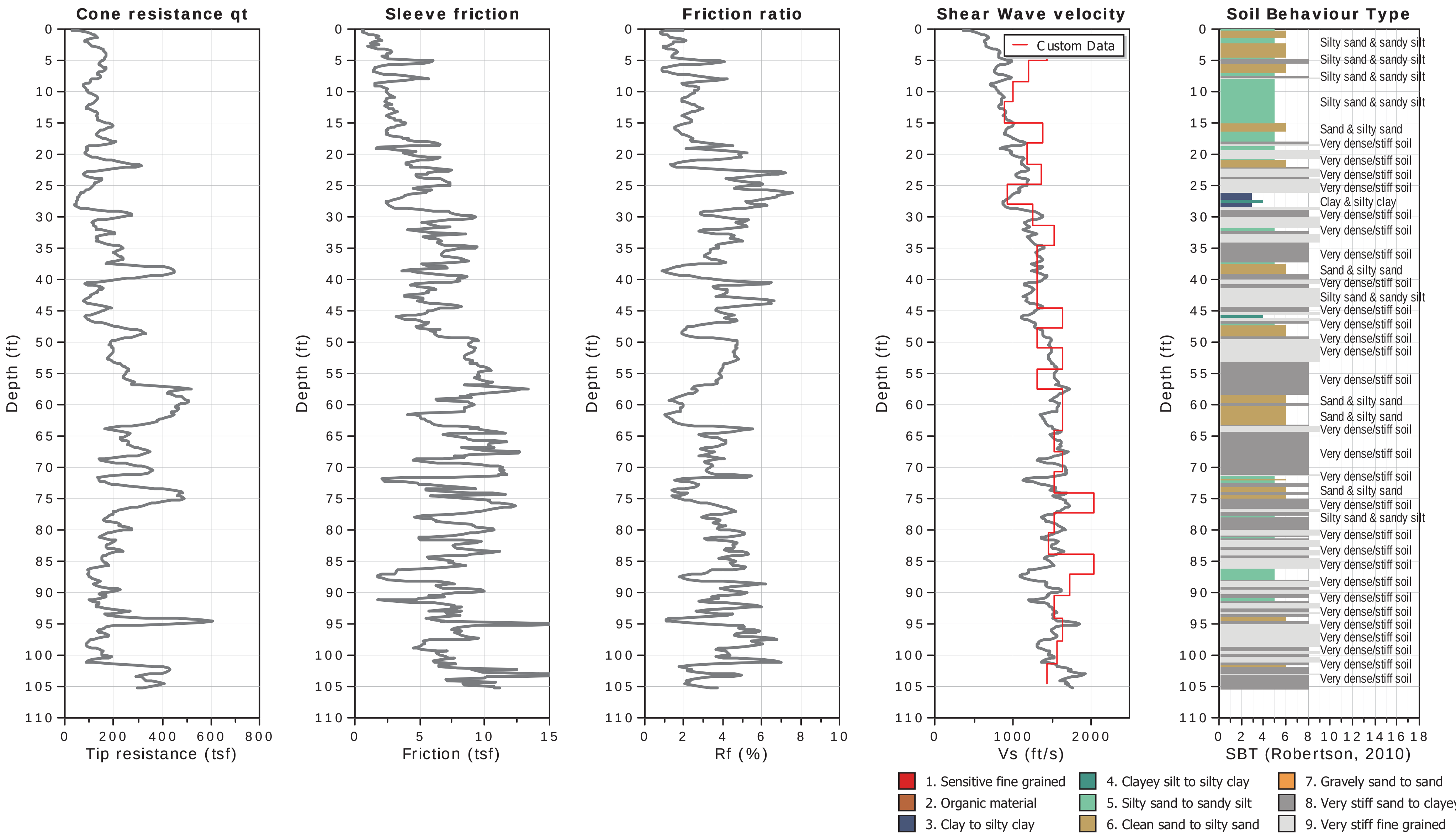
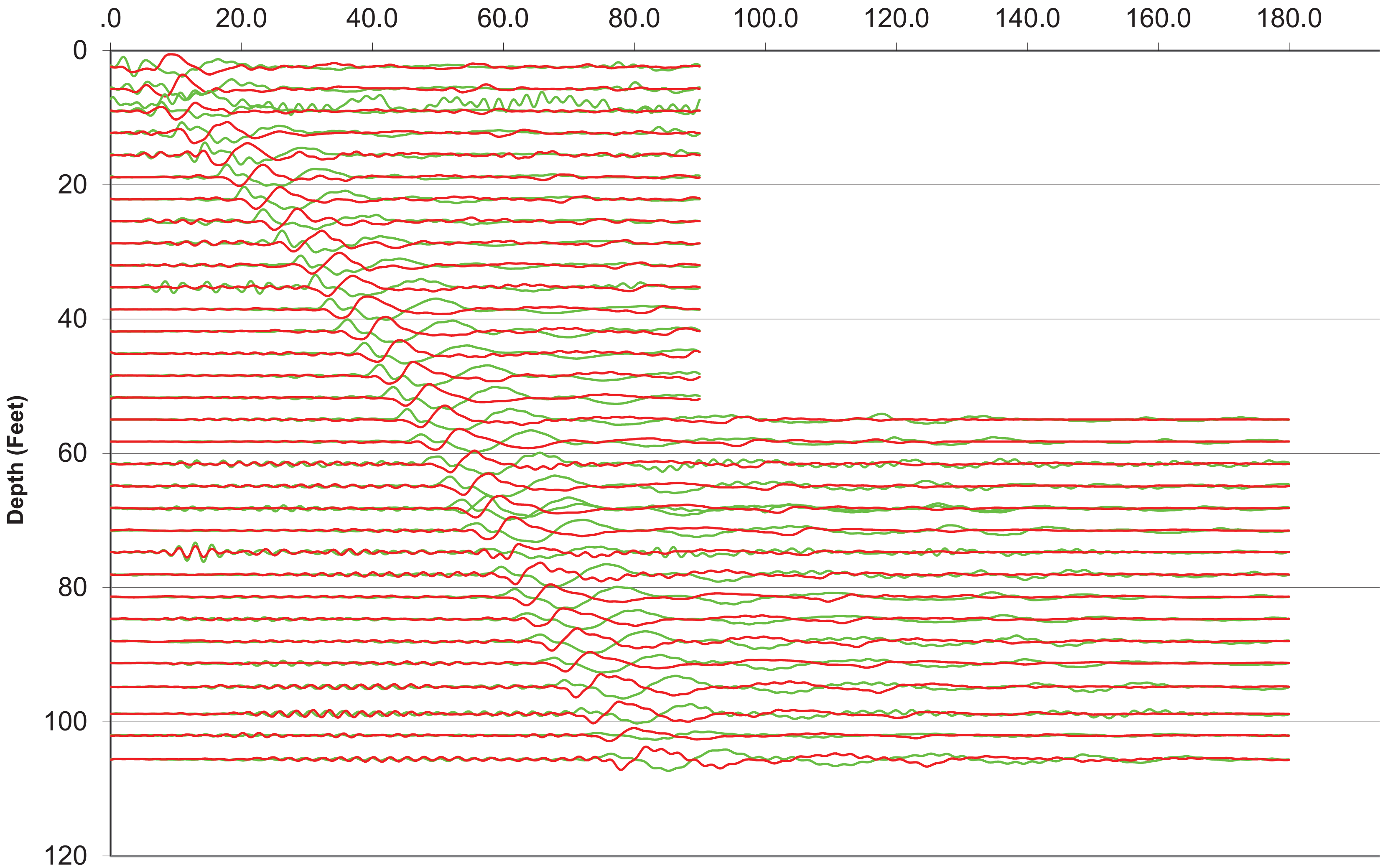
SITE: ADELANTO CONVERTER STATION, ADELANTO, CA

FIELD REP: RYAN H

Total depth: 105.31 ft, Date: 4/30/2020



Waveforms for Sounding BVS-211



Shear Wave Velocity Calculations

ADELANTO CONVERTER STATION

BVS-211

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/30/20

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
2.46	1.80	2.46	2.46	7.2000			
5.74	5.08	5.35	2.89	9.2000	2.0000	1446.5	3.44
9.02	8.36	8.53	3.18	11.8500	2.6500	1199.5	6.72
12.30	11.64	11.76	3.23	15.1000	3.2500	995.3	10.00
15.58	14.92	15.02	3.25	18.7500	3.6500	891.7	13.28
18.86	18.20	18.28	3.26	21.1000	2.3500	1389.0	16.56
22.15	21.49	21.55	3.27	23.8500	2.7500	1188.8	19.85
25.43	24.77	24.82	3.27	26.2500	2.4000	1363.4	23.13
28.71	28.05	28.10	3.27	29.7500	3.5000	935.5	26.41
31.99	31.33	31.37	3.28	32.3500	2.6000	1259.9	29.69
35.27	34.61	34.65	3.28	34.5000	2.1500	1524.0	32.97
38.55	37.89	37.93	3.28	37.0000	2.5000	1310.9	36.25
41.83	41.17	41.20	3.28	39.5000	2.5000	1311.2	39.53
45.11	44.45	44.48	3.28	42.0000	2.5000	1311.3	42.81
48.39	47.73	47.76	3.28	44.0000	2.0000	1639.3	46.09
51.67	51.01	51.04	3.28	46.5000	2.5000	1311.6	49.37
54.95	54.29	54.32	3.28	48.5000	2.0000	1639.6	52.65
58.23	57.57	57.60	3.28	51.0000	2.5000	1311.7	55.93
61.52	60.86	60.88	3.28	53.0000	2.0000	1639.8	59.22
64.80	64.14	64.16	3.28	55.0000	2.0000	1639.8	62.50
68.08	67.42	67.44	3.28	57.1500	2.1500	1525.5	65.78
71.36	70.70	70.72	3.28	59.1500	2.0000	1639.9	69.06
74.64	73.98	74.00	3.28	61.3000	2.1500	1525.6	72.34
77.92	77.26	77.28	3.28	62.9000	1.6000	2050.0	75.62
81.20	80.54	80.56	3.28	65.0500	2.1500	1525.6	78.90
84.48	83.82	83.84	3.28	67.3000	2.2500	1457.8	82.18
87.76	87.10	87.12	3.28	68.9000	1.6000	2050.1	85.46
91.04	90.38	90.40	3.28	70.8000	1.9000	1726.4	88.74
94.49	93.83	93.84	3.44	73.0500	2.2500	1530.8	92.11
98.59	97.93	97.94	4.10	75.5500	2.5000	1640.2	95.88
101.87	101.21	101.22	3.28	77.6500	2.1000	1562.1	99.57
105.31	104.65	104.67	3.44	80.0500	2.4000	1435.2	102.93

Appendix D. Downhole Seismic Testing and In Situ Electrical Soil Resistivity Survey 2020 Geotechnical Investigation

GEOPHYSICAL EVALUATION

IPP RENEWAL PROJECT
ADELANTO HVDC CONVERTER STATION
ADELANTO, CALIFORNIA

PREPARED FOR:

Terracon
1421 Edinger Avenue, Suite C
Tustin, CA 92780

PREPARED BY:

Southwest Geophysics, LLC
6280 Riverdale Street, Suite 200
San Diego, CA 92120

April 13, 2020
Project No. 120112SWG

ATLAS
SOUTHWEST GEOPHYSICS LLC
YOUR SUBSURFACE SOLUTION

April 13, 2020 Project No. 120112SWG

Mr. Ryan Hankes
Terracon
1421 Edinger Avenue, Suite C
Tustin, CA 92780

Subject: GEOPHYSICAL EVALUATION
IPP RENEWAL PROJECT
ADELANTO HVDC CONVERTER STATION
ADELANTO, CALIFORNIA

Dear Mr. Hankes:

In accordance with your authorization, we have performed geophysical evaluation services pertaining to a portion of the existing Adelanto Converter Station located at 16401-16499 Aster Road in Adelanto, California (Figures 1 and 2). Our understanding is that as part of the IPP Renewal Project for the related electrical generating station located in Delta, Utah, and the transmission lines carrying generated high voltage direct current (DC) power to the Adelanto Station, new high voltage HVDC converter station related construction is planned at the existing Adelanto HVDC Station in Adelanto, California. The purpose of our evaluation was to provide borehole buried utility designation services for your specified 29 proposed borehole locations, collect in-situ orthogonal electrical resistivity Wenner array measurements for your specified seven locations, and conduct surface to downhole seismic testing at borehole BVB-109.

We appreciate the opportunity to be of service on this project. Should you have any questions please contact the undersigned at your convenience.

Respectfully submitted,
SOUTHWEST GEOPHYSICS, LLC

Paul Neuberger
Staff Geophysicist

Mark D. Edwards, R.G. (Arizona)
Principal Geologist/Geophysicist

REGISTERED GEOPHYSICIST
PATRICK F. LEHRMANN
No. 1043
Exp. 1/31/22
STATE OF CALIFORNIA

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

PN/MDE/PFL/pfl/ds

Distribution: Mr. Ryan Hankes, Terracon at Ryan.Hankes@terracon.com

ATLAS SOUTHWEST GEOPHYSICS LLC
YOUR SUBSURFACE SOLUTION

TABLE OF CONTENTS

SECTION **PAGE**

FIGURES

ATTACHMENTS – ELECTRONIC FILES VIA EMAIL

Microsoft Excel format "In Situ Electrical Soil Resistivity Measurement Data Form, Revision 0" for Lines RL-1 through RL-7' as per Black & Veatch Project RFP Specification.

Microsoft Excel format and Waveform Plots as JPEG Images for Downhole Test Data at BVB-109 (DH-1) as per Black & Veatch Project RFP Specification.

1. INTRODUCTION

In accordance with your authorization, we have performed geophysical evaluation services pertaining to a portion of the existing Adelanto Converter Station located at 16401-16499 Aster Road in Adelanto, California (Figures 1 and 2). Our understanding is that as part of the IPP Renewal Project for the related electrical generating station located in Delta, Utah, and the transmission lines carrying generated high voltage direct current (DC) power to the Adelanto Station, new high voltage HVDC converter station related construction is planned at the existing Adelanto HVDC Station in Adelanto, California. The purpose of our evaluation was to provide borehole buried utility designation services for your specified 29 proposed borehole locations, collect in-situ orthogonal electrical resistivity Wenner array measurements for your specified seven locations, and conduct surface to downhole seismic testing at borehole BVB-109. Our services were conducted on February 24 through February 28, and March 9 of 2020. This report presents the evaluation methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Utility designations at 14 proposed geotechnical soil boring locations, 11 proposed seismic cone penetrometer test (SCPT) locations, and four proposed test pit locations to an approximate 10-foot radius at each location (29 total locations evaluated). Our utility designations utilized a Schonstedt GA-52 magnetic gradiometer, Geonics model EM61 time domain instrument, Fisher M-Scope TW-6 pipe and cable locator, Radiodetection RD 4000 utility line tracer and locator, and GSSI SIR 3000 Ground Penetrating Radar (GPR) unit using a 400 MHz transducer. Detected utilities were marked in the field with surface marking paint, where utility conflicts were detected suggested revised boring locations absent detected conflicts were marked in the field and communicated to your site representative.
- Collection of in-situ electrical resistivity measurements using an AGI SuperSting R8 earth resistivity meter for your specified seven locations (RL-1 through RL-7'), each location consisted of two orthogonal Wenner array resistivity lines.
- Performance of surface to downhole seismic testing at BVB-109 (DH-1).
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results.

3. SITE AND PROJECT DESCRIPTION

The project site is located at 16401-16499 Aster Road in Adelanto, California. The geophysical evaluations were performed within the confines of the existing converter station with the exception of two pairs of resistivity lines (RL-1, RL-1' and RL-2, RL-2') which were performed off site south of the converter station on two undeveloped properties south of Pansy Road. The study area in which the resistivity evaluations were performed predominantly consisted of unpaved terrain crossed by dirt roads with moderate vegetation including Joshua trees, creosote bushes, and other desert shrubs. The surface of the study area in which borehole clearance was performed consisted of existing developed converter station areas of gravel, paved, and unpaved areas with little vegetation.

We conducted pairs of nearly orthogonal resistivity soundings at your seven specified test locations (14 resistivity lines total). Measurements collected in a roughly north-south or northwest-southeast direction are designated as RL-1 through RL-7. Corresponding measurements per orthogonal line at each test location collected in roughly an east-west or northeast-southwest direction are given a prime designation (e.g., RL-1 through RL-7'). Figure 2 indicates each sounding location and Figures 3a, 3b, 3c, and 3d depict the general site conditions.

The resistivity data were collected in general accordance with IEEE Std. 81 and ASTM G57 using an Advanced Geosciences, Inc. (AGI) SuperSting R8 eight channel earth resistivity meter and four stainless steel electrodes in a Wenner configuration. Soil resistance measurements were collected at each of the locations using your specified electrode spacings, namely 1, 2, 3, 6, 10, 20, 30, 60, 100, 200, and 300 feet for locations RL-1 through RL-2'; 1, 2, 3, 6, 10, 20, 30, 60, and 100 feet at RL-3 through Rl-4'; and 1, 2, 3, 6, 10, 20, and 30 feet at RL-5 through RL-7'. Stainless steel electrodes were hammered into place and the soils surrounding the electrodes were moistened with a few milliliters of saline water (potable water with added table salt) to help overcome soil contact resistance.

The downhole seismic evaluation (DH-1) was performed at BVB-109. We used a 2⅜-inch diameter polyvinyl chloride (PVC) casing which was grouted in place by your drilling contractor to approximately 107 feet below ground surface (bgs) for the purpose of our surface to downhole seismic testing. The depth of BVB-109 was measured by us with a weighted measuring tape just prior to our surface to downhole test.

4. GEOPHYSICAL INSTRUMENTATION AND APPLICATIONS

Our utility conflict check evaluation included the use of a Geonics model EM61, GSSI SIR 3000 GPR, Schonstedt, model GA-52C magnetic gradiometer, Radiodetection RD 4000 utility line tracer and locator, a Fisher M-Scope TW-6 pipe and cable locator. These instruments provide real-time results and facilitate the delineation of subsurface features.

Our resistivity evaluation included use of an AGI Super Sting R8 resistivity meter. Our surface to downhole evaluation used a 24 channel Geometrics Geode seismograph and BHG-2 triaxial geophone.

4.1 UTILITY EVALUATION

4.1.1 EM61

The EM61 instrument is a high resolution, time-domain device for detecting buried conductive objects. It consists of a powerful transmitter that generates a pulsed primary magnetic field when its coils are energized, which induces eddy currents in nearby conductive objects. The decay of the eddy currents, following the input pulse, is measured by the coils, which in turn serve as receiver coils. The decay rate is measured for two coils, mounted concentrically, one above the other. By making the measurements at a relatively long time interval (measured in milliseconds) after termination of the primary pulse, the response is nearly independent of the electrical conductivity of the ground. Thus, the instrument is a super-sensitive metal detector. Due to its unique coil arrangement, the response curve is a single well-defined positive peak directly over a buried conductive object. This facilitates quick and accurate location of targets. Conductive objects to a depth of approximately 11 feet generally might be detected.

4.1.2 GPR

The GPR instrument transmits energy into the ground from its transducer/antenna, in the form of electromagnetic waves. A portion of this energy is reflected back to the antenna at boundaries in the subsurface across which there are an electrical contrast. The recorder continuously makes a record of the reflected energy as the antenna is moved across the ground surface. The greater the electrical contrast, the higher the amplitude of the returned energy. The EM wave travels at a velocity unique to the material properties of the ground being studied, and when these velocities are known, or closely estimated from ground conductivity values and other information, two-way travel times can be converted to depth. Penetration into the ground and resolution of the GPR images produced are a function of ground electrical conductivity and dielectric constant. Images tend to be graphic, even at relatively considerable depths in sandy soils, but penetration and resolution may be limited in more conductive, clayey, moist ground.

4.1.3 Magnetic Gradiometer

The magnetic gradiometer has two fluxgate magnetic fixed sensors that are passed closely to and over the ground. When not in close proximity to a magnetic object, that is, only in the earth's field, the instrument emits an audible signal at a low frequency. When the instrument passes over buried iron or steel objects (so that the field is significantly different at the two sensors) the frequency of the emitted sound increases. Frequency is a function of the gradient between the two sensors.

4.1.4 RD 4000 Line Tracer Unit

The RD 4000 utility locator transmitters can be connected to the object and a current is impressed on the conductor pipe or cable. The receiver unit is tuned to this same frequency, and it is used to trace the pipe's surface projection away from the riser. The transmitter and receiver can also be used in a non-connect (induction) mode, whereby the transmitter is positioned on the ground and an electromagnetic signal is emitted. In the presence of buried metal pipes and wires, a discrete signal will be induced on the conductor which can be sensed by the receiver. While using the instrument in passive mode, radio and 60 Hz electromagnetic signals produced by utility lines such as telecommunications and live electric lines are detected with the receiver and are traced.

4.1.5 M-Scope Pipe and Cable Locator

The M-Scope TW-6 device energizes the ground by producing an alternating primary magnetic field with alternating current (AC) in the transmitting coil. If conducting materials (including soils) are within the area of influence of the primary field, AC eddy currents are induced to flow in the conductors. A receiving coil senses the secondary magnetic field produced by these eddy currents, and outputs an audio response. The strength of the secondary field is a function of the conductivity of the object, its size, and its depth and position relative to the instrument's two coils. Conductive objects to a depth of approximately 10 feet are sensed. Also, the device is somewhat focused, that is, it is more sensitive to conductors below (and above) the instrument, than to conductors off to the side.

4.2 RESISTIVITY EVALUATION SUPER STING

The AGI Super Sting R8 resistivity meter and stainless-steel electrodes were used to collect electrical resistivity measurements at the project site. For each reading, the Super Sting injects current into the ground through a pair of current electrodes and the resulting electric potential difference between corresponding pair of potential electrodes is measured. The spacing between the current and potential electrodes is equal in the Wenner array, but changes between readings using your specified electrode spacing values. The measurements were collected using an equally spaced Wenner array configuration.

4.3 SURFACE TO DOWNHOLE SEISMIC TEST

One surface to downhole seismic test at location DH-1 (BVB-109) was performed in general accordance with ASTM D7400 at approximate 5 feet intervals in a 107 feet bgs PVC cased boring. The downhole evaluation included the use of a Geometrics 24 channel geode seismograph and a BHG-2 triaxial downhole geophone sensor for the downhole testing.

The first pulse was applied with the geophone sensor located just below the ground surface at about 2 feet bgs. The geophone was oriented to best record the transient pulse based on the source to receiver geometry and the source mechanism used to generate the transient pulse. Remaining pulses were applied within each known stratigraphic unit (using your borehole log for BVB-109), with no greater than 5 feet between sample intervals until the bottom of the casing was reached. The downhole seismic test was concluded at approximately the existing T.D. of the boring depth less approximately 5 feet bgs (due to the downhole seismic geophone tool vertical dimension). As per Black & Veatch's RFP specifications plots of the waveform data for each measurement interval with the location of the first arrival picks used to develop the compression and shear wave, velocity profiles are provided separately from this report via email. Additionally, electronic files for the downhole test in a common format (Microsoft Excel) are also provided for the downhole test compression and shear wave velocity measurements separately from this report via email.

5. RESULTS

The results of our utility evaluation were marked on the ground surface at each of your 14 proposed boreholes, seven SCPT locations, and four test pit locations, and were communicated verbally to your on-site representative from Black & Veatch.

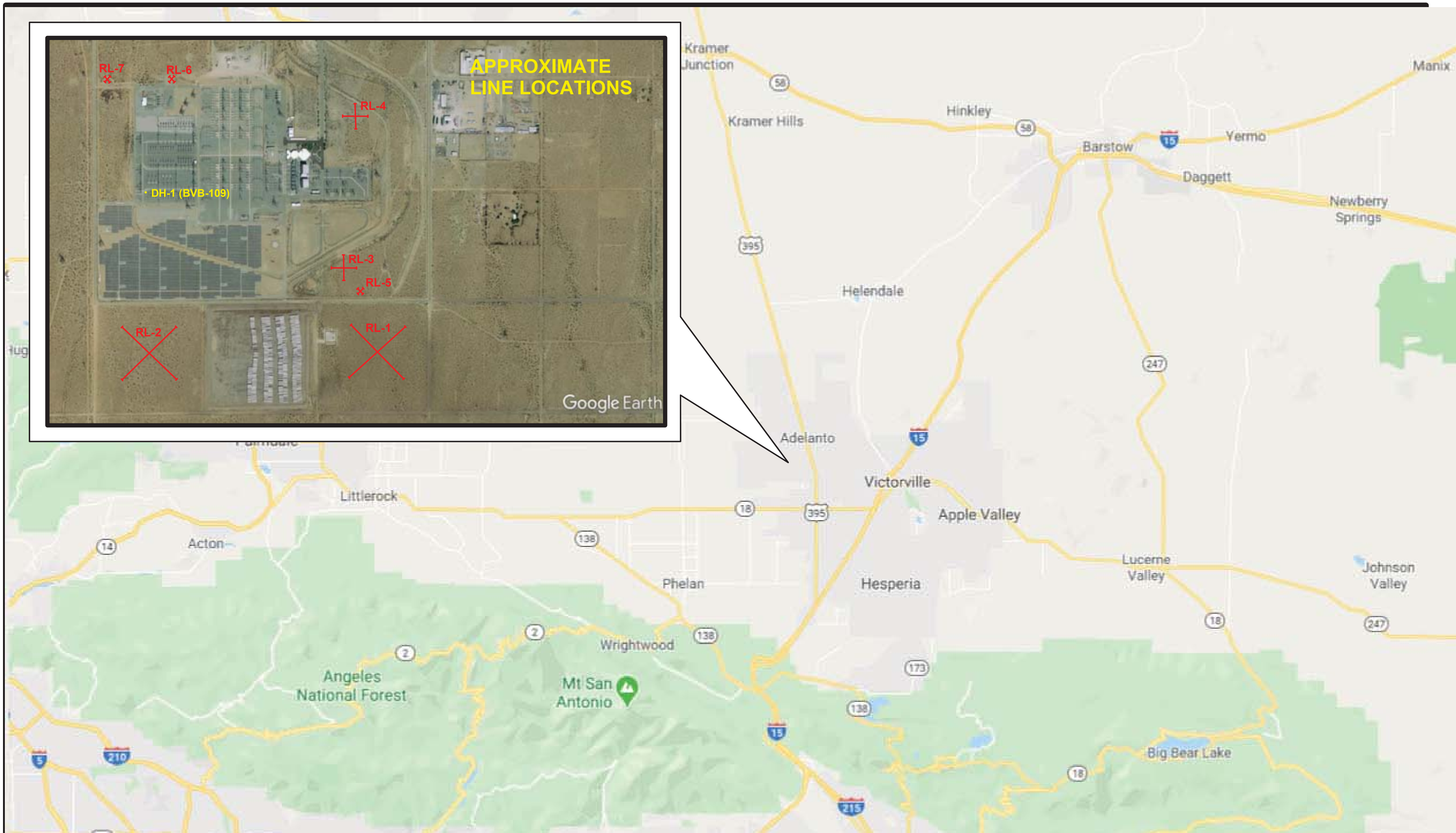
The results of our electrical resistivity evaluations are presented in Figures 4a through 4g, and in separately provided electronic spreadsheet forms you requested. The measurements collected along each of the orthogonal soundings are generally consistent (with some variations mainly in the near surface readings) indicating that the subsurface conditions are fairly uniform with respect to resistivity, especially with increasing depth bgs.

The results of our surface to downhole seismic test are presented in Figure 6, and in electronic spreadsheet and waveform image files that were requested in Black & Veatch's project RFP specifications (provided via email separately from this report). Seismic arrival picks were based on our observed first arrivals of P-waves, and on first zero crossings of reversed polarity S-waves in the seismic record sets. As per your request, surface to downhole results are reported as S-wave interval method velocities (average downhole shear wave velocities per depth interval assuming straight ray paths) in general accordance with ASTM D7400 – 19 sections 8.3 *Data Tabulation* and 8.4.2 *Calculations*.

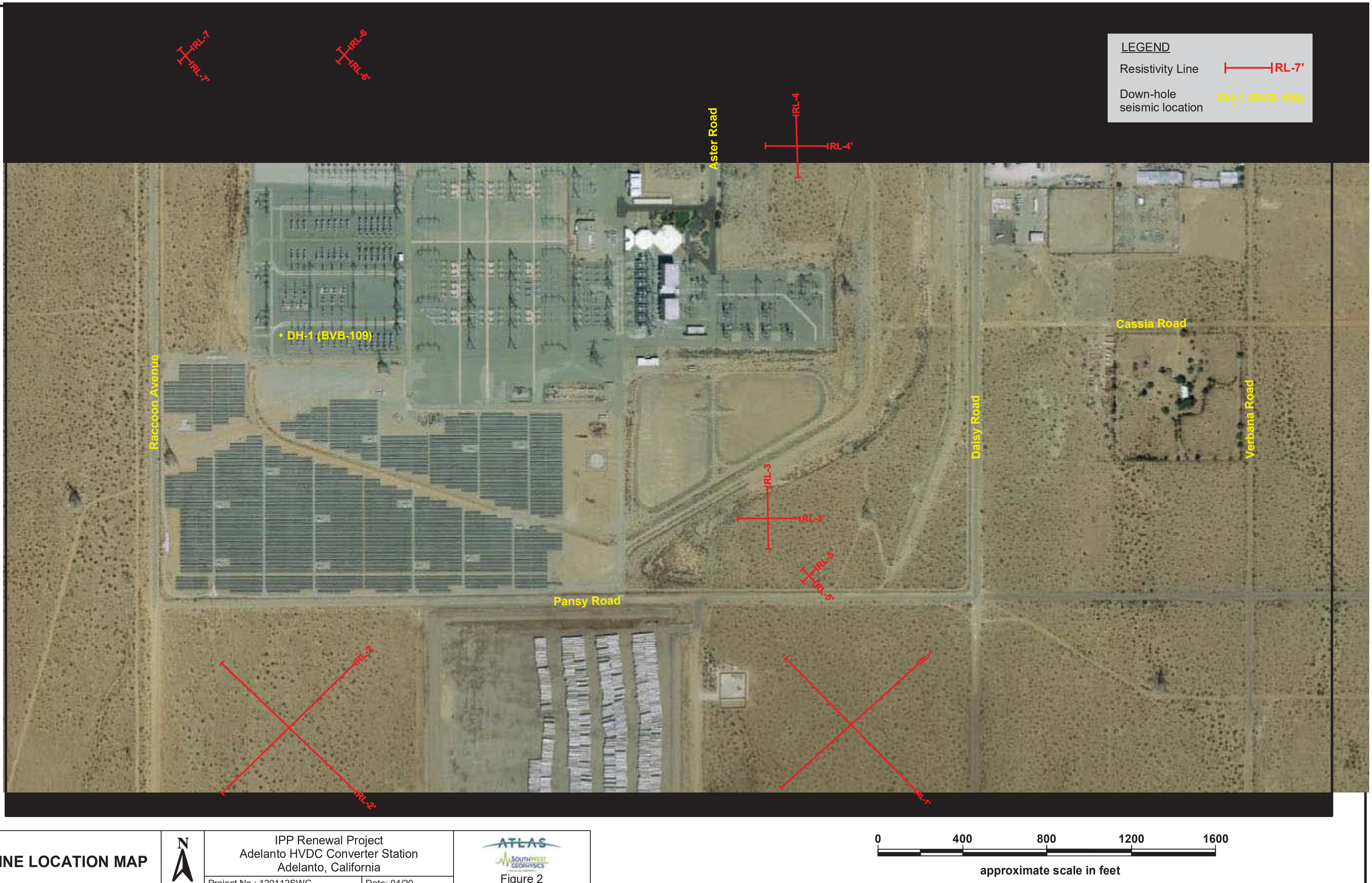
6. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluations will be performed upon request.

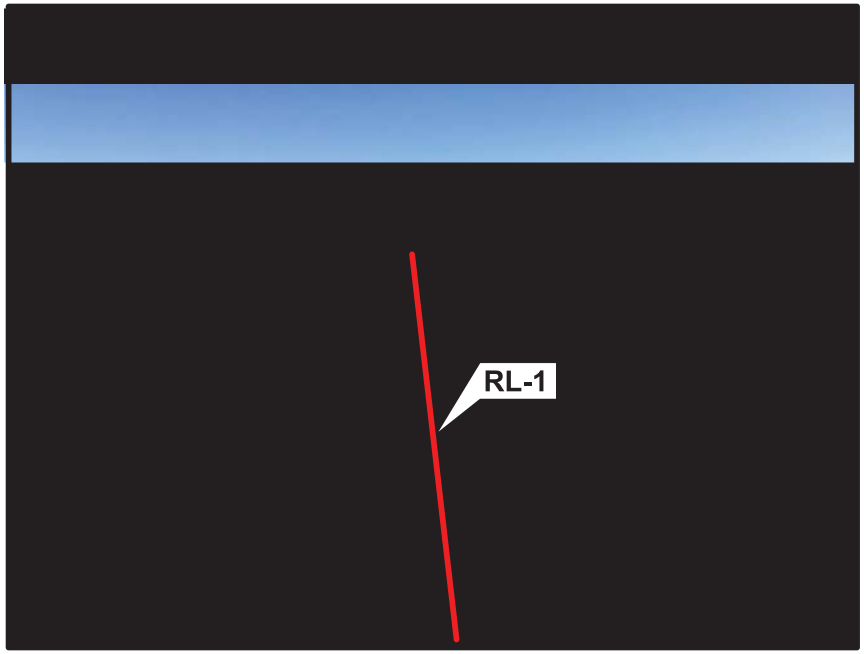
This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, LLC should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

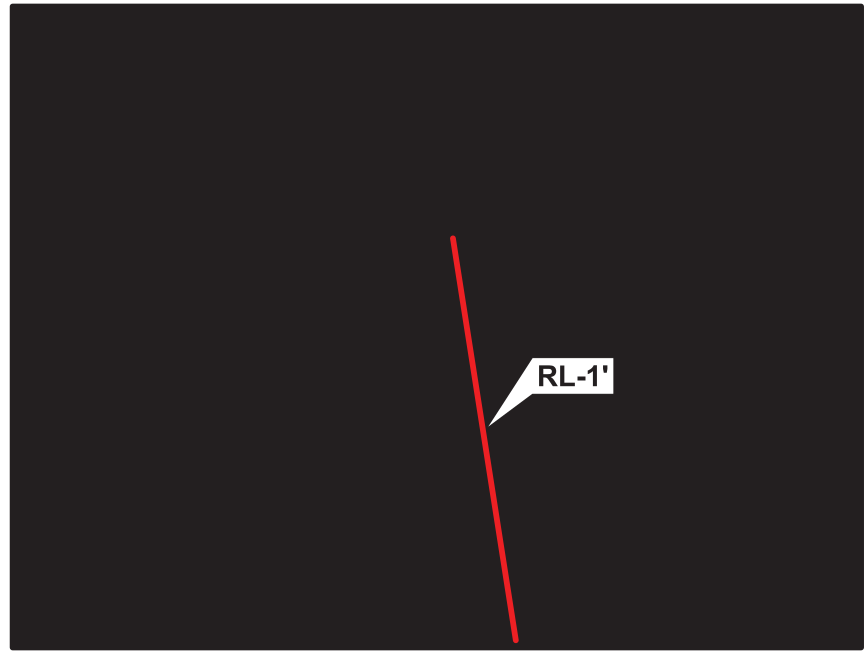


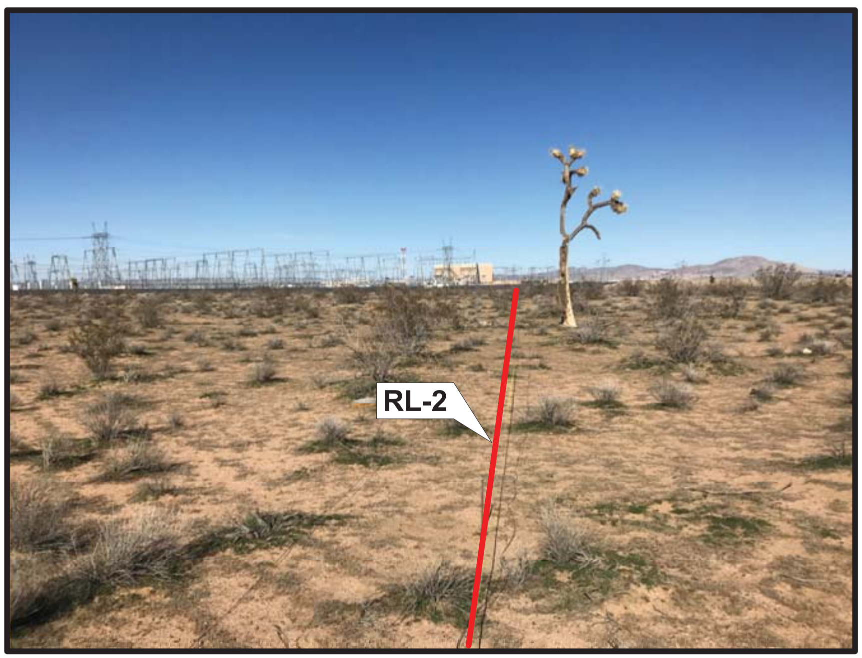
SITE LOCATION MAP	N	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG Date: 04/20	ATLAS SOUTHWEST GEOPHYSICS Figure 1



LINE LOCATION MAP	N	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG — Date: 04/20	ATLAS Southwest Geophysics Figure 2







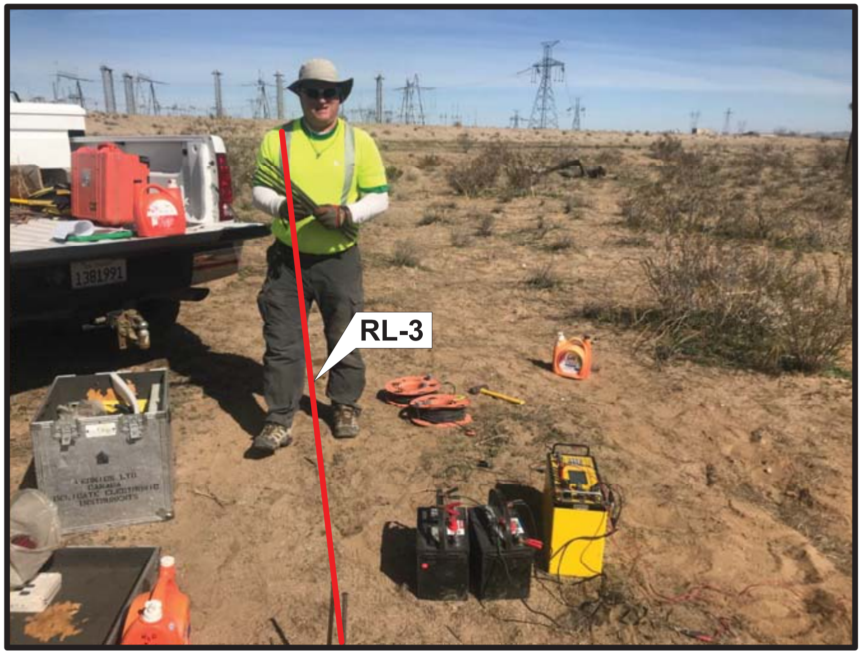
SITE PHOTOGRAPHS
RL-1 through RL-2'

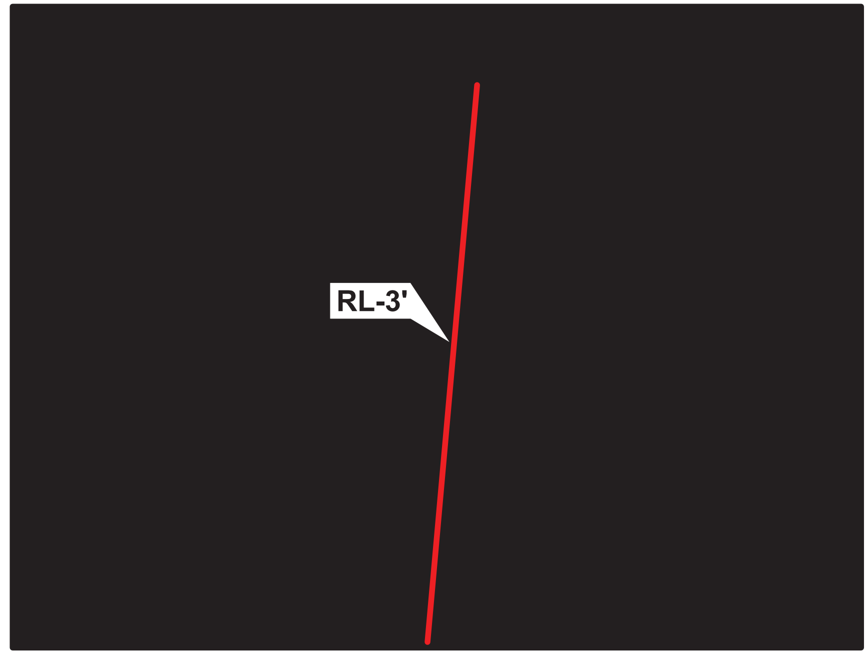
IPP Renewal Project
Adelanto HVDC Converter Station
Adelanto, California

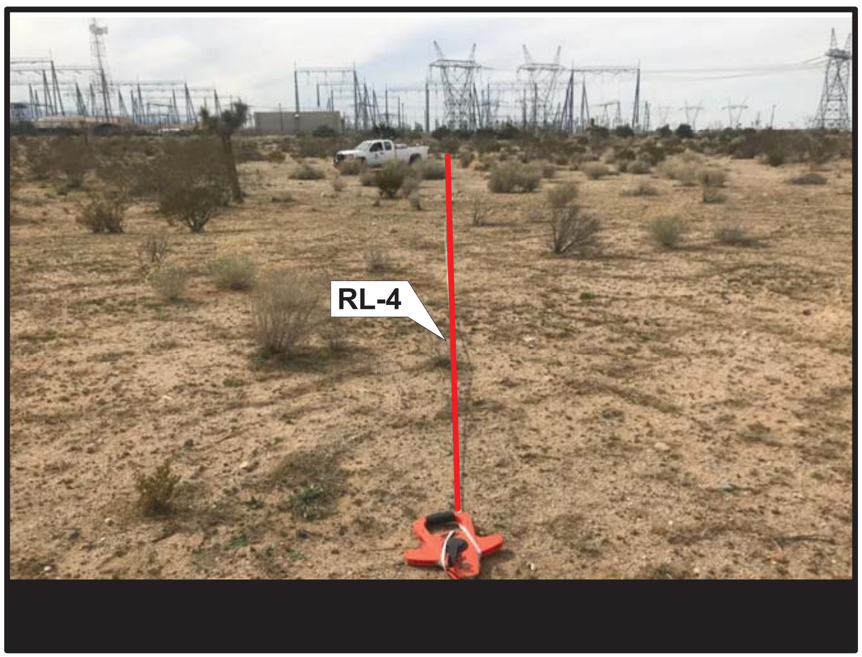
Project No.: 120112SWG | Date: 04/20

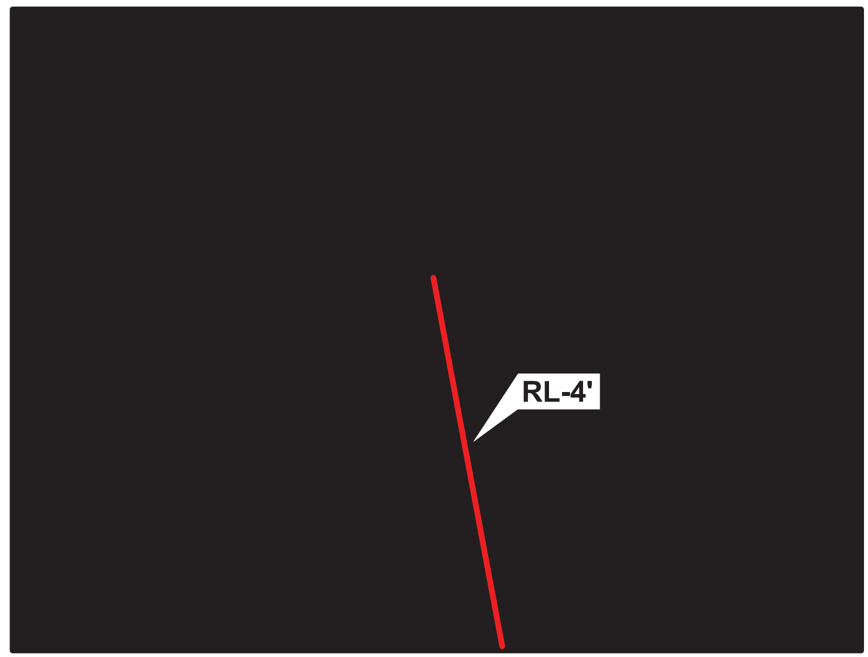
ATLAS SouthWest Geophysics

Figure 3a









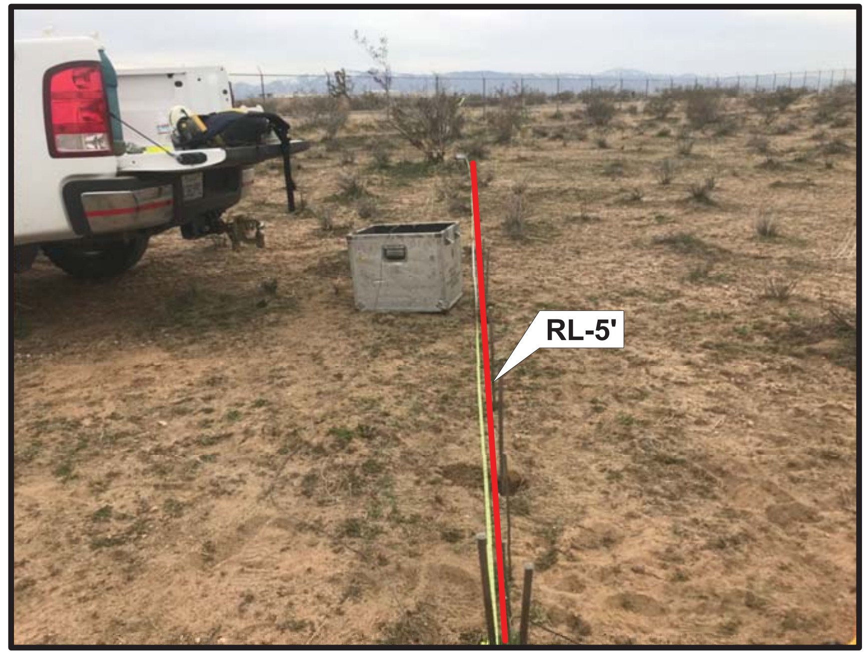
SITE PHOTOGRAPHS
RL-3 through RL-4'

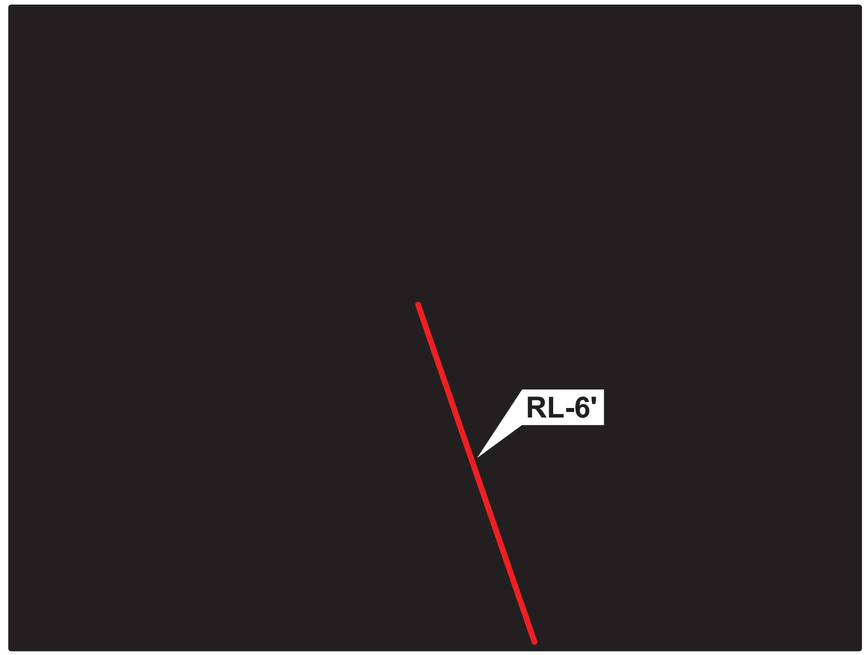
IPP Renewal Project
Adelanto HVDC Converter Station
Adelanto, California

Project No.: 120112SWG | Date: 04/20

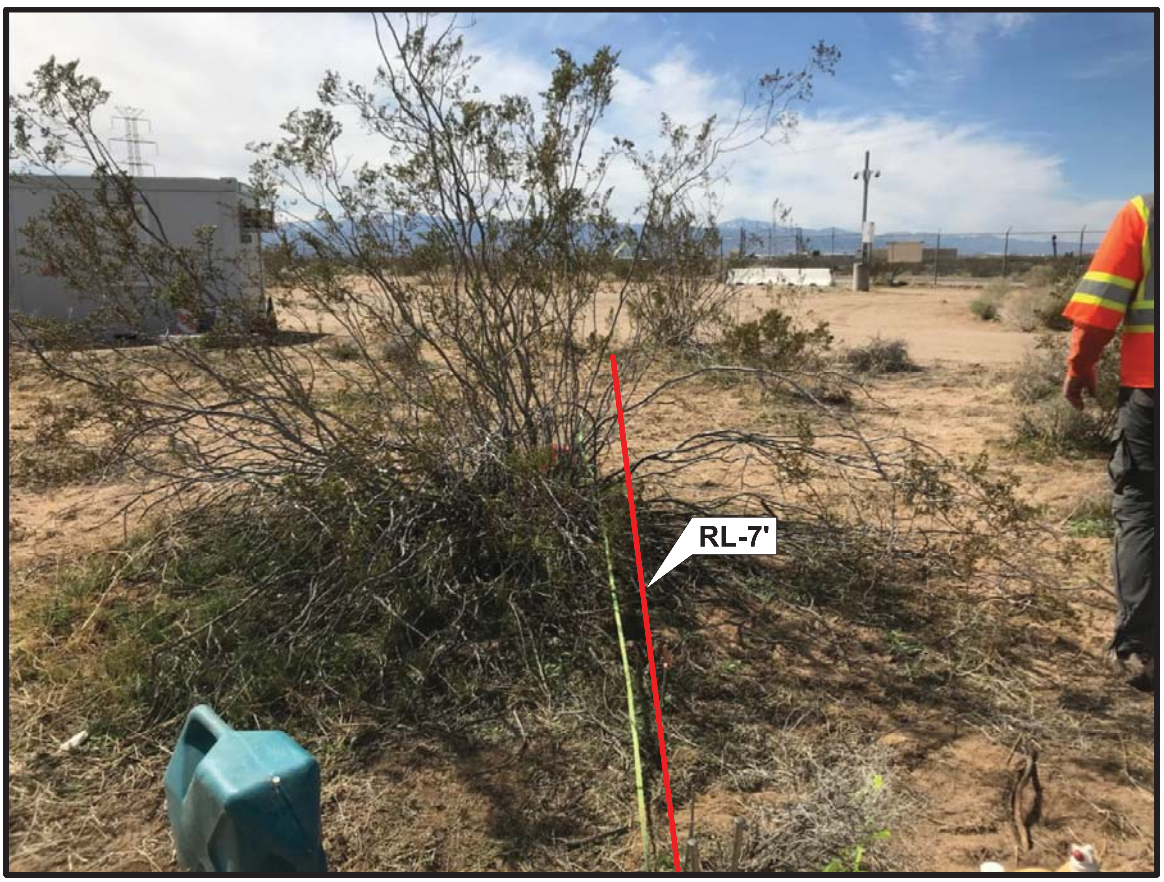
ATLAS SOUTHWEST GEOPHYSICS

Figure 3b





SITE PHOTOGRAPHS **RL-5 through RL-6'**	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG — Date: 04/20	ATLAS SOUTHWEST GEOPHYSICS Figure 3c



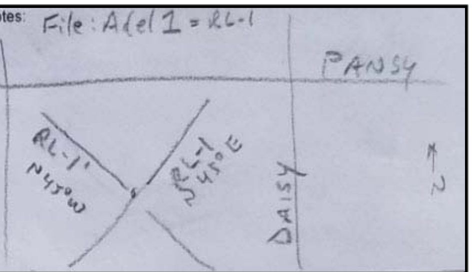
SITE PHOTOGRAPHS **RL-7 and RL-7'**	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG Date: 04/20	ATLAS SOUTHWEST GEOPHYSICS AN ATLAS COMPANY Figure 3d

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/26/2020
Measurement No. & Orientation:	RL-1 SW-NE
Description of Terrain & Probe Insertion:	Relatively Flat, Creosot & Joshua Trees
Weather (Present and Recent):	55.1°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	67.54	0.0	19.02	119.5
2	2	2	3	1		1	3	N/A	N/A	21.68	0.0	15.65	196.6
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	33.89	0.0	11.99	226.1
6	6	6	9	3		3	9	N/A	N/A	171.9	0.0	9.827	370.5
10	6	6	15	5		5	15	N/A	N/A	347.2	0.0	8.372	526.1
20	12	8	30	10		10	30	N/A	N/A	337.1	0.0	4.373	549.6
30	12	9	45	15		15	45	N/A	N/A	539.3	0.0	2.934	553.1
60	12	10	90	30		30	90	N/A	N/A	581.8	0.0	1.212	457.1
100	12	10	150	50		50	150	N/A	N/A	1000.4	0.0	0.6292	395.3
200	12	10	300	100		100	300	N/A	N/A	679.9	0.0	0.1819	228.6
300	12	10	450	150		150	450	N/A	N/A	482.6	0.0	0.07226	136.2

[1] Not required if using AGI meters.

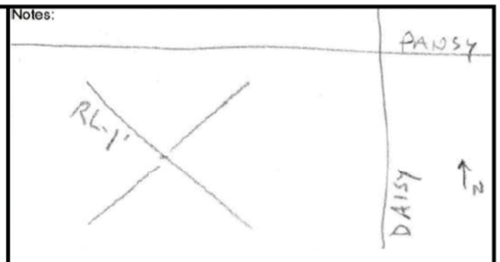
Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/26/2020
Measurement No. & Orientation:	RL-1' Northwest-Southeast
Description of Terrain & Probe Insertion:	Relatively Flat, Creosot & Joshua Trees
Weather (Present and Recent):	55.1°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	66.96	0.2	19.98	125.5
2	2	2	3	1		1	3	N/A	N/A	46.18	0.0	14.51	182.3
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	33.86	0.0	13.37	252
6	6	6	9	3		3	9	N/A	N/A	33.95	0.0	10.87	409.7
10	6	6	15	5		5	15	N/A	N/A	388.4	0.0	7.519	472.4
20	12	8	30	10		10	30	N/A	N/A	674.5	0.0	4.33	544.1
30	12	9	45	15		15	45	N/A	N/A	548.5	0.0	3.084	581.3
60	12	10	90	30		30	90	N/A	N/A	711.2	0.0	1.357	511.4
100	12	10	150	50		50	150	N/A	N/A	602.2	0.0	0.6125	384.8
200	12	10	300	100		100	300	N/A	N/A	575.5	0.0	0.1746	219.4
300	12	10	450	150		150	450	N/A	N/A	963.9	0.1	0.07847	147.9

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

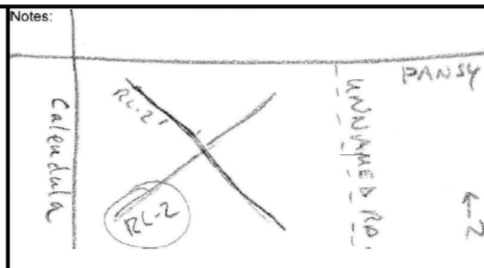
ELECTRICAL RESISTIVITY RESULTS **(RL-1 and RL-1')**	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG — Date: 04/20	ATLAS SOUTHWEST GEOPHYSICS — AN ATLAS COMPANY Figure 4a

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/26/2020
Measurement No. & Orientation:	RL-2 Southwest-Northeast
Description of Terrain & Probe Insertion:	Relatively Flat, Manual Sledge
Weather (Present and Recent):	61°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	4.43	0.0	134.3	844.1
2	2	2	3	1		1	3	N/A	N/A	4.43	0.1	80.31	1009
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	25.1	0.0	38.52	726.1
6	6	6	9	3		3	9	N/A	N/A	270.1	0.0	15.19	572.6
10	6	6	15	5		5	15	N/A	N/A	307.7	0.0	5.858	368.1
20	12	8	30	10		10	30	N/A	N/A	280.3	0.0	2.798	351.6
30	12	9	45	15		15	45	N/A	N/A	306.2	0.0	1.519	286.4
60	12	10	90	30		30	90	N/A	N/A	387.3	0.0	0.7208	271.7
100	12	10	150	50		50	150	N/A	N/A	371.5	0.0	0.4268	268.2
200	12	10	300	100		100	300	N/A	N/A	349	0.0	0.154	193.5
300	12	10	450	150		150	450	N/A	N/A	528.8	0.1	0.0745	140.4

[1] Not required if using AGI meters.

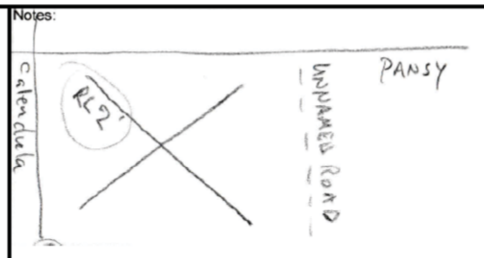
Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/26/2020
Measurement No. & Orientation:	RL-2' Southeast-Northwest
Description of Terrain & Probe Insertion:	Relatively Flat, Manual Sledge
Weather (Present and Recent):	61°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	19.8	0.1	90.51	568.7
2	2	2	3	1		1	3	N/A	N/A	14.89	0.1	81.01	1018
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	9.556	0.0	35.63	671.6
6	6	6	9	3		3	9	N/A	N/A	205.5	0.0	14.97	564.2
10	6	6	15	5		5	15	N/A	N/A	197.4	0.0	6.434	404.3
20	12	8	30	10		10	30	N/A	N/A	336.5	0.0	2.63	330.5
30	12	9	45	15		15	45	N/A	N/A	515.1	0.0	1.438	271.1
60	12	10	90	30		30	90	N/A	N/A	387.9	0.0	0.7158	269.8
100	12	12	150	50		50	150	N/A	N/A	472.2	0.0	0.4213	264.7
200	12	10	300	100		100	300	N/A	N/A	269	0.1	0.1642	206.3
300	12	10	450	150		150	450	N/A	N/A	388.4	0.1	0.06956	131.1

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

ELECTRICAL RESISTIVITY RESULTS
(RL-2 and RL-2')

IPP Renewal Project
Adelanto HVDC Converter Station
Adelanto, California

Project No.: 120112SWG Date: 04/20

ATLAS SOUTHWEST GEOPHYSICS

Figure 4b

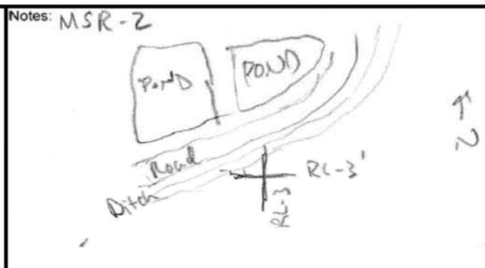
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-3 North-South
Description of Terrain & Probe Insertion:	Relatively Flat, Except N electrode in ditch
Weather (Present and Recent):	53°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes: MSR-2



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration					Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
			A (ft)	M (ft)	0	N (ft)	B (ft)						
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	25.03	0.1	44.04	276.7
2	2	2	3	1		1	3	N/A	N/A	34.26	0.0	18.5	232.5
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	24.32	0.0	16.03	302.2
6	6	6	9	3		3	9	N/A	N/A	332.5	0.0	10.71	403.9
10	6	6	15	5		5	15	N/A	N/A	421	0.0	8.277	520.1
20	12	10	30	10		10	30	N/A	N/A	385.5	0.0	4.866	611.5
30	12	10	45	15		15	45	N/A	N/A	419.2	0.0	3.001	565.6
60	12	10	90	30		30	90	N/A	N/A	476.5	0.0	1.336	503.7
100	12	12	150	50		50	150	N/A	N/A	614.9	0.0	0.6479	407.1

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

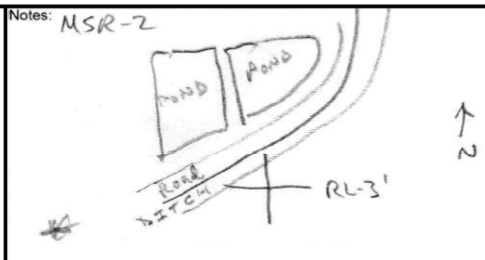
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-3' East-West
Description of Terrain & Probe Insertion:	Relatively Flat
Weather (Present and Recent):	57°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes: MSR-2



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration					Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
			A (ft)	M (ft)	0	N (ft)	B (ft)						
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	51.25	0.1	51.7	324.8
2	2	2	3	1		1	3	N/A	N/A	19.59	0.0	20.72	260.4
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	197.6	0.0	15.23	287.1
6	6	6	9	3		3	9	N/A	N/A	279.3	0.0	11.3	426.1
10	6	6	15	5		5	15	N/A	N/A	295.3	0.0	9.23	579.9
20	12	10	30	10		10	30	N/A	N/A	459.9	0.0	5.238	658.2
30	12	10	45	15		15	45	N/A	N/A	363.6	0.0	3.162	596
60	12	10	90	30		30	90	N/A	N/A	534.9	0.0	1.21	456.3
100	12	12	150	50		50	150	N/A	N/A	384.9	0.0	0.6133	385.4

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

ELECTRICAL RESISTIVITY RESULTS (RL-3 and RL-3')	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California	ATLAS / SOUTHWEST GEOPHYSICS
	Project No.: 120112SWG Date: 04/20	Figure 4c

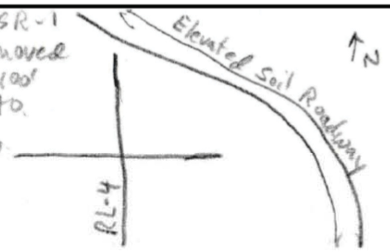
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-4 North-South
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	67°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes: MSR-1 Loc. moved approx 100' south to avoid roadway



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	1.954	0.1	99.68	626.3
2	2	2	3	1		1	3	N/A	N/A	9.301	0.0	40.68	511.2
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	25.11	0.0	25.51	480.9
6	6	4	9	3		3	9	N/A	N/A	329.5	0.0	11.57	436.1
10	6	6	15	5		5	15	N/A	N/A	322.7	0.0	7.892	495.9
20	12	6	30	10		10	30	N/A	N/A	341.3	0.0	3.711	466.4
30	12	10	45	15		15	45	N/A	N/A	322.4	0.0	1.965	370.4
60	12	10	90	30		30	90	N/A	N/A	218.8	0.0	0.7526	283.7
100	12	12	150	50		50	150	N/A	N/A	270.1	0.0	0.4014	252.2

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

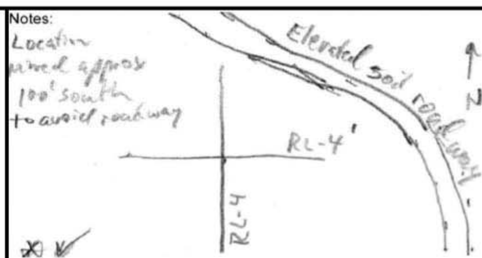
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-4' East-West
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	63°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes: Location moved approx 100' south to avoid roadway



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	1.867	0.1	106.9	671.7
2	2	2	3	1		1	3	N/A	N/A	25.44	0.0	42.49	534
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	24.32	0.0	23.89	450.4
6	6	4	9	3		3	9	N/A	N/A	323	0.0	11.56	726.6
10	6	4	15	5		5	15	N/A	N/A	313.8	0.0	7.617	478.6
20	12	6	30	10		10	30	N/A	N/A	324.5	0.0	3.078	386.8
30	12	6	45	15		15	45	N/A	N/A	367.7	0.0	1.546	291.4
60	12	10	90	30		30	90	N/A	N/A	364.2	0.0	628.4	236.9
100	12	12	150	50		50	150	N/A	N/A	350	0.0	401.1	252

**Inadvertantly entered 10.0 for "a" spacing at 6 ft measurment

[1] Not required if using AGI meters.

ELECTRICAL RESISTIVITY RESULTS (RL-4 and RL-4')	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG Date: 04/20	ATLAS SOUTHWEST GEOPHYSICS Figure 4d

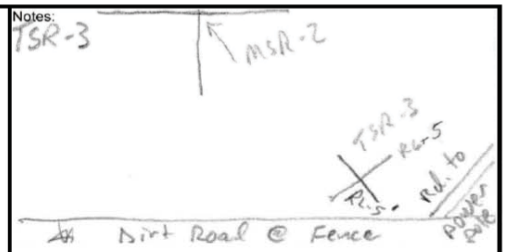
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-5 Northeast-Southwest
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	70°F, Cloudy, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	36.23	0.1	60.84	382.3
2	2	2	3	1		1	3	N/A	N/A	24.45	0.0	24.3	305.3
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	293.1	0.0	15.15	285.5
6	6	4	9	3		3	9	N/A	N/A	286.6	0.0	6.479	244.2
10	6	6	15	5		5	15	N/A	N/A	438.6	0.0	4.542	285.4
20	12	10	30	10		10	30	N/A	N/A	437.8	0.0	3.11	390.8
30	12	10	45	15		15	45	N/A	N/A	473.7	0.0	2.266	427

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

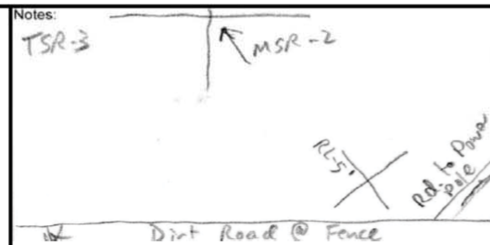
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/27/2020
Measurement No. & Orientation:	RL-5' Northwest-Southeast
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	70°F, Cloudy, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	47.12	0	73.07	459.1
2	2	2	3	1		1	3	N/A	N/A	24.07	0	26.41	331.8
3	4	4	4.5	1.5		1.5	4.5	N/A	N/A	274.6	0	13.52	254.9
6	6	6	9	3		3	9	N/A	N/A	256	0	9	229.7
10	6	6	15	5		5	15	N/A	N/A	408	0	4.671	293.5
20	12	10	30	10		10	30	N/A	N/A	663.4	0	3.237	406.8
30	12	12	45	15		15	45	N/A	N/A	863.4	0	2.241	422.4

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

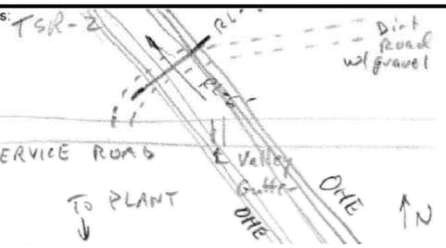
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/28/2020
Measurement No. & Orientation:	RL-6 Southwest-Northeast
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	52°F, Partly Cloudy, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	23.93	0.0	25.3	159
2	2	2	3	1		1	3	N/A	N/A	433.8	0.0	5.174	65.02
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	567.1	0.0	3.836	72.3
6	6	4	9	3		3	9	N/A	N/A	432.2	0.0	2.748	103.6
10	6	6	15	5		5	15	N/A	N/A	540	0.0	1.602	100.7
20	12	10	30	10		10	30	N/A	N/A	737.5	0.0	1.409	177.1
30	12	12	45	15		15	45	N/A	N/A	713.6	0.0	1.001	188.7

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

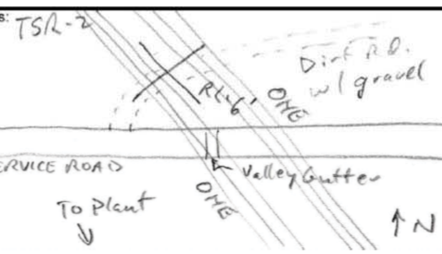
In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0

Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/28/2020
Measurement No. & Orientation:	RL-6' Northwest-Southeast
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	48°F, Partly Cloudy, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	24.03	0.1	28.54	179.3
2	2	2	3	1		1	3	N/A	N/A	309	0.0	3.038	38.18
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	326.6	0.0	3.473	65.46
6	6	4	9	3		3	9	N/A	N/A	353	0.0	2.875	108.4
10	6	6	15	5		5	15	N/A	N/A	434.8	0.0	2.136	134.2
20	12	10	30	10		10	30	N/A	N/A	379.1	0.0	1.182	148.5
30	12	12	45	15		15	45	N/A	N/A	359.7	0.0	0.8558	161.3

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

ELECTRICAL RESISTIVITY RESULTS
(RL-6 and RL-6')

IPP Renewal Project
Adelanto HVDC Converter Station
Adelanto, California

Project No.: 120112SWG | Date: 04/20

ATLAS SOUTHWEST GEOPHYSICS

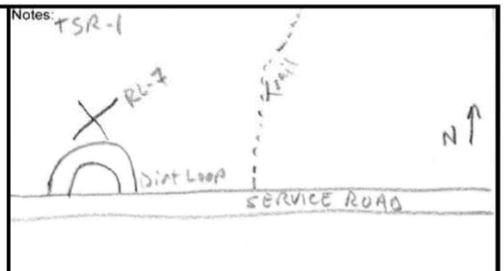
Figure 4f

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/28/2020
Measurement No. & Orientation:	RL-7 Southwest-Northeast
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	62°F, Partly Cloudy, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	2.027	0.2	356.6	2241
2	2	2	3	1		1	3	N/A	N/A	24.77	0.0	50.68	636.8
3	4	2	4.5	1.5		1.5	4.5	N/A	N/A	35.51	0.1	24.04	453.1
6	6	4	9	3		3	9	N/A	N/A	23.91	0.0	17.49	659.4
10	6	6	15	5		5	15	N/A	N/A	366.2	0.0	11.31	710.9
20	12	10	30	10		10	30	N/A	N/A	318.3	0.0	4.549	571.6
30	12	12	45	15		15	45	N/A	N/A	335.3	0.0	2.049	386.2

** Numerous shallow gopher holes & snake holes in soil in this area, shallow voids pervasive

[1] Not required if using AGI meters.

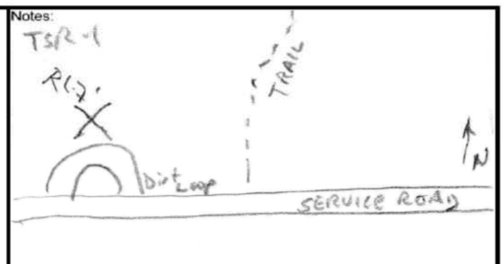
Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.

In Situ Electrical Soil Resistivity Measurement Data Form

Revision 0
Wenner Array

Project Name:	Adelanto Project GP
Black & Veatch Project No.:	
Supplier Name & Operator	SOUTHWEST GEOPHYSICS, M. EDWARDS
Project Location:	Adelanto, California
Date:	2/28/2020
Measurement No. & Orientation:	RL-7' Northwest-Southeast
Description of Terrain & Probe Insertion:	Relatively Flat, easy into SM soils
Weather (Present and Recent):	70°F, Sunny, no rain for 1+ weeks
Meter Model Type:	AGI Super Sting R8
Serial No. & Calibration Date:	SS0106182

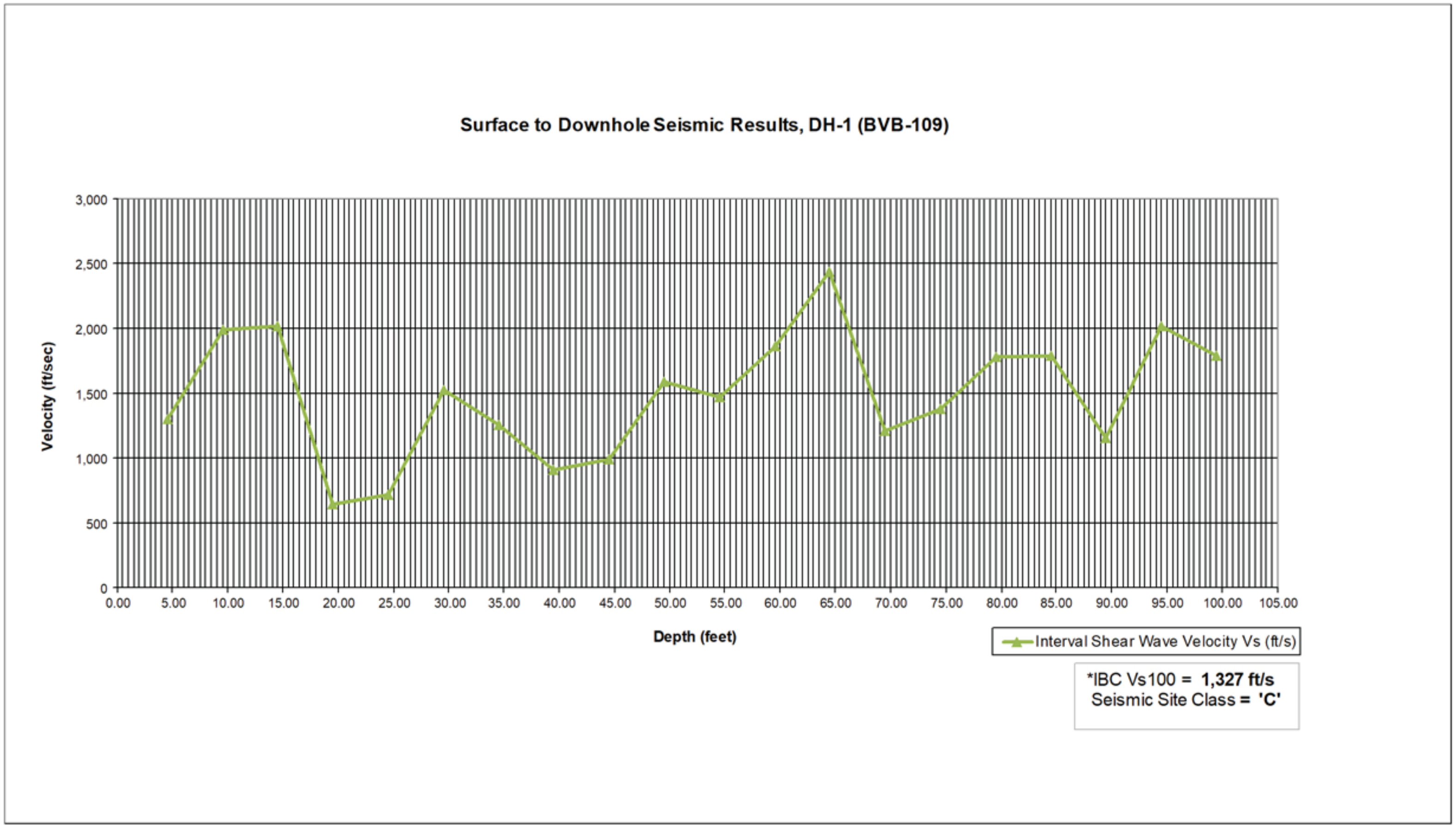
Notes:



Electrode "a" Spacing (ft)	Preferred Electrode Depth (in)	Actual Electrode Depth (in)	Electrode Configuration A (ft)	M (ft)	0	N (ft)	B (ft)	Source Voltage (V)	V_{M-N} (mV) [1]	Current Injected, I (mA)	Standard deviation (%)	Apparent Resistance (Ohm)	Apparent Resistivity (Ohm-ft)
1	1	2	1.5	0.5		0.5	1.5	N/A	N/A	2.01	0.2	283.4	1780
2	2	2	3	1		1	3	N/A	N/A	24.59	0.0	31.29	393.2
3	4	4	4.5	1.5		1.5	4.5	N/A	N/A	24.53	0.1	29.15	549.4
6	6	6	9	3		3	9	N/A	N/A	25.05	0.0	22.67	854.6
10	6	6	15	5		5	15	N/A	N/A	34.32	0.0	12.6	791.4
20	12	12	30	10		10	30	N/A	N/A	376.6	0.0	3.783	475.4
30	12	12	45	15		15	45	N/A	N/A	352.8	0.0	2.208	416.1

[1] Not required if using AGI meters.

Note: Due to soil conductivity, the electrode depth may have to be increased. However, electrode depth shall not exceed 10% of "a" spacing.



SURFACE TO DOWNHOLE SEISMIC RESULTS **DH-1 (BVB-109)**	IPP Renewal Project Adelanto HVDC Converter Station Adelanto, California Project No.: 120112SWG Date: 04/20	Figure 5

Appendix E. Laboratory Testing Results 2020 Geotechnical Investigation

June 19, 2020

BLACK & VEATCH
11401 Lamar Avenue
Overland Park, Kansas, 66211-1508

Re: Lab Completion Letter
IPP Renewal Project
16800 Aster Road
Adelanto, California 92301
Project Number: 60205007

Terracon Consultants, Inc. (Terracon) is submitting this letter summarizing the results of laboratory tests, requested by Black and Veatch, for the referenced project.

Terracon has completed the following laboratory tests as requested:

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D5333 Standard Test Method for Measurement of Collapse Potential of Soils
- ASTM D7263 Standard Test Methods for Laboratory Determination of Density (Unit Weight) of Soil Specimens
- ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
- ASTM D7928 Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
- ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D1883 Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils
- Corrosivity Testing will include pH, chlorides, sulfates, sulfides, Redox potential, and electrical lab resistivity
- ASTM D3080/D300M Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
- ASTM D5334 Standard Test Method for Determination of Thermal Conductivity of Soil and Soft Rock by Thermal Needle Probe Procedure (performed by GeothermUSA)

If you have any inquiries or comments on this report, please do not hesitate to contact the undersigned at (949) 864-2082.

Sincerely,
Terracon Consultants, Inc.

Ryan C. Hankes
Field Engineer

Joshua R. Morgan, P.E.
Geotechnical Department Manager

SUMMARY O LABORATORY RESULTS

BORING ID	Depth	USCS Classification and Soil Description	AASHTO Class.	Munsell Color	Liquid Limit	Plastic Limit	Plasticity Index	% <#200 Sieve	% Gravel	% Sand	% Silt	% Clay	Water Content (%)	Optimum Moist re Content (%)	Maximum Dry Density, (pcf)
BVB-101	2.5 - 4							43.4	0.0	6.3	13.5	29.9			
BVB-101													2		
BVB-101	10 - 11.5												1		
BVB-101	15 - 16.5							35.2	0.0	64.8					
BVB-101	20 - 21.5												1		
BVB-101	25 - 26.5							48.2	0.0	0.0					
BVB-101	30 - 31.5												3		
BVB-102	2.5 - 4												6		
BVB-102	- 6.5												3		
BVB-102	10 - 11.5												3		
BVB-102	20 - 21.5														
BVB-102	25 - 26.5							58.2	0.0	41.8					
BVB-102	30 - 31.5												2		
BVB-102	0 - 41.5				NP	NP	NP						2		
BVB-103	- 6.5												3		
BVB-103	7.5 - 9	SILTY SAND(SM)	A-4 (0)		NP	NP	NP	39.2	0.0	60.4	15.7	23.5	2		
BVB-103	10 - 11.5							42.9	0.0	0.0			1		
BVB-103	20												3		
BVB-103	25 - 26.5				31	16	15								
BVB-10															
BVB-10	7.5 - 9							33.9	0.0	0.0					
BVB-10	10 - 11.5												2		
BVB-10	20 - 21.5				32	18	14						3		
BVB-10	5 - 46.5							38.6	0.0	0.0					
BVB-10	2.5 - 4												11		

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger A e, Ste C
Tustin, CA
PH. 949-261-0051 FAX. 949-261-6110

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

EXHIBIT: B-1

SUMMARY O LABORATORY RESULTS

BORING ID	Depth	USCS Classification and Soil Description	AASHTO Class.	Munsell Color	Liquid Limit	Plastic Limit	Plasticity Index	% <#200 Sieve	% Gravel	% Sand	% Silt	% Clay	Water Content (%)	Optimum Moist re Content (%)	Maximum Dry Density, (pcf)
BVB-10	7.5												7		
BVB-10	15 - 16.5												3		
BVB-10	25 - 26.5							51.7	0.0	48.2	27.1	24.7	9		
BVB-10	30 - 31.5				25	14	11						13		
BVB-10	35 - 36.5														
BVB-10	0 - 51.5				34	22	12						21		
BVB-106	2.5														
BVB-106	- 6.5							27.9	0.6	71.5					
BVB-106	7.5 - 9														
BVB-106	10 - 11.5							62.5	0.0	37.5	12.5	50.1			
BVB-106	1 - 16.25														
BVB-106	25 - 26.5												1		
BVB-106	0 - 41.5							51.4	0.0	0.0					
BVB-107	- 6.5												2		
BVB-107	10												2		
BVB-107	15 - 16.5							47.1	0.0	0.0					
BVB-107	20														
BVB-107	30												1		
BVB-107	35 - 36.	SANDY SILT(ML)	A-4 (0)		NP	NP	NP	52.5	0.0	47.4	21.3	31.2	2		
BVB-108	2.5 - 4												6		
BVB-108	7.5												6		
BVB-108	10 - 11.5							24.9	0.0	75.1					
BVB-108	1												11		
BVB-108	20 - 21.5	SANDY SILTY CLAY(CL-ML)	A-4 (0)		21	17		61.6	0.0	38.2	27.8	33.9			
BVB-108	25 - 26.5														

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger A e, Ste C
Tustin, CA
PH. 949-261-0051 FAX. 949-261-6110

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

EXHIBIT: B-2

SUMMARY O LABORATORY RESULTS

BORING ID	Depth	USCS Classification and Soil Description	AASHTO Class.	Munsell Color	Liquid Limit	Plastic Limit	Plasticity Index	% <#200 Sieve	% Gravel	% Sand	% Silt	% Clay	Water Content (%)	Optimum Moist re Content (%)	Maximum Dry Density, (pcf)
BVB-108	0 - 40.667				29	16	13								
BVB-109	2.5 - 3.5														
BVB-109	- 6.25							28.3	0.0	0.0					
BVB-109	7.5												7		
BVB-109	15 - 16.167														
BVB-109	2 - 26.25							42.6	0.0	0.0			12		
BVB-109	0 - 41.25							43.0	0.0	0.0			18		
BVB-109	6 - 66.25							38.8	0.0	0.0					
BVB-109	70 - 71.25				28	14	14						17		
BVB-109	85 - 86.5				28	14	14						19		
BVB-109	90 - 91.25							42.9	0.0	0.0					
BVB-109	100 - 101.5				26	15	11						25		
BVB-110	- 6.5												11		
BVB-110	10												1		
BVB-110	20 - 21.5												2		
BVB-110	25 - 26.5				46	23	23								
BVB-110	30														
BVB-110	0 - 41.5							23.6	0.0	0.0					
BVB-111	2.5 - 4							22.7	2.5	72.6					
BVB-111															
BVB-111	10 - 11.5												9		
BVB-111	1 - 16.167	SANDY SILTY CLAY(CL-ML)	A-4 (1)		24	18	6	59.0	0.0	41.0	13.0	6.0			
BVB-111	18														
BVB-111	20												7		
BVB-111	2				24	19									

PROJECT: IPP Renewal Project - Adelanto	Terracon	PROJECT NUMBER: 60205007
SITE: 16800 Aster Road Adelanto, CA	1421 Edinger A e, Ste C Tustin, CA	CLIENT: Black & Veatch Corporation Overland Park, KS
	PH. 949-261-0051 FAX. 949-261-6110	EXHIBIT: B-3

SUMMARY O LABORATORY RESULTS

BORING ID	Depth	USCS Classification and Soil Description	AASHTO Class.	Munsell Color	Liquid Limit	Plastic Limit	Plasticity Index	% <#200 Sieve	% Gravel	% Sand	% Silt	% Clay	Water Content (%)	Optimum Moist re Content (%)	Maximum Dry Density, (pcf)
BVB-111	30												6		
BVB-111	35 - 36.5	CLAYEY SAND(SC)	A-6 (3)		29	15	14	47.2	0.0	0.0					
BVB-111	0 - 41.5				34	16	18								
BVB-111	0 - 51.5							56.9	0.0	0.0					
BVB-112	2.5 - 4												6		
BVB-112	7.5												13		
BVB-112	10 - 11.5							12.5	0.0	0.0					
BVB-112	15 - 16.5												3		
BVB-112	2												3		
BVB-112	35 - 36.5	SANDY LEAN CLAY(CL)	A-6 (7)		31	1	16	61.0	0.0	34.1	14.6	46.4			
BVB-113	2.5 - 4							31.9	0.0	0.0					
BVB-113													3		
BVB-113	10 - 11.5												3		
BVB-113	20 - 21				33	15	18						7		
BVB-113	2 - 2 .75							73.7	0.0	25.6	12.7	61.0			
BVB-113	30												1		
BVB-11	2.5												8		
BVB-11	- 6.5							43.0	0.8	56.2					
BVB-11	7.5 - 9												2		
BVB-11	1												1		
BVB-11	20 - 21.5							20.5	6.3	73.2					
BVB-11	0 - 51.5				NP	NP	NP								
BVB-11	2.5												13		
BVB-11	7.5												1		
BVB-11	10 - 11.5							43.5	0.0	56.0					

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger A e, Ste C
Tustin, CA
PH. 949-261-0051 FAX. 949-261-6110

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

EXHIBIT: B-4

SUMMARY O   LABORATORY RESULTS

BORING ID	Depth	USCS Classification and Soil Description	AASHTO Class.	Munsell Color	Liquid Limit	Plastic Limit	Plasticity Index	% <#200 Sieve	% Gravel	% Sand	% Silt	% Clay	Water Content (%)	Optimum Moist re Content (%)	Maximum Dry Density, (pcf)
BVB-11	1												3		
BVB-11	20 - 21.				23	15	8								
BVB-11	30 - 31.							39.3	0.0	0.0					
BVB-11	0 - 41.							.8	0.0	0.0					
BVT-301	1 - 3.5	SILTY SAND(SM)	A-2-4 (0)	light brown	NP	NP	NP	20.3	0.0	0.0			6	9.9	12 .6
BVT-301	2.5														
BVT-301	3.5 - 6													8.9	124.8
BVT-302	1 - 3.5	SILTY SAND(SM)	A-2-4 (0)		NP	NP	NP	12.7	0.0	0.0			9	8.8	118.9
BVT-302	2.5														
BVT-302	3.5 - 6													9.7	12 .9
BVT-303	1 - 3.5	SILTY SAND(SM)	A-2-4 (0)		NP	NP	NP	22.9	0.0	0.0			8	10.4	124.3
BVT-303	2.5														
BVT-303	3.5 - 6												9	8.5	129.7

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
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PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

EXHIBIT: B-5

Water Content/Moisture Density												
Location	Depth	Height (Rings)	Spec.+Tare (g)	Wt. Tare (g)	Conent Wt. Tare	Content Wet Wt. +Tare	Water Content Dry Wt. + Tare	Diameter (mm)	Height (mm)	Water Content	Wet Denisty	Dry Density
BVB-101	5	6	1140.1	270	209.6	358.7	355.9	61.37	152.4	1.9	120.5	118.2
	10	6	1138.6	270	222.3	366.9	365.8	61.37	152.4	0.8	120.3	119.4
	20	6	1117.9	270	213.8	356.4	354.9	61.37	152.4	1.1	117.4	116.2
	30	6	1041.4	270	216	332.3	328.4	61.37	152.4	3.5	106.8	103.2
BVB-102	2.5	6	1152.5	270	209.8	353.6	345.2	61.37	152.4	6.2	122.2	115.1
	5	6	1148.8	270	208	358.2	354.1	61.37	152.4	2.8	121.7	118.4
	10	6	1060.6	270	215	340.7	337	61.37	152.4	3.0	109.5	106.3
	20	6	1005.6	270	222.7	344.2	338	61.37	152.4	5.4	101.9	96.7
	30	6	1009.2	270	208.4	331.5	329.4	61.37	152.4	1.7	102.4	100.6
	40				207.3	350.1	347.2			2.1		
BVB-103	5	6	1090.3	270	222.8	363.3	359.1	61.37	152.4	3.1	113.6	110.2
	7.5				0	200	196.2			1.9		
	10	6	1068.3	270	210.6	349.3	347.6	61.37	152.4	1.2	110.5	109.2
	20	6	1080.2	270	210.4	347.2	343.3	61.37	152.4	2.9	112.2	109.0
BVB-104	5	6	1186.8	270	210.1	369.5	362.7	61.37	152.4	4.5	127.0	121.5
	10	6	1065.4	270	201.1	336.8	333.8	61.37	152.4	2.3	110.1	107.7
	20	6	1059.8	270	213.9	351.5	347.9	61.37	152.4	2.7	109.4	106.5
BVB-105	2.5	6	1177.5	270	214.9	370.2	354.8	61.37	152.4	11.0	125.7	113.2
	7.5				210.3	337.1	329.2			6.6		
	15	6	1049.8	270	211.8	345.3	341.1	61.37	152.4	3.2	108.0	104.6
	25	6	1053.1	270	213.2	357.7	345.5	61.37	152.4	9.2	108.4	99.3
	30				208.5	396.2	374			13.4		
	50				203.4	366.3	337.5			21.5		
BVB-106	2.5	5	1031.2	225	210.1	355.9	349	61.37	127	5.0	134.0	127.6
	7.5	5	966.3	225	201.2	335.1	328.7	61.37	127	5.0	123.2	117.3
	15	5	890.7	225	207.3	336	331.5	61.37	127	3.6	110.6	106.8
	25	5	883.6	225	222.8	350.7	349.4	61.37	127	1.0	109.4	108.3
BVB-107	5	6	1133.1	270	211.8	352.3	349	61.37	152.4	2.4	119.5	116.7
	10	6	1047.9	270	222.4	351.4	348.4	61.37	152.4	2.4	107.7	105.2
	20	6	1057.5	270	222.6	365.7	358.4	61.37	152.4	5.4	109.1	103.5
	30	6	1044	270	222.7	359.3	357.9	61.37	152.4	1.0	107.2	106.1
	35				0	200.2	195.9			2.2		
BVB-108	2.5	6	1181.8	270	208.1	365.7	356.7	61.37	152.4	6.1	126.3	119.1
	7.5	5	938.2	225	208.5	348.9	341.5	61.37	127	5.6	118.5	112.3
	15	6	1251.8	270	208.1	382.5	365.4	61.37	152.4	10.9	136.0	122.6
	25	6	1189.7	270	207.4	339.9	334.4	61.37	152.4	4.3	127.4	122.1
	40				207.4	356.4	350.5			4.1		
BVB-109	2.5	6	1102.5	270	207.4	336	330.6	61.37	152.4	4.4	115.3	110.4
	7.5	6	1098.5	270	207.5	338.1	329.6	61.37	152.4	7.0	114.7	107.3
	15	6	1141.6	270	208.1	339.6	333.1	61.37	152.4	5.2	120.7	114.7
	25	6	1183.6	270	208.1	369.5	352.2	61.37	152.4	12.0	126.5	113.0
	40				208.1	326.3	308.4			17.8		
	70				207.3	357.6	335.7			17.1		
	85				207.5	414.4	381.2			19.1		
	100				203.4	368.9	336.1			24.7		
BVB-110	5	6	1142.1	270	222.6	368.6	353.7	61.37	152.4	11.4	120.8	108.4
	10	6	1048.8	270	209.9	343.8	342.3	61.37	152.4	1.1	107.8	106.6
	20	6	1021.1	270	222.8	347.5	345.4	61.37	152.4	1.7	104.0	102.3
	30	6	1087.4	270	208	343.8	338.9	61.37	152.4	3.7	113.2	109.1
BVB-111	5	6	1180.3	270	208.5	372.8	364.7	61.37	152.4	5.2	126.1	119.8
	10	6	1055.8	270	207.6	338.2	327.9	61.37	152.4	8.6	108.8	100.2
	20	6	1174.2	270	203.4	334.4	325.5	61.37	152.4	7.3	125.2	116.7
	30	6	1078.1	270	222.7	365.5	357.6	61.37	152.4	5.9	111.9	105.7
	35				207.6	342.7	337			4.4		
BVB-112	7.5	6	1141.2	270	207.5	353.9	336.9	61.37	152.4	13.1	120.6	106.6
	15	6	1088.5	270	207.4	339.9	335.5	61.37	152.4	3.4	113.3	109.6
	25	6	1117.6	270	208.5	344	340.6	61.37	152.4	2.6	117.4	114.4
BVB-113	5	6	1129	270	203.4	336.8	332.4	61.37	152.4	3.4	119.0	115.0
	10	6	1097.5	270	208	343.8	339.8	61.37	152.4	3.0	114.6	111.2
	20	6	1058.3	270	200.8	340.7	331.5	61.37	152.4	7.0	109.2	102.0
	30	6	1128.7	270	208.4	343.5	342.2	61.37	152.4	1.0	118.9	117.8

BVB-114	2.5	6	1080.8	270	209.8	345.3	335.1	61.37	152.4	8.1	112.3	103.8
	7.5	6	1139.3	270	222.7	372.9	369.5	61.37	152.4	2.3	120.4	117.7
	15				211.5	338.2	337.4			0.6		
BVB-115	2.5	6	1224.2	270	212.6	372.3	354.4	61.37	152.4	12.6	132.1	117.3
	7.5	6	1055.6	270	210	344.1	342.6	61.37	152.4	1.1	108.8	107.6
	15	6	1008.2	270	209.2	345	340.7	61.37	152.4	3.3	102.2	99.0

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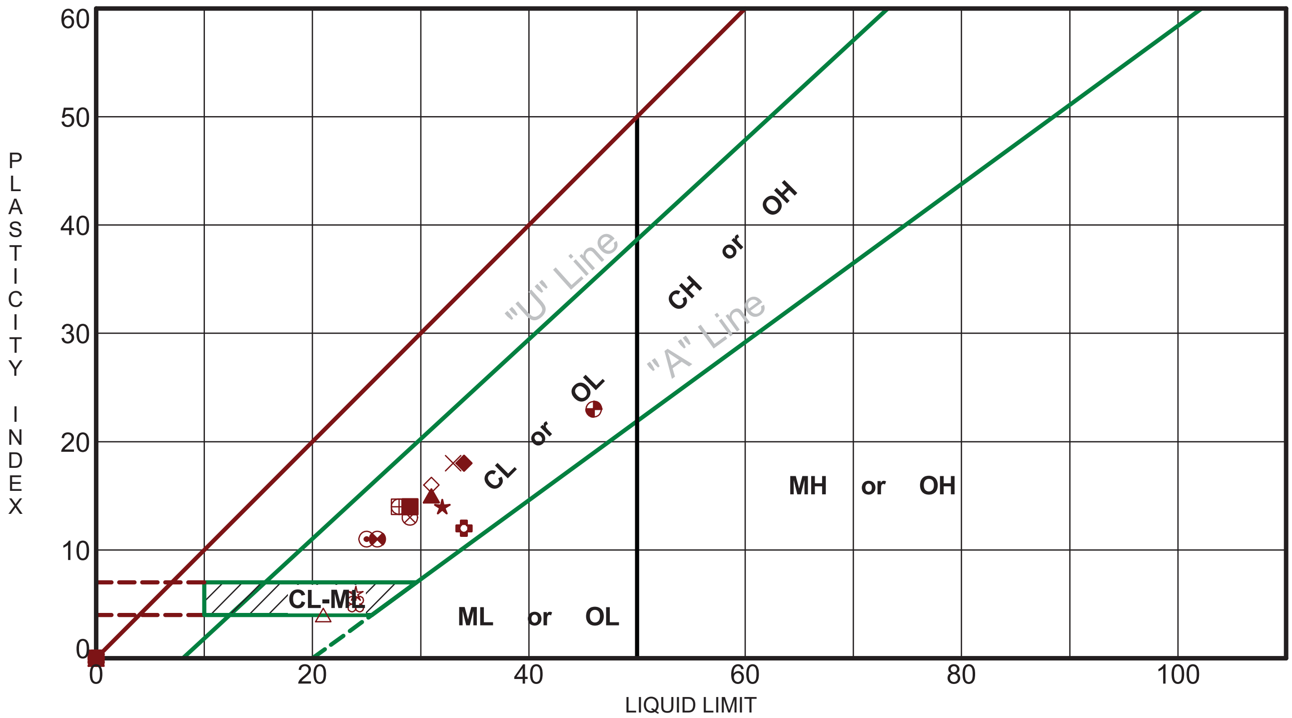
STM D4318



	Boring ID	Depth	LL	PL	PI	Fine	USCS	Description
●	BVB-102	40 - 41.5	NP	NP	NP			
⊠	BVB-103	7.5 - 9	NP	NP	NP	39.2	SM	SILTY SAND
▲	BVB-103	25 - 26.5	31	16	15			
★	BVB-104	20 - 21.5	32	18	14			
⊙	BVB-105	30 - 31.5	25	14	11			
✿	BVB-105	50 - 51.5	34	22	12			
○	BVB-107	35 - 36.5	NP	NP	NP	52.5	ML	SANDY SILT
△	BVB-108	20 - 21.5	21	17	4	61.6	CL-ML	SANDY SILTY CLAY
⊗	BVB-108	40 - 40.7	29	16	13			
⊕	BVB-109	70 - 71.3	28	14	14			
□	BVB-109	85 - 86.5	28	14	14			
◉	BVB-109	100 - 101.5	26	15	11			
◕	BVB-110	25 - 26.5	46	23	23			
☆	BVB-111	15 - 16.2	24	18	6	59.0	CL-ML	SANDY SILTY CLAY
✲	BVB-111	25	24	19	5			
■	BVB-111	35 - 36.5	29	15	14	47.2	SC	CLAYEY SAND
◆	BVB-111	40 - 41.5	34	16	18			
◇	BVB-112	35 - 36.5	31	15	16	61.0	CL	SANDY LEAN CLAY
×	BVB-113	20 - 21	33	15	18			
✖	BVB-114	50 - 51.5	NP	NP	NP			

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
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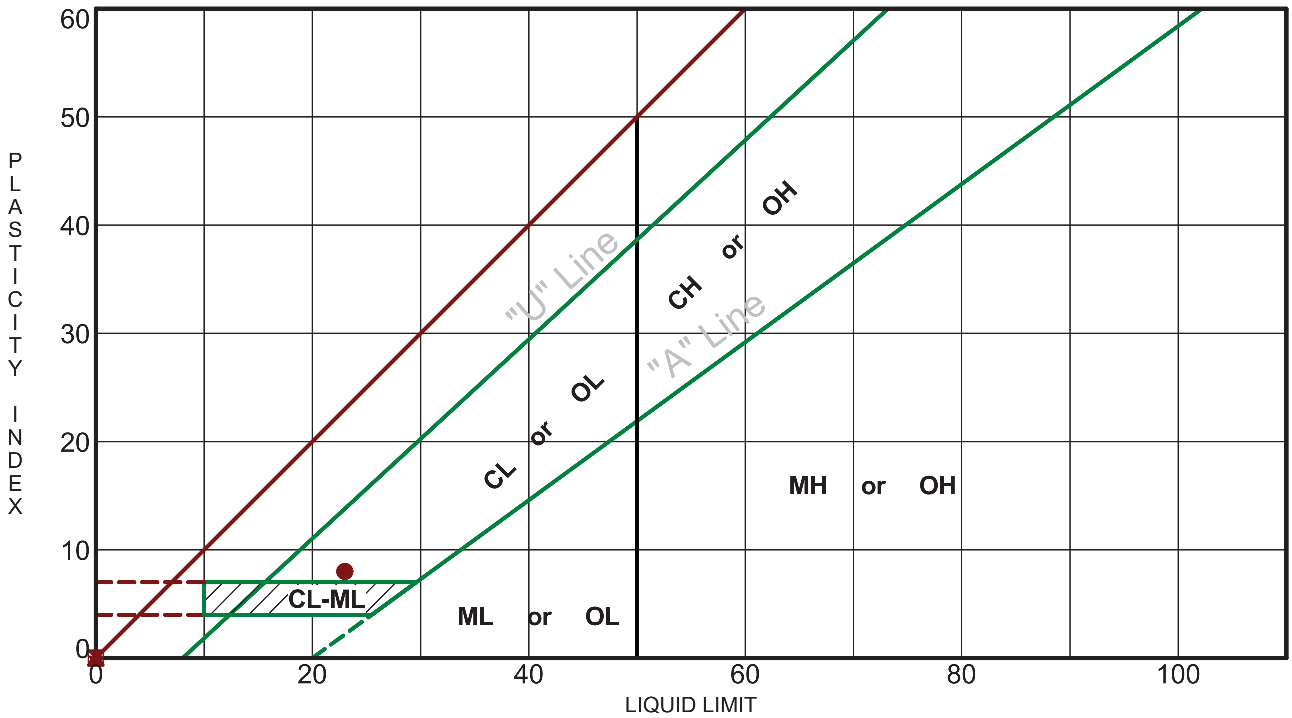
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

ERBERG LIMITS RESUL S

STM D4318



	Boring ID	Depth	LL	PL	PI	Fine	USCS	Description
●	BVB-115	20 - 21.5	23	15				
⊠	BVT-301	1 - 3.5	NP	NP	NP	20.3	SM	SILTY SAND
▲	BVT-302	1 - 3.5	NP	NP	NP	12.7	SM	SILTY SAND
★	BVT-303	1 - 3.5	NP	NP	NP	22.9	SM	SILTY SAND

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

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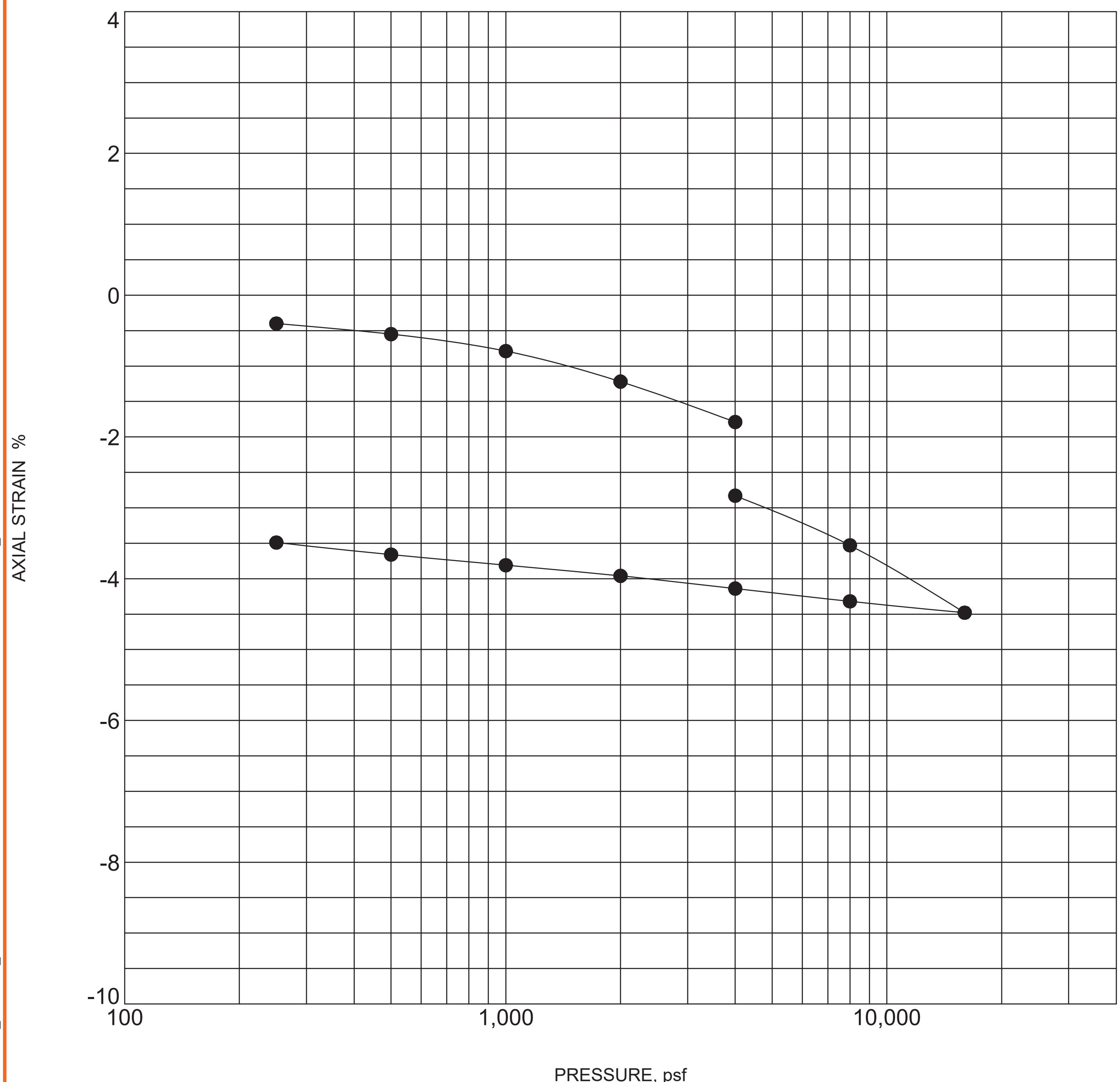
CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST
ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-102 5 - 6.5 ft		118	3

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Roa
Adelanto, CA

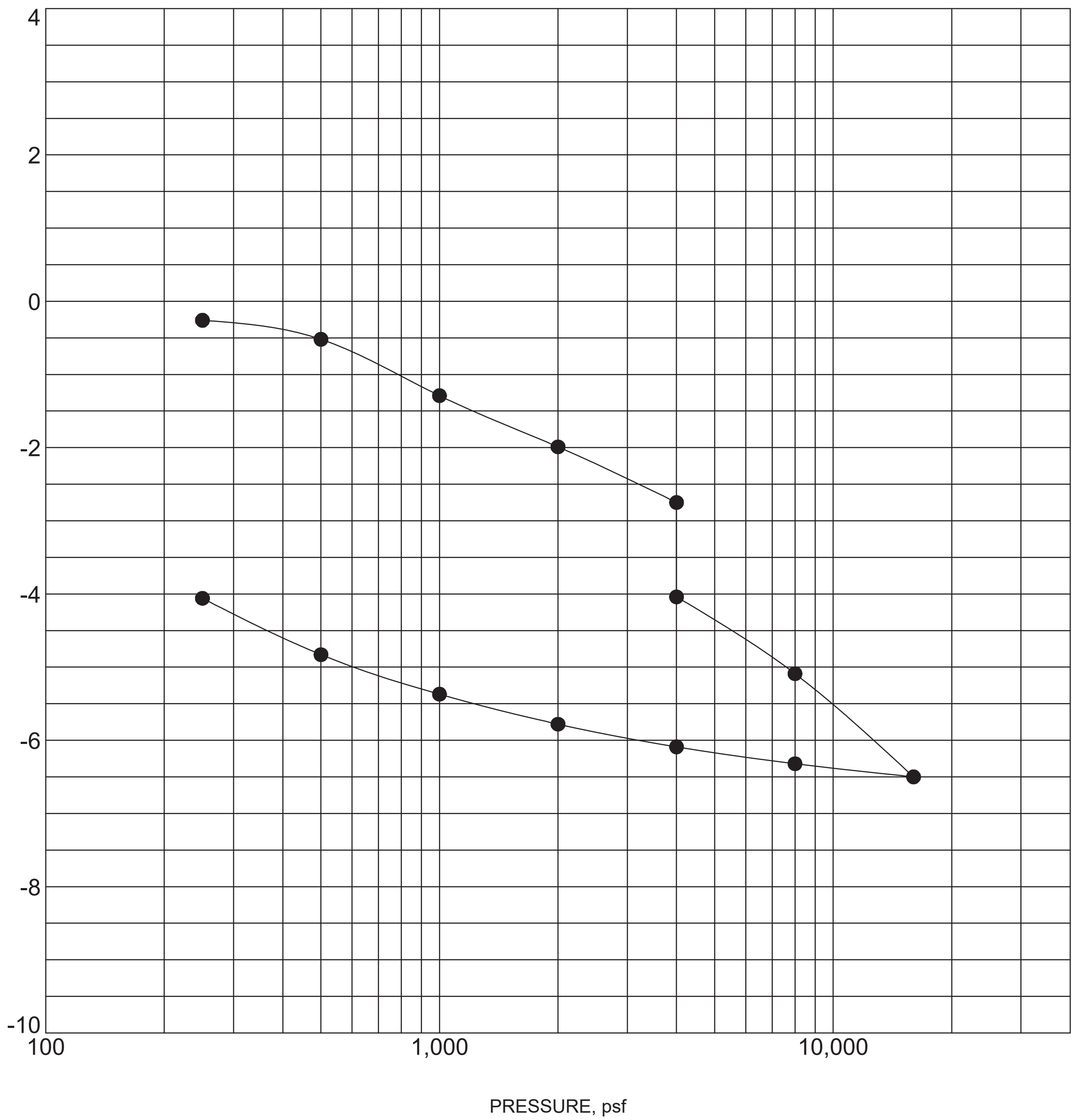
1421 Edinger Ave, Ste C
Tustin, C

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



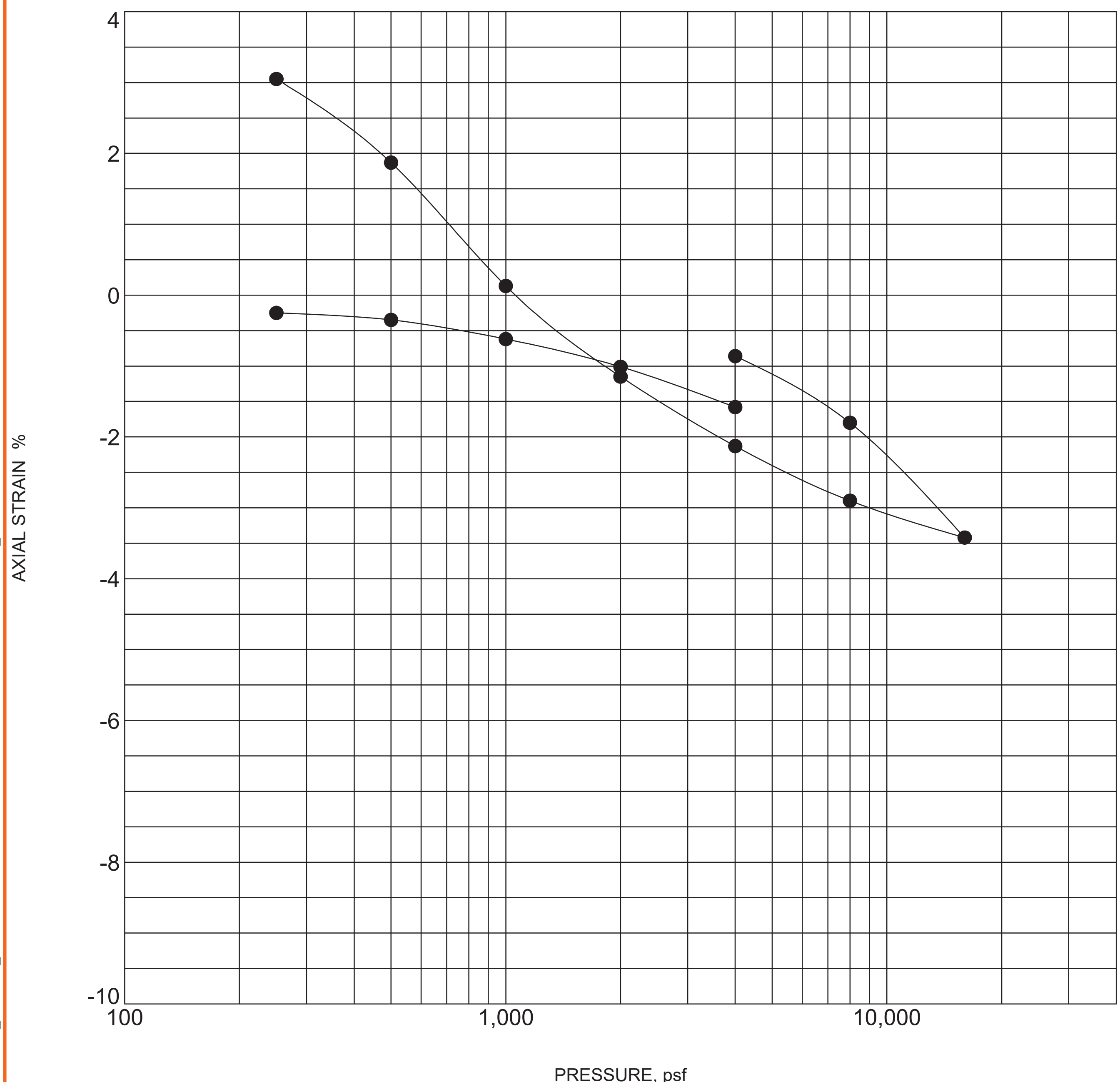
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-102 10-11.5 ft		106	3

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



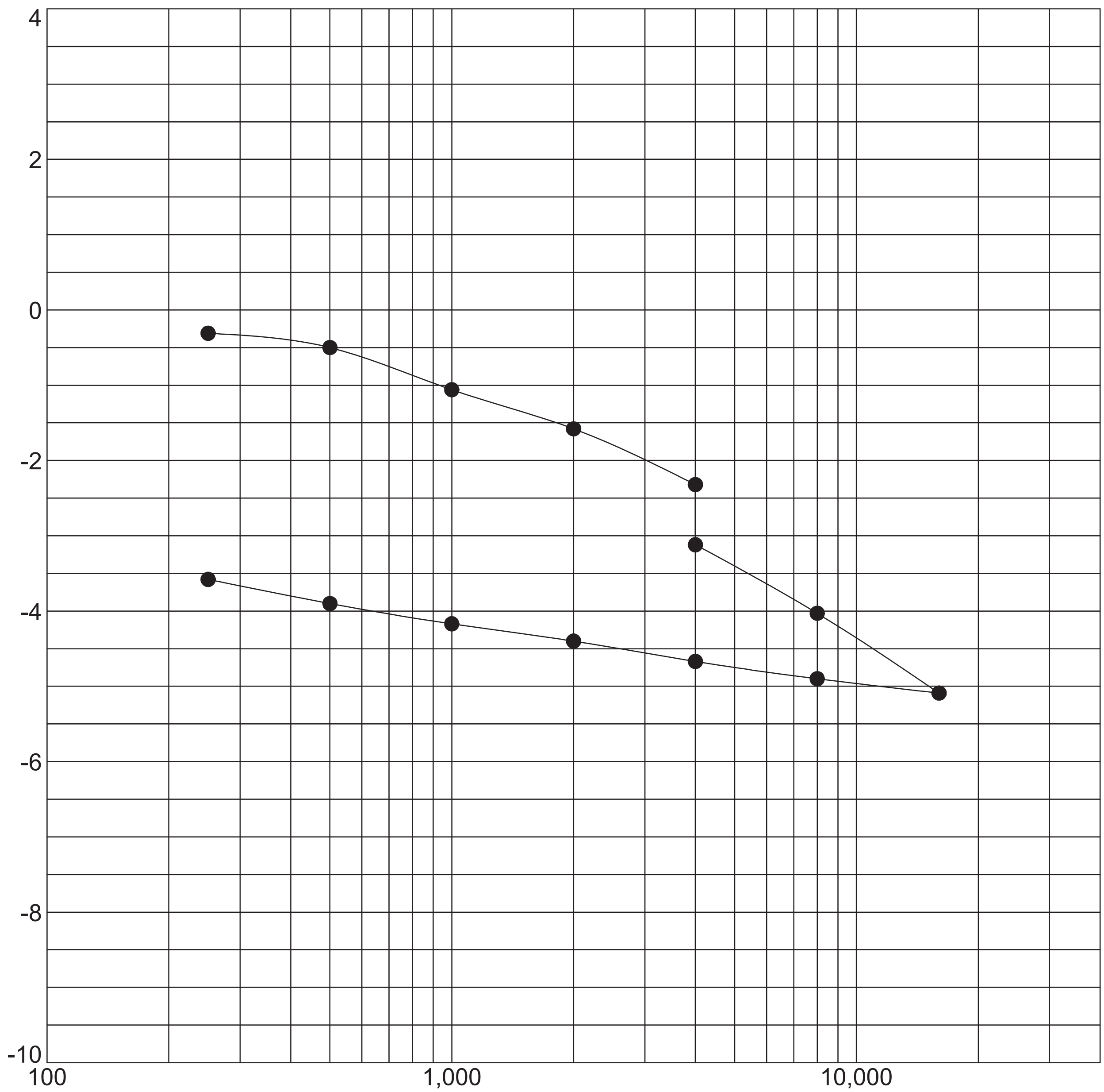
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-102 20-21.5 ft		97	5

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



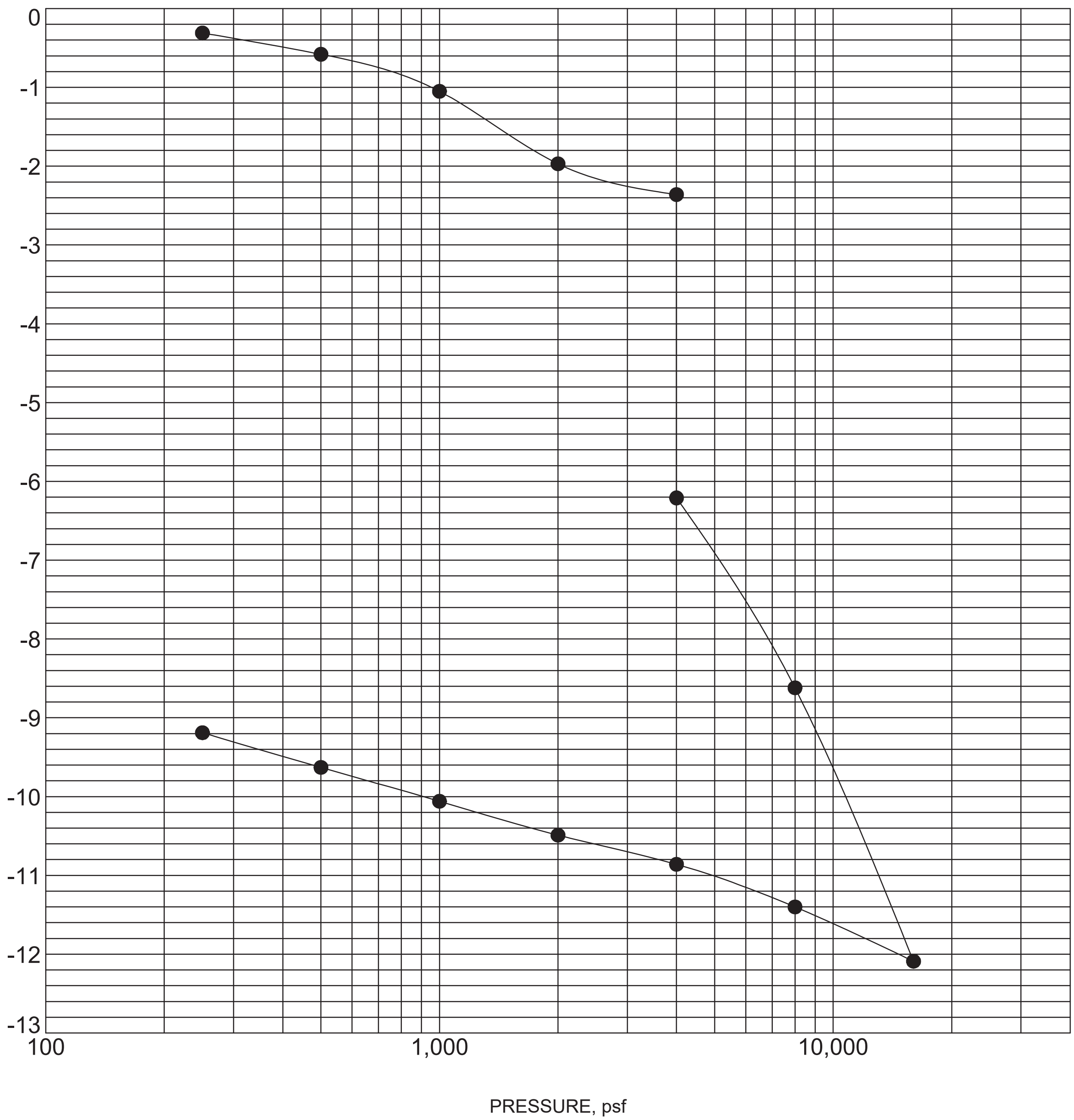
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-102 30-31.5 ft		101	2

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-103 5 - 6.5 ft		110	3

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

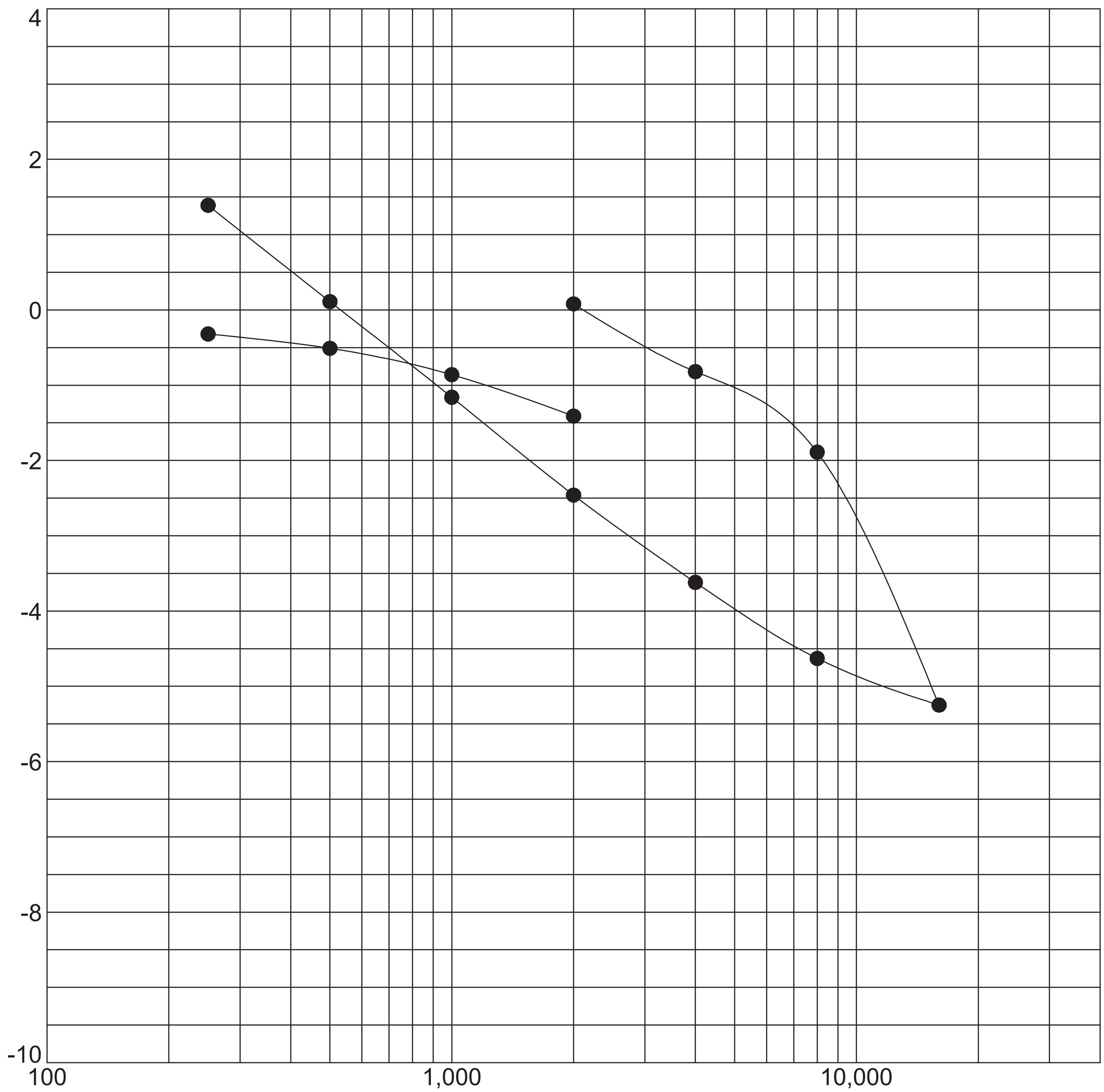
SITE: 16800 Aster Ro d
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Ve tch Corpor tion
Overland Park, KS

SWELL CONSOLI AT ON TEST
ASTM 2435



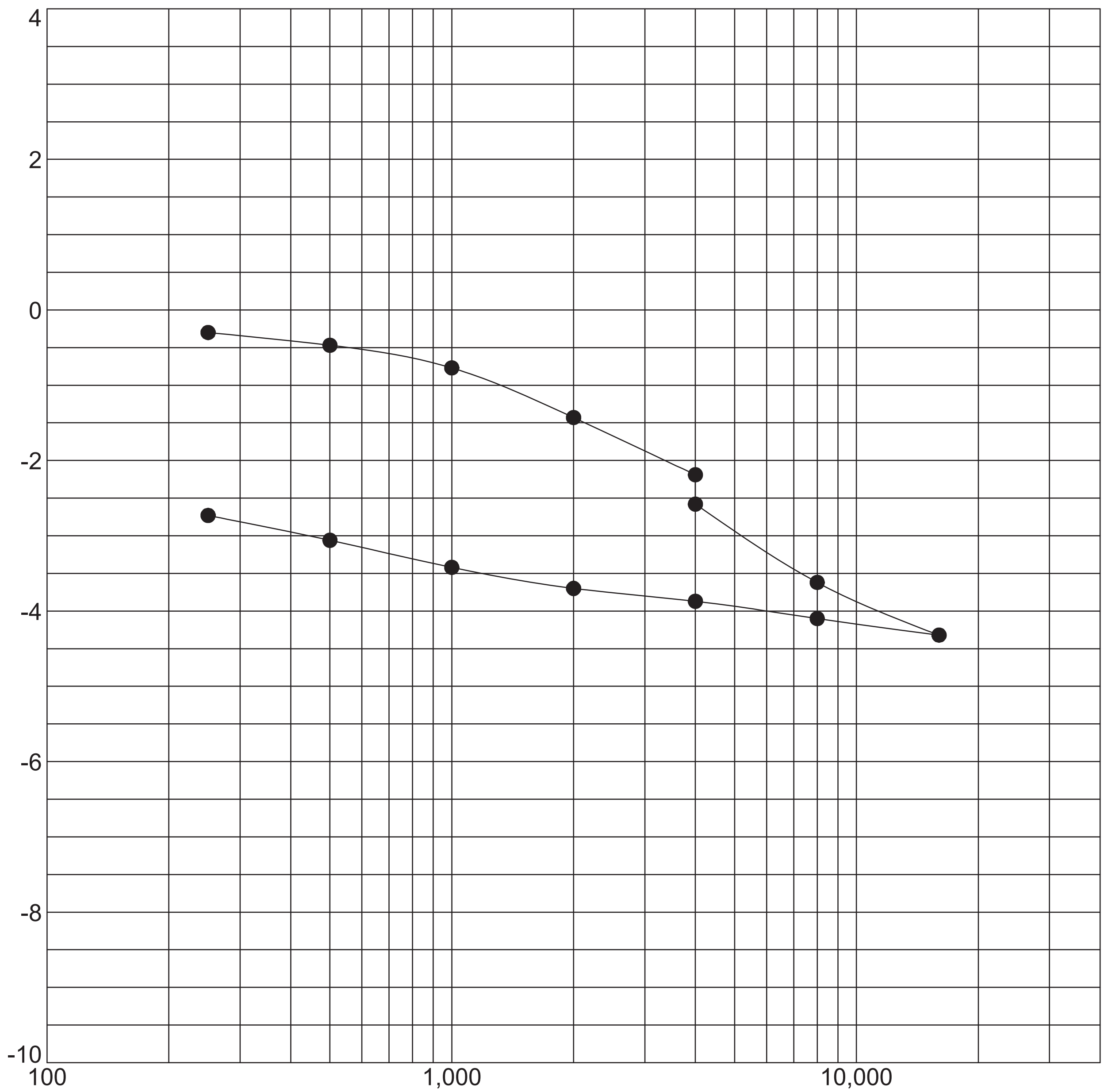
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-104 20-21.5 ft		107	3

NOTES: Water added at 2,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



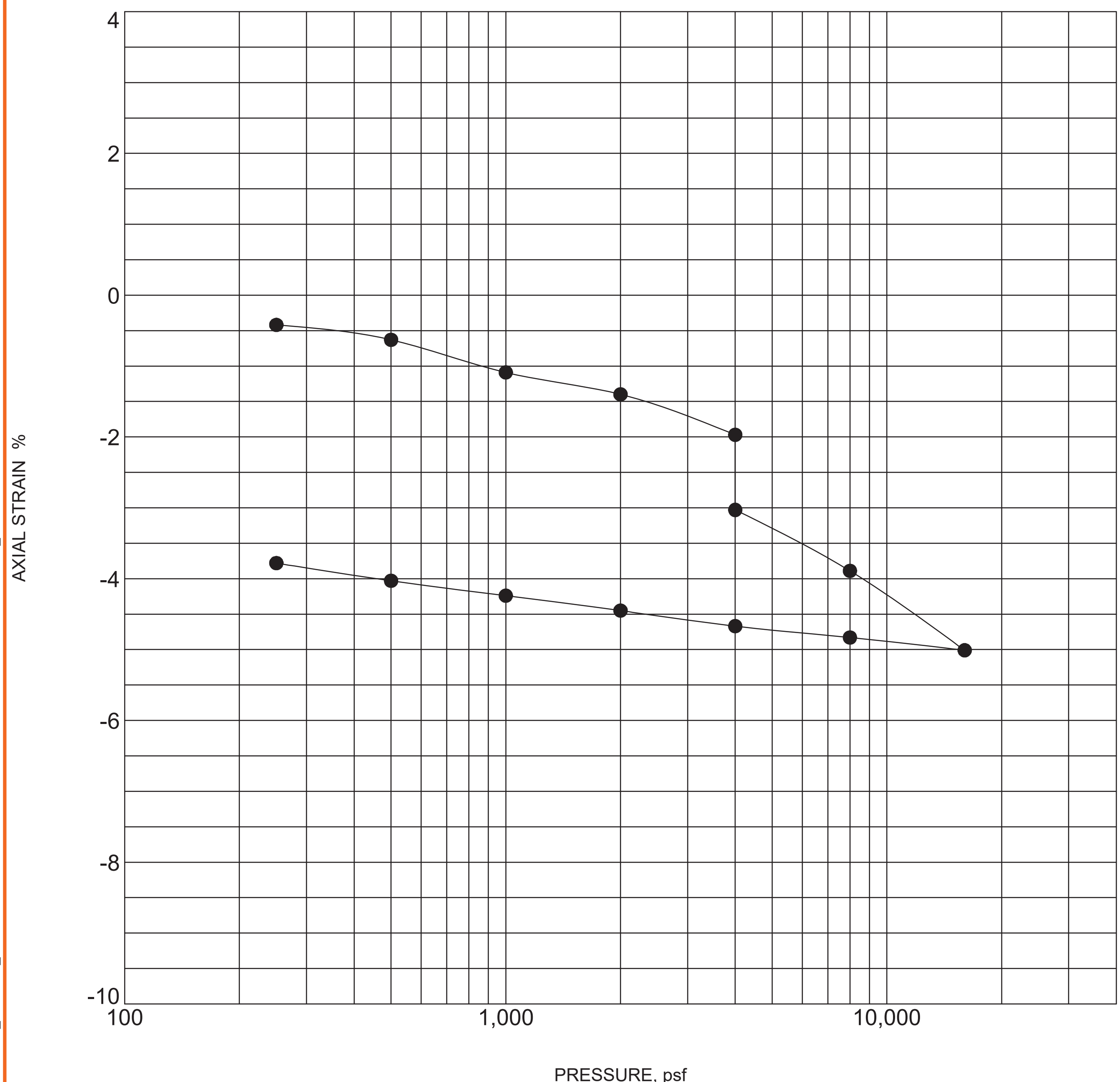
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-105 2.5 - 4 ft		113	11

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-105 15-16.5 ft		105	3

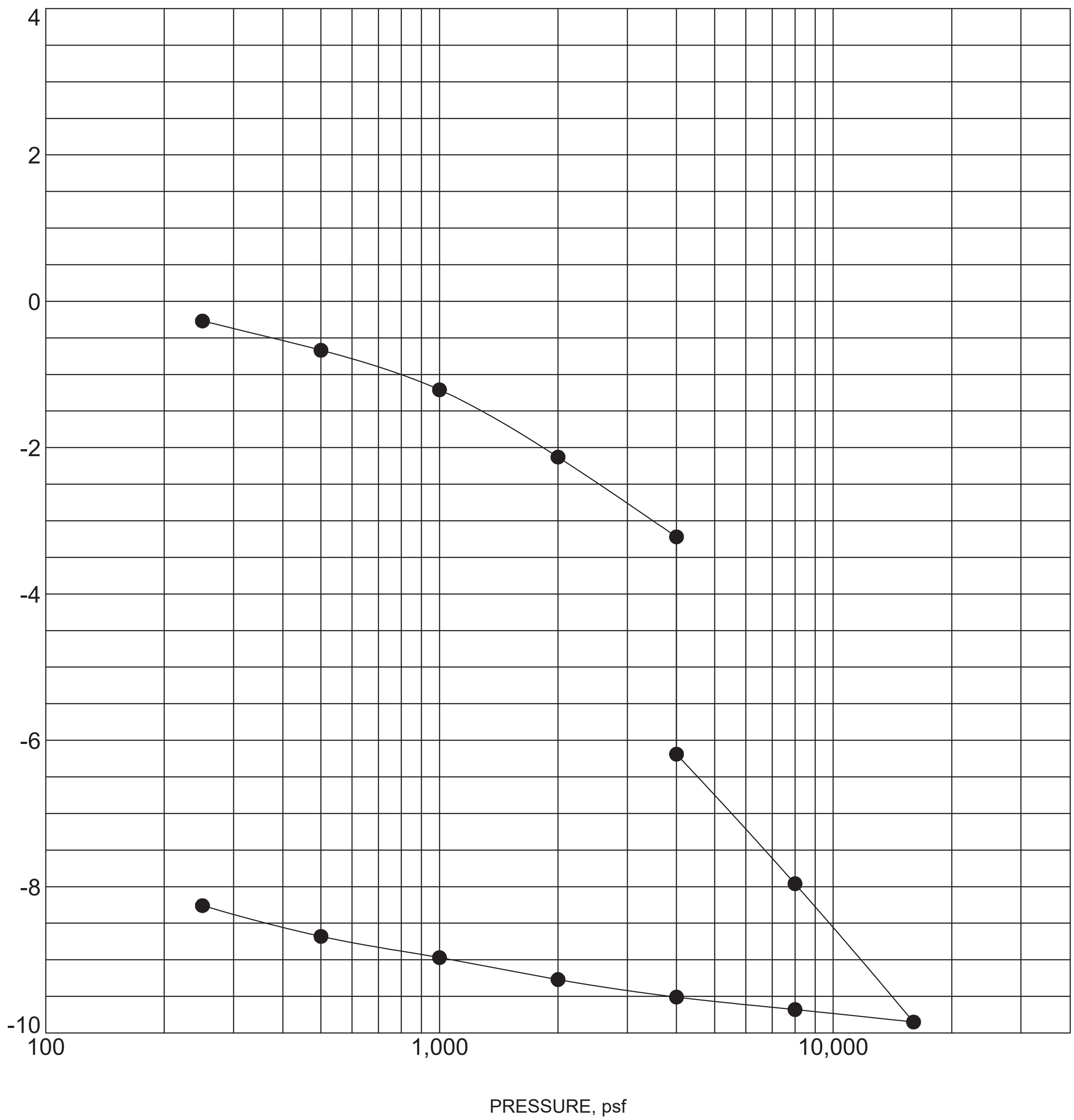
NOTES: Water added at 4,000 psf.

LABORATORY TESTS ARE NOT VALID IF SEP R TED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 4/7/20

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-106 7.5 - 9 ft		117	5

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Roa
Adelanto, CA

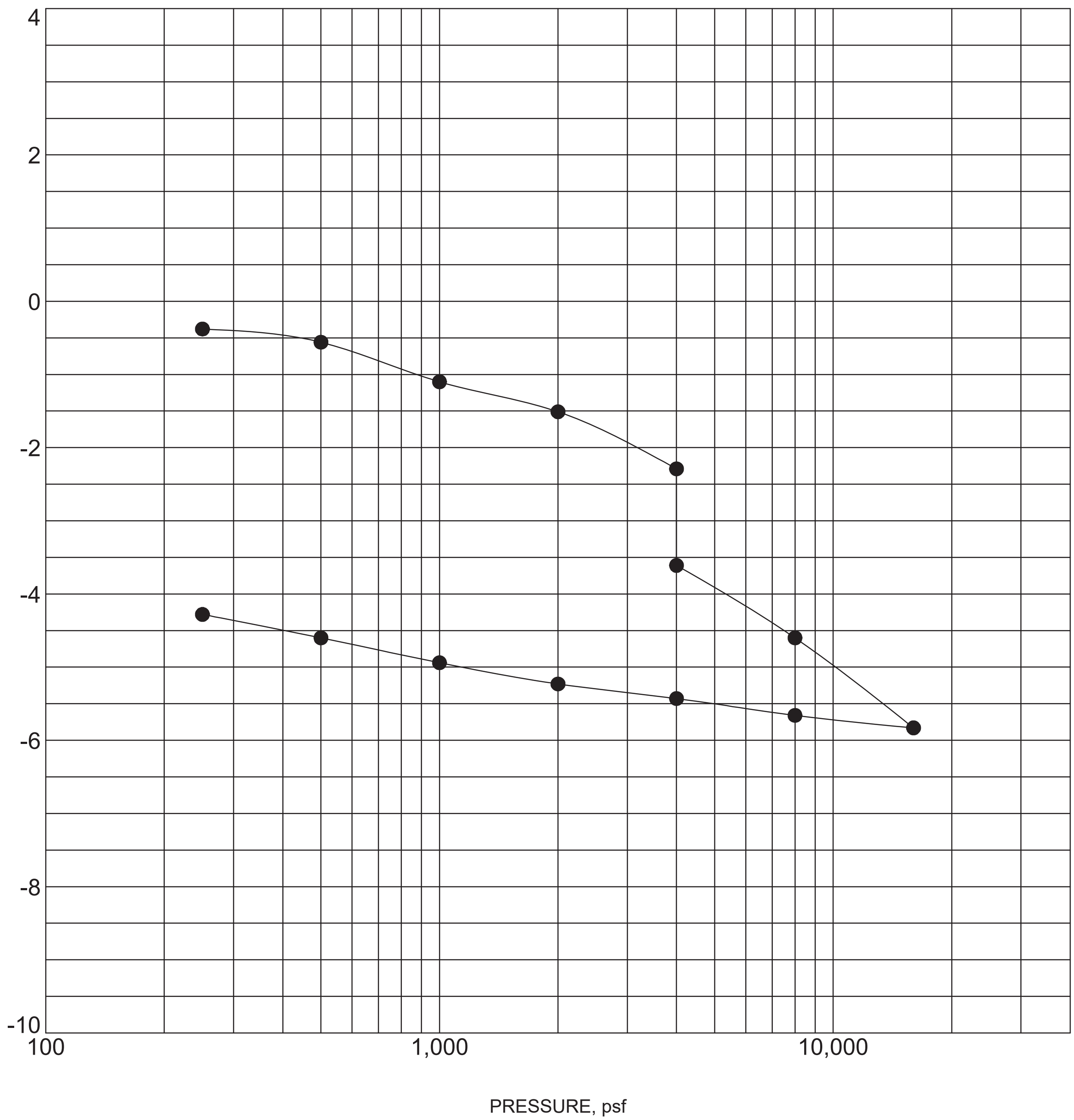
1421 Edinger Ave, Ste C
Tustin, C

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435

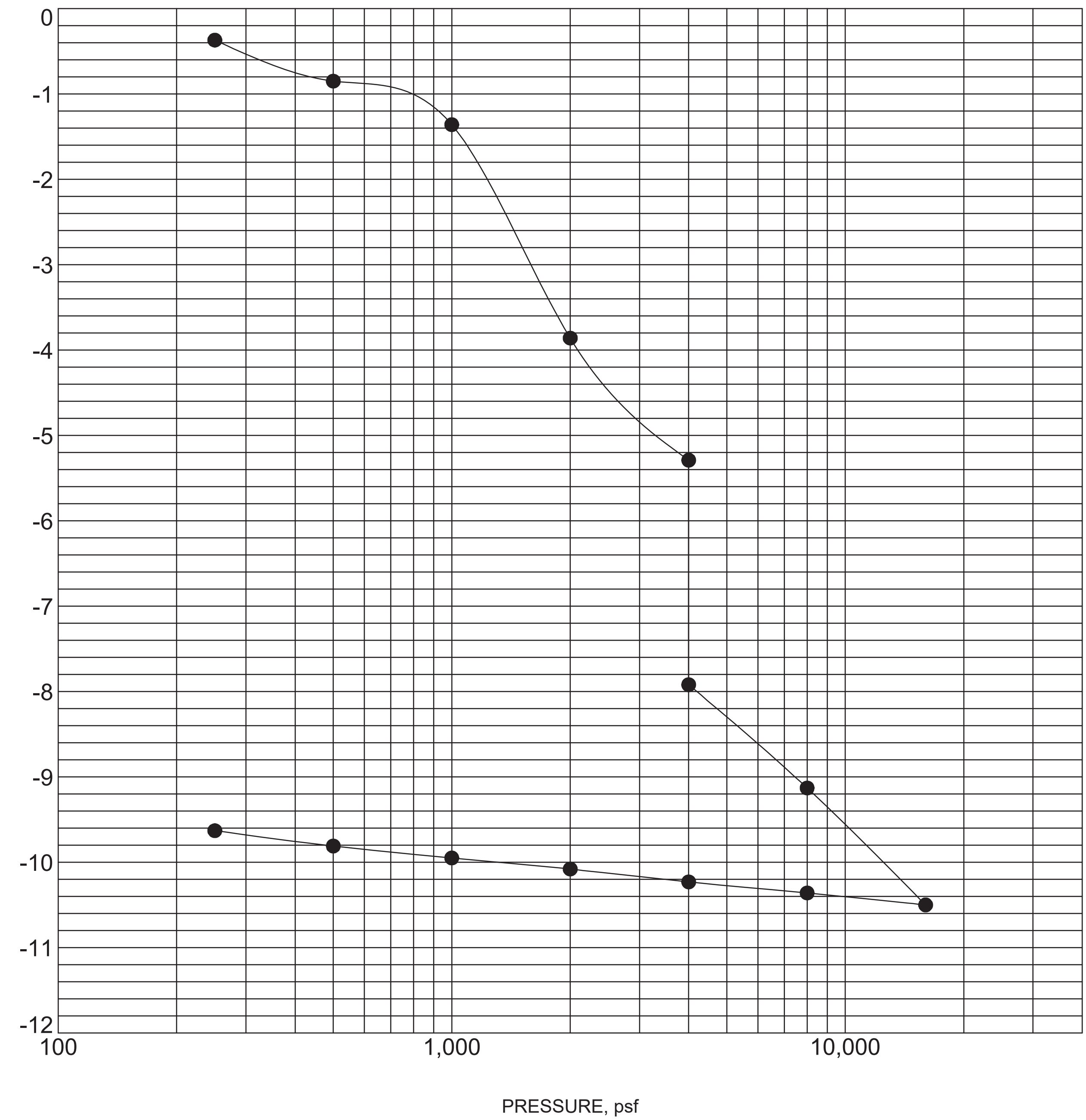


Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-106 25-26.5 ft		108	1

NOTES: Water added at 4,000 psf.

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-107 5 - 6.5 ft		117	2

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Ro d
Adelanto, CA

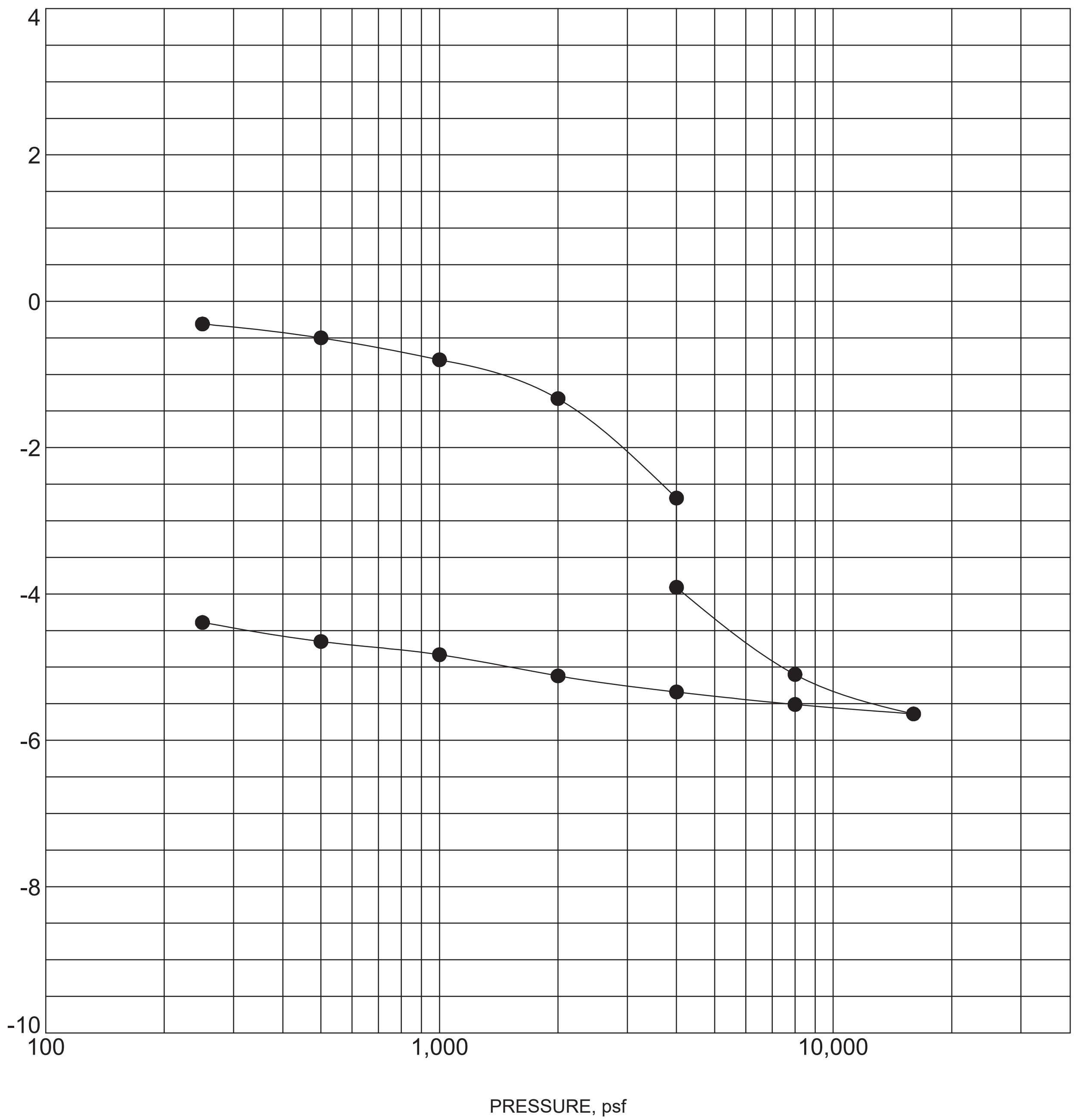
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Ve tch Corpor tion
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



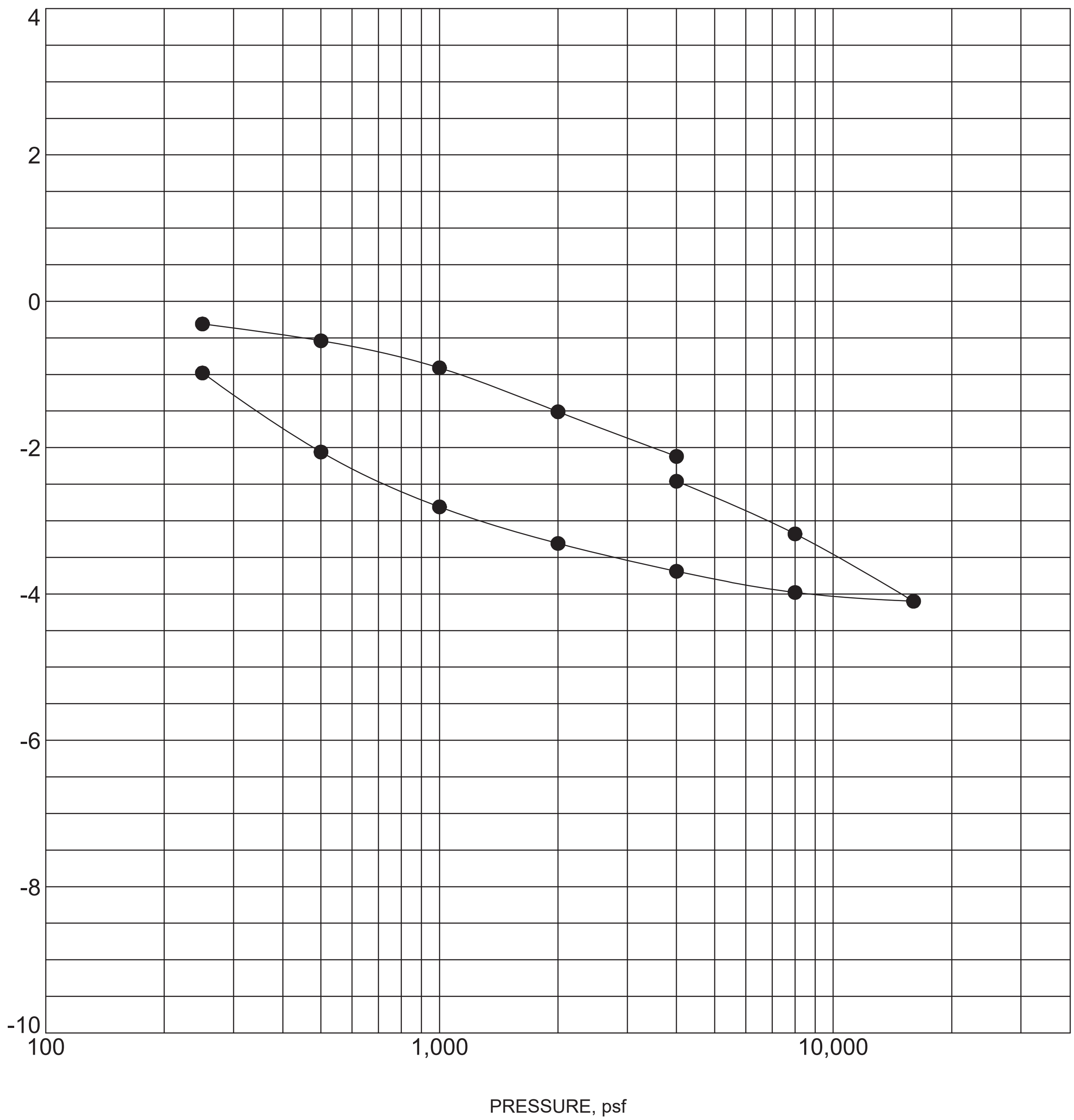
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-108 2.5 - 4 ft		122	4

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435

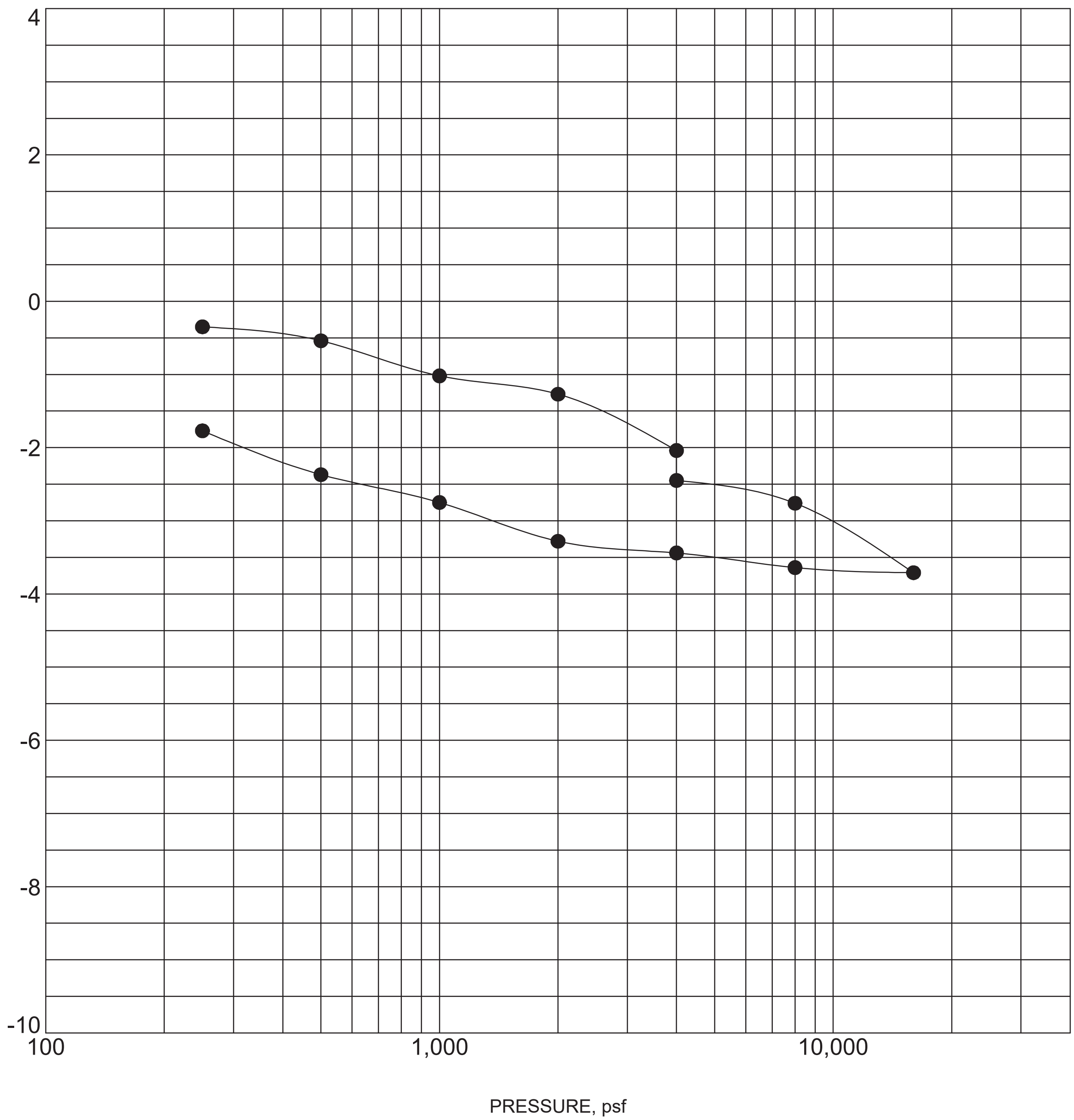


Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-108 25-26.5 ft		122	4

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST
ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-110 5 - 6.5 ft		108	11

NOTES: Water added at 4,000 psf.

LABORATORY TESTS ARE NOT VALID IF SEP R TED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 4/7/20

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Roa
Adelanto, CA

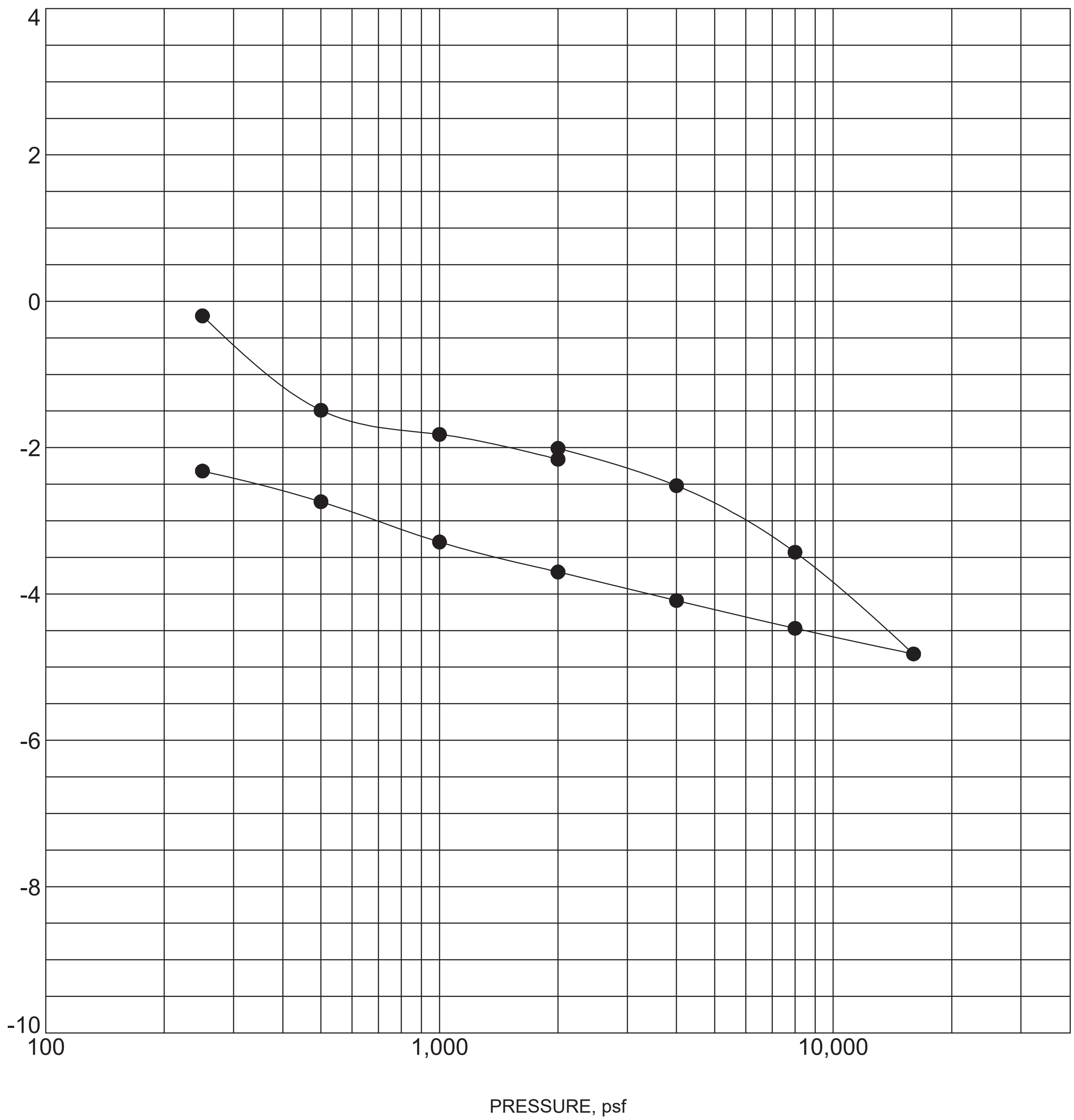
Terracon
1421 Edinger Ave, Ste C
Tustin, C

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-110 20-21.5 ft		102	2

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Roa
Adelanto, CA

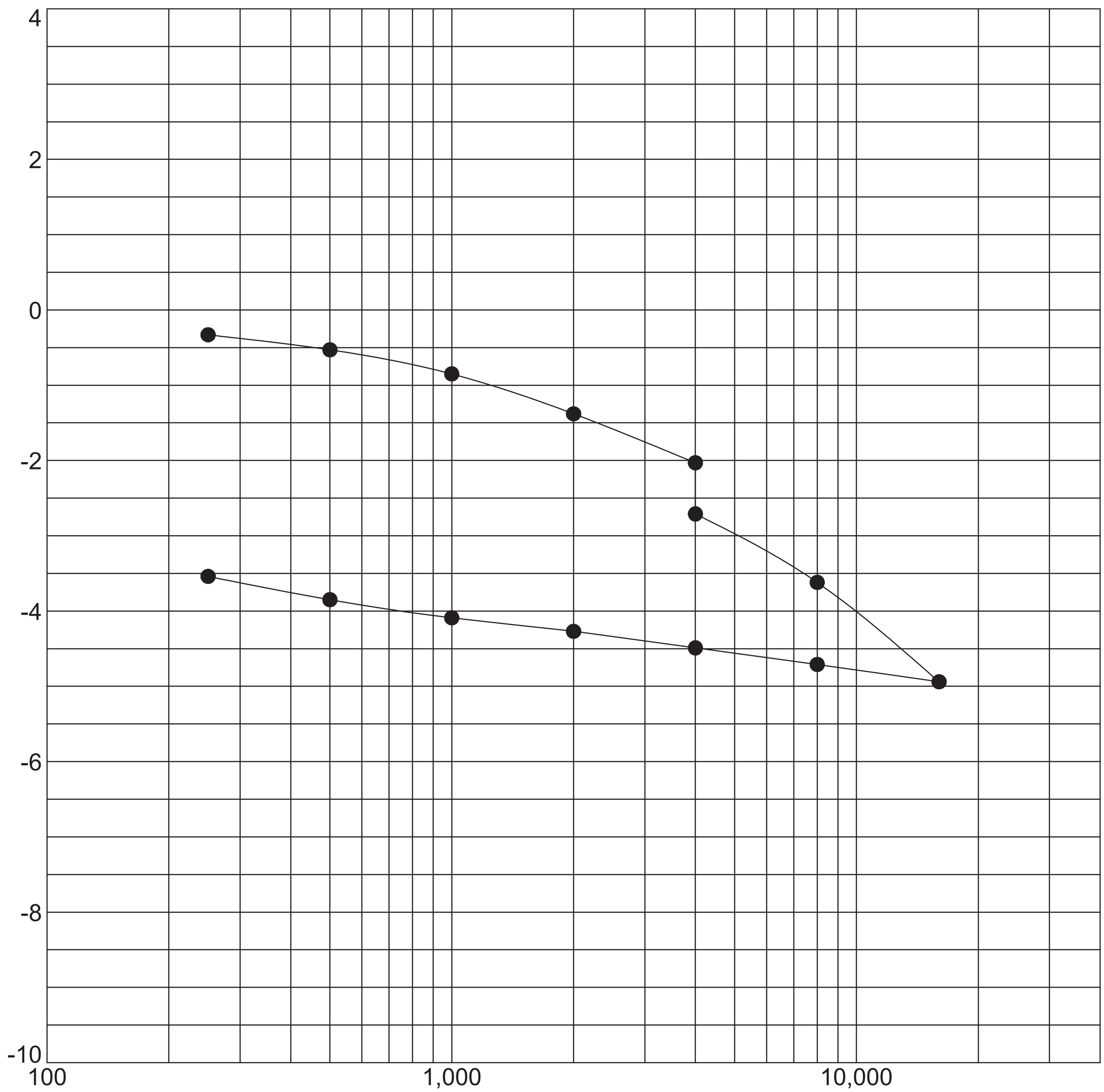
Terracon
1421 Edinger Ave, Ste C
Tustin, C

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-111 10-11.5 ft		100	9

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Roa
Adelanto, CA

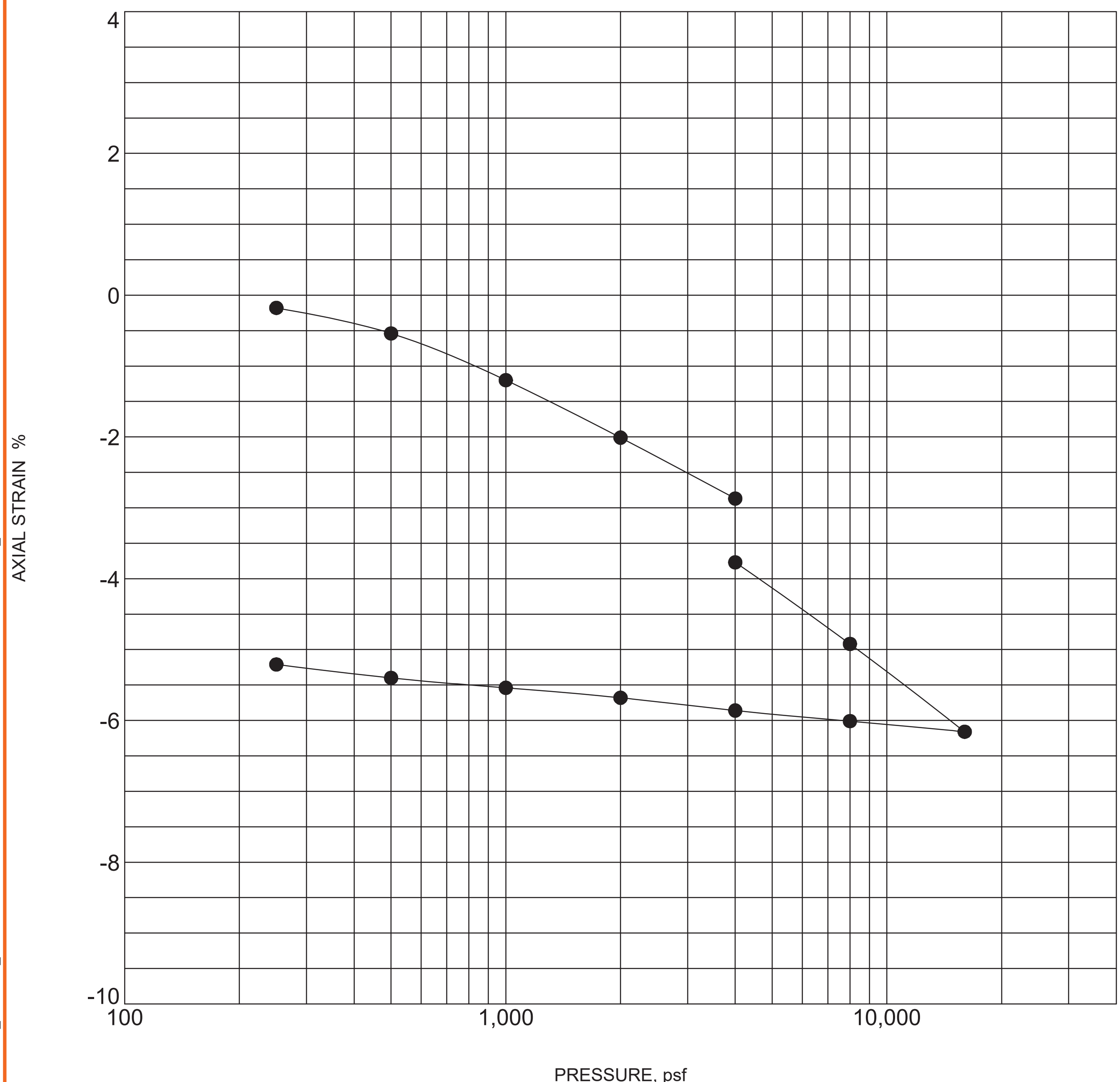
Terracon
1421 Edinger Ave, Ste C
Tustin, C

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435

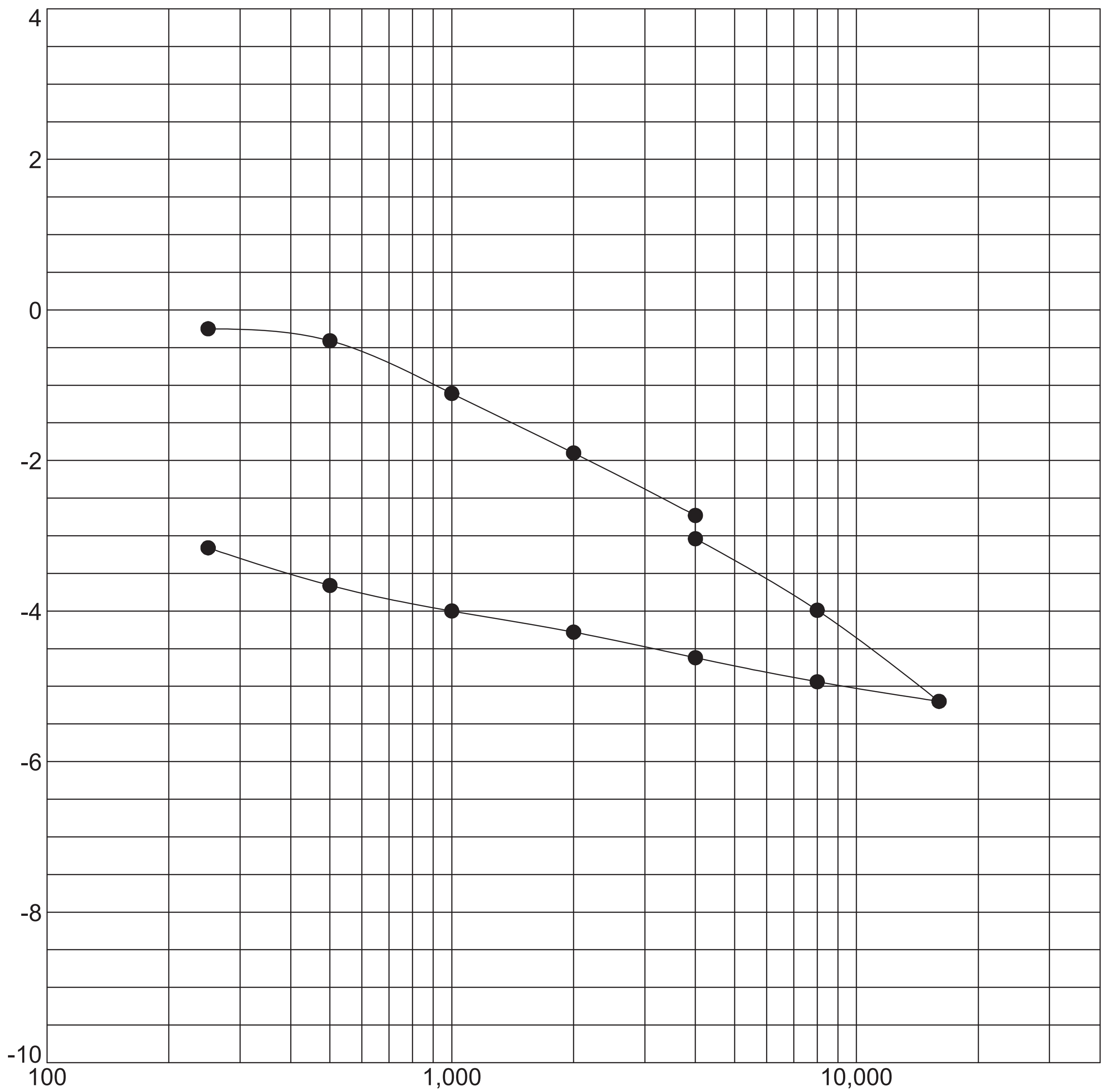


Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-112 2.5 - 4 ft		115	6

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST
ASTM 2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-112 15-16.5 ft		110	3

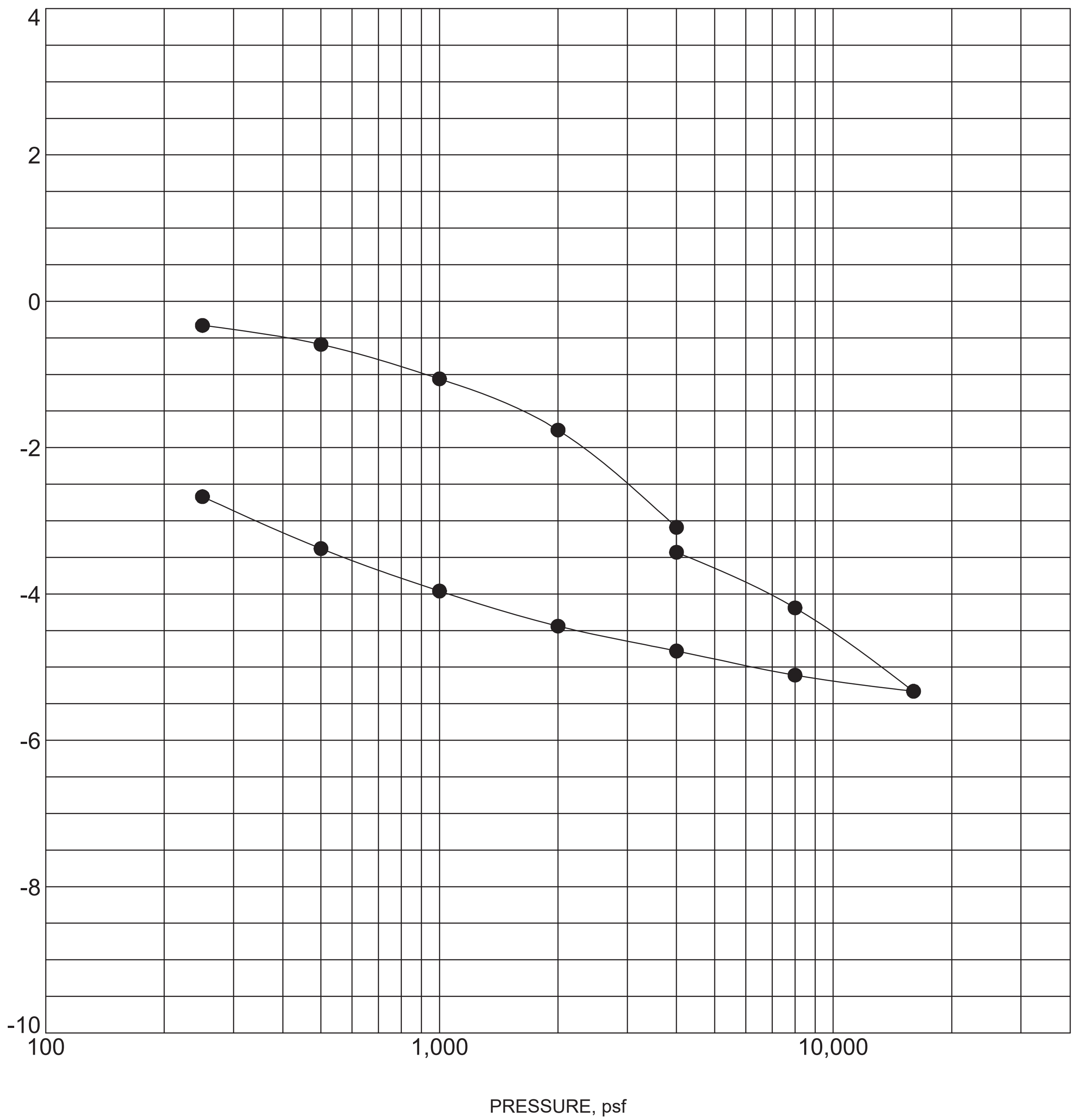
NOTES: Water added at 4,000 psf.

LABORATORY TESTS ARE NOT VALID IF SEP R TED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 4/7/20

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

SWELL CONSOLI AT ON TEST

ASTM 2435



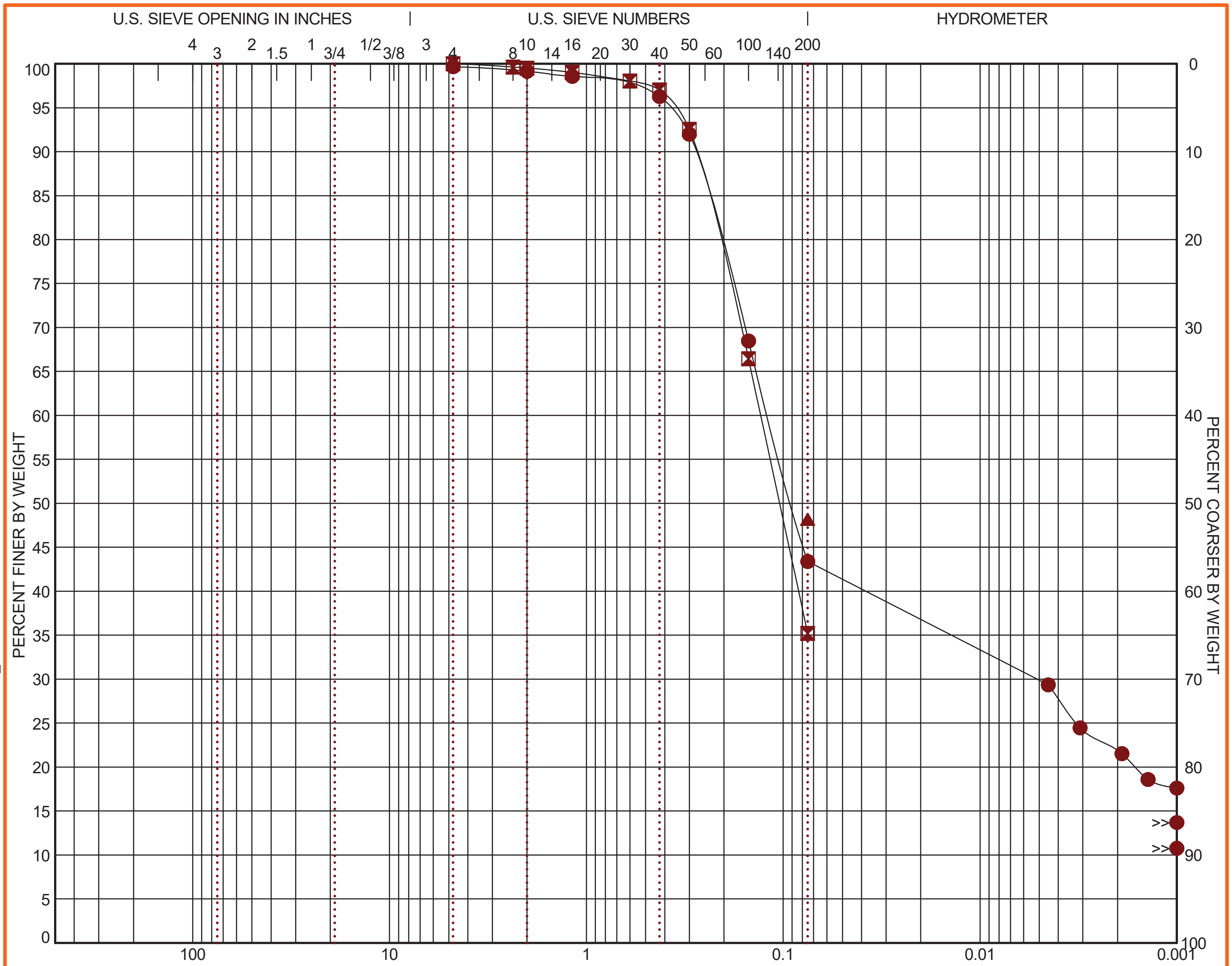
Specimen Identification		Classification	γ_d, pcf	WC, %
●	BVB-113 10-11.5 ft		111	3

NOTES: Water added at 4,000 psf.

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, C	PROJECT NUMBER: 60205007
SITE: 16800 Aster Roa Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-101	2.5 - 4			56.3	13.5		29.9	
⊠	BVB-101	15 - 16.5	0.0	0.0	64.8		35.2		
▲	BVB-101	25 - 26.5					48.2		

GRAIN SIZE	●	⊠	▲
60	0.119	0.13	
30	0.005		
10			

COEFFICI NTS	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
#4	99.	#4	100.0	#200	48.1
#10	99.14	#8	99. 3		
#16	98.5	#10	99.51		
#40	96.2	#16	99.01		
#50	91.98	#30	98.04		
#100	68.4	#40	97.01		
#200	43.39	#50	92.53		
		#100	66.44		
		#200	35.2		

SOIL SCRI TION	
●	
⊠	
▲	

REMARKS	
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

PROJECT NUMBER: 60205007

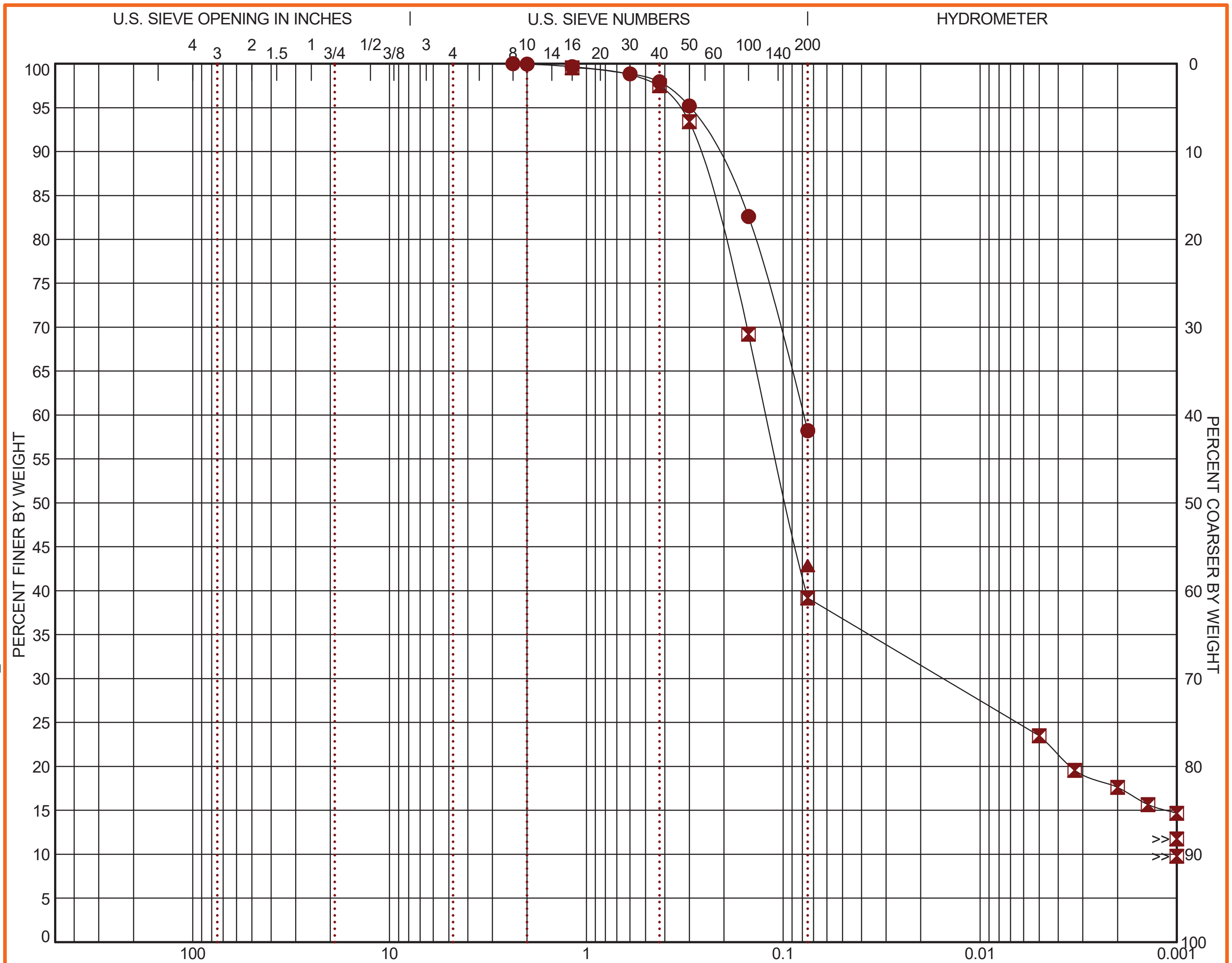
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-102	25 - 26.5	0.0	0.0	41.8		58.2		
⊠	BVB-103	7.5 - 9			60.4	15.7		23.5	SM
▲	BVB-103	10 - 11.5					42.9		

GRAIN SIZE	●	⊠	▲
60	0.079	0.121	
30		0.015	
10		0	

COEFFICI NTS	●	⊠	▲
C_C		8.83	
C_U		548.03	

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
#8	100.0	#16	99.54	#200	42.85
#10	99.95	#40	97.51		
#16	99.	#50	93.39		
#30	98.84	#100	69.19		
#40	97.94	#200	39.1		
#50	95.19				
#100	82.				
#200	58.22				

	SOIL SCRI TION
●	
⊠	SILTY SAND (SM)
▲	

	REMARKS
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

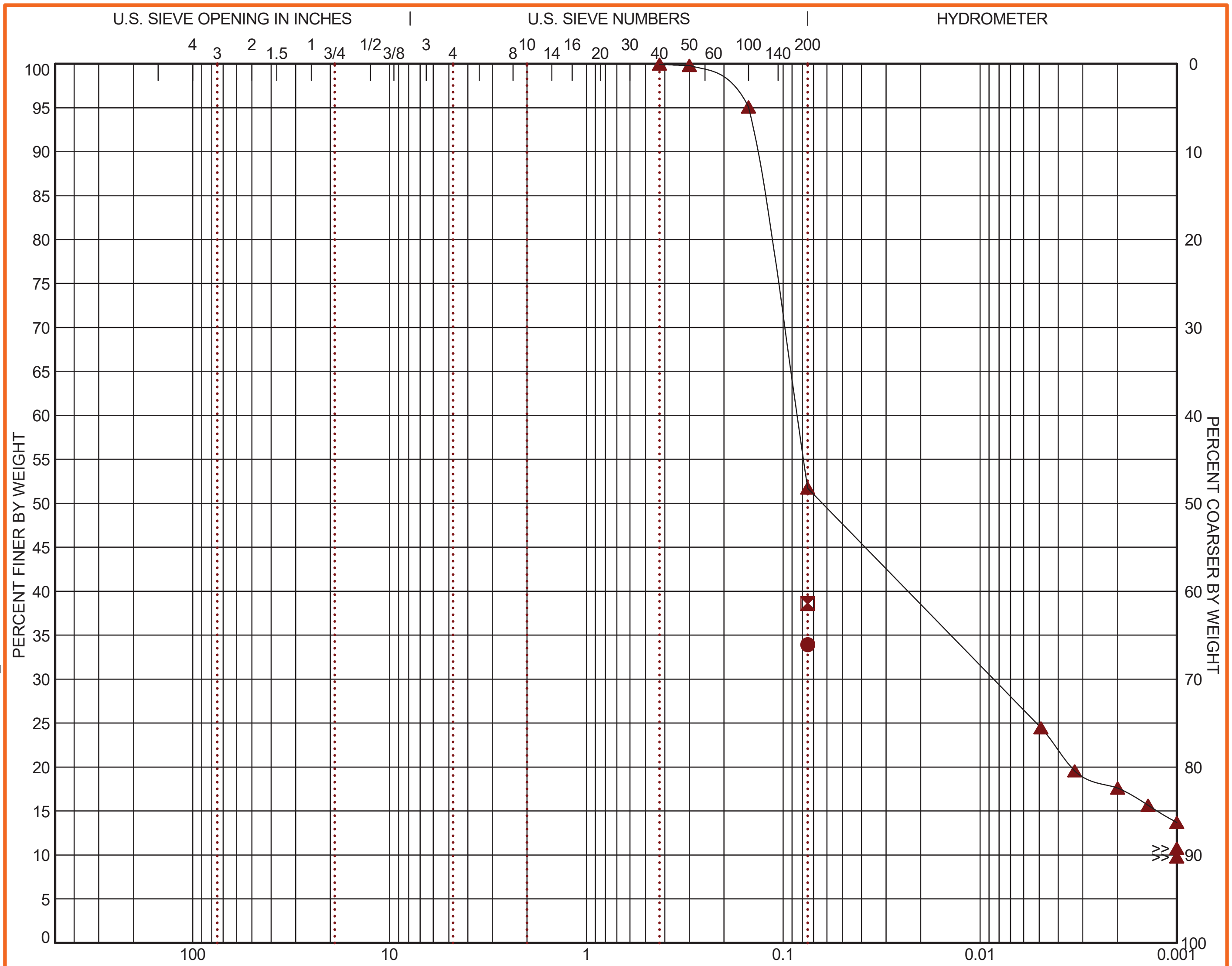
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-104	7.5 - 9					33.9		
⊠	BVB-104	45 - 46.5					38.6		
▲	BVB-105	25 - 26.5			48.2	27.1		24.7	

GRAIN SIZE			
	●	⊠	▲
60			0.08
30			0.009
10			0

COEFFICI NTS			
	●	⊠	▲
C_C			3.47
C_U			349.37

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#200	33.93	#200	38.61	#40 #50 #100 #200	99.95 99.81 95.09 51. 3

SOIL SCRI TION	
●	
⊠	
▲	

REMARKS	
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

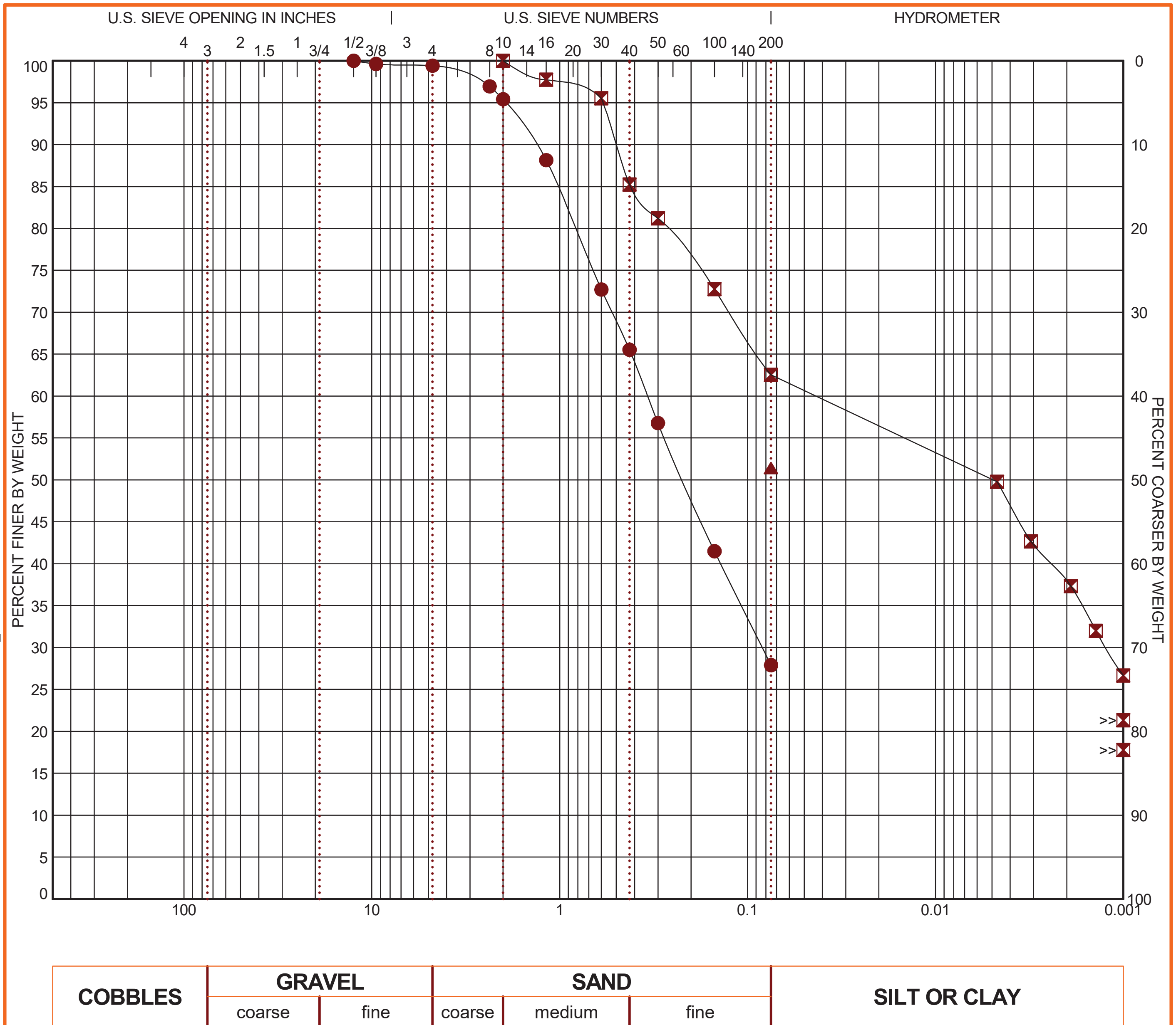
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
● BVB-106	5 - 6.5	0.0	0.6	71.5		27.9		
⊠ BVB-106	10 - 11.5	0.0	0.0	37.5	12.5		50.1	
▲ BVB-106	40 - 40.3					51.4		

GRAIN SIZE	●	⊠	▲
60	0.341	0.043	
30	0.083	0.001	
10			

COEFFICI NTS	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
1/2"	100.0	#10	100.0	#200	51.41
3/8"	99. 2	#16	97.		
#4	99.41	#30	95.51		
#8	96.95	#40	85.22		
#10	95.41	#50	81.2		
#16	88.14	#100	72.		
#30	72.	#200	62.53		
#40	65.52				
#50	56. 8				
#100	41.49				
#200	27.91				

SOIL SCRI TION	
●	
⊠	
▲	

REMARKS	
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

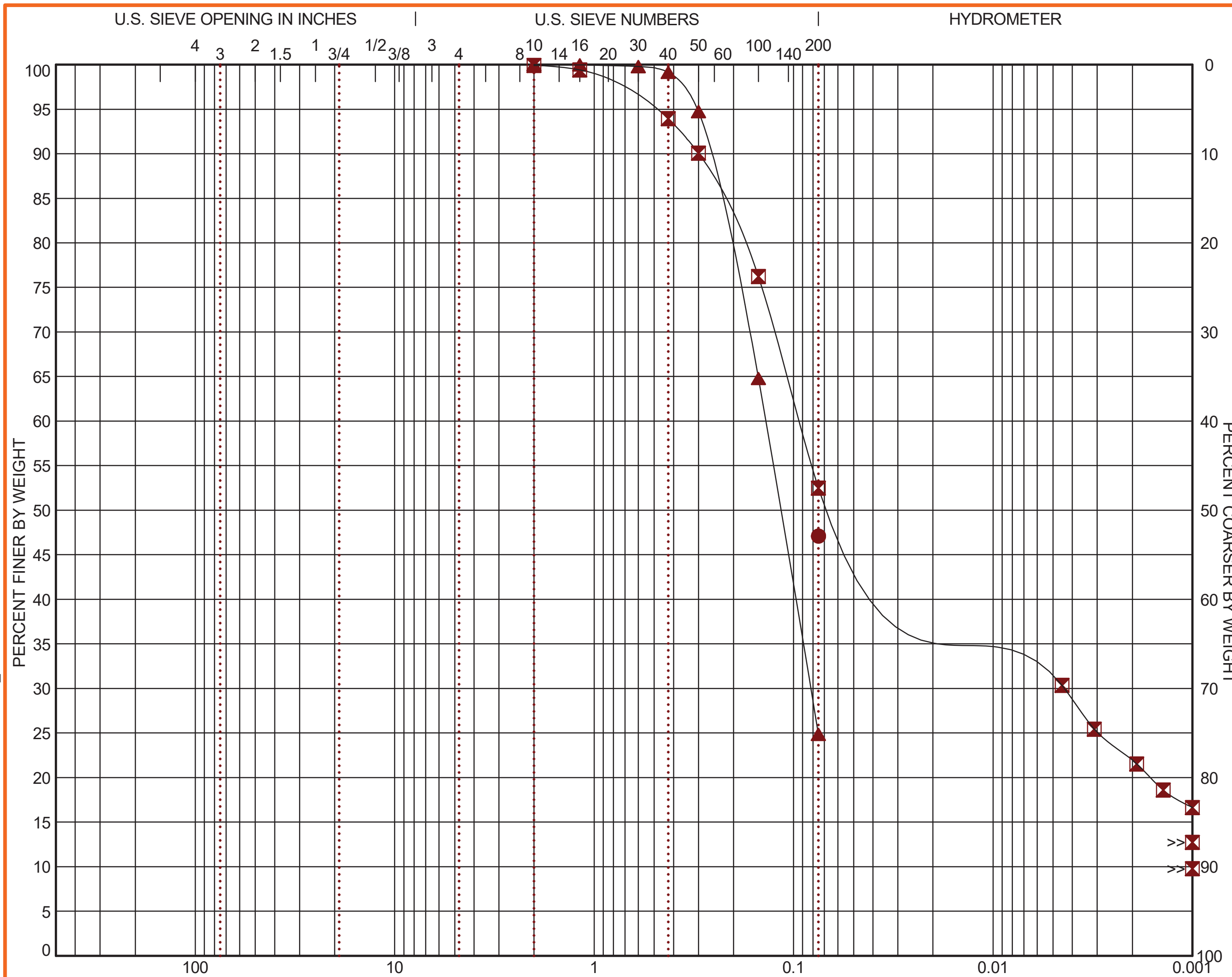
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	**BVB-107**	15 - 16.5					47.1		
⊠	**BVB-107**	35 - 36.5			47.4	21.3		31.2	ML
▲	**BVB-108**	10 - 11.5	0.0	0.0	75.1		24.9		

GRAIN SIZE

	●	⊠	▲
60		0.093	0.138
30		0.004	0.082
10		0	

COEFFICI NTS

	●	⊠	▲
C_C		0.96	
C_U		436.47	

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#200	47.1	#10	99.92	#10	100.0
		#16	99.4	#16	99.9
		#40	93.93	#30	99. 9
		#50	90.0	#40	99.13
		#100	76.24	#50	94. 3
		#200	52.48	#100	64. 8
				#200	24.85

SOIL SCRI TION

●	
⊠	SANDY SILT (ML)
▲	

REMARKS

●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

PROJECT NUMBER: 60205007

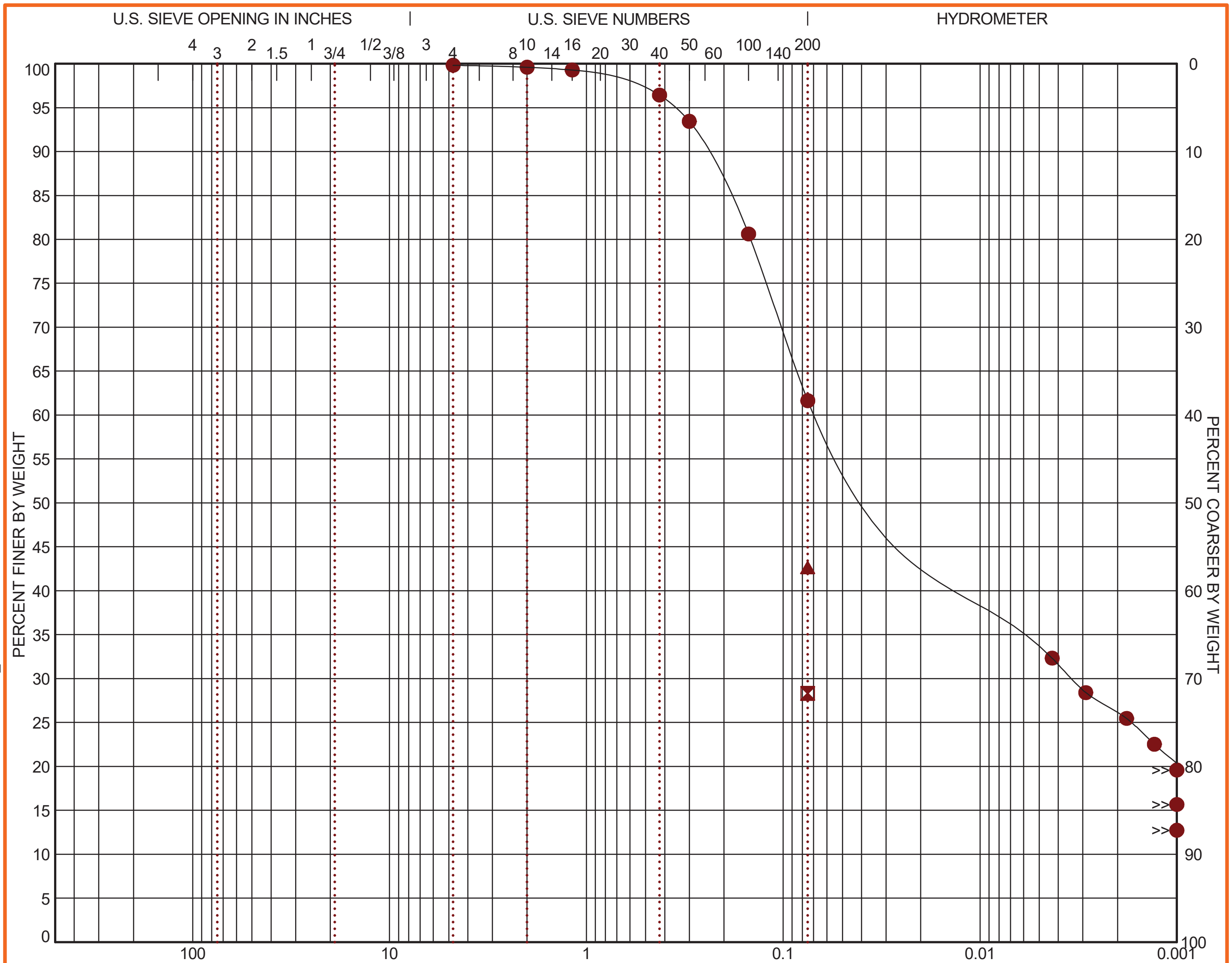
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-108	20 - 21.5			38.2	27.8		33.9	CL-ML
⊠	BVB-109	5 - 6.3					28.3		
▲	BVB-109	25 - 26.3					42.6		

GRAIN SIZE	●	⊠	▲
60	0.064		
30	0.003		
10			

COEFFICI NTS	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
#4	99.82	#200	28.3	#200	42. 3
#10	99.59				
#16	99.28				
#40	96.42				
#50	93.43				
#100	80. 2				
#200	61. 4				

	SOIL SCRI TION
●	SANDY SILTY CLAY (CL-ML)
⊠	
▲	

	REMARKS
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

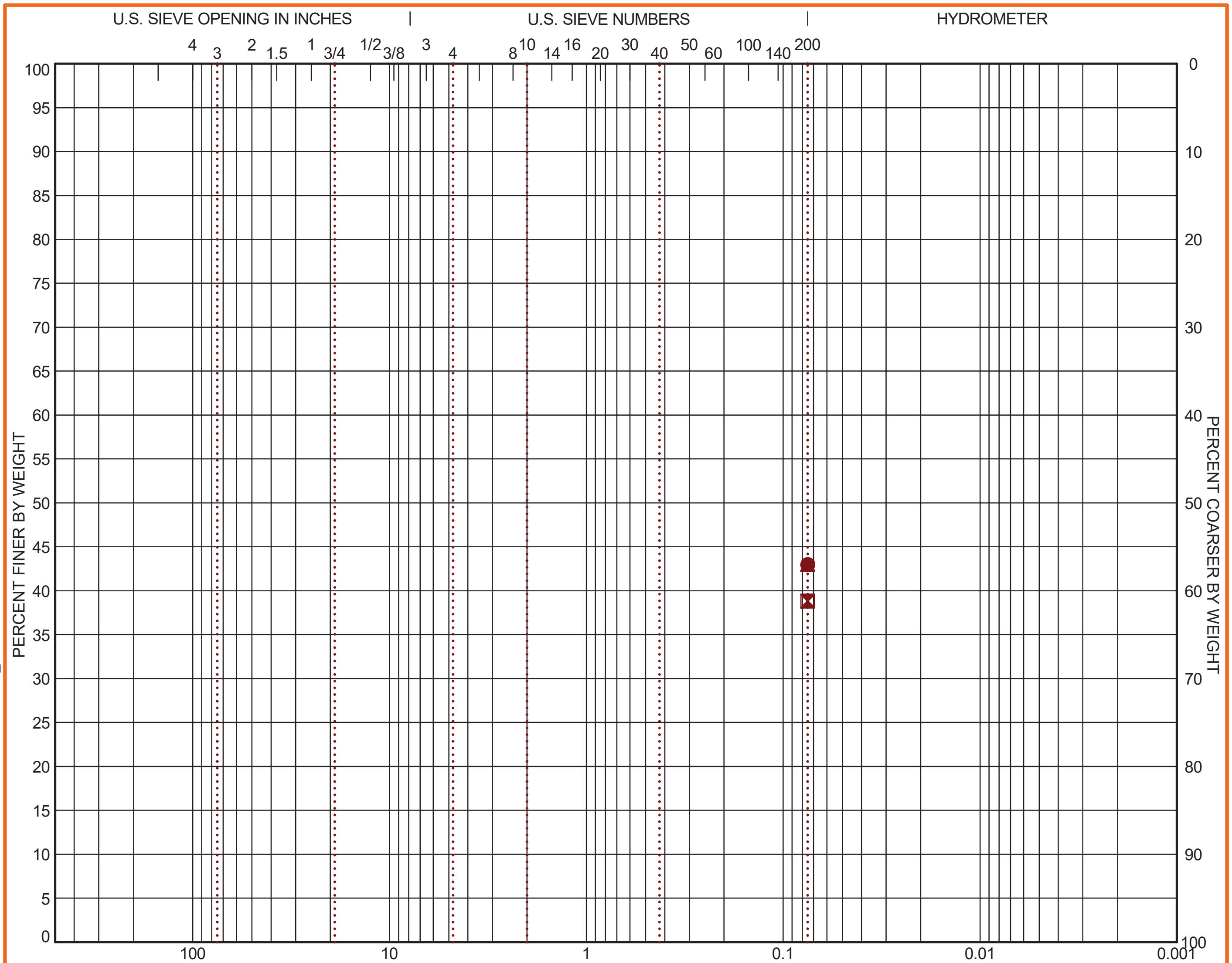
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	**BVB-109**	40 - 41.3					43.0		
⊠	**BVB-109**	65 - 66.3					38.8		
▲	**BVB-109**	90 - 91.3					42.9		

GRAIN SIZE

	●	⊠	▲
60			
30			
10			

COEFFICI NTS

	●	⊠	▲
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#200	42.98	#200	38.84	#200	42.9

SOIL SCRI TION

●	
⊠	
▲	

REMARKS

●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

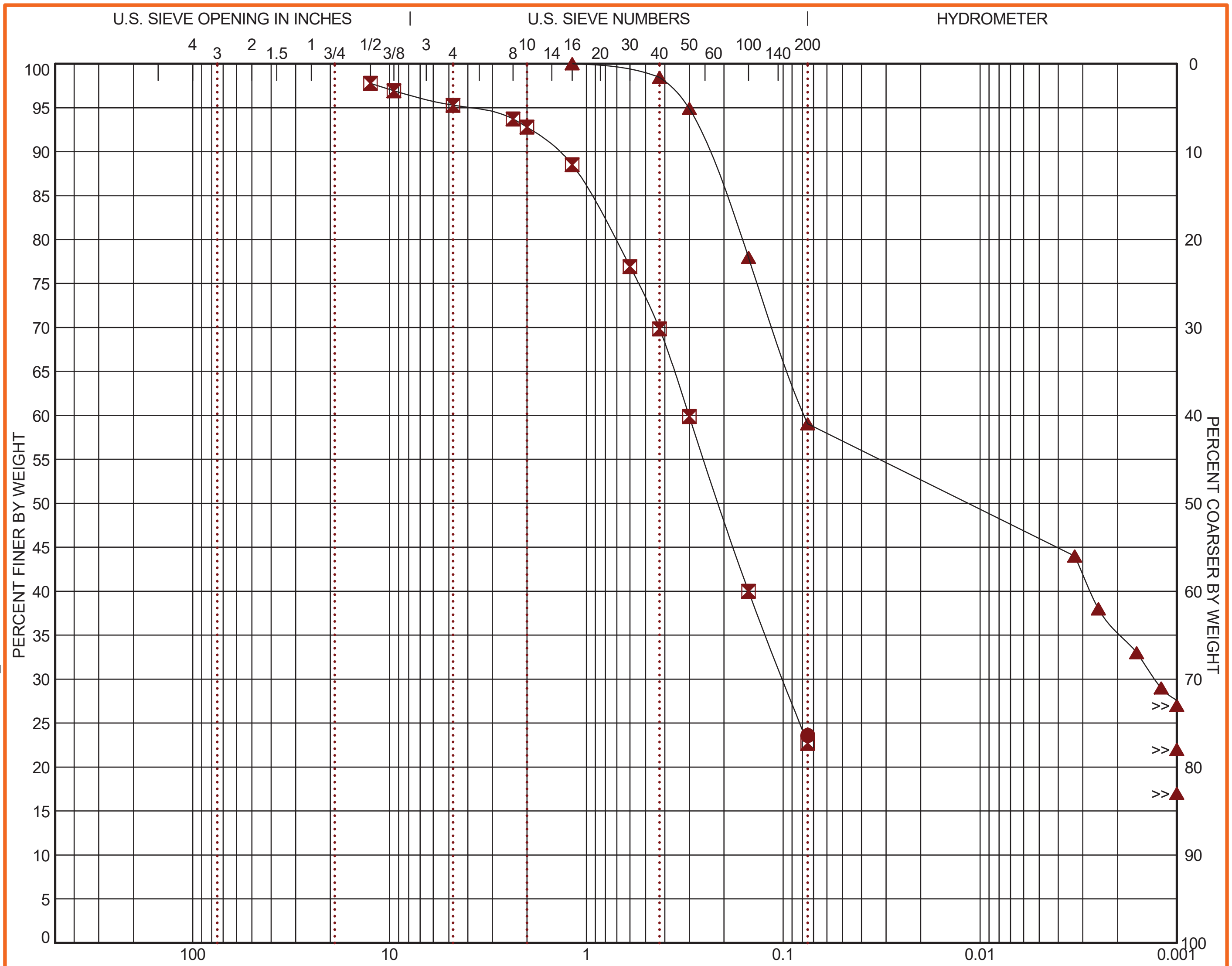
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-110	40 - 41.5					23.6		
⊠	BVB-111	2.5 - 4		2.5	72.6		22.7		
▲	BVB-111	15 - 16.2	0.0	0.0	41.0	13.0		4 .0	CL-ML

GRAIN SIZE

	●	⊠	▲
60		0.301	0.078
30		0.101	0.001
10			

COEFFICI NTS

	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
#200	23.	1/2"	97.	#16	100.0
		3/8"	96.93	#40	98.44
		#4	95.28	#50	94.9
		#8	93. 2	#100	77.9
		#10	92. 8	#200	59.03
		#16	88.5		
		#30	76.92		
		#40	69.85		
		#50	59.88		
		#100	39.99		
		#200	22.		

SOIL SCRI TION

●	
⊠	
▲	SANDY SILTY CLAY (CL-ML)

REMARKS

●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

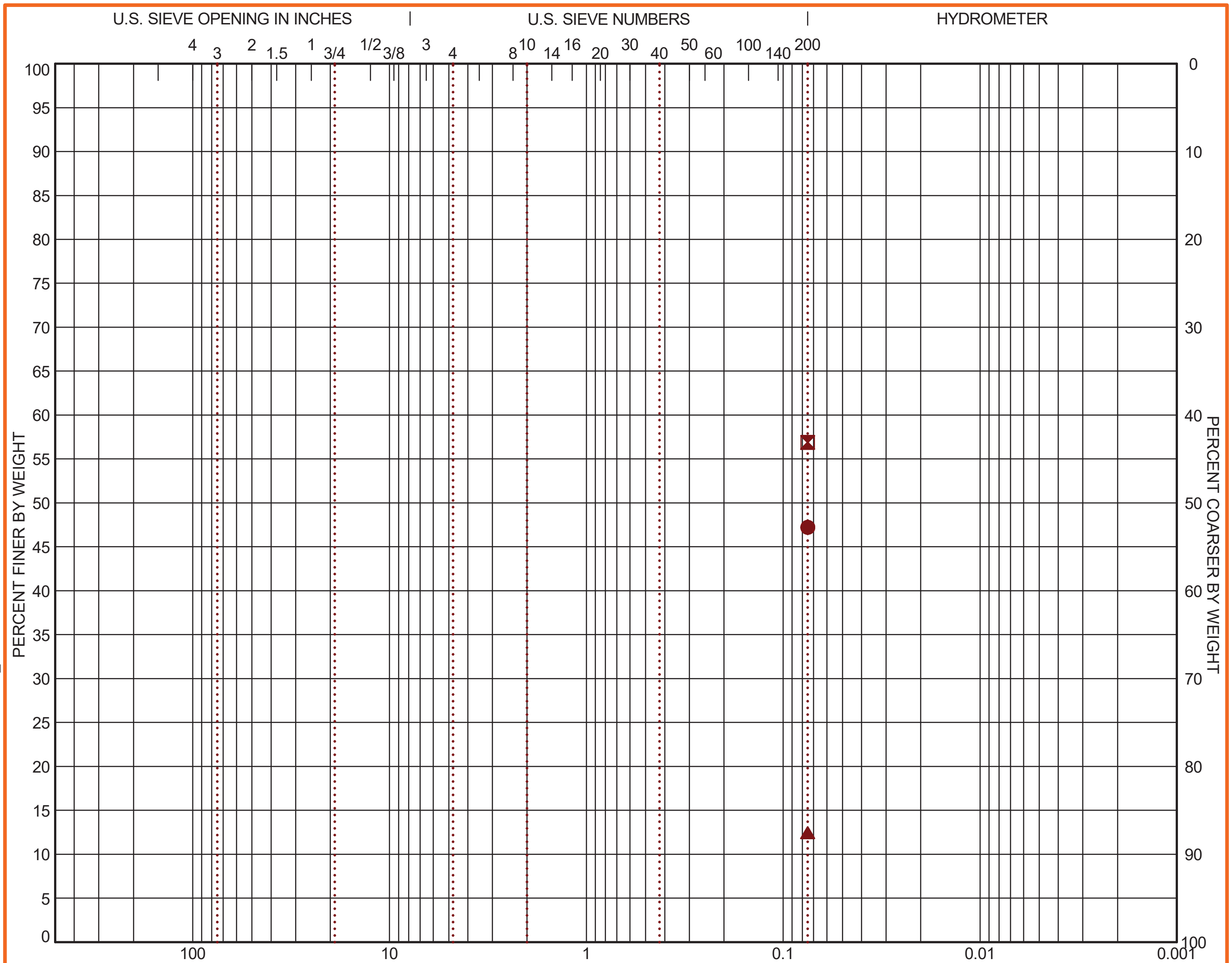
PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS 1 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 4/7/20

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	**BVB-111**	35 - 36.5					47.2		SC
⊠	**BVB-111**	50 - 51.5					56.9		
▲	**BVB-112**	10 - 11.5					12.5		

GRAIN SIZE			
	●	⊠	▲
60			
30			
10			

COEFFICI NTS			
	●	⊠	▲
C_C			
C_U			

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#200	47.22	#200	56.89	#200	12.4

	SOIL SCRI TION
●	CLAYEY SAND (SC)
⊠	
▲	

	REMARKS
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

PROJECT NUMBER: 60205007

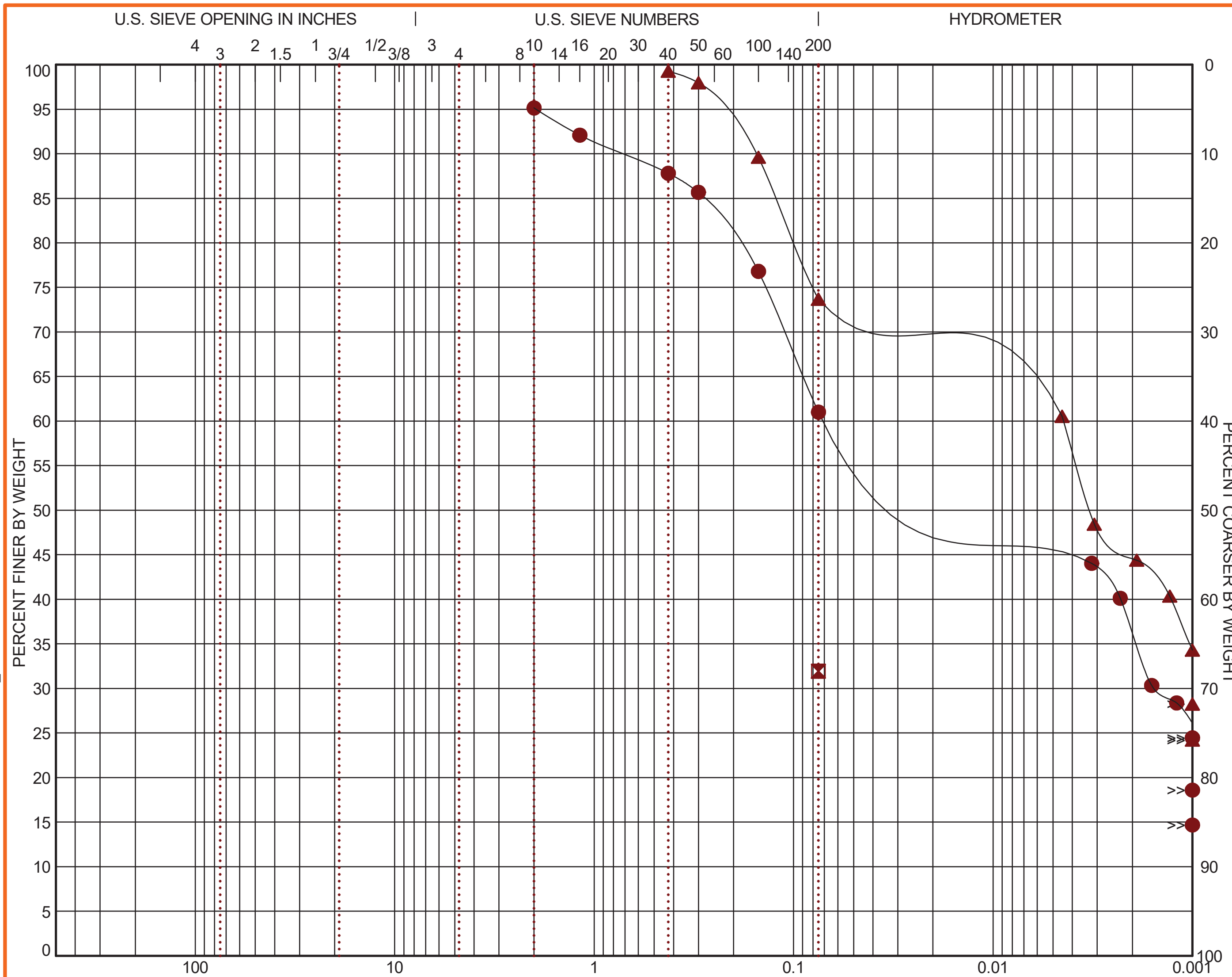
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-112	35 - 36.5			34.1	14.6		46.4	CL
⊠	BVB-113	2.5 - 4					31.9		
▲	BVB-113	25 - 25.8			25.6	12.7		61.0	

GRAIN SIZE

	●	⊠	▲
60	0.062		0.004
30	0.002		0.001
10			

COEFFICI NTS

	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
#10	95.13	#200	31.92	#40	99.26
#16	92.08			#50	97.98
#40	87.81			#100	89.
#50	85.			#200	73. 9
#100	76.8				
#200	61.01				

SOIL SCRI TION

●	SANDY LEAN CLAY (CL)
⊠	
▲	

REMARKS

●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

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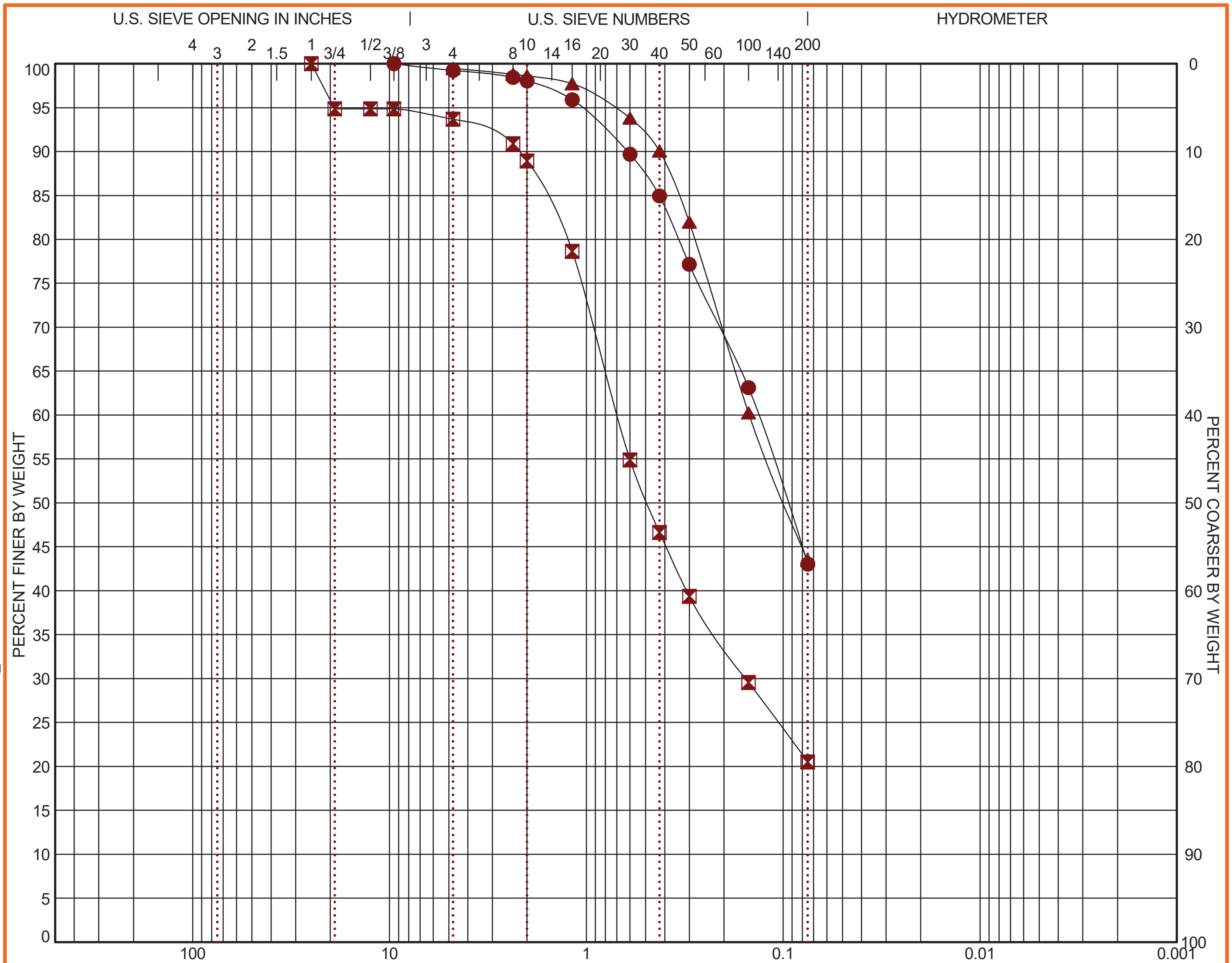
CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL coarse	GRAVEL fine	SAND coarse	SAND medium	SAND fine	SILT OR CLAY

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	**BVB-114**	5 - 6.5	0.0	0.8	56.2		43.0		
⊠	**BVB-114**	20 - 21.5	0.0	6.3	73.2		20.5		
▲	**BVB-115**	10 - 11.5			56.0		43.5		

GRAIN SIZE	●	⊠	▲
60	0.135	0.694	0.149
30		0.155	
10			

COEFFICI NTS	●	⊠	▲
C_C			
C_U			

● Sieve	● % Finer	⊠ Sieve	⊠ % Finer	▲ Sieve	▲ % Finer
3/8"	100.0	1"	100.0	#4	99.4
#4	99.23	3/4"	94.8	#8	98.8
#8	98.43	1/2"	94.8	#10	98.
#10	98.03	3/8"	94.8	#16	97. 2
#16	95.9	#4	93.	#30	93. 9
#30	89. 9	#8	90.88	#40	90.04
#40	84.94	#10	88.94	#50	81.95
#50	77.15	#16	78. 4	#100	60.24
#100	63.12	#30	54.89	#200	43.4
#200	43.03	#40	46. 5		
		#50	39.38		
		#100	29.54		
		#200	20.5		

	SOIL SCRI TION
●	
⊠	
▲	

	REMARKS
●	
⊠	
▲	

PROJECT: IPP Renewal Project - Adelanto

PROJECT NUMBER: 60205007

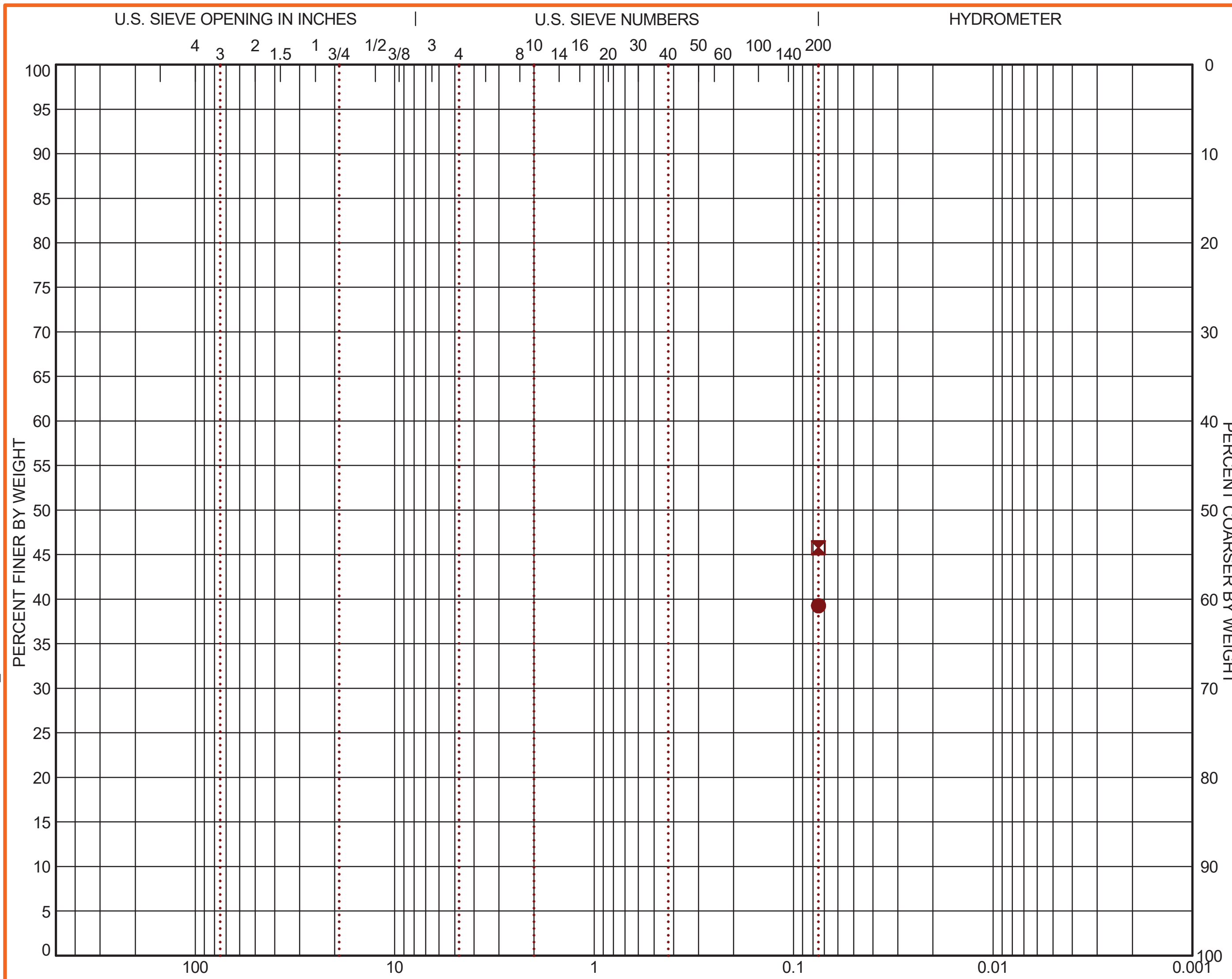
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

CLIENT: Black & Veatch Corporation
Overland Park, KS

GRAIN SIZE ISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING I	EPTH	% COBBL S	% GRAVEL	% SAN	% SILT	% FIN S	% CLAY	USCS
●	BVB-115	30 - 31.5					39.3		
⊠	BVB-115	40 - 41.5					45.8		

GRAIN SIZE			
	●	⊠	
60			
30			
10			

COEFFICI NTS			
	●	⊠	
C_C			
C_U			

●		⊠			
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#200	39.2	#200	45.		

SOIL SCRI TION	
●	
⊠	

REMARKS	
●	
⊠	

PROJECT: IPP Renewal Project - Adelanto

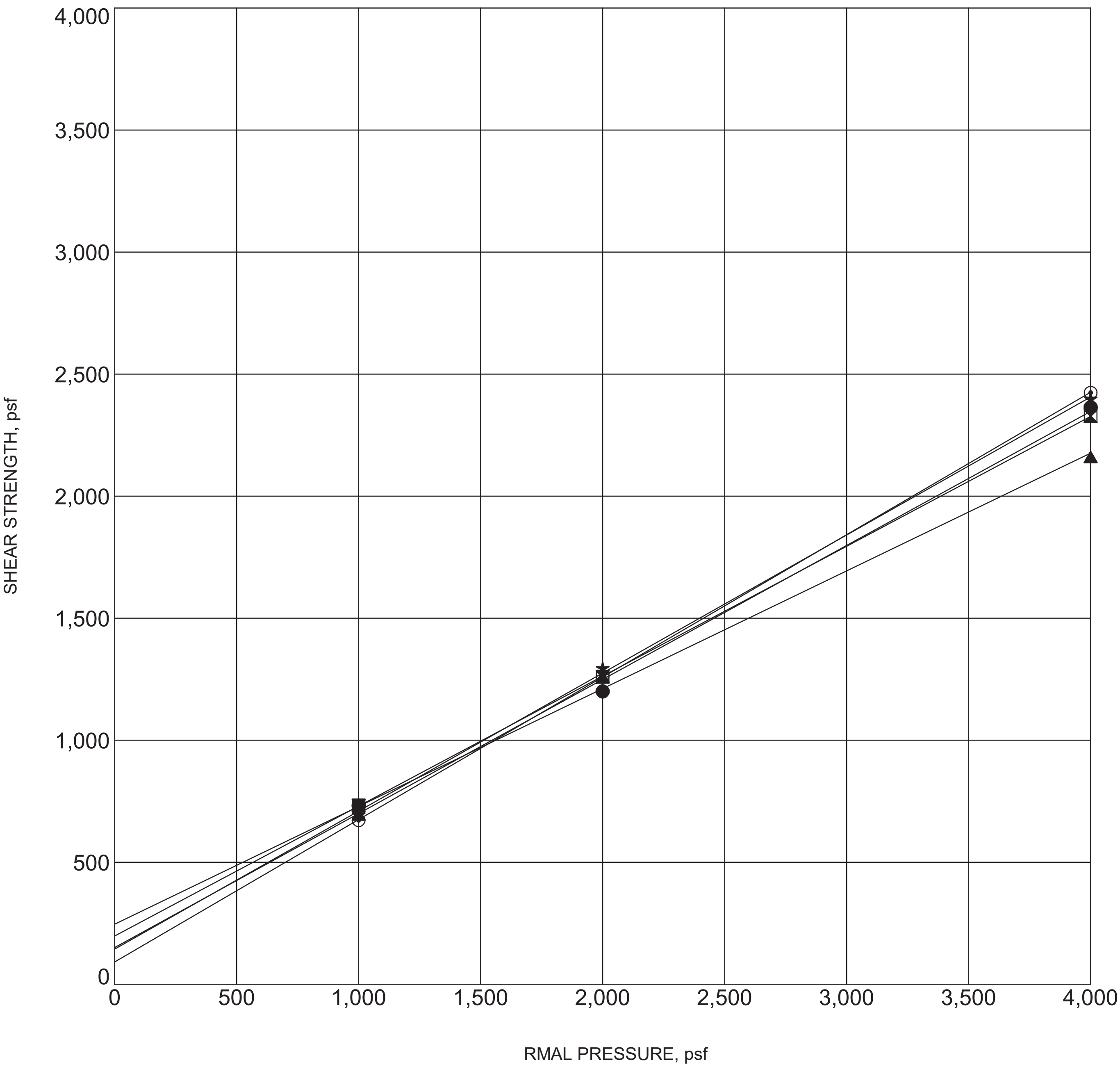
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

DIRECT SHEAR TEST STM D3080



	Specimen Identification		Classification	γ_d, pcf	WC,%	c, psf	$\phi°$
●	BVB-101	10.0ft		119	1	150	29
⊠	BVB-101	20.0ft		116	1	198	28
▲	BVB-101	30.0ft		103	3	246	26
★	BVB-104	10.0ft		108	2	144	29
⊙	BVB-114	7.5ft		118	2	92	30

PROJECT: IPP Renewal Project - Adelanto

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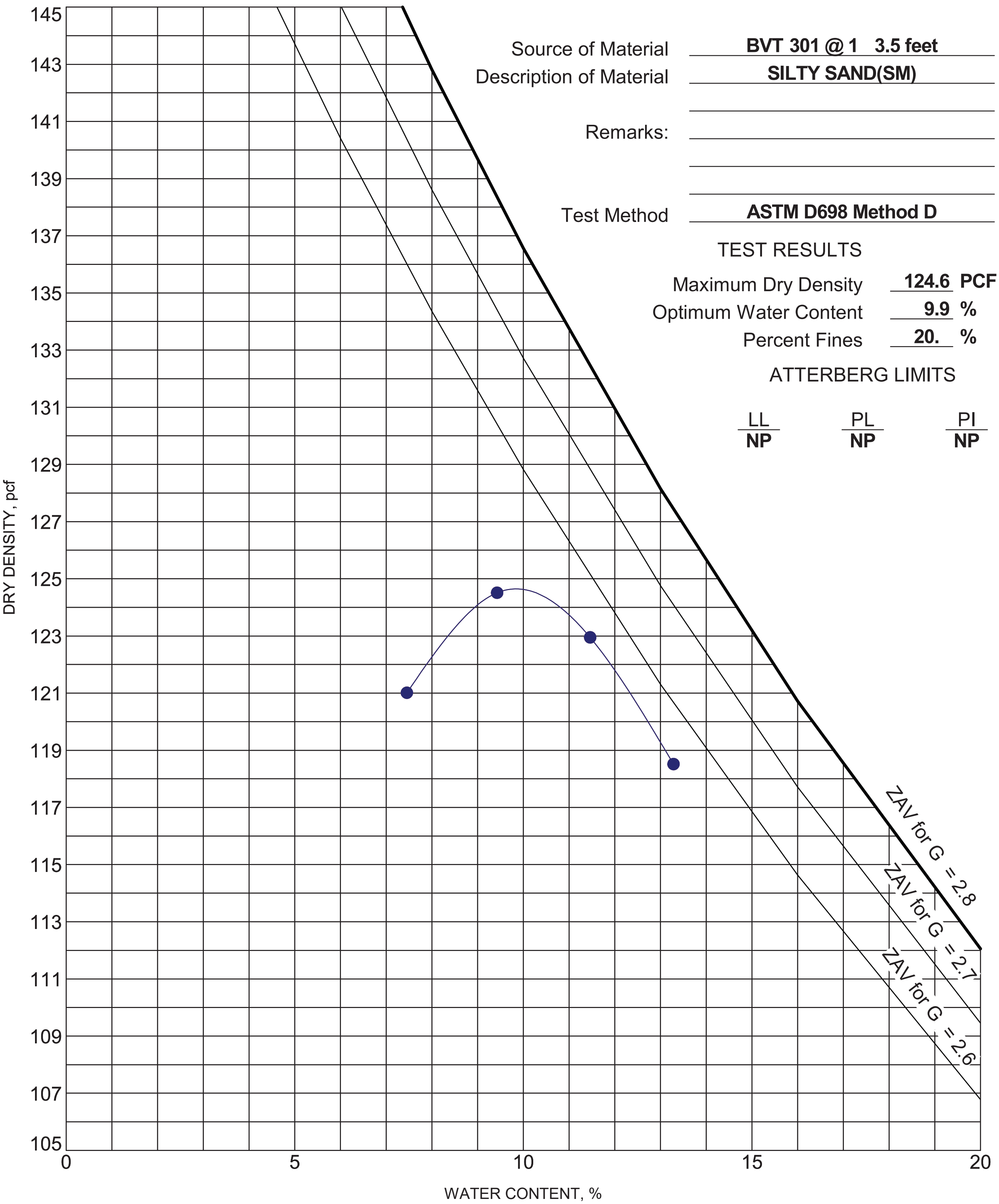
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

MOISTUR DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**BVT 301 @ 1 3.5 feet**
Description of Material	**SILTY SAND(SM)**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	124.6	PCF
Optimum Water Content	9.9	%
Percent Fines	20.	%

ATTERBERG LIMITS

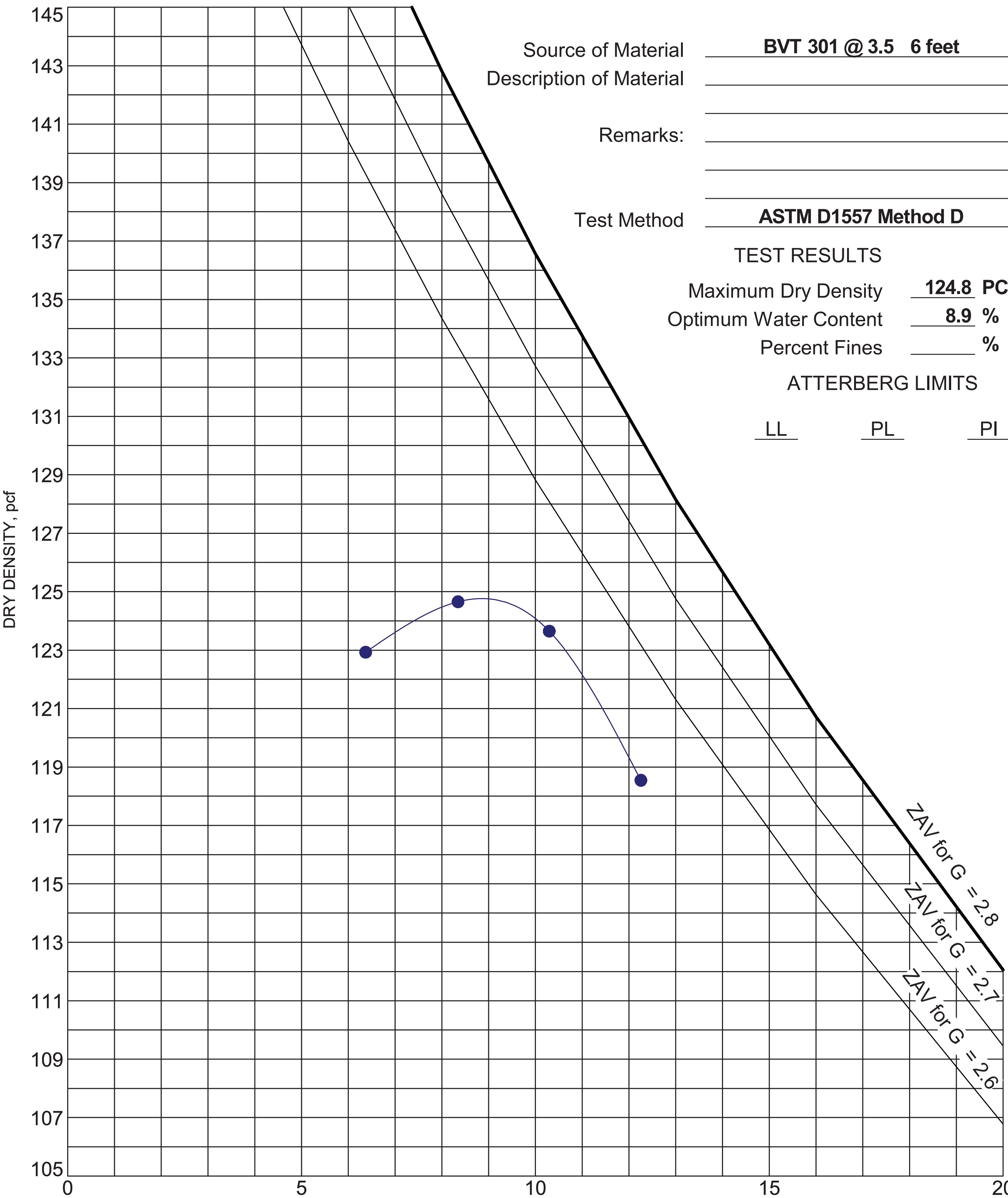
LL	PL	PI
NP	NP	NP

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V1 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 6/17/20

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60205007
SITE: 16800 Aster Road Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

MOISTUR DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material **BVT 301 @ 3.5 6 feet**

Description of Material

Remarks:

Test Method **ASTM D1557 Method D**

TEST RESULTS

Maximum Dry Density **124.8 PCF**

Optimum Water Content **8.9 %**

Percent Fines %

ATTERBERG LIMITS

LL	PL	PI

PROJECT: IPP Renewal Project - Adelanto

PROJECT NUMBER: 60205007

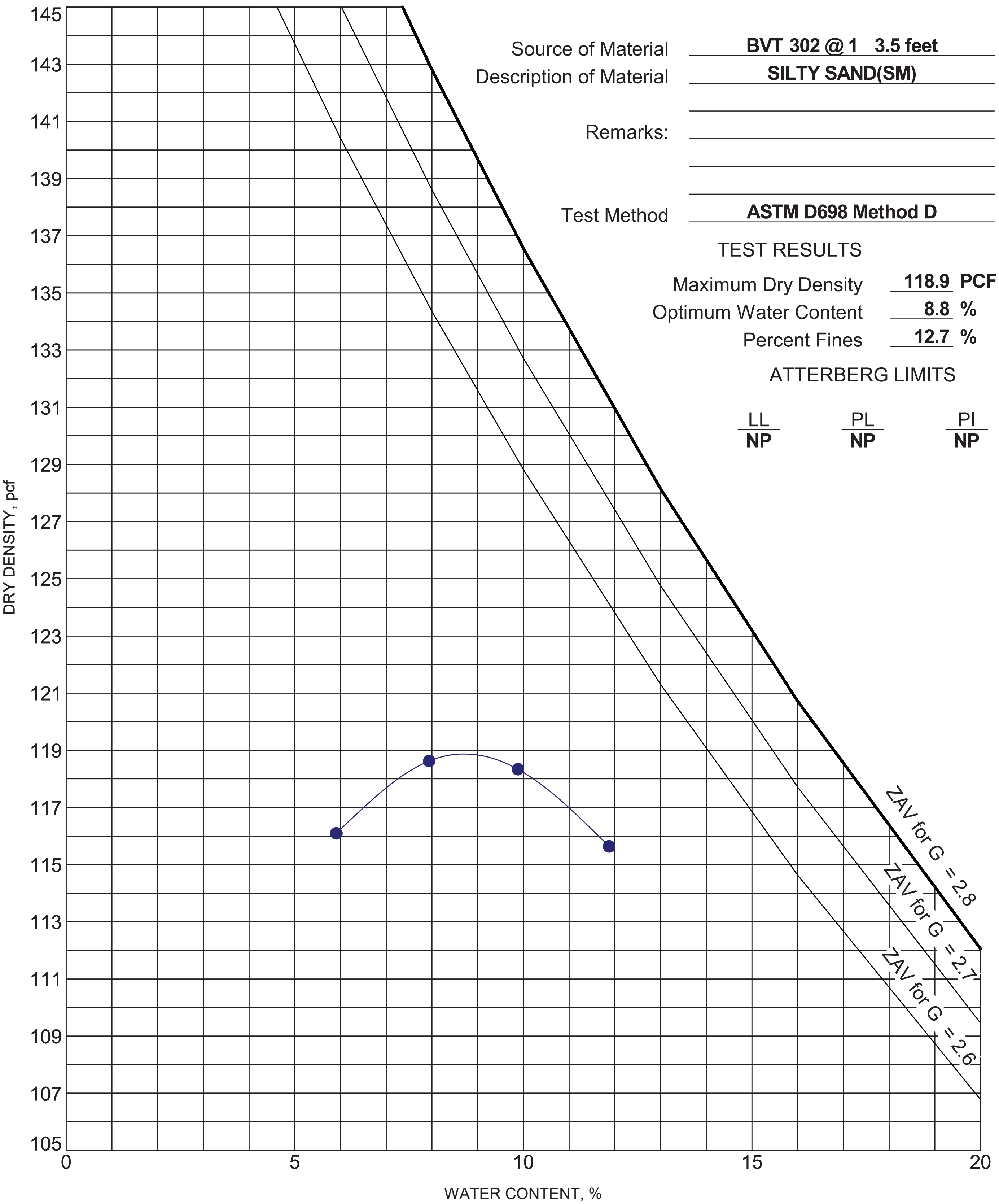
SITE: 16800 Aster Road
Adelanto, CA

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

CLIENT: Black & Veatch Corporation
Overland Park, KS

MOISTUR DENSITY RELATIONSHIP

ASTM D698/D1557

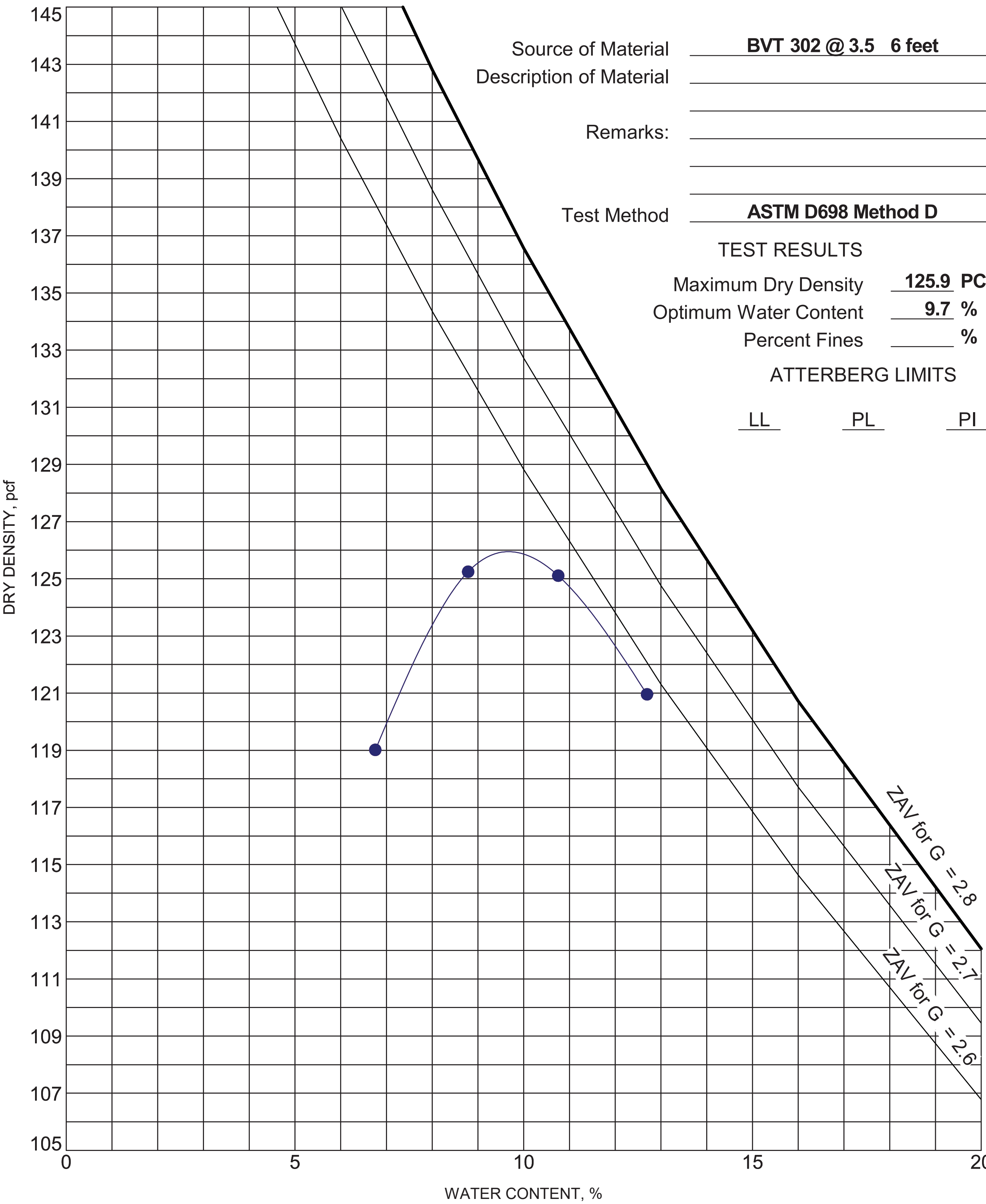


PROJECT: IPP Renewal Project - Adelanto	PROJECT NUMBER: 60205007
SITE: 16800 Aster Road Adelanto, CA	CLIENT: Black & Veatch Corporation Overland Park, KS

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

MOISTUR DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**BVT 302 @ 3.5 6 feet**
Description of Material	
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**125.9**	**PCF**
Optimum Water Content	**9.7**	**%**
Percent Fines		**%**

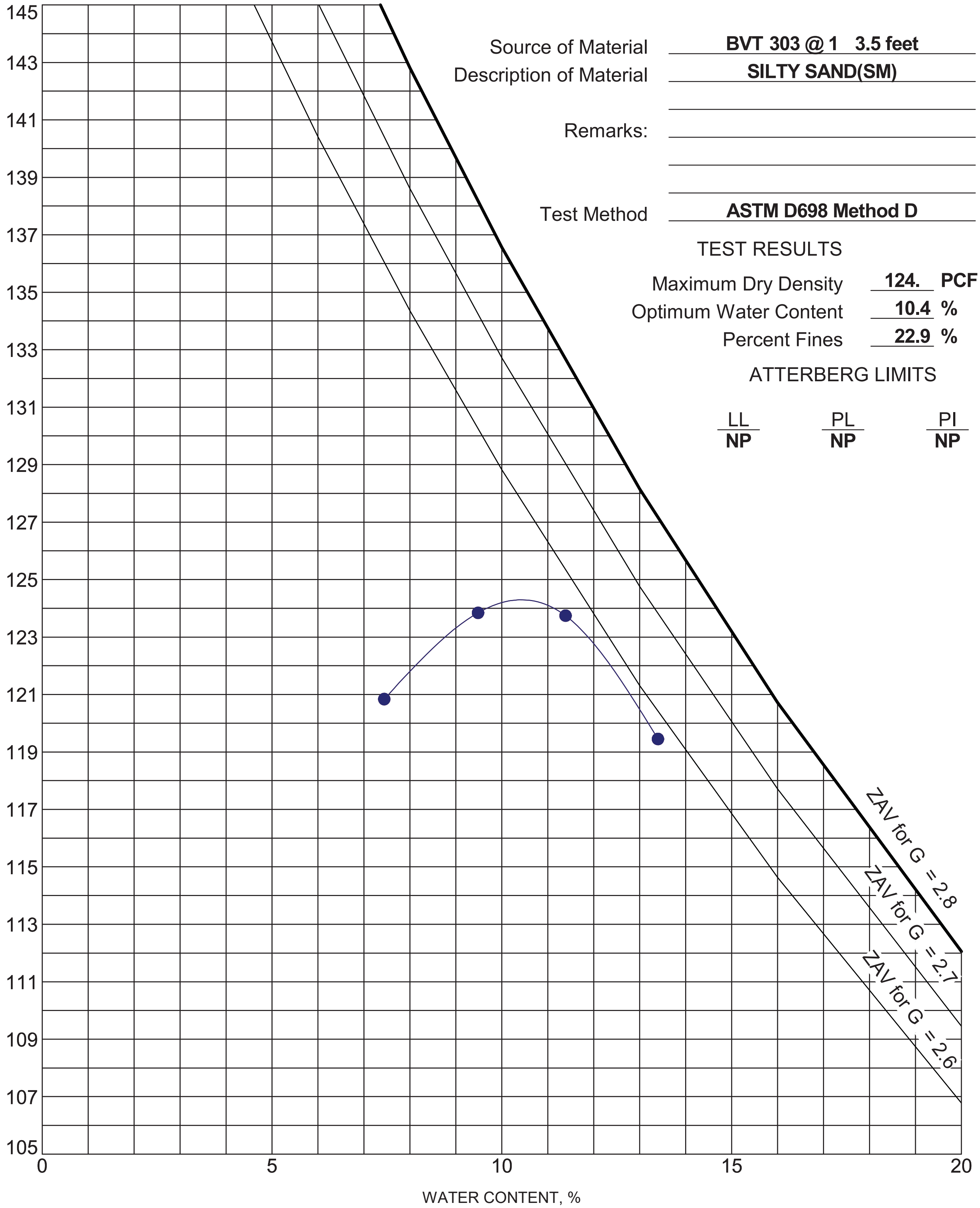
ATTERBERG LIMITS

LL	PL	PI

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60205007
SITE: 16800 Aster Road Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

MOISTUR   DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **BVT 303 @ 1   3.5 feet**

Description of Material: **SILTY SAND(SM)**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density **124.** **PCF**

Optimum Water Content **10.4** **%**

Percent Fines **22.9** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

PROJECT: IPP Renewal Project - Adelanto

SITE: 16800 Aster Road
Adelanto, CA

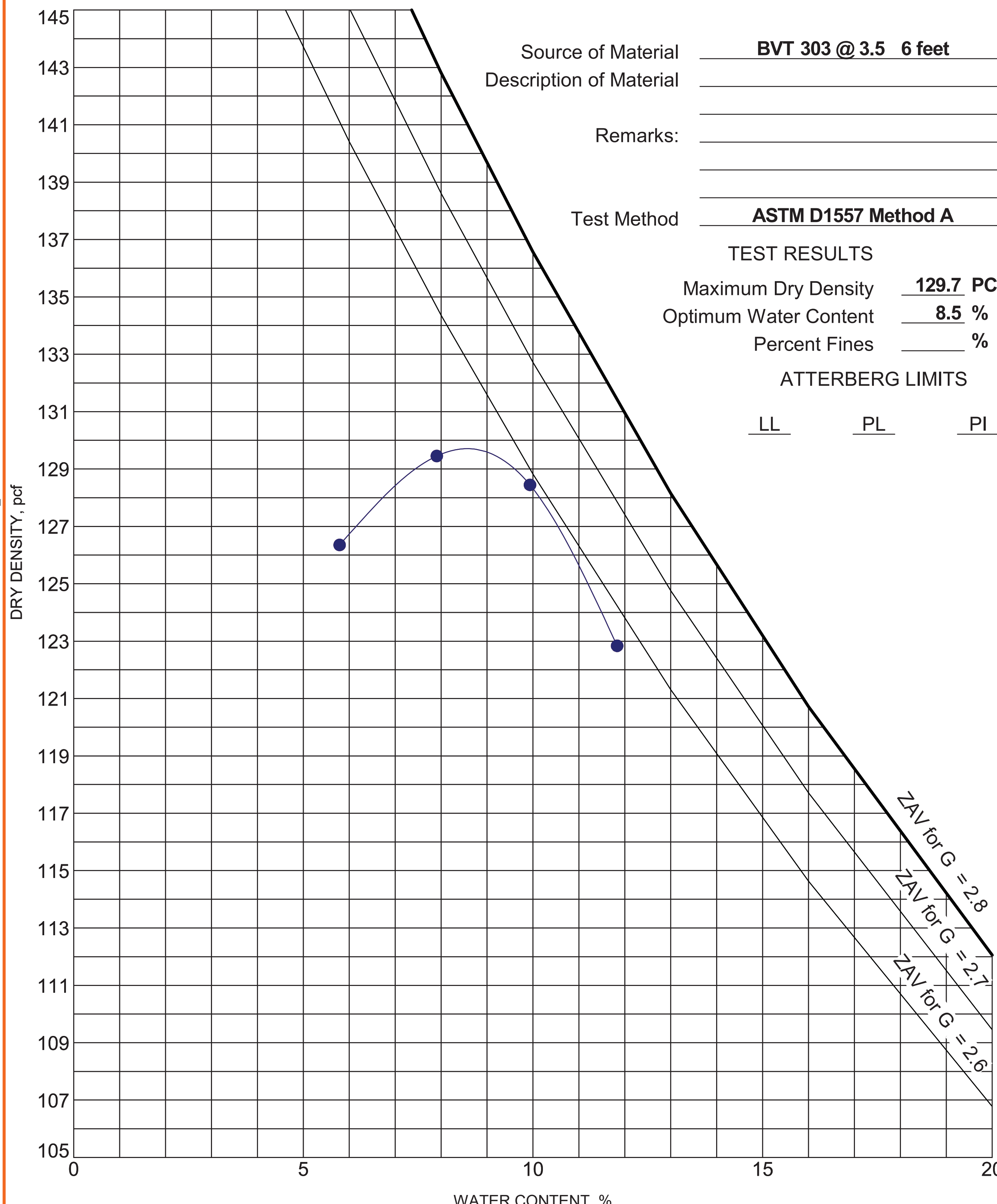
Terracon
1421 Edinger Ave, Ste C
Tustin, CA

PROJECT NUMBER: 60205007

CLIENT: Black & Veatch Corporation
Overland Park, KS

MOISTUR DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **BVT 303 @ 3.5 6 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **129.7 PCF**

Optimum Water Content **8.5 %**

Percent Fines %

ATTERBERG LIMITS

LL	PL	PI

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V1 60205007 IPP RENEWAL PROJE.GPJ TERRACON_DATATEMPLATE.GDT 6/17/20

PROJECT: IPP Renewal Project - Adelanto	Terracon 1421 Edinger Ave, Ste C Tustin, CA	PROJECT NUMBER: 60205007
SITE: 16800 Aster Road Adelanto, CA		CLIENT: Black & Veatch Corporation Overland Park, KS

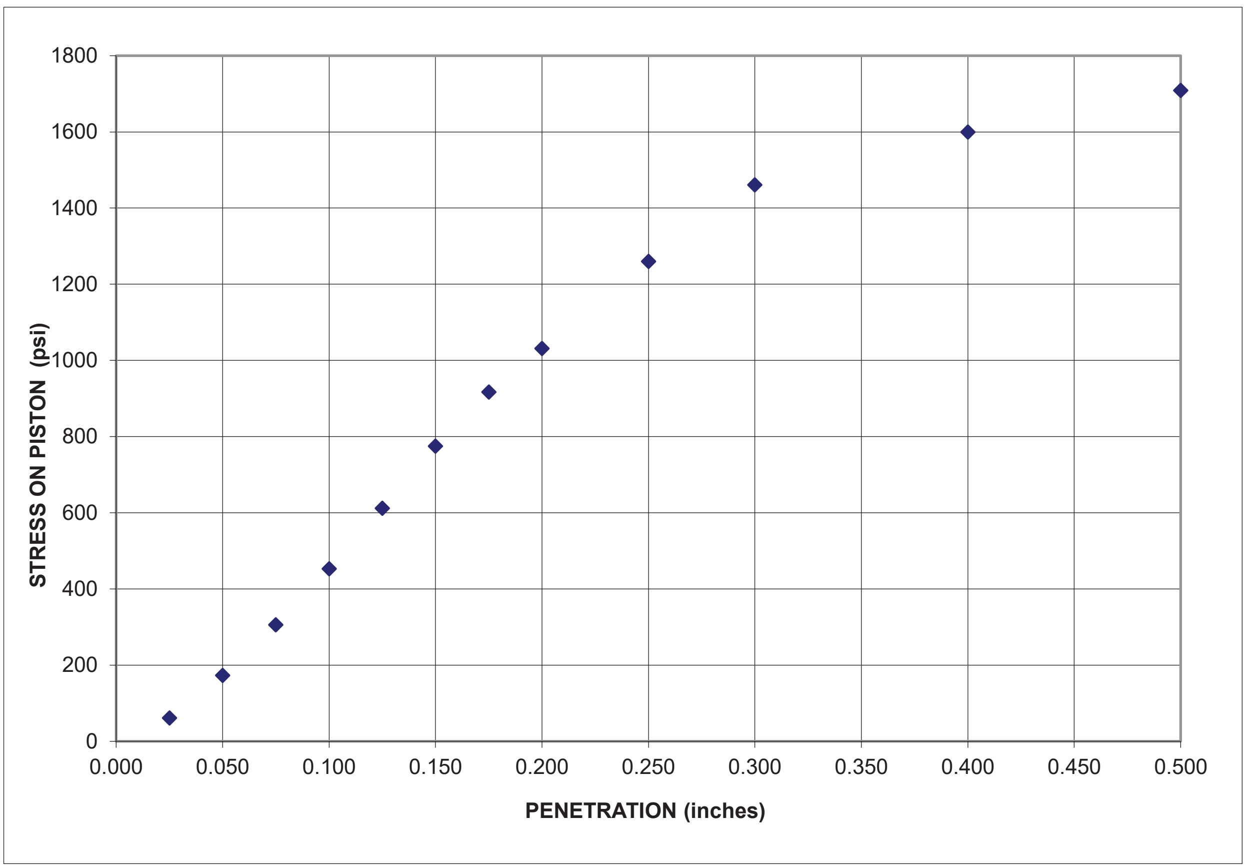
Terracon

PROJECT:	IPP Renewal Project - Adelanto	**JOB NO:**	60205007
LOCATION:	Orange County, CA	**LAB NO:**	BVT-301 @ 1'-3.5'
SAMPLE SOURCE:	BVT-301 @ 1'-3.5'		

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1833 (SOAKED)

COMPACTION(%)	102	PENETRATION	0.100	0.200
COMPACTION METHOD	ASTM D1557	CORRECTION	0.00	0.00
	5 LIFTS @ 56 BLOWS/LIFT	CORRECTED CBR	45.3	68.8
SAMPLE CONDITION	SOAKED			
PERCENT SWELL	0.00%			
% MOISTURE (TOP 1")	10.6%	**CBR (SOAKED)**	**69**	
SURCHARGE WEIGHT	10 lbs			
% RETAINED 19mm SIEVE	0%			

	BEFORE SOAK
DRY DENSITY	127.7 lbs./cu.ft
PERCENT MOISTURE	8.4 %



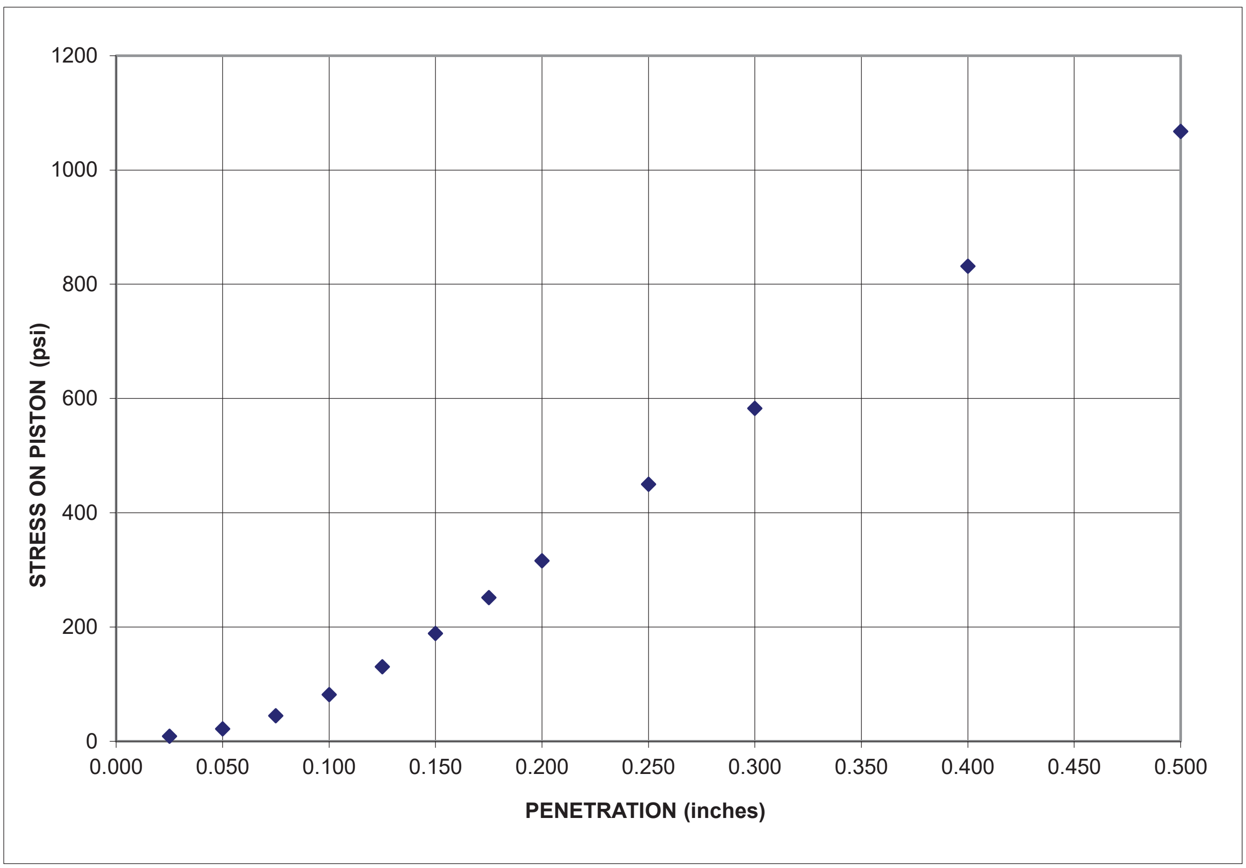
REVIEWED BY ______________________

PROJECT:	IPP Renewal Project - Adelanto	**JOB NO:**	60205007
LOCATION:	Orange County, CA	**LAB NO:**	BVT-302 @ 1'-3.5'
SAMPLE SOURCE:	BVT-302 @ 1'-3.5'		

CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1833 (SOAKED)

COMPACTION(%)	97	PENETRATION	0.100	0.200
COMPACTION METHOD	ASTM D1557	CORRECTION	0.00	0.00
	5 LIFTS @ 56 BLOWS/LIFT	CORRECTED CBR	8.2	21.1
SAMPLE CONDITION	SOAKED			
PERCENT SWELL	0.00%			
% MOISTURE (TOP 1")	10.7%	**CBR (SOAKED)**	**21**	
SURCHARGE WEIGHT	10 lbs			
% RETAINED 19mm SIEVE	0%			

	BEFORE SOAK
DRY DENSITY	122.5 lbs./cu.ft
PERCENT MOISTURE	9.5 %



REVIEWED BY ______________________

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Black & Veatch Corporation
Overland Park, KS

Project

IPP Renewal Project - Adelanto

Sample Submitted By: Terracon (60) **Date Received:** 3/11/2020 **Lab No.: 20-0293**

Results of Corrosion Analysis

Sample Number	1
Sample Location	BVB-102
Sample Depth (ft.)	2.5-4.0
pH Analysis (in H2O), ASTM D 4972	8.23
pH Analysis (in CaCl2), ASTM D 4972	5.65
Water Soluble Sulfate (SO4), ASTM C 1580 (percent %)	0.02
Sulfides, AWWA M27	Negative
Red-Ox, ASTM D 1498, (mV)	+684
Chlorides, ASTM D 512, (percent %)	<0.01

Analyzed By:

Trisha Campo
Chemist

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client
Black & Veatch Corporation
Overland Park, KS

Project
IPP Renewal Project - Adelanto

Sample Submitted By: Terracon (60) **Date Received:** 5/14/2020 **Lab No.: 20-0532**

Results of Corrosion Analysis

Sample Number	--	--	--
Sample Location	BVT-301	BVT-302	BVT-303
Sample Depth (ft.)	1.0-3.5	1.0-3.5	3.5-6.0
pH Analysis (in H2O), ASTM D 4972	7.99	7.77	7.98
pH Analysis (in CaCl2), ASTM D 4972	5.61	5.80	5.49
Water Soluble Sulfate (SO4), ASTM C 1580 (percent %)	0.01	0.02	0.02
Sulfides, AWWA M27	Negative	Negative	Negative
Red-Ox, ASTM D 1498, (mV)	+683	+688	+682
Chlorides, ASTM D 512, (percent %)	<0.01	<0.01	<0.01

Analyzed By: Trisha Campo

Trisha Campo
Chemist

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Geotherm USA

21239 FM529 Rd., Bldg. F
Cypress, TX 77433
Tel: 281-985-9344
Fax: 832-427-1752
info@geothermusa.com
http://www.geothermusa.com

June 4, 2020

Terracon Consultants, Inc.
1421 Edinger Avenue, Suite C
Tustin, CA 92780
Attn: Ryan Hankes, P.E.

Re: Thermal Analysis of Native Soil Samples
IPP Renewal Project, Adelanto, CA (Project No. 60205007)

The following is the report of thermal dryout characterization tests conducted on four (4) bulk samples of native soil from the referenced project sent to our laboratory.

Thermal Resistivity Tests: The samples were tested at their 'optimum' moisture content and 95% of the standard Proctor density ***provided by Terracon.*** The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dry out curves are presented in **Figure 1.**

Sample ID, Description, Thermal Resistivity, Moisture Content and Density

Sample ID		Description (Terracon)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft^3)
Location	Depth (ft)		Wet	Dry		
BVT-301	1'-3'	Brown silty FM sand	79	157	10	118
BVT-302	1' – 3.5'	Brown silty sand	82	188	9	113
BVT-302	3.5'-6'	Brown silty FC sand trace of clay	73	137	10	120
BVT-303	1' – 3.5'	Brown silty sand	81	153	10	118

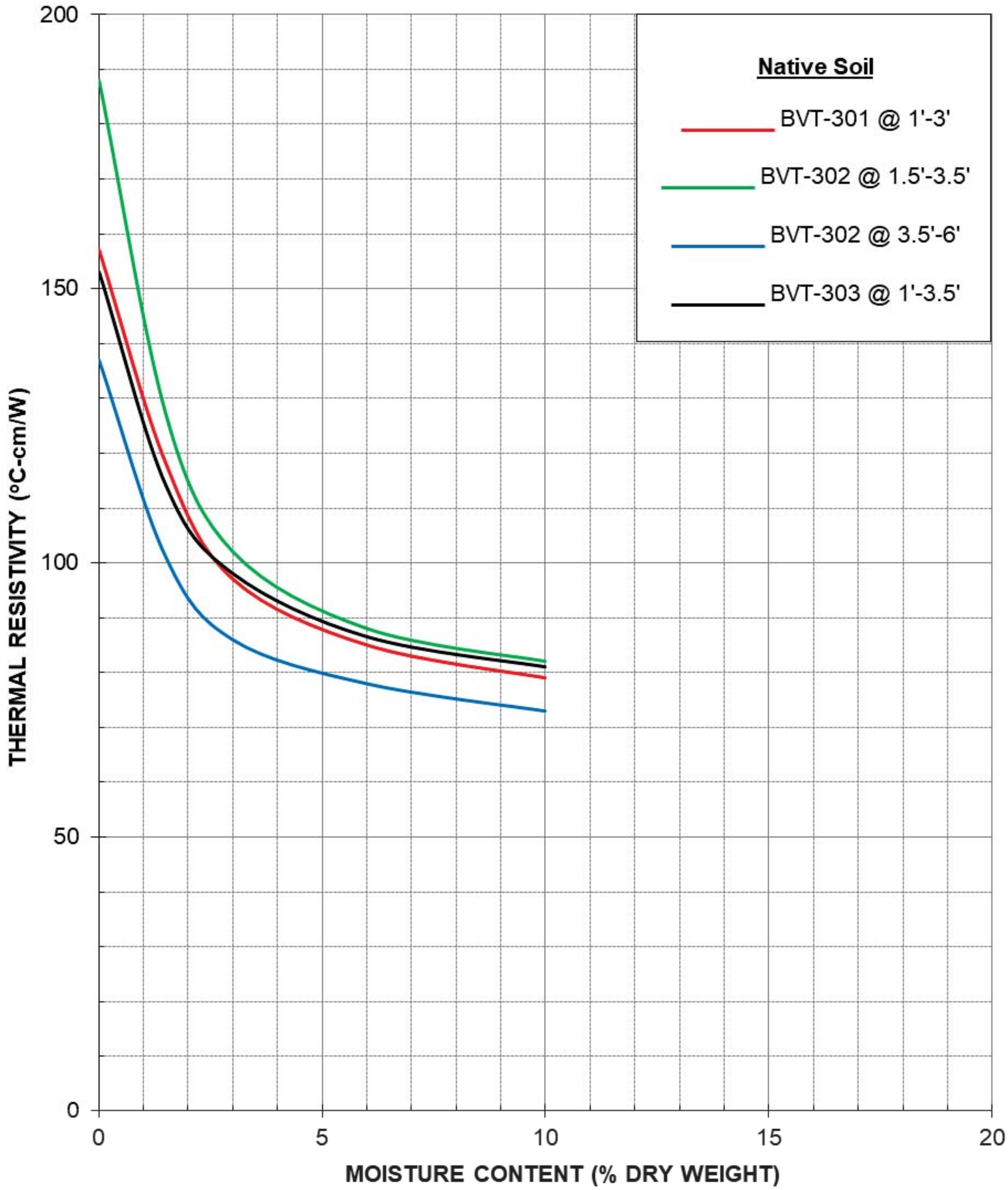
Comments: The thermal characteristic depicted in the dryout curve applies for the samples at their respective test dry density.

Please contact us if you have any questions or if we can be of further assistance.

Geotherm USA

Nimesh Patel

THERMAL DRYOUT CURVES



Terracon Consultants, Inc. (Project No. 60205007)

Thermal Analysis of Native Soil

IPP Renewal Project, Adelanto, CA

June 2020 **Figure 1**

APPENDIX E

GREENHOUSE GAS EMISSIONS IMPACT

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taha
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Technical Memorandum

TO: Kim Quinn
POWER Engineers, Inc.

FROM: Terry A. Hayes Associates Inc.

DATE: January 7, 2021

RE: Greenhouse Gas Emissions Impacts Assessment for the Adelanto Substation Expansion Project

INTRODUCTION

The purpose of this Technical Memorandum is to evaluate potential environmental impacts related to greenhouse gas (GHG) emissions in accordance with California Environmental Quality Act (CEQA) requirements for the Adelanto Substation Expansion Project (proposed Project). The proposed Project would not result in a significant GHG emissions impact in the context of the Appendix G Environmental Checklist criteria of the CEQA Guidelines. The GHG Emissions Impacts Assessment is organized as follows:

- Introduction
- Project Description
- Greenhouse Gas Topical Information
- Regulatory Framework
- Existing Setting
- Significance Thresholds
- Methodology
- Impact Assessment
- References

PROJECT DESCRIPTION

The Los Angeles Department of Water and Power (LADWP) proposes the expansion of the Adelanto Switching Station located in the City of Adelanto in San Bernardino County. The expansion would occur within the existing approximately 315-acre fenced Adelanto property, owned by LADWP and the Intermountain Power Agency, a political subdivision of the State of Utah. As part of the proposed Project, a new converter station will be built adjacent to the existing converter station in order to upgrade and replace aging infrastructure. The switching station will also be expanded to accommodate the new converter station and associated equipment. In addition, other components include: transmission line relocation, construction of new towers, site preparation, and demolition of existing structures. The proposed Project is needed to upgrade and replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability. The regional location of the proposed Project is shown in **Figure 1** and the local location is shown in **Figure 2**.

Terry A. Hayes Associates Inc.
3535 Hayden Avenue, Suite 350
Culver City, California 90232
310.839.4200 fax 310.839.4201

Source: TAHA, 2021.

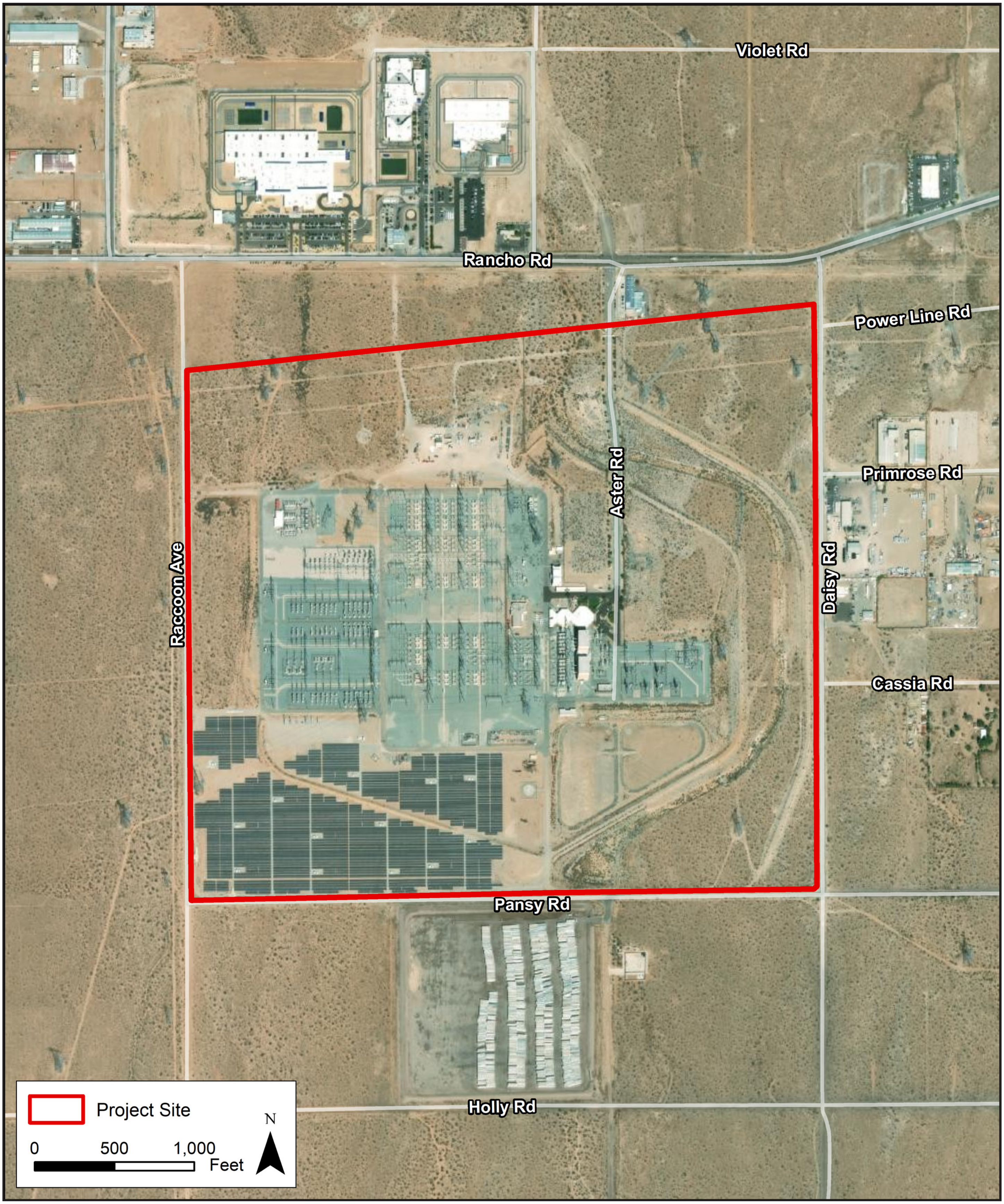
TAHA 2020-032

Adelanto Switching Station Expansion Project
Greenhouse Gas Emissions Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 1

REGIONAL PROJECT LOCATION



Source: TAHA, 2021.

taha environmental planners

TAHA 2020-032

Adelanto Switching Station Expansion Project
Greenhouse Gas Emissions Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 2

PROJECT SITE

Construction of the proposed Project is anticipated to take approximately seven years to complete. Project construction activities are expected to occur Monday through Saturday, from 7:00 a.m. to 6:00 p.m. It is not anticipated that nighttime, Sunday or holiday work would occur regularly; however, the work schedule may be modified throughout the year based on electrical system conditions and to account for the changing weather conditions (e.g., starting or ending the workday earlier in summer months to avoid work during the hottest part of the day for health and safety reasons).

GREENHOUSE GAS TOPICAL INFORMATION

GHG emissions refer to a group of emissions that are generally believed to affect global climate conditions. The greenhouse effect compares the Earth and the atmosphere surrounding it to a greenhouse with glass panes. The glass panes in a greenhouse let heat from sunlight in and reduce the amount of heat that escapes. GHGs, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), keep the average surface temperature of the Earth close to 60-degree Fahrenheit (°F). Without the natural greenhouse effect, the Earth's surface would be about 61°F cooler.[1]

In addition to CO_2, CH_4, and N_2O, GHGs include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), black carbon (black carbon is the most strongly light-absorbing component of particulate matter emitted from burning fuels such as coal, diesel, and biomass), and water vapor. CO_2 is the most abundant pollutant that contributes to climate change through fossil fuel combustion. The other GHGs are less abundant but have higher global warming potential than CO_2. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent of CO_2, denoted as CO_2e. CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. **Table 1** shows various GWP.

TABLE 1: GLOBAL WARMING POTENTIAL FOR VARIOUS GREENHOUSE GASES

Pollutant	Lifetime (Years)	Global Warming Potential (20-Year)	Global Warming Potential (100-Year)
Carbon Dioxide (CO_2)	--	1	1
Methane (CH_4)	12	21	25
Nitrous Oxide (N_2O)	114	310	298
Nitrogen Trifluoride	740	Unknown	17,200
Sulfur Hexafluoride (SF_6)	3,200	23,900	22,800
Perfluorocarbons (PFCs)	2,600-50,000	6,500-9,200	7,390-12,200
Hydrofluorocarbons (HFCs)	1-270	140-11,700	124-14,800

SOURCE: CARB, *First Update to the Climate Change Scoping Plan*, 2014.

[1]California Environmental Protection Agency Climate Action Team, *Climate Action Report to Governor Schwarzenegger and the California Legislator*, March 2006.

REGULATORY FRAMEWORK

In response to growing scientific and political concern with global climate change, a series of federal and state laws have been adopted to reduce GHG emissions. The following provides a brief summary of GHG regulations and policies. This is a not an exhaustive list of all regulations and policies.

Federal

***Massachusetts vs. Environmental Protection Agency*, 127 S. Ct. 1438 (2007)**. A Supreme Court ruling that CO_2 and other GHGs are pollutants under the Clean Air Act.

Energy Independence and Security Act. This act set a Renewable Fuel Standard of 36 billion gallons of biofuel usage by 2022, increases Corporate Average Fuel Economy Standards of setting 35 miles per gallon of cars and light trucks by 2020 and sets new standards for lighting and residential and commercial appliance equipment.

National Fuel Efficiency Policy and Fuel Economy Standards. This 2009 policy was designed to increase fuel economy by more than five percent by 2016 starting with model year 2012 cars and trucks.

Heavy-Duty Vehicle Program. This 2011 program established the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with model year 2014.

State

Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24 of the California Code of Regulations). Title 24 standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings.

California Green Building Code. Also referred to as CalGreen, lays out minimum requirements for newly constructed buildings in California, which will reduce GHG emissions through improved efficiency and process improvements.

Senate Bill 1078 (SB 1078), Senate Bill 107 (SB 107), and Executive Order (E.O.) S-14-08 (Renewables Portfolio Standard). Signed on September 12, 2002, SB 1078 required California to generate 20 percent of its electricity from renewable energy by 2017. SB 107, signed on September 26, 2006 changed the due date for this goal from 2017 to 2010, which was achieved by the state. On November 17, 2008, E.O. S-14-08 established a Renewables Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020.

Executive Order (E.O.) S-3-05. E.O. S-3-05 set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32. The California Global Warming Solutions Act of 2006, also known as Assembly Bill 32, focuses on reducing GHG emissions in California and requires the California Air Resources Board (CARB) to adopt rules and regulations that would achieve GHG emissions equivalent to Statewide levels in 1990 by 2020. The 2020 target reductions were estimated to be 174 million metric tons of CO_2e. In November 2017, CARB adopted the final 2017 Scoping Plan: The Strategy for Achieving California's 2030 GHG target (2017

Scoping Plan). The 2017 Scoping Plan incorporates, coordinates, and leverages many existing and ongoing efforts and identifies new policies and actions to accomplish the State's climate goals.

Senate Bill 375 (SB 375). Provides a means for achieving Assembly Bill 32 goals through the reduction in emissions by cars and light trucks. SB 375 requires regional transportation plans (RTPs) prepared by Metropolitan Planning Organizations (MPOs) to include sustainable communities strategies (SCSs).

Senate Bill 743 (SB 743). Encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled (VMT), which contribute to GHG emissions, as required by Assembly Bill 32.

Executive Order (E.O) B-30-15. This policy set a goal to reduce GHG emissions 40 percent below their 1990 levels by 2030. The E.O. establishes GHG emissions reduction targets to reduce emissions to 80 percent below 1990 levels by 2050 and sets an interim target of emissions reductions for 2030 as being necessary to guide regulatory policy and investments in California and put California on the most cost-effective path for long-term emissions reductions.

Senate Bill 32 (SB 32). This bill required a commitment to reducing statewide GHG emissions by 2020 to 1990 levels and by 2030 to 40 percent less than 1990 levels.

Regional

Southern California Association of Governments (SCAG) *Connect SoCal* 2020–2045 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS). SCAG is the MPO for the six-county region that includes Los Angeles, Orange, Riverside, Ventura, San Bernardino and Imperial counties. The 2020–2045 RTP/SCS includes commitments to reduce emissions from transportation sources to comply with SB 375. Goals and policies included in the 2016–2045 RTP/SCS to reduce air pollution consist of adding density in proximity to transit stations, mixed-use development and encouraging active transportation (i.e., non-motorized transportation such as bicycling).

Local

City of Adelanto Local Hazard Mitigation Plan. The City of Adelanto has released a Local Hazard Mitigation Plan, which includes an estimate of the probability and severity of future climate change impacts as well as goals to mitigate potential risks or reduce and eliminate long-term risk of these impacts.

MDAQMD Community Air Protection Program. In response to Assembly Bill 617, CARB established the Community Air Protection Program. The Program's focus is to reduce exposure in communities most impacted by air pollution, including exposure to GHG emissions. The Program's projects are part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing GHG emissions, strengthening the economy, and improving public health and the environment — particularly in disadvantaged communities.

San Bernardino Regional Greenhouse Gas Reduction Plan. The San Bernardino Association of Governments (now San Bernardino Council of Governments/San Bernardino County Transportation Authority (SBCOG/SBCTA)) prepared a 2008 GHG emissions inventory for each partnership city and forecasted each city's emissions to the year 2020, including for the City of Adelanto, in the Regional Reduction Plan. In addition to city-specific GHG emissions inventory, the Regional Reduction Plan includes a comprehensive list of measures applicable to the region that were developed by SBCOG/SBCTA and presented to each city to identify measures that would be feasible for implementation locally. Partnership cities provided a selection of potential GHG reduction strategies that were used to identify the level of reduction that would be achieved locally toward achieving a 2020 emissions reduction target. Through the Regional Reduction Plan, the City selected a goal to reduce community GHG emissions to a level 30 percent below 2008 GHG emissions by 2020.

Resilient IE. Western Riverside Council of Governments (WRCOG) in partnership with the SBCOG/SBCTA developed the Resilient IE program to support regional and local efforts to prepare for and mitigate risks associated with climate adaptation and transportation infrastructure. The Resilient IE program includes six primary components:

- Establish a regional climate collaborative, referred to as the Inland Southern California Climate Collaborative (ISC3);
- Revise WRCOG's community vulnerability assessment and establish a vulnerability assessment for San Bernardino County;
- Develop city-level, climate-related transportation hazards and evacuation maps;
- Develop a climate resilient transportation infrastructure guidebook;
- Prepare a regional climate adaptation and resiliency general plan element template; and
- Serve as a pilot project to assess the community cost of downed or damaged transportation assets.

Through the development of the San Bernardino County Vulnerability Assessment and Adaptation Strategies, the Resilient IE program includes a vulnerability assessment that summarizes projected climate change—related hazards that would affect the county and cities within it. The proposed Project also includes a summary of climate change adaptation measures developed through a regional context for consideration by local agencies to implement in their own general plans or other planning documents.

Local

Adelanto North 2035 Comprehensive Sustainable Plan. The Plan is the result of the State of California Sustainable Communities Planning Grant and Incentives Program. The planning process created a framework facilitating collaboration between public and private entities to promote sustainable development approaches, protect environmental resources, and forge a strong physical and economic connection between the Southern California Logistic Airport (SCLA) jobs center and new mixed-use neighborhoods. The Plan establishes land use, transportation, infrastructure, economic development, and resource protection strategies that promote sustainable development approaches, particularly by reducing automobile usage and fuel consumption, and requiring cluster development approaches to protect and respect the sensitive desert environment. Well important to note for background information, the Plan is not particularly relevant to the switching station expansion.

EXISTING SETTING

GHGs are the result of both natural and human-influenced activities. Volcanic activity, forest fires, decomposition, industrial processes, landfills, consumption of fossil fuels for power generation, transportation, heating, and cooling are the primary sources of GHG emissions. Without human activity, the Earth would maintain an approximate, but varied, balance between the emission of GHGs into the atmosphere and the storage of GHG in oceans and terrestrial ecosystems. Increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.) has contributed to a rapid increase in atmospheric levels of GHGs over the last 150 years.

Table 2 shows GHG emissions from 2008 to 2017 in California. California's GHG emissions have followed a declining trend since 2008. In 2017, emissions from routine emitting activities statewide were 63 million metric tons of CO_2e ($MMTCO_2$e) lower than 2007 levels. Of note, between October 23, 2015 and February 18, 2016, an exceptional natural gas leak event occurred at the Aliso Canyon natural gas storage facility that resulted in unexpected GHG emissions of considerable magnitude. The exceptional incident released approximately 109,000 metric tons of CH_4, which equated to approximately 1.96 $MMTCO_2$e of unanticipated emissions in 2015 and an additional 0.52 $MMTCO_2$e in 2016. According to CARB, these emissions will be mitigated in the future through projects funded by the Southern California Gas Company based on legal settlement and are presented alongside but tracked separately from routine inventory emissions.[2,3]

TABLE 2: CALIFORNIA GREENHOUSE GAS EMISSIONS INVENTORY TREND

Sector	CO_2e Emissions (Million Metric Tons)									
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Electricity Generation (In State)	55	54	47	41	51	50	52	50	42	39
Electricity Generation (Imports)	66	48	44	47	45	40	37	34	26	24
Transportation	182	175	170	167	166	166	167	171	173	174
Industrial	100	98	102	101	102	104	105	103	101	101
Commercial	18	19	20	21	21	22	21	22	23	23
Residential	31	31	32	33	31	32	27	28	29	30
Agriculture and Forestry	35	33	34	34	35	34	35	34	34	32
Emissions Total	**487**	**457**	**449**	**444**	**451**	**448**	**445**	**441**	**429**	**424**

SOURCE: CARB, *California Greenhouse Gas Emission Inventory - 2019 Edition*, August 12, 2019.

SIGNIFICANCE THRESHOLDS

This Assessment was undertaken to determine whether construction or operation of the proposed Project would have the potential to result in significant environmental impacts related to GHG emissions in the context of the Appendix G Environmental Checklist criteria of the CEQA Statute and Guidelines. Implementation of the proposed Project may result in a significant environmental impact related to GHG emissions if the proposed Project would:

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

[2]CARB, *California Greenhouse Gas Inventory for 2000-2015 – Trends of Emissions and Other Indicators*, June 2017.
[3]CARB, *Determination of Total Methane Emissions from the Aliso Canyon Natural Gas Leak Incident*, October 2016.

Section 15064.4 of the CEQA Guidelines states that a lead agency should make a good-faith effort to describe, calculate, or estimate the amount of GHG emissions resulting from a project, and that the lead agency should consider the following factors when assessing the significance of impacts from GHG emissions on the environment:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The CEQA Guidelines require lead agencies to adopt GHG thresholds of significance. When adopting these thresholds, the amended Guideline allows lead agencies to consider thresholds of significance adopted or recommended by other public agencies, or recommended by experts, provided that the thresholds are supported by substantial evidence, and/or to develop their own significance threshold.

Under CEQA, MDAQMD is an expert commenting agency on air quality and related matters within its jurisdiction or impacting on its jurisdiction. The *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines* are intended to assist persons preparing environmental analysis or review documents for any project within the jurisdiction of the MDAQMD by providing background information and guidance on the preferred analysis approach. MDAQMD has established CO_2e significance thresholds of 548,000 pounds per day and 100,000 tons per year. The intensity of daily construction activity would vary substantially throughout the duration of construction, and it is uncertain which specific activities may be occurring simultaneously on a given day. Therefore, it is most appropriate to evaluate total GHG emissions that would be generated by construction in the context of the MDAQMD annual threshold.

METHODOLOGY

The GHG emissions analysis conducted for the proposed Project is consistent with the methods described in the MDAQMD *California Environmental Quality Act (CEQA) And Federal Conformity Guidelines*. The guidelines recommend the use of the California Emissions Estimator Model (CalEEMod, version 2016.3.2) as a tool for quantifying emissions of air pollutants that will be generated by development projects under CEQA. CalEEMod is the preferred regulatory model for estimating GHG emissions from construction and operation of land use development projects in California. The model was developed using a compilation of robust land use survey data and CARB off-road and on-road mobile emission source inventories. CalEEMod relies on project-specific information and regional default parameters derived from the survey data and CARB models to characterize air pollutant emissions that would be generated by construction and operation of CEQA projects. CalEEMod produces estimated annual emissions of CO_2, CH_4, and N_2O for construction projects based on the project location, construction schedule, and equipment and vehicle inventories. The GHG emissions analysis produced and analyzed estimates of annual GHG emissions in accordance with the MDAQMD guidance.

Construction of the proposed Project is anticipated to begin in spring of 2021 comprise several general components and stages. Decommissioning of the existing substation facilities is not anticipated to begin until the third quarter of 2027. **Table 3** presents an overview of the approximate start and end dates for each general component of proposed Project construction, as well as a brief description of the activities involved. The number of workers on the project site and the number of equipment and vehicles in use will vary throughout the construction period, as several activities for different components will be occurring simultaneously at various stages throughout construction. During peak construction activities, up to 275 workers would be on-site. During switchyard and converter station construction, the average daily crew size would be approximately 140 workers. During periods where less overlap occurs, average daily crew size would be approximately 40 workers. Construction crews would implement carpooling in shuttle vans to reduce vehicle trips to the project site whenever possible.

TABLE 3: OVERVIEW OF CONSTRUCTION COMPONENTS

Project Component	Approximate Start	Approximate End	Activities Involved
Site Prep/Clearing	April 2021	June 2023	Excavation, Grading, Pushing/Loading, Dumping
Transmission Line Relocation	April 2021	March 2022	Remove and relocate existing AC transmission lines
Switchyard Construction	January 2023	November 2024	General Construction: pier drilling, trenching, excavation, foundations Electrical Construction: transmission line and switchyard structures
Converter Station	May 2023	April 2026	Earthwork & utilities, pile driving, conduit & grounding, structures
Decommissioning	July 2027	December 2029	Remove existing substation structures and waste disposal

SOURCE: LADWP, September 2020.

Site preparation work for the proposed Project includes clearing and grubbing, excavation, placement and compaction of engineered fill to provide stabilized subgrade for switching station and converter station facilities. Excavated materials would be rebalanced on-site such that long-distance disposal hauling would be minimized to the extent possible during site preparation. Temporary silt fence and other stormwater pollution prevention Best Management Practices (BMPs) would be implemented, in accordance with the Stormwater Pollution Prevention Plan (SWPPP). The proposed Project site will be graded to maintain current drainage patterns to the greatest extent possible. Following site grading, reinforced concrete foundations would be installed to support the steel structures, electrical equipment, and control facilities. During construction, a variety of equipment and vehicles would be operating on the site at any given time. Vehicles and equipment used in the construction of the proposed Project would include, but may not be limited to, graders and excavators, backhoes, drill rigs, water trucks, bob cat, scrapers, sheep's foot compactors, front end loaders, concrete trucks and pumps, dump trucks, trash trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks may also be required.

The GHG emissions analysis quantified annual emissions that would be generated during each year of construction using the schedule presented in **Table 3** and equipment and vehicle inventories developed by LADWP for each of the components and activities. Sources of air pollutant emissions involved in construction activities would include combustion engine exhaust emissions from off-road construction equipment and on- and off-road vehicle travel. Vehicle trips during proposed Project construction would be associated with crews commuting to and from the site as well as on-site vehicle travel, which would comprise pickup trucks, dump trucks, buggies, flatbed trucks, and concrete trucks. On-site dumping trips were assumed to be approximately one-half mile in length on average based on the site configuration. The GHG emissions analysis accounted for on-site light- and heavy-duty truck trips using vehicle fleet information provided by LADWP. The decommissioning phase of the proposed Project would generate approximately 21,805 cubic yards of waste material that would be disposed of off-site. Preliminary information determined that possible disposal locations could be located up to 40 miles away at the Mid-Valley Landfill located in Rialto. Hauling trips during the decommissioning phase were assumed to be 40 miles in length. The detailed CalEEMod output files disclosing estimated GHG emissions can be found in the Appendix.

Following completion of construction activities, the operational conditions of the proposed Project facilities would not substantially change from existing conditions. Implementation of the proposed Project would not introduce a new substantial long-term source of GHG emissions into the region. For this reason, the GHG emissions analysis focused on annual emissions that would be generated during the construction activities. LADWP maintains a rigorous and robust set of procedures and protocols to comply with all applicable regulations related to facility management. The assessment of operational GHG emissions associated with implementation of the proposed Project is qualitative in nature.

IMPACT ASSESSMENT

a) ***Would the proposed project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment? (Less-than-Significant Impact)***

Implementation of the proposed Project would generate GHG emissions predominantly from off- and on-road combustion engine exhaust during construction activities. The GHG emissions analysis focused on annual emissions that would be generated during each year of construction in the context of the MDAQMD CEQA guidelines. **Table 4** presents the estimated emissions of GHGs that would be released to the atmosphere on an annual basis throughout construction of the proposed Project. Construction of the proposed Project would produce approximately 12,125.7 $MTCO_2e$ over the entire duration, with a maximum annual emission rate of 2,915.3 $MTCO_2e$ and an average annual emission rate of 1,347.3 $MTCO_2e$. The maximum annual mass emissions would be below the significance threshold of 10,000 $MTCO_2e$ per year. Furthermore, emissions would cease upon completion of construction activities and implementation of the proposed Project would not introduce a new substantial permanent source of GHG emissions to the project area. The new facilities will be designed with enhanced energy efficiency features relative to existing structures and would not substantially affect operational energy consumption. Therefore, implementation of the proposed Project will result in a less-than-significant impact related to GHG emissions.

Mitigation Measure

Neither construction nor operation of the proposed Project would generate GHG emissions of sufficient magnitude to result in a significant environmental impact related to GHG emissions inventories. Therefore, no mitigation measures are required.

TABLE 4: ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS		
Year	Ongoing Activities	Annual Emissions ($MTCO_2e$ per Year)
2021	Site Prep, Transmission Line	1,342.1
2022	Site Prep, Transmission Line	166.5
2023	Site Prep, Switchyard, Converter	1,897.9
2024	Switchyard, Converter	2,579.2
2025	Converter Station	2,915.0
2026	Converter Station	241.7
2027	Decommissioning	584.3
2028	Decommissioning	1,212.4
2029	Decommissioning	1,186.6
	Maximum Annual GHG Emissions	**2,915.3**
	Average Annual GHG Emissions	**1,347.3**
	Significance Threshold	10,000
	Exceed Threshold?	**No**
SOURCE: TAHA, 2020.		

b) Would the proposed project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs? (Less-than-Significant Impact)

There is no potential for the substation expansion to conflict with GHG emissions reduction plans. The existing switching station and existing converter station would be rebuilt in order to upgrade and replace aging infrastructure, thus allowing allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability. As previously discussed, the proposed Project would not permanently increase emissions. GHG emissions are regionally cumulative in nature and it is highly unlikely construction of any individual project would generate GHG emissions of sufficient quantity to conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Standard construction procedures would be undertaken in accordance with MDAQMD and CARB regulations applicable to heavy duty construction equipment and diesel haul trucks. Adhering to requirements pertinent to construction equipment maintenance and inspections and emissions standards, as well as diesel fleet requirements, including idling time restrictions and maintenance, would ensure that construction of the proposed Project would not conflict with GHG emissions reductions efforts.

The proposed Project is required to reliably interconnect and integrate multiple renewable generation projects onto the electric grid. Renewable energy is a key component of all statewide, regional, and local GHG reduction plans. The proposed Project provides infrastructure to support renewable energy.

Mitigation Measures

No mitigation measures are required.

REFERENCES

California Air Pollution Control Officers Association, *California Emissions Estimator Model (CalEEMod v2016.3.2) User's Guide*, November 2017.

California Air Resources Board, *California Greenhouse Gas Emission Inventory - 2019 Edition*, August 12, 2019.

California Air Resources Board, *California Greenhouse Gas Inventory for 2000-2015 – Trends of Emissions and Other Indicators*, June 2017.

California Air Resources Board, *Determination of Total Methane Emissions from the Aliso Canyon Natural Gas Leak Incident*, October 2016.

California Air Resources Board, *First Update to the Climate Change Scooping Plan*, May 2014.

California Environmental Quality Act Guidelines *Section 15064.4*.

City of Adelanto, *Adelanto North 2035 Comprehensive Sustainable Plan*, August 2014.

County of San Bernardino, *Greenhouse Gas Emissions Development Review Process*, March 2015.

Mojave Desert Air Quality Management District, *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*, August 2016.

Western Riverside Council of Governments, *San Bernardino County Vulnerability Assessment*, 2019.

Appendix

LADWP Adelanto Switching Station Expansion Project

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	38.00	1,655,280.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2030
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	570	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2018 LADWP CO2 Intensity Factor = 770 lb./MWh @ 32% RPS

2030 LADWP assumes 50% RPS = 570 lb./MWh

Land Use - Project consists of removal/decommissioning of existing facilities and substation expansion.

Total Disturbed Area ~ 38 acres.

Construction Phase - Approximate Project Schedule

Off-road Equipment - Deliver and unload equipment - mostly delivery trucks.
Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Inventory (9/29/20)

Off-road Equipment - Project Inventory (9/29/20)
Off-road Equipment - Project Schedule (09/29/20)

Off-road Equipment - Install Trailers/Deliver Equipment (10-day fleet)

Off-road Equipment - Pier Drilling (25-day fleet)

Off-road Equipment - 60-day fleet: 2x bobcat, 1 x backhoe

Off-road Equipment - General Construction (25-day fleet)

Off-road Equipment - Project Inventory (09/29/29) - 75 day fleet

Off-road Equipment - Project Inventory (09/29/20) - 25/30 day fleet

Off-road Equipment - 140-day fleet : 3x crane, 4x aerial lift

Off-road Equipment - Project Inventory (09/29/20) - 320 day fleet - vehicles

Off-road Equipment - Project Inventory (09/29/20) - vehicles (140-day fleet)

Off-road Equipment - Project Inventory 09/29/20 (40-day fleet) - mostly vehicles

Off-road Equipment - Earthwork & utilities (470-day fleet)

Off-road Equipment - Project Inventory (09/29/20) 700-day fleet: 1 crane, 1 forklift, 2x lifts

Off-road Equipment - Project Inventory (09/29/20) - 315-day fleet
5x crane, 1 x pump, 3 x forklifts, 2x piling, 2x loader, 2x hammer, 1x mini excavator, 1x skid steer, 1 x compactor

Off-road Equipment - Project Inventory 09/29/20
315-day fleet
2x forklift; 3x boom truck, 2 x forklift, 1 x backhoe, 2 x scissor lift, 5x booms, 3x booms, 2x crane

Off-road Equipment - Project Inventory (09/29/20) - 160 day fleet

Off-road Equipment - Project Inventory (09/29/20) - 105 days, self-propelled modulator transporter.

Off-road Equipment - Project Inventory (09/29/20)

Trips and VMT - Project Trips
Worker Trips include commute to site (avg. length 12 miles) and on-site light duty trucks
Haul trips include on-site dump trucks (0.5 mi trip) and waste disposal (40-mile trip)
Vendor trips include equipment and material deliveries

Demolition - Total Debris = 21,805 CY

Grading - All Material Balanced on Site

On-road Fugitive Dust - Accounting for on-site travel.

Energy Use -

Construction Off-road Equipment Mitigation -

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tblOnRoadDust	HaulingPercentPave	100.00	90.00

tblOnRoadDust	HaulingPercentPave	100.00	90.00
tblOnRoadDust	HaulingPercentPave	100.00	90.00
tblOnRoadDust	HaulingPercentPave	100.00	90.00
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tblOnRoadDust	HaulingPercentPave	100.00	90.00
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tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00

tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
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tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
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tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
tblOnRoadDust	MeanVehicleSpeed	40.00	30.00
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tblTripsAndVMT	VendorTripNumber	0.00	20.00
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tblTripsAndVMT	VendorTripNumber	271.00	20.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	271.00	20.00
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tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT
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tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT
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tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblTripsAndVMT	WorkerTripNumber	695.00	80.00
tblTripsAndVMT	WorkerTripNumber	695.00	80.00
tblTripsAndVMT	WorkerTripNumber	3.00	60.00
tblTripsAndVMT	WorkerTripNumber	40.00	80.00

tblTripsAndVMT	WorkerTripNumber	3.00	40.00
tblTripsAndVMT	WorkerTripNumber	695.00	80.00
tblTripsAndVMT	WorkerTripNumber	20.00	60.00
tblTripsAndVMT	WorkerTripNumber	695.00	80.00
tblTripsAndVMT	WorkerTripNumber	695.00	20.00
tblTripsAndVMT	WorkerTripNumber	65.00	80.00
tblTripsAndVMT	WorkerTripNumber	18.00	80.00
tblTripsAndVMT	WorkerTripNumber	695.00	120.00
tblTripsAndVMT	WorkerTripNumber	5.00	60.00
tblTripsAndVMT	WorkerTripNumber	695.00	40.00
tblTripsAndVMT	WorkerTripNumber	695.00	160.00
tblTripsAndVMT	WorkerTripNumber	8.00	160.00
tblTripsAndVMT	WorkerTripNumber	695.00	80.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.5664	8.2654	4.2088	0.0146	2.5039	0.2019	2.7058	0.5297	0.1874	0.7170	0.0000	1,335.4441	1,335.4441	0.2661	0.0000	1,342.0973
2022	0.0819	0.7018	0.6120	1.8400e-003	0.0596	0.0262	0.0858	0.0159	0.0245	0.0404	0.0000	165.8209	165.8209	0.0273	0.0000	166.5021
2023	0.4998	6.6944	4.7730	0.0204	4.0427	0.1079	4.1505	0.4999	0.0993	0.5993	0.0000	1,890.8963	1,890.8963	0.2797	0.0000	1,897.8890
2024	0.8520	8.9941	8.2322	0.0282	3.1289	0.2325	3.3614	0.4371	0.2146	0.6516	0.0000	2,567.4645	2,567.4645	0.4710	0.0000	2,579.2382
2025	1.0931	10.5408	11.5286	0.0323	3.0031	0.3444	3.3475	0.4033	0.3179	0.7212	0.0000	2,898.5272	2,898.5272	0.6603	0.0000	2,915.0353
2026	0.0729	0.8557	1.1083	2.6600e-003	0.0454	0.0233	0.0687	0.0122	0.0214	0.0336	0.0000	240.3334	240.3334	0.0537	0.0000	241.6764
2027	0.2100	1.8863	2.5075	6.5200e-003	0.2764	0.0681	0.3444	0.0648	0.0631	0.1279	0.0000	581.0530	581.0530	0.1297	0.0000	584.2946
2028	0.4350	3.9165	5.2033	0.0135	0.3961	0.1415	0.5376	0.0909	0.1313	0.2221	0.0000	1,205.6800	1,205.6800	0.2696	0.0000	1,212.4191
2029	0.4248	3.8344	5.0913	0.0133	0.3917	0.1387	0.5304	0.0899	0.1287	0.2186	0.0000	1,179.9742	1,179.9742	0.2643	0.0000	1,186.5804
Maximum	**1.0931**	**10.5408**	**11.5286**	**0.0323**	**4.0427**	**0.3444**	**4.1505**	**0.5297**	**0.3179**	**0.7212**	**0.0000**	**2,898.5272**	**2,898.5272**	**0.6603**	**0.0000**	**2,915.0353**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.5664	8.2653	4.2088	0.0146	2.1260	0.2019	2.3279	0.3428	0.1874	0.5302	0.0000	1,335.443 4	1,335.443 4	0.2661	0.0000	1,342.096 6
2022	0.0819	0.7018	0.6120	1.8400e-003	0.0596	0.0262	0.0858	0.0159	0.0245	0.0404	0.0000	165.8208	165.8208	0.0273	0.0000	166.5020
2023	0.4998	6.6944	4.7729	0.0204	3.9667	0.1079	4.0745	0.4917	0.0993	0.5911	0.0000	1,890.895 6	1,890.895 6	0.2797	0.0000	1,897.888 4
2024	0.8520	8.9941	8.2322	0.0282	3.0019	0.2325	3.2345	0.4234	0.2146	0.6379	0.0000	2,567.463 0	2,567.463 0	0.4710	0.0000	2,579.236 7
2025	1.0931	10.5408	11.5286	0.0323	2.8761	0.3444	3.2205	0.3896	0.3179	0.7075	0.0000	2,898.524 8	2,898.524 8	0.6603	0.0000	2,915.033 0
2026	0.0729	0.8557	1.1083	2.6600e-003	0.0454	0.0233	0.0687	0.0122	0.0214	0.0336	0.0000	240.3332	240.3332	0.0537	0.0000	241.6762
2027	0.2100	1.8863	2.5075	6.5200e-003	0.2426	0.0681	0.3106	0.0597	0.0631	0.1228	0.0000	581.0525	581.0525	0.1297	0.0000	584.2941
2028	0.4350	3.9165	5.2033	0.0135	0.3258	0.1415	0.4673	0.0802	0.1313	0.2115	0.0000	1,205.679 1	1,205.679 1	0.2696	0.0000	1,212.418 2
2029	0.4248	3.8344	5.0913	0.0133	0.3227	0.1387	0.4614	0.0795	0.1287	0.2081	0.0000	1,179.973 2	1,179.973 2	0.2643	0.0000	1,186.579 4
Maximum	**1.0931**	**10.5408**	**11.5286**	**0.0323**	**3.9667**	**0.3444**	**4.0745**	**0.4917**	**0.3179**	**0.7075**	**0.0000**	**2,898.524 8**	**2,898.524 8**	**0.6603**	**0.0000**	**2,915.033 0**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**6.36**	**0.00**	**5.82**	**11.60**	**0.00**	**7.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-5-2021**	**7-4-2021**	3.3028	3.3028

2	**7-5-2021**	**10-4-2021**	3.0888	3.0888
3	**10-5-2021**	**1-4-2022**	2.3458	2.3458
4	**1-5-2022**	**4-4-2022**	0.6808	0.6808
5	**4-5-2022**	**7-4-2022**	0.0640	0.0640
8	**1-5-2023**	**4-4-2023**	1.0321	1.0321
9	**4-5-2023**	**7-4-2023**	1.7672	1.7672
10	**7-5-2023**	**10-4-2023**	2.6484	2.6484
11	**10-5-2023**	**1-4-2024**	1.7028	1.7028
12	**1-5-2024**	**4-4-2024**	2.0209	2.0209
13	**4-5-2024**	**7-4-2024**	2.1222	2.1222
14	**7-5-2024**	**10-4-2024**	2.6786	2.6786
15	**10-5-2024**	**1-4-2025**	3.0223	3.0223
16	**1-5-2025**	**4-4-2025**	3.5241	3.5241
17	**4-5-2025**	**7-4-2025**	3.3973	3.3973
18	**7-5-2025**	**10-4-2025**	3.0666	3.0666
19	**10-5-2025**	**1-4-2026**	1.4999	1.4999
20	**1-5-2026**	**4-4-2026**	0.8654	0.8654
26	**7-5-2027**	**10-4-2027**	1.0156	1.0156
27	**10-5-2027**	**1-4-2028**	1.1004	1.1004
28	**1-5-2028**	**4-4-2028**	1.0863	1.0863
29	**4-5-2028**	**7-4-2028**	1.0851	1.0851
30	**7-5-2028**	**10-4-2028**	1.0971	1.0971
31	**10-5-2028**	**1-4-2029**	1.0982	1.0982
32	**1-5-2029**	**4-4-2029**	1.0722	1.0722
33	**4-5-2029**	**7-4-2029**	1.0830	1.0830
34	**7-5-2029**	**9-30-2029**	1.0473	1.0473
		Highest	3.5241	3.5241

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	1a Site Prep - Mobilization	Site Preparation	3/22/2021	4/2/2021	5	10	Move equipment/materials to site.
2	1b Site Prep - Excavate/Grade	Site Preparation	4/5/2021	12/10/2021	5	180	
3	2a Transmission Line Foundation	Grading	4/5/2021	7/16/2021	5	75	
4	2b - Transmission Line Construction	Building Construction	6/7/2021	3/11/2022	5	200	
5	1c Site Prep - Push/Load/Level	Site Preparation	1/3/2022	5/6/2022	5	90	
6	3a General Construction - Mobilization	Building Construction	1/9/2023	1/20/2023	5	10	
7	3b General Construction - Pier Drilling	Building Construction	1/23/2023	2/24/2023	5	25	
8	3c General Construction - Trenching	Trenching	3/6/2023	5/26/2023	5	60	
9	3d General Construction - Misc.	Building Construction	3/6/2023	4/7/2023	5	25	
10	6a Converter Station - Earthwork/Utilities	Grading	5/1/2023	2/14/2025	5	470	
11	6b Converter Station - Offloading/Vehicles	Building Construction	5/1/2023	1/2/2026	5	700	
12	3e General Construction - Concrete	Paving	6/5/2023	9/15/2023	5	75	
13	5a Testing & Commissioning (QA/Inspect)	Trenching	8/28/2023	11/15/2024	5	320	
14	4a Electrical Construction - High (100 ft)	Building Construction	9/25/2023	11/3/2023	5	30	
15	4b Electrical Construction - Ground/Mid	Building Construction	1/8/2024	7/19/2024	5	140	
16	5b Testing & Commissioning (Vehicles)	Trenching	5/6/2024	11/15/2024	5	140	
17	6c Converter Station - Foundations	Site Preparation	8/5/2024	10/17/2025	5	315	Concrete, Pile Driving, Conduit/Grounding
18	5c Testing & Commissioning (Testing)	Trenching	9/23/2024	11/15/2024	5	40	
19	6d Converter Station - Structures	Building Construction	1/20/2025	4/3/2026	5	315	
20	6e Converter Station - Gen. Construciton	Building Construction	1/20/2025	8/29/2025	5	160	
21	6f Transformer Delivery	Building Construction	10/20/2025	3/13/2026	5	105	
22	7 Decommissioning	Demolition	7/12/2027	12/21/2029	5	640	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1a Site Prep - Mobilization	Cranes	1	7.00	231	0.29
1b Site Prep - Excavate/Grade	Excavators	3	8.00	158	0.38
1b Site Prep - Excavate/Grade	Graders	1	8.00	187	0.41
1b Site Prep - Excavate/Grade	Rubber Tired Dozers	1	8.00	247	0.40
1b Site Prep - Excavate/Grade	Skid Steer Loaders	2	8.00	65	0.37
1b Site Prep - Excavate/Grade	Tractors/Loaders/Backhoes	1	8.00	97	0.37
2a Transmission Line Foundation	Bore/Drill Rigs	1	8.00	221	0.50
2a Transmission Line Foundation	Crawler Tractors	1	6.00	212	0.43
2a Transmission Line Foundation	Excavators	1	8.00	158	0.38
2a Transmission Line Foundation	Graders	1	6.00	187	0.41
2a Transmission Line Foundation	Rubber Tired Loaders	1	6.00	203	0.36
2a Transmission Line Foundation	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2b - Transmission Line Construction	Air Compressors	2	8.00	78	0.48
2b - Transmission Line Construction	Cranes	3	6.00	231	0.29
2b - Transmission Line Construction	Rough Terrain Forklifts	1	8.00	100	0.40
1c Site Prep - Push/Load/Level	Rollers	1	8.00	80	0.38
1c Site Prep - Push/Load/Level	Rubber Tired Loaders	1	8.00	203	0.36
3a General Construction - Mobilization	Cranes	1	4.00	231	0.29
3b General Construction - Pier Drilling	Bore/Drill Rigs	2	8.00	221	0.50

3b General Construction - Pier Drilling	Excavators	2	8.00	158	0.38
3c General Construction - Trenching	Skid Steer Loaders	2	8.00	65	0.37
3c General Construction - Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
3d General Construction - Misc.	Cranes	1	8.00	231	0.29
3d General Construction - Misc.	Excavators	2	8.00	158	0.38
3d General Construction - Misc.	Rough Terrain Forklifts	1	4.00	100	0.40
6a Converter Station - Earthwork/Utilities	Excavators	3	8.00	158	0.38
6a Converter Station - Earthwork/Utilities	Graders	1	8.00	187	0.41
6a Converter Station - Earthwork/Utilities	Off-Highway Trucks	1	8.00	402	0.38
6a Converter Station - Earthwork/Utilities	Rollers	1	8.00	80	0.38
6a Converter Station - Earthwork/Utilities	Skid Steer Loaders	3	8.00	65	0.37
6b Converter Station - Offloading/Vehicles	Aerial Lifts	2	8.00	63	0.31
6b Converter Station - Offloading/Vehicles	Cranes	1	8.00	231	0.29
6b Converter Station - Offloading/Vehicles	Rough Terrain Forklifts	1	8.00	100	0.40
3e General Construction - Concrete	Paving Equipment	2	4.00	132	0.36
3e General Construction - Concrete	Rollers	1	8.00	80	0.38
5a Testing & Commissioning (QA/Inspect)	Other Construction Equipment	1	0.00	172	0.42
4a Electrical Construction - High (100 ft)	Aerial Lifts	2	8.00	63	0.31
4a Electrical Construction - High (100 ft)	Cranes	2	8.00	231	0.29
4b Electrical Construction - Ground/Mid	Aerial Lifts	4	8.00	63	0.31
4b Electrical Construction - Ground/Mid	Cranes	3	8.00	231	0.29
5b Testing & Commissioning (Vehicles)	Other Construction Equipment	1	0.00	172	0.42
6c Converter Station - Foundations	Bore/Drill Rigs	2	8.00	221	0.50
6c Converter Station - Foundations	Cranes	5	8.00	231	0.29
6c Converter Station - Foundations	Crawler Tractors	1	8.00	212	0.43

6c Converter Station - Foundations	Excavators	2	8.00	158	0.38
6c Converter Station - Foundations	Pumps	1	8.00	84	0.74
6c Converter Station - Foundations	Rough Terrain Forklifts	3	8.00	100	0.40
6c Converter Station - Foundations	Skid Steer Loaders	1	8.00	65	0.37
6c Converter Station - Foundations	Tractors/Loaders/Backhoes	2	8.00	97	0.37
5c Testing & Commissioning (Testing)	Other Construction Equipment	1	0.00	172	0.42
6d Converter Station - Structures	Aerial Lifts	11	8.00	63	0.31
6d Converter Station - Structures	Cranes	2	8.00	231	0.29
6d Converter Station - Structures	Rough Terrain Forklifts	4	8.00	100	0.40
6d Converter Station - Structures	Tractors/Loaders/Backhoes	1	8.00	97	0.37
6e Converter Station - Gen. Construciton	Cranes	2	8.00	231	0.29
6e Converter Station - Gen. Construciton	Off-Highway Trucks	2	8.00	402	0.38
6e Converter Station - Gen. Construciton	Rubber Tired Dozers	1	8.00	185	0.40
6e Converter Station - Gen. Construciton	Rubber Tired Dozers	1	8.00	310	0.40
6e Converter Station - Gen. Construciton	Tractors/Loaders/Backhoes	1	8.00	62	0.37
6f Transformer Delivery	Other Construction Equipment	1	8.00	172	0.42
7 Decommissioning	Cranes	2	8.00	231	0.29
7 Decommissioning	Excavators	4	8.00	158	0.38
7 Decommissioning	Other Material Handling Equipment	1	8.00	168	0.40
7 Decommissioning	Plate Compactors	10	8.00	8	0.43
7 Decommissioning	Rubber Tired Loaders	2	8.00	203	0.36
7 Decommissioning	Skid Steer Loaders	4	8.00	65	0.37
7 Decommissioning	Tractors/Loaders/Backhoes	3	8.00	97	0.37
6c Converter Station - Foundations	Plate Compactors	1	8.00	8	0.43

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1a Site Prep - Mobilization	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
1b Site Prep - Excavate/Grade	8	60.00	0.00	57,600.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
2a Transmission Line Foundation	7	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
2b - Transmission Line Construction	6	120.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
1c Site Prep - Push/Load/Level	2	60.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
3a General Construction - Mobiliz	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3b General Construction - Pier Dril	4	160.00	40.00	8,000.00	12.00	20.00	0.50	LD_Mix	HHDT	HHDT
3c General Construction - Trenchi	3	160.00	40.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3d General Construction - Misc	4	80.00	0.00	8,000.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
6a Converter Station - Earthwork/Utilities	9	180.00	0.00	75,200.00	12.00	6.60	0.50	LD_Mix	HHDT	HHDT
6b Converter Station - Offloading/Vehicles	4	180.00	40.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
3e General Construction - Concret	3	160.00	40.00	24,000.00	12.00	20.00	0.50	LD_Mix	HHDT	HHDT
5a Testing & Commissioning (QA/In	1	20.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
4a Electrical Construction - High (1	4	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
4b Electrical Construction - Ground	7	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
5b Testing & Commissioning (Vehic	1	60.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6c Converter Station - Foundations	16	80.00	0.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
5c Testing & Commissioning (Testi	1	40.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6d Converter Station - Structures	18	80.00	20.00	0.00	12.00	20.00	20.00	LD_Mix	HHDT	HHDT
6e Converter Station - Gen. Construciton	7	80.00	0.00	0.00	12.00	0.00	20.00	LD_Mix	HHDT	HHDT
6f Transformer Delivery	1	20.00	20.00	0.00	12.00	6.60	20.00	LD_Mix	HHDT	HHDT
7 Decommissioning	26	80.00	0.00	12,800.00	12.00	6.60	40.00	LD_Mix	HHDT	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 1a Site Prep - Mobilization - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0212	8.6700e-003	3.0000e-005		8.6000e-004	8.6000e-004		7.9000e-004	7.9000e-004	0.0000	2.2176	2.2176	7.2000e-004	0.0000	2.2355
Total	**1.8100e-003**	**0.0212**	**8.6700e-003**	**3.0000e-005**	**0.0000**	**8.6000e-004**	**8.6000e-004**	**0.0000**	**7.9000e-004**	**7.9000e-004**	**0.0000**	**2.2176**	**2.2176**	**7.2000e-004**	**0.0000**	**2.2355**

3.2 1a Site Prep - Mobilization - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.1000e-004	0.0234	3.7500e-003	8.0000e-005	1.7200e-003	6.0000e-005	1.7900e-003	4.7000e-004	6.0000e-005	5.3000e-004	0.0000	7.4036	7.4036	4.2000e-004	0.0000	7.4140
Worker	7.9000e-004	5.8000e-004	6.0000e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4928	1.4928	4.0000e-005	0.0000	1.4939
Total	**1.4000e-003**	**0.0239**	**9.7500e-003**	**1.0000e-004**	**3.5100e-003**	**7.0000e-005**	**3.5900e-003**	**9.5000e-004**	**7.0000e-005**	**1.0200e-003**	**0.0000**	**8.8964**	**8.8964**	**4.6000e-004**	**0.0000**	**8.9079**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8100e-003	0.0212	8.6700e-003	3.0000e-005		8.6000e-004	8.6000e-004		7.9000e-004	7.9000e-004	0.0000	2.2176	2.2176	7.2000e-004	0.0000	2.2355
Total	**1.8100e-003**	**0.0212**	**8.6700e-003**	**3.0000e-005**	**0.0000**	**8.6000e-004**	**8.6000e-004**	**0.0000**	**7.9000e-004**	**7.9000e-004**	**0.0000**	**2.2176**	**2.2176**	**7.2000e-004**	**0.0000**	**2.2355**

3.2 1a Site Prep - Mobilization - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.1000e-004	0.0234	3.7500e-003	8.0000e-005	1.7200e-003	6.0000e-005	1.7900e-003	4.7000e-004	6.0000e-005	5.3000e-004	0.0000	7.4036	7.4036	4.2000e-004	0.0000	7.4140
Worker	7.9000e-004	5.8000e-004	6.0000e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.4928	1.4928	4.0000e-005	0.0000	1.4939
Total	**1.4000e-003**	**0.0239**	**9.7500e-003**	**1.0000e-004**	**3.5100e-003**	**7.0000e-005**	**3.5900e-003**	**9.5000e-004**	**7.0000e-005**	**1.0200e-003**	**0.0000**	**8.8964**	**8.8964**	**4.6000e-004**	**0.0000**	**8.9079**

3.3 1b Site Prep - Excavate/Grade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5897	0.0000	0.5897	0.3031	0.0000	0.3031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2273	2.4533	1.8595	3.4100e-003		0.1104	0.1104		0.1016	0.1016	0.0000	299.7173	299.7173	0.0969	0.0000	302.1407
Total	**0.2273**	**2.4533**	**1.8595**	**3.4100e-003**	**0.5897**	**0.1104**	**0.7001**	**0.3031**	**0.1016**	**0.4047**	**0.0000**	**299.7173**	**299.7173**	**0.0969**	**0.0000**	**302.1407**

3.3 1b Site Prep - Excavate/Grade - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0641	3.1743	0.3638	4.7300e-003	1.6864	1.4000e-003	1.6878	0.1704	1.3400e-003	0.1718	0.0000	454.2349	454.2349	0.0794	0.0000	456.2192
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0214	0.0157	0.1619	4.5000e-004	0.0483	3.2000e-004	0.0487	0.0128	3.0000e-004	0.0131	0.0000	40.3055	40.3055	1.1500e-003	0.0000	40.3341
Total	**0.0855**	**3.1900**	**0.5257**	**5.1800e-003**	**1.7347**	**1.7200e-003**	**1.7364**	**0.1833**	**1.6400e-003**	**0.1849**	**0.0000**	**494.5404**	**494.5404**	**0.0805**	**0.0000**	**496.5534**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2300	0.0000	0.2300	0.1182	0.0000	0.1182	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2273	2.4533	1.8595	3.4100e-003		0.1104	0.1104		0.1016	0.1016	0.0000	299.7170	299.7170	0.0969	0.0000	302.1404
Total	**0.2273**	**2.4533**	**1.8595**	**3.4100e-003**	**0.2300**	**0.1104**	**0.3404**	**0.1182**	**0.1016**	**0.2198**	**0.0000**	**299.7170**	**299.7170**	**0.0969**	**0.0000**	**302.1404**

3.3 1b Site Prep - Excavate/Grade - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0641	3.1743	0.3638	4.7300e-003	1.6864	1.4000e-003	1.6878	0.1704	1.3400e-003	0.1718	0.0000	454.2349	454.2349	0.0794	0.0000	456.2192
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0214	0.0157	0.1619	4.5000e-004	0.0483	3.2000e-004	0.0487	0.0128	3.0000e-004	0.0131	0.0000	40.3055	40.3055	1.1500e-003	0.0000	40.3341
Total	**0.0855**	**3.1900**	**0.5257**	**5.1800e-003**	**1.7347**	**1.7200e-003**	**1.7364**	**0.1833**	**1.6400e-003**	**0.1849**	**0.0000**	**494.5404**	**494.5404**	**0.0805**	**0.0000**	**496.5534**

3.4 2a Transmission Line Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0298	0.0000	0.0298	3.2200e-003	0.0000	3.2200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0667	0.7720	0.4908	1.3000e-003		0.0299	0.0299		0.0275	0.0275	0.0000	114.6135	114.6135	0.0371	0.0000	115.5402
Total	**0.0667**	**0.7720**	**0.4908**	**1.3000e-003**	**0.0298**	**0.0299**	**0.0598**	**3.2200e-003**	**0.0275**	**0.0307**	**0.0000**	**114.6135**	**114.6135**	**0.0371**	**0.0000**	**115.5402**

3.4 2a Transmission Line Foundation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5400e-003	0.1752	0.0282	5.8000e-004	0.0129	4.9000e-004	0.0134	3.5500e-003	4.7000e-004	4.0100e-003	0.0000	55.5270	55.5270	3.1200e-003	0.0000	55.6051
Worker	0.0119	8.7100e-003	0.0900	2.5000e-004	0.0269	1.8000e-004	0.0270	7.1300e-003	1.6000e-004	7.3000e-003	0.0000	22.3919	22.3919	6.4000e-004	0.0000	22.4079
Total	**0.0164**	**0.1839**	**0.1181**	**8.3000e-004**	**0.0398**	**6.7000e-004**	**0.0404**	**0.0107**	**6.3000e-004**	**0.0113**	**0.0000**	**77.9189**	**77.9189**	**3.7600e-003**	**0.0000**	**78.0129**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0116	0.0000	0.0116	1.2600e-003	0.0000	1.2600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0667	0.7720	0.4908	1.3000e-003		0.0299	0.0299		0.0275	0.0275	0.0000	114.6133	114.6133	0.0371	0.0000	115.5400
Total	**0.0667**	**0.7720**	**0.4908**	**1.3000e-003**	**0.0116**	**0.0299**	**0.0416**	**1.2600e-003**	**0.0275**	**0.0288**	**0.0000**	**114.6133**	**114.6133**	**0.0371**	**0.0000**	**115.5400**

3.4 2a Transmission Line Foundation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5400e-003	0.1752	0.0282	5.8000e-004	0.0129	4.9000e-004	0.0134	3.5500e-003	4.7000e-004	4.0100e-003	0.0000	55.5270	55.5270	3.1200e-003	0.0000	55.6051
Worker	0.0119	8.7100e-003	0.0900	2.5000e-004	0.0269	1.8000e-004	0.0270	7.1300e-003	1.6000e-004	7.3000e-003	0.0000	22.3919	22.3919	6.4000e-004	0.0000	22.4079
Total	**0.0164**	**0.1839**	**0.1181**	**8.3000e-004**	**0.0398**	**6.7000e-004**	**0.0404**	**0.0107**	**6.3000e-004**	**0.0113**	**0.0000**	**77.9189**	**77.9189**	**3.7600e-003**	**0.0000**	**78.0129**

3.5 2b - Transmission Line Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1227	1.2446	0.8702	1.8300e-003		0.0567	0.0567		0.0537	0.0537	0.0000	159.3102	159.3102	0.0385	0.0000	160.2731
Total	**0.1227**	**1.2446**	**0.8702**	**1.8300e-003**		**0.0567**	**0.0567**		**0.0537**	**0.0537**	**0.0000**	**159.3102**	**159.3102**	**0.0385**	**0.0000**	**160.2731**

3.5 2b - Transmission Line Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0800e-003	0.3503	0.0563	1.1500e-003	0.0258	9.7000e-004	0.0268	7.0900e-003	9.3000e-004	8.0200e-003	0.0000	111.0539	111.0539	6.2500e-003	0.0000	111.2101
Worker	0.0356	0.0261	0.2699	7.4000e-004	0.0806	5.4000e-004	0.0811	0.0214	4.9000e-004	0.0219	0.0000	67.1758	67.1758	1.9100e-003	0.0000	67.2236
Total	**0.0447**	**0.3764**	**0.3262**	**1.8900e-003**	**0.1064**	**1.5100e-003**	**0.1079**	**0.0285**	**1.4200e-003**	**0.0299**	**0.0000**	**178.2298**	**178.2298**	**8.1600e-003**	**0.0000**	**178.4337**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1227	1.2446	0.8702	1.8300e-003		0.0567	0.0567		0.0537	0.0537	0.0000	159.3100	159.3100	0.0385	0.0000	160.2729
Total	**0.1227**	**1.2446**	**0.8702**	**1.8300e-003**		**0.0567**	**0.0567**		**0.0537**	**0.0537**	**0.0000**	**159.3100**	**159.3100**	**0.0385**	**0.0000**	**160.2729**

3.5 2b - Transmission Line Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0800e-003	0.3503	0.0563	1.1500e-003	0.0258	9.7000e-004	0.0268	7.0900e-003	9.3000e-004	8.0200e-003	0.0000	111.0539	111.0539	6.2500e-003	0.0000	111.2101
Worker	0.0356	0.0261	0.2699	7.4000e-004	0.0806	5.4000e-004	0.0811	0.0214	4.9000e-004	0.0219	0.0000	67.1758	67.1758	1.9100e-003	0.0000	67.2236
Total	**0.0447**	**0.3764**	**0.3262**	**1.8900e-003**	**0.1064**	**1.5100e-003**	**0.1079**	**0.0285**	**1.4200e-003**	**0.0299**	**0.0000**	**178.2298**	**178.2298**	**8.1600e-003**	**0.0000**	**178.4337**

3.5 2b - Transmission Line Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0374	0.3663	0.2846	6.1000e-004		0.0165	0.0165		0.0156	0.0156	0.0000	53.1078	53.1078	0.0128	0.0000	53.4272
Total	**0.0374**	**0.3663**	**0.2846**	**6.1000e-004**		**0.0165**	**0.0165**		**0.0156**	**0.0156**	**0.0000**	**53.1078**	**53.1078**	**0.0128**	**0.0000**	**53.4272**

3.5 2b - Transmission Line Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8600e-003	0.1069	0.0182	3.8000e-004	8.6000e-003	2.7000e-004	8.8700e-003	2.3600e-003	2.6000e-004	2.6200e-003	0.0000	36.6023	36.6023	2.0300e-003	0.0000	36.6531
Worker	0.0111	7.8200e-003	0.0825	2.4000e-004	0.0269	1.7000e-004	0.0270	7.1300e-003	1.6000e-004	7.2900e-003	0.0000	21.5854	21.5854	5.7000e-004	0.0000	21.5997
Total	**0.0140**	**0.1147**	**0.1006**	**6.2000e-004**	**0.0355**	**4.4000e-004**	**0.0359**	**9.4900e-003**	**4.2000e-004**	**9.9100e-003**	**0.0000**	**58.1877**	**58.1877**	**2.6000e-003**	**0.0000**	**58.2528**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0374	0.3663	0.2846	6.1000e-004		0.0165	0.0165		0.0156	0.0156	0.0000	53.1077	53.1077	0.0128	0.0000	53.4272
Total	**0.0374**	**0.3663**	**0.2846**	**6.1000e-004**		**0.0165**	**0.0165**		**0.0156**	**0.0156**	**0.0000**	**53.1077**	**53.1077**	**0.0128**	**0.0000**	**53.4272**

3.5 2b - Transmission Line Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8600e-003	0.1069	0.0182	3.8000e-004	8.6000e-003	2.7000e-004	8.8700e-003	2.3600e-003	2.6000e-004	2.6200e-003	0.0000	36.6023	36.6023	2.0300e-003	0.0000	36.6531
Worker	0.0111	7.8200e-003	0.0825	2.4000e-004	0.0269	1.7000e-004	0.0270	7.1300e-003	1.6000e-004	7.2900e-003	0.0000	21.5854	21.5854	5.7000e-004	0.0000	21.5997
Total	**0.0140**	**0.1147**	**0.1006**	**6.2000e-004**	**0.0355**	**4.4000e-004**	**0.0359**	**9.4900e-003**	**4.2000e-004**	**9.9100e-003**	**0.0000**	**58.1877**	**58.1877**	**2.6000e-003**	**0.0000**	**58.2528**

3.6 1c Site Prep - Push/Load/Level - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0206	0.2138	0.1526	4.0000e-004		9.0400e-003	9.0400e-003		8.3200e-003	8.3200e-003	0.0000	35.0986	35.0986	0.0114	0.0000	35.3824
Total	**0.0206**	**0.2138**	**0.1526**	**4.0000e-004**	**0.0000**	**9.0400e-003**	**9.0400e-003**	**0.0000**	**8.3200e-003**	**8.3200e-003**	**0.0000**	**35.0986**	**35.0986**	**0.0114**	**0.0000**	**35.3824**

3.6 1c Site Prep - Push/Load/Level - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9800e-003	7.0400e-003	0.0742	2.1000e-004	0.0242	1.6000e-004	0.0243	6.4200e-003	1.4000e-004	6.5600e-003	0.0000	19.4269	19.4269	5.1000e-004	0.0000	19.4397
Total	**9.9800e-003**	**7.0400e-003**	**0.0742**	**2.1000e-004**	**0.0242**	**1.6000e-004**	**0.0243**	**6.4200e-003**	**1.4000e-004**	**6.5600e-003**	**0.0000**	**19.4269**	**19.4269**	**5.1000e-004**	**0.0000**	**19.4397**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0206	0.2138	0.1526	4.0000e-004		9.0400e-003	9.0400e-003		8.3200e-003	8.3200e-003	0.0000	35.0985	35.0985	0.0114	0.0000	35.3823
Total	**0.0206**	**0.2138**	**0.1526**	**4.0000e-004**	**0.0000**	**9.0400e-003**	**9.0400e-003**	**0.0000**	**8.3200e-003**	**8.3200e-003**	**0.0000**	**35.0985**	**35.0985**	**0.0114**	**0.0000**	**35.3823**

3.6 1c Site Prep - Push/Load/Level - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9800e-003	7.0400e-003	0.0742	2.1000e-004	0.0242	1.6000e-004	0.0243	6.4200e-003	1.4000e-004	6.5600e-003	0.0000	19.4269	19.4269	5.1000e-004	0.0000	19.4397
Total	**9.9800e-003**	**7.0400e-003**	**0.0742**	**2.1000e-004**	**0.0242**	**1.6000e-004**	**0.0243**	**6.4200e-003**	**1.4000e-004**	**6.5600e-003**	**0.0000**	**19.4269**	**19.4269**	**5.1000e-004**	**0.0000**	**19.4397**

3.7 3a General Construction - Mobilization - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.8000e-004	9.5400e-003	4.5900e-003	1.0000e-005		4.0000e-004	4.0000e-004		3.7000e-004	3.7000e-004	0.0000	1.2674	1.2674	4.1000e-004	0.0000	1.2776
Total	**8.8000e-004**	**9.5400e-003**	**4.5900e-003**	**1.0000e-005**		**4.0000e-004**	**4.0000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**1.2674**	**1.2674**	**4.1000e-004**	**0.0000**	**1.2776**

3.7 3a General Construction - Mobilization - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9000e-004	0.0142	3.1500e-003	7.0000e-005	1.7200e-003	2.0000e-005	1.7500e-003	4.7000e-004	2.0000e-005	5.0000e-004	0.0000	7.0719	7.0719	3.4000e-004	0.0000	7.0804
Worker	6.9000e-004	4.7000e-004	5.0400e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3850	1.3850	3.0000e-005	0.0000	1.3859
Total	**1.0800e-003**	**0.0147**	**8.1900e-003**	**9.0000e-005**	**3.5100e-003**	**3.0000e-005**	**3.5500e-003**	**9.5000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**8.4569**	**8.4569**	**3.7000e-004**	**0.0000**	**8.4663**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.8000e-004	9.5400e-003	4.5900e-003	1.0000e-005		4.0000e-004	4.0000e-004		3.7000e-004	3.7000e-004	0.0000	1.2674	1.2674	4.1000e-004	0.0000	1.2776
Total	**8.8000e-004**	**9.5400e-003**	**4.5900e-003**	**1.0000e-005**		**4.0000e-004**	**4.0000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**1.2674**	**1.2674**	**4.1000e-004**	**0.0000**	**1.2776**

3.7 3a General Construction - Mobilization - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.9000e-004	0.0142	3.1500e-003	7.0000e-005	1.7200e-003	2.0000e-005	1.7500e-003	4.7000e-004	2.0000e-005	5.0000e-004	0.0000	7.0719	7.0719	3.4000e-004	0.0000	7.0804
Worker	6.9000e-004	4.7000e-004	5.0400e-003	2.0000e-005	1.7900e-003	1.0000e-005	1.8000e-003	4.8000e-004	1.0000e-005	4.9000e-004	0.0000	1.3850	1.3850	3.0000e-005	0.0000	1.3859
Total	**1.0800e-003**	**0.0147**	**8.1900e-003**	**9.0000e-005**	**3.5100e-003**	**3.0000e-005**	**3.5500e-003**	**9.5000e-004**	**3.0000e-005**	**9.9000e-004**	**0.0000**	**8.4569**	**8.4569**	**3.7000e-004**	**0.0000**	**8.4663**

3.8 3b General Construction - Pier Drilling - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0897	0.1323	3.7000e-004		3.5500e-003	3.5500e-003		3.2600e-003	3.2600e-003	0.0000	32.1032	32.1032	0.0104	0.0000	32.3628
Total	**0.0101**	**0.0897**	**0.1323**	**3.7000e-004**		**3.5500e-003**	**3.5500e-003**		**3.2600e-003**	**3.2600e-003**	**0.0000**	**32.1032**	**32.1032**	**0.0104**	**0.0000**	**32.3628**

3.8 3b General Construction - Pier Drilling - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	1.9500e-003	0.0711	0.0157	3.7000e-004	8.6000e-003	1.2000e-004	8.7300e-003	2.3600e-003	1.2000e-004	2.4800e-003	0.0000	35.3596	35.3596	1.7000e-003	0.0000	35.4021
Worker	6.9200e-003	4.6900e-003	0.0504	1.5000e-004	0.0179	1.1000e-004	0.0180	4.7600e-003	1.0000e-004	4.8600e-003	0.0000	13.8501	13.8501	3.4000e-004	0.0000	13.8587
Total	**0.0148**	**0.4271**	**0.1042**	**1.1400e-003**	**0.2607**	**3.1000e-004**	**0.2611**	**0.0308**	**3.0000e-004**	**0.0311**	**0.0000**	**109.1216**	**109.1216**	**0.0102**	**0.0000**	**109.3773**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0101	0.0897	0.1323	3.7000e-004		3.5500e-003	3.5500e-003		3.2600e-003	3.2600e-003	0.0000	32.1032	32.1032	0.0104	0.0000	32.3627
Total	**0.0101**	**0.0897**	**0.1323**	**3.7000e-004**		**3.5500e-003**	**3.5500e-003**		**3.2600e-003**	**3.2600e-003**	**0.0000**	**32.1032**	**32.1032**	**0.0104**	**0.0000**	**32.3627**

3.8 3b General Construction - Pier Drilling - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	1.9500e-003	0.0711	0.0157	3.7000e-004	8.6000e-003	1.2000e-004	8.7300e-003	2.3600e-003	1.2000e-004	2.4800e-003	0.0000	35.3596	35.3596	1.7000e-003	0.0000	35.4021
Worker	6.9200e-003	4.6900e-003	0.0504	1.5000e-004	0.0179	1.1000e-004	0.0180	4.7600e-003	1.0000e-004	4.8600e-003	0.0000	13.8501	13.8501	3.4000e-004	0.0000	13.8587
Total	**0.0148**	**0.4271**	**0.1042**	**1.1400e-003**	**0.2607**	**3.1000e-004**	**0.2611**	**0.0308**	**3.0000e-004**	**0.0311**	**0.0000**	**109.1216**	**109.1216**	**0.0102**	**0.0000**	**109.3773**

3.9 3c General Construction - Trenching - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4500e-003	0.0980	0.1501	2.2000e-004		4.0300e-003	4.0300e-003		3.7100e-003	3.7100e-003	0.0000	19.1203	19.1203	6.1800e-003	0.0000	19.2749
Total	**8.4500e-003**	**0.0980**	**0.1501**	**2.2000e-004**		**4.0300e-003**	**4.0300e-003**		**3.7100e-003**	**3.7100e-003**	**0.0000**	**19.1203**	**19.1203**	**6.1800e-003**	**0.0000**	**19.2749**

3.9 3c General Construction - Trenching - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6900e-003	0.1707	0.0378	8.8000e-004	0.0207	3.0000e-004	0.0210	5.6700e-003	2.8000e-004	5.9600e-003	0.0000	84.8629	84.8629	4.0900e-003	0.0000	84.9651
Worker	0.0166	0.0113	0.1209	3.7000e-004	0.0430	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	33.2403	33.2403	8.2000e-004	0.0000	33.2608
Total	**0.0213**	**0.1820**	**0.1586**	**1.2500e-003**	**0.0636**	**5.7000e-004**	**0.0642**	**0.0171**	**5.3000e-004**	**0.0176**	**0.0000**	**118.1032**	**118.1032**	**4.9100e-003**	**0.0000**	**118.2258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.4500e-003	0.0980	0.1501	2.2000e-004		4.0300e-003	4.0300e-003		3.7100e-003	3.7100e-003	0.0000	19.1202	19.1202	6.1800e-003	0.0000	19.2748
Total	**8.4500e-003**	**0.0980**	**0.1501**	**2.2000e-004**		**4.0300e-003**	**4.0300e-003**		**3.7100e-003**	**3.7100e-003**	**0.0000**	**19.1202**	**19.1202**	**6.1800e-003**	**0.0000**	**19.2748**

3.9 3c General Construction - Trenching - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.6900e-003	0.1707	0.0378	8.8000e-004	0.0207	3.0000e-004	0.0210	5.6700e-003	2.8000e-004	5.9600e-003	0.0000	84.8629	84.8629	4.0900e-003	0.0000	84.9651
Worker	0.0166	0.0113	0.1209	3.7000e-004	0.0430	2.7000e-004	0.0432	0.0114	2.5000e-004	0.0117	0.0000	33.2403	33.2403	8.2000e-004	0.0000	33.2608
Total	**0.0213**	**0.1820**	**0.1586**	**1.2500e-003**	**0.0636**	**5.7000e-004**	**0.0642**	**0.0171**	**5.3000e-004**	**0.0176**	**0.0000**	**118.1032**	**118.1032**	**4.9100e-003**	**0.0000**	**118.2258**

3.10 3d General Construction - Misc. - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.7700e-003	0.0952	0.1187	2.2000e-004		4.1700e-003	4.1700e-003		3.8300e-003	3.8300e-003	0.0000	19.5717	19.5717	6.3300e-003	0.0000	19.7300
Total	**9.7700e-003**	**0.0952**	**0.1187**	**2.2000e-004**		**4.1700e-003**	**4.1700e-003**		**3.8300e-003**	**3.8300e-003**	**0.0000**	**19.5717**	**19.5717**	**6.3300e-003**	**0.0000**	**19.7300**

3.10 3d General Construction - Misc. - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4600e-003	2.3500e-003	0.0252	8.0000e-005	8.9500e-003	6.0000e-005	9.0100e-003	2.3800e-003	5.0000e-005	2.4300e-003	0.0000	6.9251	6.9251	1.7000e-004	0.0000	6.9293
Total	**9.4200e-003**	**0.3536**	**0.0633**	**7.0000e-004**	**0.2432**	**1.4000e-004**	**0.2433**	**0.0261**	**1.3000e-004**	**0.0262**	**0.0000**	**66.8370**	**66.8370**	**8.3600e-003**	**0.0000**	**67.0459**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.7700e-003	0.0952	0.1187	2.2000e-004		4.1700e-003	4.1700e-003		3.8300e-003	3.8300e-003	0.0000	19.5717	19.5717	6.3300e-003	0.0000	19.7300
Total	**9.7700e-003**	**0.0952**	**0.1187**	**2.2000e-004**		**4.1700e-003**	**4.1700e-003**		**3.8300e-003**	**3.8300e-003**	**0.0000**	**19.5717**	**19.5717**	**6.3300e-003**	**0.0000**	**19.7300**

3.10 3d General Construction - Misc. - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9600e-003	0.3513	0.0381	6.2000e-004	0.2342	8.0000e-005	0.2343	0.0237	8.0000e-005	0.0238	0.0000	59.9119	59.9119	8.1900e-003	0.0000	60.1166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4600e-003	2.3500e-003	0.0252	8.0000e-005	8.9500e-003	6.0000e-005	9.0100e-003	2.3800e-003	5.0000e-005	2.4300e-003	0.0000	6.9251	6.9251	1.7000e-004	0.0000	6.9293
Total	**9.4200e-003**	**0.3536**	**0.0633**	**7.0000e-004**	**0.2432**	**1.4000e-004**	**0.2433**	**0.0261**	**1.3000e-004**	**0.0262**	**0.0000**	**66.8370**	**66.8370**	**8.3600e-003**	**0.0000**	**67.0459**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.4937	1.8168	3.8700e-003		0.0598	0.0598		0.0550	0.0550	0.0000	339.4729	339.4729	0.1098	0.0000	342.2178
Total	**0.1577**	**1.4937**	**1.8168**	**3.8700e-003**	**0.1246**	**0.0598**	**0.1844**	**0.0135**	**0.0550**	**0.0685**	**0.0000**	**339.4729**	**339.4729**	**0.1098**	**0.0000**	**342.2178**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0209	1.2295	0.1333	2.1800e-003	2.1986	2.8000e-004	2.1989	0.2214	2.7000e-004	0.2217	0.0000	209.6917	209.6917	0.0287	0.0000	210.4080
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0754**	**1.2664**	**0.5299**	**3.3900e-003**	**2.3396**	**1.1700e-003**	**2.3408**	**0.2588**	**1.0900e-003**	**0.2599**	**0.0000**	**318.7615**	**318.7615**	**0.0313**	**0.0000**	**319.5448**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.4937	1.8167	3.8700e-003		0.0598	0.0598		0.0550	0.0550	0.0000	339.4725	339.4725	0.1098	0.0000	342.2173
Total	**0.1577**	**1.4937**	**1.8167**	**3.8700e-003**	**0.0486**	**0.0598**	**0.1084**	**5.2500e-003**	**0.0550**	**0.0603**	**0.0000**	**339.4725**	**339.4725**	**0.1098**	**0.0000**	**342.2173**

3.11 6a Converter Station - Earthwork/Utilities - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0209	1.2295	0.1333	2.1800e-003	2.1986	2.8000e-004	2.1989	0.2214	2.7000e-004	0.2217	0.0000	209.6917	209.6917	0.0287	0.0000	210.4080
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0754**	**1.2664**	**0.5299**	**3.3900e-003**	**2.3396**	**1.1700e-003**	**2.3408**	**0.2588**	**1.0900e-003**	**0.2599**	**0.0000**	**318.7615**	**318.7615**	**0.0313**	**0.0000**	**319.5448**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2260	2.0562	2.7124	5.7900e-003		0.0815	0.0815		0.0750	0.0750	0.0000	508.3434	508.3434	0.1644	0.0000	512.4536
Total	**0.2260**	**2.0562**	**2.7124**	**5.7900e-003**	**0.1246**	**0.0815**	**0.2061**	**0.0135**	**0.0750**	**0.0884**	**0.0000**	**508.3434**	**508.3434**	**0.1644**	**0.0000**	**512.4536**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0308	1.8310	0.1947	3.2300e-003	2.1995	4.0000e-004	2.1999	0.2217	3.8000e-004	0.2221	0.0000	310.6665	310.6665	0.0429	0.0000	311.7397
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.1075**	**1.8811**	**0.7471**	**4.9800e-003**	**2.4106**	**1.7100e-003**	**2.4123**	**0.2778**	**1.5900e-003**	**0.2794**	**0.0000**	**468.6611**	**468.6611**	**0.0466**	**0.0000**	**469.8258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2260	2.0562	2.7124	5.7900e-003		0.0815	0.0815		0.0750	0.0750	0.0000	508.3428	508.3428	0.1644	0.0000	512.4530
Total	**0.2260**	**2.0562**	**2.7124**	**5.7900e-003**	**0.0486**	**0.0815**	**0.1301**	**5.2500e-003**	**0.0750**	**0.0802**	**0.0000**	**508.3428**	**508.3428**	**0.1644**	**0.0000**	**512.4530**

3.11 6a Converter Station - Earthwork/Utilities - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0308	1.8310	0.1947	3.2300e-003	2.1995	4.0000e-004	2.1999	0.2217	3.8000e-004	0.2221	0.0000	310.6665	310.6665	0.0429	0.0000	311.7397
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.1075**	**1.8811**	**0.7471**	**4.9800e-003**	**2.4106**	**1.7100e-003**	**2.4123**	**0.2778**	**1.5900e-003**	**0.2794**	**0.0000**	**468.6611**	**468.6611**	**0.0466**	**0.0000**	**469.8258**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1246	0.0000	0.1246	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0265	0.2278	0.3389	7.3000e-004		8.8800e-003	8.8800e-003		8.1700e-003	8.1700e-003	0.0000	64.0117	64.0117	0.0207	0.0000	64.5293
Total	**0.0265**	**0.2278**	**0.3389**	**7.3000e-004**	**0.1246**	**8.8800e-003**	**0.1335**	**0.0135**	**8.1700e-003**	**0.0216**	**0.0000**	**64.0117**	**64.0117**	**0.0207**	**0.0000**	**64.5293**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8100e-003	0.2293	0.0240	4.0000e-004	2.1972	5.0000e-005	2.1972	0.2209	4.0000e-005	0.2209	0.0000	38.7184	38.7184	5.3800e-003	0.0000	38.8530
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1200e-003	5.7300e-003	0.0643	2.1000e-004	0.0266	1.6000e-004	0.0268	7.0600e-003	1.5000e-004	7.2100e-003	0.0000	19.1101	19.1101	4.2000e-004	0.0000	19.1205
Total	**0.0129**	**0.2350**	**0.0883**	**6.1000e-004**	**2.2238**	**2.1000e-004**	**2.2240**	**0.2279**	**1.9000e-004**	**0.2281**	**0.0000**	**57.8284**	**57.8284**	**5.8000e-003**	**0.0000**	**57.9735**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0486	0.0000	0.0486	5.2500e-003	0.0000	5.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0265	0.2278	0.3389	7.3000e-004		8.8800e-003	8.8800e-003		8.1700e-003	8.1700e-003	0.0000	64.0117	64.0117	0.0207	0.0000	64.5292
Total	**0.0265**	**0.2278**	**0.3389**	**7.3000e-004**	**0.0486**	**8.8800e-003**	**0.0575**	**5.2500e-003**	**8.1700e-003**	**0.0134**	**0.0000**	**64.0117**	**64.0117**	**0.0207**	**0.0000**	**64.5292**

3.11 6a Converter Station - Earthwork/Utilities - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8100e-003	0.2293	0.0240	4.0000e-004	2.1972	5.0000e-005	2.1972	0.2209	4.0000e-005	0.2209	0.0000	38.7184	38.7184	5.3800e-003	0.0000	38.8530
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1200e-003	5.7300e-003	0.0643	2.1000e-004	0.0266	1.6000e-004	0.0268	7.0600e-003	1.5000e-004	7.2100e-003	0.0000	19.1101	19.1101	4.2000e-004	0.0000	19.1205
Total	**0.0129**	**0.2350**	**0.0883**	**6.1000e-004**	**2.2238**	**2.1000e-004**	**2.2240**	**0.2279**	**1.9000e-004**	**0.2281**	**0.0000**	**57.8284**	**57.8284**	**5.8000e-003**	**0.0000**	**57.9735**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0461	0.5496	0.5518	1.1000e-003		0.0195	0.0195		0.0179	0.0179	0.0000	96.6723	96.6723	0.0313	0.0000	97.4539
Total	**0.0461**	**0.5496**	**0.5518**	**1.1000e-003**		**0.0195**	**0.0195**		**0.0179**	**0.0179**	**0.0000**	**96.6723**	**96.6723**	**0.0313**	**0.0000**	**97.4539**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0137	0.4980	0.1101	2.5700e-003	0.0602	8.7000e-004	0.0611	0.0165	8.3000e-004	0.0174	0.0000	247.5168	247.5168	0.0119	0.0000	247.8148
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0682**	**0.5349**	**0.5067**	**3.7800e-003**	**0.2012**	**1.7600e-003**	**0.2030**	**0.0540**	**1.6500e-003**	**0.0556**	**0.0000**	**356.5866**	**356.5866**	**0.0146**	**0.0000**	**356.9516**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0461	0.5496	0.5518	1.1000e-003		0.0195	0.0195		0.0179	0.0179	0.0000	96.6722	96.6722	0.0313	0.0000	97.4538
Total	**0.0461**	**0.5496**	**0.5518**	**1.1000e-003**		**0.0195**	**0.0195**		**0.0179**	**0.0179**	**0.0000**	**96.6722**	**96.6722**	**0.0313**	**0.0000**	**97.4538**

3.12 6b Converter Station - Offloading/Vehicles - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0137	0.4980	0.1101	2.5700e-003	0.0602	8.7000e-004	0.0611	0.0165	8.3000e-004	0.0174	0.0000	247.5168	247.5168	0.0119	0.0000	247.8148
Worker	0.0545	0.0370	0.3967	1.2100e-003	0.1410	8.9000e-004	0.1419	0.0375	8.2000e-004	0.0383	0.0000	109.0698	109.0698	2.6800e-003	0.0000	109.1368
Total	**0.0682**	**0.5349**	**0.5067**	**3.7800e-003**	**0.2012**	**1.7600e-003**	**0.2030**	**0.0540**	**1.6500e-003**	**0.0556**	**0.0000**	**356.5866**	**356.5866**	**0.0146**	**0.0000**	**356.9516**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0659	0.7738	0.8187	1.6500e-003		0.0269	0.0269		0.0247	0.0247	0.0000	144.7228	144.7228	0.0468	0.0000	145.8930
Total	**0.0659**	**0.7738**	**0.8187**	**1.6500e-003**		**0.0269**	**0.0269**		**0.0247**	**0.0247**	**0.0000**	**144.7228**	**144.7228**	**0.0468**	**0.0000**	**145.8930**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0208	0.7456	0.1673	3.8300e-003	0.0902	1.2900e-003	0.0915	0.0248	1.2400e-003	0.0260	0.0000	369.5931	369.5931	0.0180	0.0000	370.0417
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.0976**	**0.7957**	**0.7197**	**5.5800e-003**	**0.3013**	**2.6000e-003**	**0.3039**	**0.0808**	**2.4500e-003**	**0.0833**	**0.0000**	**527.5876**	**527.5876**	**0.0216**	**0.0000**	**528.1279**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0659	0.7738	0.8187	1.6500e-003		0.0269	0.0269		0.0247	0.0247	0.0000	144.7227	144.7227	0.0468	0.0000	145.8928
Total	**0.0659**	**0.7738**	**0.8187**	**1.6500e-003**		**0.0269**	**0.0269**		**0.0247**	**0.0247**	**0.0000**	**144.7227**	**144.7227**	**0.0468**	**0.0000**	**145.8928**

3.12 6b Converter Station - Offloading/Vehicles - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0208	0.7456	0.1673	3.8300e-003	0.0902	1.2900e-003	0.0915	0.0248	1.2400e-003	0.0260	0.0000	369.5931	369.5931	0.0180	0.0000	370.0417
Worker	0.0768	0.0501	0.5524	1.7500e-003	0.2111	1.3100e-003	0.2124	0.0561	1.2100e-003	0.0573	0.0000	157.9945	157.9945	3.6600e-003	0.0000	158.0862
Total	**0.0976**	**0.7957**	**0.7197**	**5.5800e-003**	**0.3013**	**2.6000e-003**	**0.3039**	**0.0808**	**2.4500e-003**	**0.0833**	**0.0000**	**527.5876**	**527.5876**	**0.0216**	**0.0000**	**528.1279**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0624	0.7168	0.8096	1.6400e-003		0.0246	0.0246		0.0226	0.0226	0.0000	144.1705	144.1705	0.0466	0.0000	145.3362
Total	**0.0624**	**0.7168**	**0.8096**	**1.6400e-003**		**0.0246**	**0.0246**		**0.0226**	**0.0226**	**0.0000**	**144.1705**	**144.1705**	**0.0466**	**0.0000**	**145.3362**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0206	0.7323	0.1661	3.7900e-003	0.0898	1.2700e-003	0.0911	0.0247	1.2200e-003	0.0259	0.0000	366.1152	366.1152	0.0179	0.0000	366.5627
Worker	0.0722	0.0453	0.5082	1.6700e-003	0.2103	1.2800e-003	0.2116	0.0559	1.1800e-003	0.0570	0.0000	151.1433	151.1433	3.3000e-003	0.0000	151.2257
Total	**0.0928**	**0.7776**	**0.6743**	**5.4600e-003**	**0.3001**	**2.5500e-003**	**0.3027**	**0.0805**	**2.4000e-003**	**0.0829**	**0.0000**	**517.2585**	**517.2585**	**0.0212**	**0.0000**	**517.7884**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0624	0.7168	0.8096	1.6400e-003		0.0246	0.0246		0.0226	0.0226	0.0000	144.1703	144.1703	0.0466	0.0000	145.3360
Total	**0.0624**	**0.7168**	**0.8096**	**1.6400e-003**		**0.0246**	**0.0246**		**0.0226**	**0.0226**	**0.0000**	**144.1703**	**144.1703**	**0.0466**	**0.0000**	**145.3360**

3.12 6b Converter Station - Offloading/Vehicles - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0206	0.7323	0.1661	3.7900e-003	0.0898	1.2700e-003	0.0911	0.0247	1.2200e-003	0.0259	0.0000	366.1152	366.1152	0.0179	0.0000	366.5627
Worker	0.0722	0.0453	0.5082	1.6700e-003	0.2103	1.2800e-003	0.2116	0.0559	1.1800e-003	0.0570	0.0000	151.1433	151.1433	3.3000e-003	0.0000	151.2257
Total	**0.0928**	**0.7776**	**0.6743**	**5.4600e-003**	**0.3001**	**2.5500e-003**	**0.3027**	**0.0805**	**2.4000e-003**	**0.0829**	**0.0000**	**517.2585**	**517.2585**	**0.0212**	**0.0000**	**517.7884**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.8000e-004	5.4900e-003	6.2000e-003	1.0000e-005		1.9000e-004	1.9000e-004		1.7000e-004	1.7000e-004	0.0000	1.1048	1.1048	3.6000e-004	0.0000	1.1137
Total	**4.8000e-004**	**5.4900e-003**	**6.2000e-003**	**1.0000e-005**		**1.9000e-004**	**1.9000e-004**		**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.1048**	**1.1048**	**3.6000e-004**	**0.0000**	**1.1137**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.5300e-003	1.2700e-003	3.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	2.7908	2.7908	1.4000e-004	0.0000	2.7943
Worker	5.2000e-004	3.2000e-004	3.6200e-003	1.0000e-005	1.6100e-003	1.0000e-005	1.6200e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.1162	1.1162	2.0000e-005	0.0000	1.1168
Total	**6.8000e-004**	**5.8500e-003**	**4.8900e-003**	**4.0000e-005**	**2.3000e-003**	**2.0000e-005**	**2.3200e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**3.9070**	**3.9070**	**1.6000e-004**	**0.0000**	**3.9110**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.8000e-004	5.4900e-003	6.2000e-003	1.0000e-005		1.9000e-004	1.9000e-004		1.7000e-004	1.7000e-004	0.0000	1.1048	1.1048	3.6000e-004	0.0000	1.1137
Total	**4.8000e-004**	**5.4900e-003**	**6.2000e-003**	**1.0000e-005**		**1.9000e-004**	**1.9000e-004**		**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.1048**	**1.1048**	**3.6000e-004**	**0.0000**	**1.1137**

3.12 6b Converter Station - Offloading/Vehicles - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6000e-004	5.5300e-003	1.2700e-003	3.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	2.7908	2.7908	1.4000e-004	0.0000	2.7943
Worker	5.2000e-004	3.2000e-004	3.6200e-003	1.0000e-005	1.6100e-003	1.0000e-005	1.6200e-003	4.3000e-004	1.0000e-005	4.4000e-004	0.0000	1.1162	1.1162	2.0000e-005	0.0000	1.1168
Total	**6.8000e-004**	**5.8500e-003**	**4.8900e-003**	**4.0000e-005**	**2.3000e-003**	**2.0000e-005**	**2.3200e-003**	**6.2000e-004**	**2.0000e-005**	**6.4000e-004**	**0.0000**	**3.9070**	**3.9070**	**1.6000e-004**	**0.0000**	**3.9110**

3.13 3e General Construction - Concrete - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0122	0.1205	0.1653	2.5000e-004		6.2500e-003	6.2500e-003		5.7500e-003	5.7500e-003	0.0000	22.0641	22.0641	7.1400e-003	0.0000	22.2425
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.1205**	**0.1653**	**2.5000e-004**		**6.2500e-003**	**6.2500e-003**		**5.7500e-003**	**5.7500e-003**	**0.0000**	**22.0641**	**22.0641**	**7.1400e-003**	**0.0000**	**22.2425**

3.13 3e General Construction - Concrete - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	1.0538	0.1142	1.8700e-003	0.7027	2.4000e-004	0.7029	0.0710	2.3000e-004	0.0712	0.0000	179.7358	179.7358	0.0246	0.0000	180.3497
Vendor	5.8600e-003	0.2134	0.0472	1.1000e-003	0.0258	3.7000e-004	0.0262	7.0900e-003	3.6000e-004	7.4500e-003	0.0000	106.0786	106.0786	5.1100e-003	0.0000	106.2063
Worker	0.0208	0.0141	0.1511	4.6000e-004	0.0537	3.4000e-004	0.0541	0.0143	3.1000e-004	0.0146	0.0000	41.5504	41.5504	1.0200e-003	0.0000	41.5759
Total	**0.0445**	**1.2813**	**0.3125**	**3.4300e-003**	**0.7822**	**9.5000e-004**	**0.7831**	**0.0924**	**9.0000e-004**	**0.0933**	**0.0000**	**327.3648**	**327.3648**	**0.0307**	**0.0000**	**328.1319**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0122	0.1205	0.1653	2.5000e-004		6.2500e-003	6.2500e-003		5.7500e-003	5.7500e-003	0.0000	22.0641	22.0641	7.1400e-003	0.0000	22.2425
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.1205**	**0.1653**	**2.5000e-004**		**6.2500e-003**	**6.2500e-003**		**5.7500e-003**	**5.7500e-003**	**0.0000**	**22.0641**	**22.0641**	**7.1400e-003**	**0.0000**	**22.2425**

3.13 3e General Construction - Concrete - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	1.0538	0.1142	1.8700e-003	0.7027	2.4000e-004	0.7029	0.0710	2.3000e-004	0.0712	0.0000	179.7358	179.7358	0.0246	0.0000	180.3497
Vendor	5.8600e-003	0.2134	0.0472	1.1000e-003	0.0258	3.7000e-004	0.0262	7.0900e-003	3.6000e-004	7.4500e-003	0.0000	106.0786	106.0786	5.1100e-003	0.0000	106.2063
Worker	0.0208	0.0141	0.1511	4.6000e-004	0.0537	3.4000e-004	0.0541	0.0143	3.1000e-004	0.0146	0.0000	41.5504	41.5504	1.0200e-003	0.0000	41.5759
Total	**0.0445**	**1.2813**	**0.3125**	**3.4300e-003**	**0.7822**	**9.5000e-004**	**0.7831**	**0.0924**	**9.0000e-004**	**0.0933**	**0.0000**	**327.3648**	**327.3648**	**0.0307**	**0.0000**	**328.1319**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1100e-003	0.0227	7.0000e-005	8.0600e-003	5.0000e-005	8.1100e-003	2.1400e-003	5.0000e-005	2.1900e-003	0.0000	6.2326	6.2326	1.5000e-004	0.0000	6.2364
Total	**3.1100e-003**	**2.1100e-003**	**0.0227**	**7.0000e-005**	**8.0600e-003**	**5.0000e-005**	**8.1100e-003**	**2.1400e-003**	**5.0000e-005**	**2.1900e-003**	**0.0000**	**6.2326**	**6.2326**	**1.5000e-004**	**0.0000**	**6.2364**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1100e-003	0.0227	7.0000e-005	8.0600e-003	5.0000e-005	8.1100e-003	2.1400e-003	5.0000e-005	2.1900e-003	0.0000	6.2326	6.2326	1.5000e-004	0.0000	6.2364
Total	**3.1100e-003**	**2.1100e-003**	**0.0227**	**7.0000e-005**	**8.0600e-003**	**5.0000e-005**	**8.1100e-003**	**2.1400e-003**	**5.0000e-005**	**2.1900e-003**	**0.0000**	**6.2326**	**6.2326**	**1.5000e-004**	**0.0000**	**6.2364**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4900e-003	4.8900e-003	0.0539	1.7000e-004	0.0206	1.3000e-004	0.0207	5.4700e-003	1.2000e-004	5.5900e-003	0.0000	15.4108	15.4108	3.6000e-004	0.0000	15.4198
Total	**7.4900e-003**	**4.8900e-003**	**0.0539**	**1.7000e-004**	**0.0206**	**1.3000e-004**	**0.0207**	**5.4700e-003**	**1.2000e-004**	**5.5900e-003**	**0.0000**	**15.4108**	**15.4108**	**3.6000e-004**	**0.0000**	**15.4198**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.14 5a Testing & Commissioning (QA/Inspect) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.4900e-003	4.8900e-003	0.0539	1.7000e-004	0.0206	1.3000e-004	0.0207	5.4700e-003	1.2000e-004	5.5900e-003	0.0000	15.4108	15.4108	3.6000e-004	0.0000	15.4198
Total	**7.4900e-003**	**4.8900e-003**	**0.0539**	**1.7000e-004**	**0.0206**	**1.3000e-004**	**0.0207**	**5.4700e-003**	**1.2000e-004**	**5.5900e-003**	**0.0000**	**15.4108**	**15.4108**	**3.6000e-004**	**0.0000**	**15.4198**

3.15 4a Electrical Construction - High (100 ft) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.1305	0.0878	2.2000e-004		5.0600e-003	5.0600e-003		4.6500e-003	4.6500e-003	0.0000	19.6344	19.6344	6.3500e-003	0.0000	19.7931
Total	**0.0116**	**0.1305**	**0.0878**	**2.2000e-004**		**5.0600e-003**	**5.0600e-003**		**4.6500e-003**	**4.6500e-003**	**0.0000**	**19.6344**	**19.6344**	**6.3500e-003**	**0.0000**	**19.7931**

3.15 4a Electrical Construction - High (100 ft) - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1700e-003	0.0427	9.4400e-003	2.2000e-004	5.1600e-003	7.0000e-005	5.2400e-003	1.4200e-003	7.0000e-005	1.4900e-003	0.0000	21.2157	21.2157	1.0200e-003	0.0000	21.2413
Worker	4.1500e-003	2.8200e-003	0.0302	9.0000e-005	0.0107	7.0000e-005	0.0108	2.8500e-003	6.0000e-005	2.9200e-003	0.0000	8.3101	8.3101	2.0000e-004	0.0000	8.3152
Total	**5.3200e-003**	**0.0455**	**0.0397**	**3.1000e-004**	**0.0159**	**1.4000e-004**	**0.0161**	**4.2700e-003**	**1.3000e-004**	**4.4100e-003**	**0.0000**	**29.5258**	**29.5258**	**1.2200e-003**	**0.0000**	**29.5565**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0116	0.1305	0.0878	2.2000e-004		5.0600e-003	5.0600e-003		4.6500e-003	4.6500e-003	0.0000	19.6343	19.6343	6.3500e-003	0.0000	19.7931
Total	**0.0116**	**0.1305**	**0.0878**	**2.2000e-004**		**5.0600e-003**	**5.0600e-003**		**4.6500e-003**	**4.6500e-003**	**0.0000**	**19.6343**	**19.6343**	**6.3500e-003**	**0.0000**	**19.7931**

3.15 4a Electrical Construction - High (100 ft) - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1700e-003	0.0427	9.4400e-003	2.2000e-004	5.1600e-003	7.0000e-005	5.2400e-003	1.4200e-003	7.0000e-005	1.4900e-003	0.0000	21.2157	21.2157	1.0200e-003	0.0000	21.2413
Worker	4.1500e-003	2.8200e-003	0.0302	9.0000e-005	0.0107	7.0000e-005	0.0108	2.8500e-003	6.0000e-005	2.9200e-003	0.0000	8.3101	8.3101	2.0000e-004	0.0000	8.3152
Total	**5.3200e-003**	**0.0455**	**0.0397**	**3.1000e-004**	**0.0159**	**1.4000e-004**	**0.0161**	**4.2700e-003**	**1.3000e-004**	**4.4100e-003**	**0.0000**	**29.5258**	**29.5258**	**1.2200e-003**	**0.0000**	**29.5565**

3.16 4b Electrical Construction - Ground/Mid - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.8833	0.6787	1.6800e-003		0.0332	0.0332		0.0305	0.0305	0.0000	147.7651	147.7651	0.0478	0.0000	148.9598
Total	**0.0794**	**0.8833**	**0.6787**	**1.6800e-003**		**0.0332**	**0.0332**		**0.0305**	**0.0305**	**0.0000**	**147.7651**	**147.7651**	**0.0478**	**0.0000**	**148.9598**

3.16 4b Electrical Construction - Ground/Mid - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0182	0.0119	0.1312	4.1000e-004	0.0501	3.1000e-004	0.0505	0.0133	2.9000e-004	0.0136	0.0000	37.5220	37.5220	8.7000e-004	0.0000	37.5438
Total	**0.0238**	**0.2111**	**0.1759**	**1.4300e-003**	**0.0742**	**6.6000e-004**	**0.0749**	**0.0199**	**6.2000e-004**	**0.0206**	**0.0000**	**136.2683**	**136.2683**	**5.6600e-003**	**0.0000**	**136.4099**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0794	0.8833	0.6787	1.6800e-003		0.0332	0.0332		0.0305	0.0305	0.0000	147.7649	147.7649	0.0478	0.0000	148.9596
Total	**0.0794**	**0.8833**	**0.6787**	**1.6800e-003**		**0.0332**	**0.0332**		**0.0305**	**0.0305**	**0.0000**	**147.7649**	**147.7649**	**0.0478**	**0.0000**	**148.9596**

3.16 4b Electrical Construction - Ground/Mid - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0182	0.0119	0.1312	4.1000e-004	0.0501	3.1000e-004	0.0505	0.0133	2.9000e-004	0.0136	0.0000	37.5220	37.5220	8.7000e-004	0.0000	37.5438
Total	**0.0238**	**0.2111**	**0.1759**	**1.4300e-003**	**0.0742**	**6.6000e-004**	**0.0749**	**0.0199**	**6.2000e-004**	**0.0206**	**0.0000**	**136.2683**	**136.2683**	**5.6600e-003**	**0.0000**	**136.4099**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0137	8.9300e-003	0.0984	3.1000e-004	0.0376	2.3000e-004	0.0378	9.9900e-003	2.2000e-004	0.0102	0.0000	28.1415	28.1415	6.5000e-004	0.0000	28.1578
Total	**0.0192**	**0.2081**	**0.1431**	**1.3300e-003**	**0.0617**	**5.8000e-004**	**0.0623**	**0.0166**	**5.5000e-004**	**0.0172**	**0.0000**	**126.8878**	**126.8878**	**5.4400e-003**	**0.0000**	**127.0240**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.17 5b Testing & Commissioning (Vehicles) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.5600e-003	0.1992	0.0447	1.0200e-003	0.0241	3.5000e-004	0.0244	6.6200e-003	3.3000e-004	6.9500e-003	0.0000	98.7462	98.7462	4.7900e-003	0.0000	98.8661
Worker	0.0137	8.9300e-003	0.0984	3.1000e-004	0.0376	2.3000e-004	0.0378	9.9900e-003	2.2000e-004	0.0102	0.0000	28.1415	28.1415	6.5000e-004	0.0000	28.1578
Total	**0.0192**	**0.2081**	**0.1431**	**1.3300e-003**	**0.0617**	**5.8000e-004**	**0.0623**	**0.0166**	**5.5000e-004**	**0.0172**	**0.0000**	**126.8878**	**126.8878**	**5.4400e-003**	**0.0000**	**127.0240**

3.18 6c Converter Station - Foundations - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0835	0.0000	0.0835	9.0200e-003	0.0000	9.0200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2069	2.1122	2.0510	4.9100e-003		0.0849	0.0849		0.0786	0.0786	0.0000	429.5666	429.5666	0.1301	0.0000	432.8194
Total	**0.2069**	**2.1122**	**2.0510**	**4.9100e-003**	**0.0835**	**0.0849**	**0.1684**	**9.0200e-003**	**0.0786**	**0.0877**	**0.0000**	**429.5666**	**429.5666**	**0.1301**	**0.0000**	**432.8194**

3.18 6c Converter Station - Foundations - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	9.1000e-003	0.1003	3.2000e-004	0.0383	2.4000e-004	0.0386	0.0102	2.2000e-004	0.0104	0.0000	28.6776	28.6776	6.7000e-004	0.0000	28.6942
Total	**0.0139**	**9.1000e-003**	**0.1003**	**3.2000e-004**	**0.0383**	**2.4000e-004**	**0.0386**	**0.0102**	**2.2000e-004**	**0.0104**	**0.0000**	**28.6776**	**28.6776**	**6.7000e-004**	**0.0000**	**28.6942**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0326	0.0000	0.0326	3.5200e-003	0.0000	3.5200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2069	2.1122	2.0510	4.9100e-003		0.0849	0.0849		0.0786	0.0786	0.0000	429.5661	429.5661	0.1301	0.0000	432.8189
Total	**0.2069**	**2.1122**	**2.0510**	**4.9100e-003**	**0.0326**	**0.0849**	**0.1175**	**3.5200e-003**	**0.0786**	**0.0822**	**0.0000**	**429.5661**	**429.5661**	**0.1301**	**0.0000**	**432.8189**

3.18 6c Converter Station - Foundations - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0139	9.1000e-003	0.1003	3.2000e-004	0.0383	2.4000e-004	0.0386	0.0102	2.2000e-004	0.0104	0.0000	28.6776	28.6776	6.7000e-004	0.0000	28.6942
Total	**0.0139**	**9.1000e-003**	**0.1003**	**3.2000e-004**	**0.0383**	**2.4000e-004**	**0.0386**	**0.0102**	**2.2000e-004**	**0.0104**	**0.0000**	**28.6776**	**28.6776**	**6.7000e-004**	**0.0000**	**28.6942**

3.18 6c Converter Station - Foundations - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0835	0.0000	0.0835	9.0200e-003	0.0000	9.0200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3777	3.7403	3.9518	9.5400e-003		0.1478	0.1478		0.1369	0.1369	0.0000	835.0510	835.0510	0.2527	0.0000	841.3692
Total	**0.3777**	**3.7403**	**3.9518**	**9.5400e-003**	**0.0835**	**0.1478**	**0.2313**	**9.0200e-003**	**0.1369**	**0.1459**	**0.0000**	**835.0510**	**835.0510**	**0.2527**	**0.0000**	**841.3692**

3.18 6c Converter Station - Foundations - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0256	0.0161	0.1800	5.9000e-004	0.0745	4.5000e-004	0.0749	0.0198	4.2000e-004	0.0202	0.0000	53.5339	53.5339	1.1700e-003	0.0000	53.5631
Total	**0.0256**	**0.0161**	**0.1800**	**5.9000e-004**	**0.0745**	**4.5000e-004**	**0.0749**	**0.0198**	**4.2000e-004**	**0.0202**	**0.0000**	**53.5339**	**53.5339**	**1.1700e-003**	**0.0000**	**53.5631**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0326	0.0000	0.0326	3.5200e-003	0.0000	3.5200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3777	3.7403	3.9518	9.5400e-003		0.1478	0.1478		0.1369	0.1369	0.0000	835.0501	835.0501	0.2527	0.0000	841.3682
Total	**0.3777**	**3.7403**	**3.9518**	**9.5400e-003**	**0.0326**	**0.1478**	**0.1804**	**3.5200e-003**	**0.1369**	**0.1404**	**0.0000**	**835.0501**	**835.0501**	**0.2527**	**0.0000**	**841.3682**

3.18 6c Converter Station - Foundations - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0256	0.0161	0.1800	5.9000e-004	0.0745	4.5000e-004	0.0749	0.0198	4.2000e-004	0.0202	0.0000	53.5339	53.5339	1.1700e-003	0.0000	53.5631
Total	**0.0256**	**0.0161**	**0.1800**	**5.9000e-004**	**0.0745**	**4.5000e-004**	**0.0749**	**0.0198**	**4.2000e-004**	**0.0202**	**0.0000**	**53.5339**	**53.5339**	**1.1700e-003**	**0.0000**	**53.5631**

3.19 5c Testing & Commissioning (Testing) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.19 5c Testing & Commissioning (Testing) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0569	0.0128	2.9000e-004	6.8800e-003	1.0000e-004	6.9800e-003	1.8900e-003	9.0000e-005	1.9800e-003	0.0000	28.2132	28.2132	1.3700e-003	0.0000	28.2475
Worker	2.6000e-003	1.7000e-003	0.0187	6.0000e-005	7.1600e-003	4.0000e-005	7.2100e-003	1.9000e-003	4.0000e-005	1.9400e-003	0.0000	5.3603	5.3603	1.2000e-004	0.0000	5.3634
Total	**4.1900e-003**	**0.0586**	**0.0315**	**3.5000e-004**	**0.0140**	**1.4000e-004**	**0.0142**	**3.7900e-003**	**1.3000e-004**	**3.9200e-003**	**0.0000**	**33.5735**	**33.5735**	**1.4900e-003**	**0.0000**	**33.6109**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.19 5c Testing & Commissioning (Testing) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5900e-003	0.0569	0.0128	2.9000e-004	6.8800e-003	1.0000e-004	6.9800e-003	1.8900e-003	9.0000e-005	1.9800e-003	0.0000	28.2132	28.2132	1.3700e-003	0.0000	28.2475
Worker	2.6000e-003	1.7000e-003	0.0187	6.0000e-005	7.1600e-003	4.0000e-005	7.2100e-003	1.9000e-003	4.0000e-005	1.9400e-003	0.0000	5.3603	5.3603	1.2000e-004	0.0000	5.3634
Total	**4.1900e-003**	**0.0586**	**0.0315**	**3.5000e-004**	**0.0140**	**1.4000e-004**	**0.0142**	**3.7900e-003**	**1.3000e-004**	**3.9200e-003**	**0.0000**	**33.5735**	**33.5735**	**1.4900e-003**	**0.0000**	**33.6109**

3.20 6d Converter Station - Structures - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1885	2.2980	3.3289	5.8200e-003		0.0701	0.0701		0.0645	0.0645	0.0000	511.0908	511.0908	0.1653	0.0000	515.2233
Total	**0.1885**	**2.2980**	**3.3289**	**5.8200e-003**		**0.0701**	**0.0701**		**0.0645**	**0.0645**	**0.0000**	**511.0908**	**511.0908**	**0.1653**	**0.0000**	**515.2233**

3.20 6d Converter Station - Structures - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.7900e-003	0.3479	0.0789	1.8000e-003	0.0427	6.0000e-004	0.0433	0.0117	5.8000e-004	0.0123	0.0000	173.9398	173.9398	8.5000e-003	0.0000	174.1524
Worker	0.0305	0.0192	0.2146	7.1000e-004	0.0888	5.4000e-004	0.0894	0.0236	5.0000e-004	0.0241	0.0000	63.8289	63.8289	1.3900e-003	0.0000	63.8637
Total	**0.0403**	**0.3671**	**0.2935**	**2.5100e-003**	**0.1315**	**1.1400e-003**	**0.1326**	**0.0353**	**1.0800e-003**	**0.0364**	**0.0000**	**237.7687**	**237.7687**	**9.8900e-003**	**0.0000**	**238.0161**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1885	2.2980	3.3289	5.8200e-003		0.0701	0.0701		0.0645	0.0645	0.0000	511.0902	511.0902	0.1653	0.0000	515.2226
Total	**0.1885**	**2.2980**	**3.3289**	**5.8200e-003**		**0.0701**	**0.0701**		**0.0645**	**0.0645**	**0.0000**	**511.0902**	**511.0902**	**0.1653**	**0.0000**	**515.2226**

3.20 6d Converter Station - Structures - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.7900e-003	0.3479	0.0789	1.8000e-003	0.0427	6.0000e-004	0.0433	0.0117	5.8000e-004	0.0123	0.0000	173.9398	173.9398	8.5000e-003	0.0000	174.1524
Worker	0.0305	0.0192	0.2146	7.1000e-004	0.0888	5.4000e-004	0.0894	0.0236	5.0000e-004	0.0241	0.0000	63.8289	63.8289	1.3900e-003	0.0000	63.8637
Total	**0.0403**	**0.3671**	**0.2935**	**2.5100e-003**	**0.1315**	**1.1400e-003**	**0.1326**	**0.0353**	**1.0800e-003**	**0.0364**	**0.0000**	**237.7687**	**237.7687**	**9.8900e-003**	**0.0000**	**238.0161**

3.20 6d Converter Station - Structures - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.6208	0.8993	1.5700e-003		0.0190	0.0190		0.0174	0.0174	0.0000	138.0770	138.0770	0.0447	0.0000	139.1934
Total	**0.0509**	**0.6208**	**0.8993**	**1.5700e-003**		**0.0190**	**0.0190**		**0.0174**	**0.0174**	**0.0000**	**138.0770**	**138.0770**	**0.0447**	**0.0000**	**139.1934**

3.20 6d Converter Station - Structures - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6300e-003	0.0927	0.0213	4.8000e-004	0.0115	1.6000e-004	0.0117	3.1700e-003	1.5000e-004	3.3200e-003	0.0000	46.7466	46.7466	2.2900e-003	0.0000	46.8039
Worker	7.8000e-003	4.7300e-003	0.0538	1.8000e-004	0.0240	1.4000e-004	0.0241	6.3700e-003	1.3000e-004	6.5000e-003	0.0000	16.6188	16.6188	3.4000e-004	0.0000	16.6274
Total	**0.0104**	**0.0974**	**0.0751**	**6.6000e-004**	**0.0355**	**3.0000e-004**	**0.0358**	**9.5400e-003**	**2.8000e-004**	**9.8200e-003**	**0.0000**	**63.3654**	**63.3654**	**2.6300e-003**	**0.0000**	**63.4312**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0509	0.6208	0.8993	1.5700e-003		0.0190	0.0190		0.0174	0.0174	0.0000	138.0768	138.0768	0.0447	0.0000	139.1932
Total	**0.0509**	**0.6208**	**0.8993**	**1.5700e-003**		**0.0190**	**0.0190**		**0.0174**	**0.0174**	**0.0000**	**138.0768**	**138.0768**	**0.0447**	**0.0000**	**139.1932**

3.20 6d Converter Station - Structures - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6300e-003	0.0927	0.0213	4.8000e-004	0.0115	1.6000e-004	0.0117	3.1700e-003	1.5000e-004	3.3200e-003	0.0000	46.7466	46.7466	2.2900e-003	0.0000	46.8039
Worker	7.8000e-003	4.7300e-003	0.0538	1.8000e-004	0.0240	1.4000e-004	0.0241	6.3700e-003	1.3000e-004	6.5000e-003	0.0000	16.6188	16.6188	3.4000e-004	0.0000	16.6274
Total	**0.0104**	**0.0974**	**0.0751**	**6.6000e-004**	**0.0355**	**3.0000e-004**	**0.0358**	**9.5400e-003**	**2.8000e-004**	**9.8200e-003**	**0.0000**	**63.3654**	**63.3654**	**2.6300e-003**	**0.0000**	**63.4312**

3.21 6e Converter Station - Gen. Construciton - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2362	2.0206	1.5988	4.5800e-003		0.0844	0.0844		0.0777	0.0777	0.0000	401.8625	401.8625	0.1300	0.0000	405.1117
Total	**0.2362**	**2.0206**	**1.5988**	**4.5800e-003**		**0.0844**	**0.0844**		**0.0777**	**0.0777**	**0.0000**	**401.8625**	**401.8625**	**0.1300**	**0.0000**	**405.1117**

3.21 6e Converter Station - Gen. Construciton - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0197	0.0124	0.1385	4.6000e-004	0.0573	3.5000e-004	0.0577	0.0152	3.2000e-004	0.0155	0.0000	41.1799	41.1799	9.0000e-004	0.0000	41.2024
Total	**0.0197**	**0.0124**	**0.1385**	**4.6000e-004**	**0.0573**	**3.5000e-004**	**0.0577**	**0.0152**	**3.2000e-004**	**0.0155**	**0.0000**	**41.1799**	**41.1799**	**9.0000e-004**	**0.0000**	**41.2024**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2362	2.0206	1.5988	4.5800e-003		0.0844	0.0844		0.0777	0.0777	0.0000	401.8620	401.8620	0.1300	0.0000	405.1113
Total	**0.2362**	**2.0206**	**1.5988**	**4.5800e-003**		**0.0844**	**0.0844**		**0.0777**	**0.0777**	**0.0000**	**401.8620**	**401.8620**	**0.1300**	**0.0000**	**405.1113**

3.21 6e Converter Station - Gen. Construciton - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0197	0.0124	0.1385	4.6000e-004	0.0573	3.5000e-004	0.0577	0.0152	3.2000e-004	0.0155	0.0000	41.1799	41.1799	9.0000e-004	0.0000	41.2024
Total	**0.0197**	**0.0124**	**0.1385**	**4.6000e-004**	**0.0573**	**3.5000e-004**	**0.0577**	**0.0152**	**3.2000e-004**	**0.0155**	**0.0000**	**41.1799**	**41.1799**	**9.0000e-004**	**0.0000**	**41.2024**

3.22 6f Transformer Delivery - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9300e-003	0.0732	0.1059	1.6000e-004		3.7800e-003	3.7800e-003		3.4800e-003	3.4800e-003	0.0000	14.3912	14.3912	4.6500e-003	0.0000	14.5075
Total	**7.9300e-003**	**0.0732**	**0.1059**	**1.6000e-004**		**3.7800e-003**	**3.7800e-003**		**3.4800e-003**	**3.4800e-003**	**0.0000**	**14.3912**	**14.3912**	**4.6500e-003**	**0.0000**	**14.5075**

3.22 6f Transformer Delivery - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1800e-003	0.0549	8.5900e-003	1.8000e-004	3.0200e-003	5.0000e-005	3.0600e-003	8.3000e-004	4.0000e-005	8.7000e-004	0.0000	16.9698	16.9698	1.3100e-003	0.0000	17.0026
Worker	1.6300e-003	1.0200e-003	0.0115	4.0000e-005	4.7400e-003	3.0000e-005	4.7700e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.4102	3.4102	7.0000e-005	0.0000	3.4121
Total	**2.8100e-003**	**0.0559**	**0.0201**	**2.2000e-004**	**7.7600e-003**	**8.0000e-005**	**7.8300e-003**	**2.0900e-003**	**7.0000e-005**	**2.1600e-003**	**0.0000**	**20.3800**	**20.3800**	**1.3800e-003**	**0.0000**	**20.4147**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9300e-003	0.0732	0.1059	1.6000e-004		3.7800e-003	3.7800e-003		3.4800e-003	3.4800e-003	0.0000	14.3912	14.3912	4.6500e-003	0.0000	14.5075
Total	**7.9300e-003**	**0.0732**	**0.1059**	**1.6000e-004**		**3.7800e-003**	**3.7800e-003**		**3.4800e-003**	**3.4800e-003**	**0.0000**	**14.3912**	**14.3912**	**4.6500e-003**	**0.0000**	**14.5075**

3.22 6f Transformer Delivery - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1800e-003	0.0549	8.5900e-003	1.8000e-004	3.0200e-003	5.0000e-005	3.0600e-003	8.3000e-004	4.0000e-005	8.7000e-004	0.0000	16.9698	16.9698	1.3100e-003	0.0000	17.0026
Worker	1.6300e-003	1.0200e-003	0.0115	4.0000e-005	4.7400e-003	3.0000e-005	4.7700e-003	1.2600e-003	3.0000e-005	1.2900e-003	0.0000	3.4102	3.4102	7.0000e-005	0.0000	3.4121
Total	**2.8100e-003**	**0.0559**	**0.0201**	**2.2000e-004**	**7.7600e-003**	**8.0000e-005**	**7.8300e-003**	**2.0900e-003**	**7.0000e-005**	**2.1600e-003**	**0.0000**	**20.3800**	**20.3800**	**1.3800e-003**	**0.0000**	**20.4147**

3.22 6f Transformer Delivery - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.7800e-003	0.0718	0.1039	1.6000e-004		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	14.1197	14.1197	4.5700e-003	0.0000	14.2338
Total	**7.7800e-003**	**0.0718**	**0.1039**	**1.6000e-004**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**14.1197**	**14.1197**	**4.5700e-003**	**0.0000**	**14.2338**

3.22 6f Transformer Delivery - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1500e-003	0.0534	8.3800e-003	1.7000e-004	2.9600e-003	5.0000e-005	3.0100e-003	8.1000e-004	4.0000e-005	8.6000e-004	0.0000	16.5351	16.5351	1.2800e-003	0.0000	16.5671
Worker	1.5100e-003	9.2000e-004	0.0105	4.0000e-005	4.6600e-003	3.0000e-005	4.6800e-003	1.2400e-003	3.0000e-005	1.2600e-003	0.0000	3.2245	3.2245	7.0000e-005	0.0000	3.2262
Total	**2.6600e-003**	**0.0543**	**0.0188**	**2.1000e-004**	**7.6200e-003**	**8.0000e-005**	**7.6900e-003**	**2.0500e-003**	**7.0000e-005**	**2.1200e-003**	**0.0000**	**19.7596**	**19.7596**	**1.3500e-003**	**0.0000**	**19.7933**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.7800e-003	0.0718	0.1039	1.6000e-004		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	14.1196	14.1196	4.5700e-003	0.0000	14.2338
Total	**7.7800e-003**	**0.0718**	**0.1039**	**1.6000e-004**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**14.1196**	**14.1196**	**4.5700e-003**	**0.0000**	**14.2338**

3.22 6f Transformer Delivery - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1500e-003	0.0534	8.3800e-003	1.7000e-004	2.9600e-003	5.0000e-005	3.0100e-003	8.1000e-004	4.0000e-005	8.6000e-004	0.0000	16.5351	16.5351	1.2800e-003	0.0000	16.5671
Worker	1.5100e-003	9.2000e-004	0.0105	4.0000e-005	4.6600e-003	3.0000e-005	4.6800e-003	1.2400e-003	3.0000e-005	1.2600e-003	0.0000	3.2245	3.2245	7.0000e-005	0.0000	3.2262
Total	**2.6600e-003**	**0.0543**	**0.0188**	**2.1000e-004**	**7.6200e-003**	**8.0000e-005**	**7.6900e-003**	**2.0500e-003**	**7.0000e-005**	**2.1200e-003**	**0.0000**	**19.7596**	**19.7596**	**1.3500e-003**	**0.0000**	**19.7933**

3.23 7 Decommissioning - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0554	0.0000	0.0554	8.3900e-003	0.0000	8.3900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1881	1.6426	2.3449	4.5600e-003		0.0672	0.0672		0.0623	0.0623	0.0000	393.6493	393.6493	0.1230	0.0000	396.7249
Total	**0.1881**	**1.6426**	**2.3449**	**4.5600e-003**	**0.0554**	**0.0672**	**0.1227**	**8.3900e-003**	**0.0623**	**0.0707**	**0.0000**	**393.6493**	**393.6493**	**0.1230**	**0.0000**	**396.7249**

3.23 7 Decommissioning - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0700e-003	0.2357	0.0690	1.6300e-003	0.1762	5.8000e-004	0.1768	0.0445	5.5000e-004	0.0451	0.0000	157.4281	157.4281	6.0600e-003	0.0000	157.5797
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0138	8.0800e-003	0.0936	3.3000e-004	0.0448	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121	0.0000	29.9756	29.9756	5.8000e-004	0.0000	29.9901
Total	**0.0218**	**0.2438**	**0.1626**	**1.9600e-003**	**0.2210**	**8.3000e-004**	**0.2218**	**0.0564**	**7.8000e-004**	**0.0572**	**0.0000**	**187.4036**	**187.4036**	**6.6400e-003**	**0.0000**	**187.5697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0216	0.0000	0.0216	3.2700e-003	0.0000	3.2700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1881	1.6426	2.3449	4.5600e-003		0.0672	0.0672		0.0623	0.0623	0.0000	393.6489	393.6489	0.1230	0.0000	396.7244
Total	**0.1881**	**1.6426**	**2.3449**	**4.5600e-003**	**0.0216**	**0.0672**	**0.0889**	**3.2700e-003**	**0.0623**	**0.0656**	**0.0000**	**393.6489**	**393.6489**	**0.1230**	**0.0000**	**396.7244**

3.23 7 Decommissioning - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0700e-003	0.2357	0.0690	1.6300e-003	0.1762	5.8000e-004	0.1768	0.0445	5.5000e-004	0.0451	0.0000	157.4281	157.4281	6.0600e-003	0.0000	157.5797
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0138	8.0800e-003	0.0936	3.3000e-004	0.0448	2.5000e-004	0.0450	0.0119	2.3000e-004	0.0121	0.0000	29.9756	29.9756	5.8000e-004	0.0000	29.9901
Total	**0.0218**	**0.2438**	**0.1626**	**1.9600e-003**	**0.2210**	**8.3000e-004**	**0.2218**	**0.0564**	**7.8000e-004**	**0.0572**	**0.0000**	**187.4036**	**187.4036**	**6.6400e-003**	**0.0000**	**187.5697**

3.23 7 Decommissioning - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1153	0.0000	0.1153	0.0175	0.0000	0.0175	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3913	3.4165	4.8774	9.4900e-003		0.1398	0.1398		0.1297	0.1297	0.0000	818.7906	818.7906	0.2559	0.0000	825.1877
Total	**0.3913**	**3.4165**	**4.8774**	**9.4900e-003**	**0.1153**	**0.1398**	**0.2551**	**0.0175**	**0.1297**	**0.1471**	**0.0000**	**818.7906**	**818.7906**	**0.2559**	**0.0000**	**825.1877**

3.23 7 Decommissioning - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0167	0.4845	0.1437	3.3800e-003	0.1877	1.1900e-003	0.1889	0.0487	1.1400e-003	0.0498	0.0000	326.4208	326.4208	0.0126	0.0000	326.7351
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0270	0.0154	0.1822	6.7000e-004	0.0931	4.8000e-004	0.0936	0.0247	4.4000e-004	0.0252	0.0000	60.4687	60.4687	1.1100e-003	0.0000	60.4963
Total	**0.0437**	**0.5000**	**0.3258**	**4.0500e-003**	**0.2808**	**1.6700e-003**	**0.2825**	**0.0734**	**1.5800e-003**	**0.0750**	**0.0000**	**386.8894**	**386.8894**	**0.0137**	**0.0000**	**387.2315**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0450	0.0000	0.0450	6.8100e-003	0.0000	6.8100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3913	3.4165	4.8774	9.4900e-003		0.1398	0.1398		0.1297	0.1297	0.0000	818.7896	818.7896	0.2559	0.0000	825.1867
Total	**0.3913**	**3.4165**	**4.8774**	**9.4900e-003**	**0.0450**	**0.1398**	**0.1848**	**6.8100e-003**	**0.1297**	**0.1365**	**0.0000**	**818.7896**	**818.7896**	**0.2559**	**0.0000**	**825.1867**

3.23 7 Decommissioning - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0167	0.4845	0.1437	3.3800e-003	0.1877	1.1900e-003	0.1889	0.0487	1.1400e-003	0.0498	0.0000	326.4208	326.4208	0.0126	0.0000	326.7351
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0270	0.0154	0.1822	6.7000e-004	0.0931	4.8000e-004	0.0936	0.0247	4.4000e-004	0.0252	0.0000	60.4687	60.4687	1.1100e-003	0.0000	60.4963
Total	**0.0437**	**0.5000**	**0.3258**	**4.0500e-003**	**0.2808**	**1.6700e-003**	**0.2825**	**0.0734**	**1.5800e-003**	**0.0750**	**0.0000**	**386.8894**	**386.8894**	**0.0137**	**0.0000**	**387.2315**

3.23 7 Decommissioning - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1131	0.0000	0.1131	0.0171	0.0000	0.0171	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3838	3.3508	4.7836	9.3100e-003		0.1371	0.1371		0.1272	0.1272	0.0000	803.0446	803.0446	0.2510	0.0000	809.3187
Total	**0.3838**	**3.3508**	**4.7836**	**9.3100e-003**	**0.1131**	**0.1371**	**0.2502**	**0.0171**	**0.1272**	**0.1443**	**0.0000**	**803.0446**	**803.0446**	**0.2510**	**0.0000**	**809.3187**

3.23 7 Decommissioning - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.4698	0.1409	3.3000e-003	0.1873	1.1600e-003	0.1884	0.0485	1.1100e-003	0.0496	0.0000	319.2487	319.2487	0.0123	0.0000	319.5561
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0247	0.0139	0.1668	6.4000e-004	0.0913	4.4000e-004	0.0918	0.0243	4.0000e-004	0.0247	0.0000	57.6809	57.6809	9.9000e-004	0.0000	57.7056
Total	**0.0410**	**0.4836**	**0.3077**	**3.9400e-003**	**0.2786**	**1.6000e-003**	**0.2802**	**0.0728**	**1.5100e-003**	**0.0743**	**0.0000**	**376.9296**	**376.9296**	**0.0133**	**0.0000**	**377.2617**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0441	0.0000	0.0441	6.6800e-003	0.0000	6.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3838	3.3508	4.7836	9.3100e-003		0.1371	0.1371		0.1272	0.1272	0.0000	803.0437	803.0437	0.2510	0.0000	809.3177
Total	**0.3838**	**3.3508**	**4.7836**	**9.3100e-003**	**0.0441**	**0.1371**	**0.1812**	**6.6800e-003**	**0.1272**	**0.1339**	**0.0000**	**803.0437**	**803.0437**	**0.2510**	**0.0000**	**809.3177**

3.23 7 Decommissioning - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.4698	0.1409	3.3000e-003	0.1873	1.1600e-003	0.1884	0.0485	1.1100e-003	0.0496	0.0000	319.2487	319.2487	0.0123	0.0000	319.5561
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0247	0.0139	0.1668	6.4000e-004	0.0913	4.4000e-004	0.0918	0.0243	4.0000e-004	0.0247	0.0000	57.6809	57.6809	9.9000e-004	0.0000	57.7056
Total	**0.0410**	**0.4836**	**0.3077**	**3.9400e-003**	**0.2786**	**1.6000e-003**	**0.2802**	**0.0728**	**1.5100e-003**	**0.0743**	**0.0000**	**376.9296**	**376.9296**	**0.0133**	**0.0000**	**377.2617**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Industrial	0.568260	0.033614	0.184668	0.102877	0.010818	0.004253	0.018932	0.067054	0.001372	0.001348	0.005404	0.000777	0.000623

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	8.3828	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.9181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.4647					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.9181					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	6.4647					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**8.3828**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX F

NOISE AND VIBRATION IMPACTS ASSESSMENT

taha
environmental planners

Technical Memorandum

TO: Kim Quinn
Power Engineers

FROM: Terry A. Hayes Associates Inc.

DATE: January 6, 2021

RE: Adelanto Switching Station Expansion Project – Noise and Vibration Assessment

INTRODUCTION

Terry A. Hayes Associates Inc. (TAHA) has completed a Noise and Vibration Assessment for the Adelanto Switching Station Expansion Project (proposed Project) in accordance with the provisions of the California Environmental Quality Act (CEQA) Statutes and Guidelines. This Assessment is organized as follows:

- Introduction
- Project Description
- Noise and Vibration Topical Information
- Regulatory Framework
- Significance Thresholds and Local Standards
- Existing Setting
- Impact Assessment
- References

PROJECT DESCRIPTION

The Los Angeles Department of Water and Power (LADWP) proposes the expansion of the Adelanto Switching Station located in the City of Adelanto in San Bernardino County. The expansion would occur within the existing approximately 315-acre fenced Adelanto property, owned by LADWP and the Intermountain Power Agency, a political subdivision of the State of Utah. As part of the proposed Project, a new converter station will be built adjacent to the existing converter station in order to upgrade and replace aging infrastructure. The switching station will also be expanded to accommodate the new converter station and associated equipment. In addition, other components include: transmission line relocation, construction of new towers, site preparation, and demolition of existing structures. The proposed Project is needed to upgrade and replace aging infrastructure and to allow LADWP greater control in managing the energy transfer along the existing high voltage transmission lines and improve long-term reliability. The regional location of the proposed Project is shown in **Figure 1** and the local location is shown in **Figure 2**.

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3535 Hayden Avenue, Suite 350
Culver City, California 90232
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Source: TAHA, 2021.

taha environmental planners

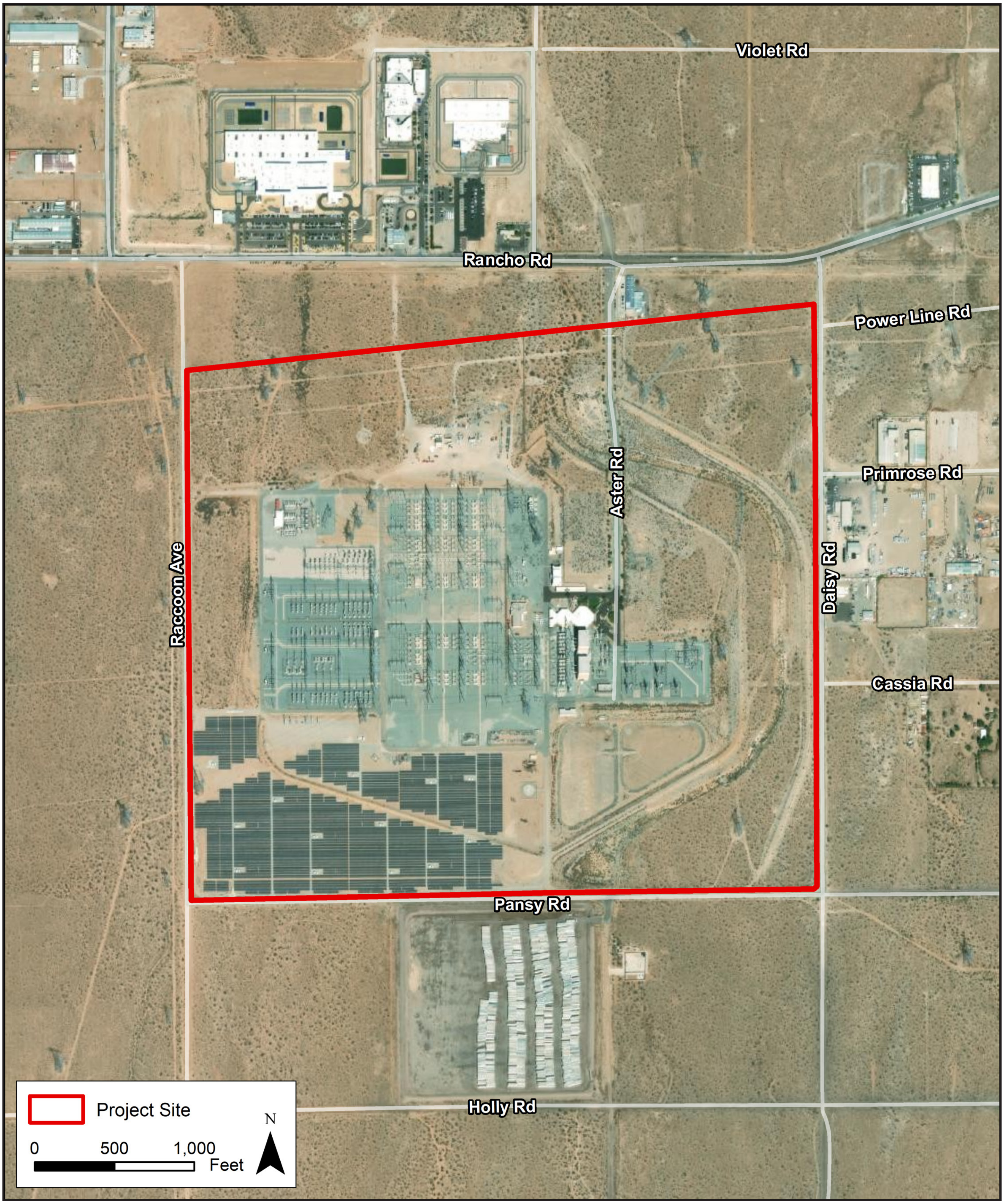
TAHA 2020-032

Adelanto Switching Station Expansion Project
Noise and Vibration Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 1

REGIONAL PROJECT LOCATION



Source: TAHA, 2021.

taha environmental planners

TAHA 2020-032

Adelanto Switching Station Expansion Project
Noise and Vibration Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 2

PROJECT SITE

Construction of the proposed Project is anticipated to take approximately seven years to complete. Project construction activities are expected to occur Monday through Saturday, from 7:00 a.m. to 6:00 p.m. It is not anticipated that nighttime, Sunday or holiday work would occur regularly; however, the work schedule may be modified throughout the year based on electrical system conditions and to account for the changing weather conditions (e.g., starting or ending the workday earlier in summer months to avoid work during the hottest part of the day for health and safety reasons).

It is anticipated that an average of eight crews will be working on-site with each crew consisting of four to six people. Construction of the proposed Project would include, but may not be limited to, graders and excavators, backhoes, drill rigs, water trucks, bob cat, scrapers, sheep's foot compactors, front end loaders, concrete trucks and pumps, dump trucks, trash trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks may also be required. The proposed Project would not require the import or export of soil and all excavated material would be disposed of on-site.

NOISE AND VIBRATION TOPICAL INFORMATION

The standard unit of measurement for noise is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The A-weighted scale, abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA. The noise analysis discusses sound levels in terms of Equivalent Noise Level (L_{eq}). L_{eq} is the average noise level on an energy basis for any specific time period. The L_{eq} for one hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. L_{eq} can be thought of as the level of a continuous noise which has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.

Noise levels decrease as the distance from the noise source to the receiver increases. Noise generated by a stationary noise source, or "point source," decreases by approximately 6 dBA over hard surfaces (e.g., reflective surfaces such as parking lots or smooth bodies of water) and 7.5 dBA over soft surfaces (e.g., absorptive surfaces such as soft dirt, grass, or scattered bushes and trees) for each doubling of the distance. For example, if a noise source produces a noise level of 89 dBA at a reference distance of 50 feet, then the noise level is 83 dBA at a distance of 100 feet from the noise source, 77 dBA at a distance of 200 feet over a hard surface.

Noise generated by a mobile source decreases by approximately 3 dBA over hard surfaces and 4.8 dBA over soft surfaces for each doubling of the distance. Generally, noise is most audible when the source is in a direct line-of-sight of the receiver. Barriers, such as walls, berms, or buildings that break the line-of-sight between the source and the receiver greatly reduce noise levels from the source since sound can only reach the receiver by bending over the top of the barrier. However, if a barrier is not sufficiently high or long to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and may evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would likely cause a negative community reaction.

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as rock blasting, pile driving, and heavy earth-moving equipment. High levels of vibration may cause physical personal injury or damage to buildings. However, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of vibration may damage fragile buildings or interfere with equipment that is highly sensitive to vibration (e.g., electron microscopes).

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The VdB acts to compress the range of numbers required to describe vibration.[1]

REGULATORY FRAMEWORK

Noise

Federal. The Noise Control Act of 1972 established programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In 1981, the United States Environmental Protection Agency (USEPA) determined that subjective issues such as noise would be better addressed at local levels of government, thereby allowing more individualized control for specific issues by designated federal, state, and local government agencies. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to specific federal agencies, and state and local governments. However, noise control guidelines and regulations contained in the USEPA rulings in prior years remain in place.

State. The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. State regulations governing noise levels generated by individual motor vehicles and occupational noise control are not applicable to planning efforts, nor are these areas typically subject to CEQA analysis.

Local. The City of Adelanto has established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses. Regarding construction, City of Adelanto Municipal Code (AMC) Section 17.90.020(c) exempt construction noise from the regulations of the noise ordinance as long as they are in compliance with Section 17.90.020(d). Construction practices related to noise include:

- Construction activity and equipment maintenance is limited to the hours between 7:00 a.m. to dusk on weekdays. Construction may not occur on weekends or State holidays, without prior consent of the Building Official. Non-noise generating activities (e.g. interior painting) are not subject to these restrictions. City and State construction projects, such as road re-building or resurfacing, and any construction activity that is in response to an emergency, shall be exempt from this requirement.
- Stationary construction equipment that generates noise in excess of sixty-five (65) dBA at the project boundaries must be acoustically shielded and located at least one hundred feet (100') from occupied residences. The equipment area with appropriate acoustic shielding shall be designated on building

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[1]Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, September 2018.

and grading plans. Equipment and shielding shall remain in the designated location throughout construction activities.
- Construction routes are limited to City of Adelanto designated truck routes.
- All grading equipment shall be kept in good working order per factory specifications.

AMC Section 17.90.020(c) also exempts construction, operation, maintenance and repairs of equipment related to utilities subject to the regulatory jurisdiction of the California Public Utilities Commission (CPUC).

AMC Section 17.90.020(b) states that the the noise standards contained in Table VIII-2, "Land Use Compatibility Guidelines Related to Noise Exposure" in the Noise Element of the General Plan shall apply to land uses city-wide and shall be used to define acceptable and unacceptable noise levels. The noise standard plus three (3) dBA for that receiving land use specified in Table VIII-2 of the General Plan Noise Element (shown in **Table 1**) for a cumulative period of more than thirty (30) minutes in any hour; or the noise standard plus five (5) dBA for a cumulative period of more than five (5) minutes in any hour; the noise standard plus ten (10) dBA for a cumulative period of more than three (3) minutes in any hour; the noise standard plus fifteen (15) dBA for a cumulative period of more than one (1) minute in any hour; or the noise standard plus twenty (20) dBA for any period of time.

TABLE 1: LAND USE COMPATIBILITY GUIDELINES RELATED TO NOISE EXPOSURE

	Noise Level (dB, CNEL)		
Land Use	**65-70**	**70-75**	**75 & Above**
Residential other than mobile homes/transient lodging	NLR required	NLR required	Incompatible
Mobile Home Parks	Incompatible	Incompatible	Incompatible
Transient Lodgings	NLR required	NLR required	Incompatible

CNEL: Community Noise Equivalent Level
NLR: Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitat interior spaces to 45 dB CNEL.
Incompatible: Generally, the land use is considered to be incompatible with outdoor noise exposure, even if special attenuating materials were to be used in the construction of the building.
SOURCE: City of Adelanto General Plan, *Noise Element*, 1993.

If the measured ambient level exceeds any of the first four categories, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels shall be reduced by five (5) dBA.

AMC Section 17.90.060 (Mechanical and Electrical Equipment) states that all such equipment, including air conditioners, antennas, pumps, transformers, and heating and ventilating equipment, shall be located and operated in a manner that does not disturb adjacent uses and activities.

Vibration

The City has established a significance threshold related to vibration. AMC Section 17.90.030 regulates vibration within the City and states that no ground vibration shall be permitted which can be felt without the aid of instruments at or beyond the property line, nor will any vibration be permitted which produces a particle velocity greater than or equal to 0.2 inches per second measure at or beyond the lot line.

SIGNIFICANCE THRESHOLDS AND LOCAL STANDARDS

Noise

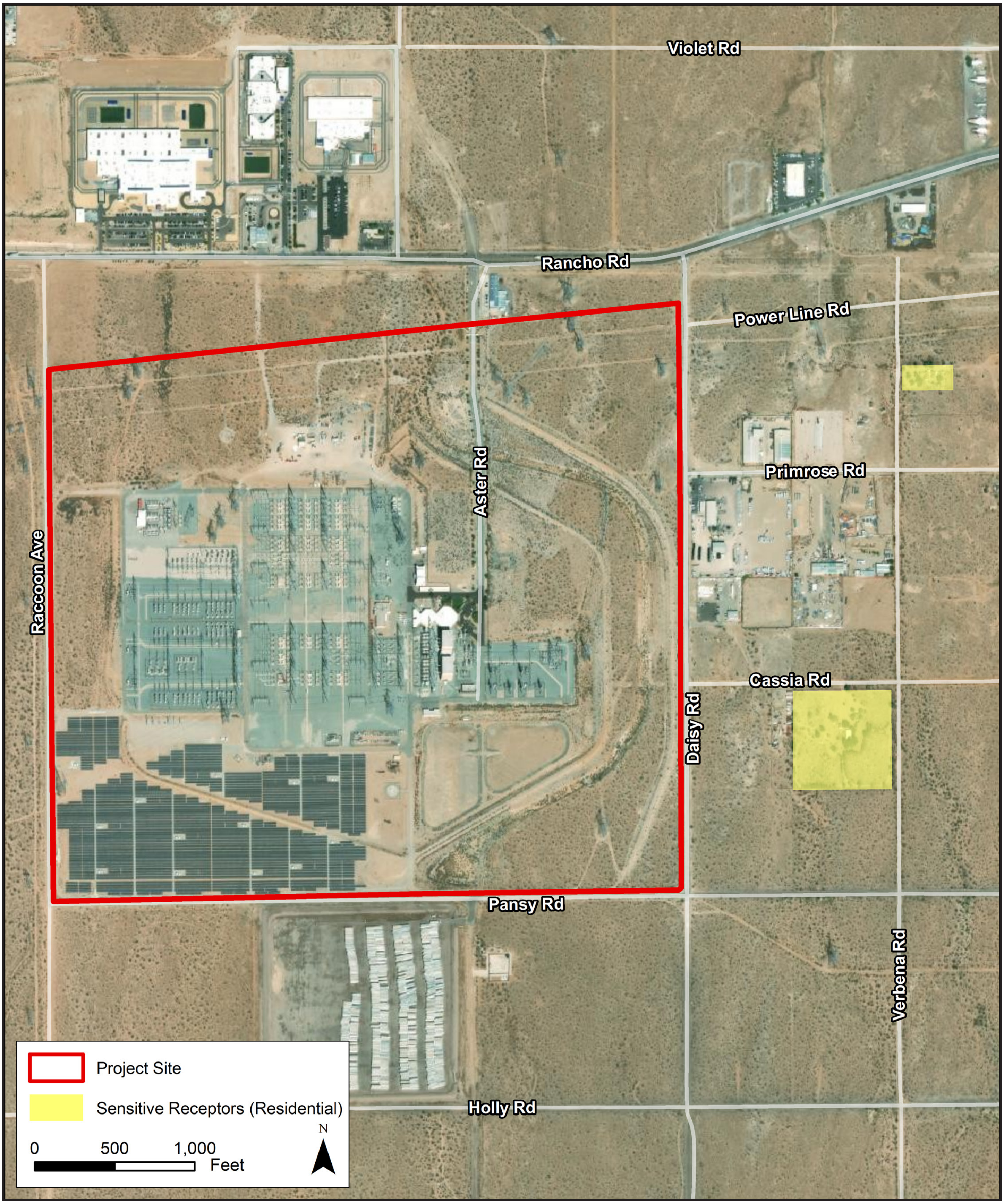
This Assessment was undertaken to determine whether construction or operation of the proposed Project would have the potential to result in significant environmental impacts related to noise or vibration in the context of the Appendix G Environmental Checklist criteria of the CEQA Guidelines. Implementation of the proposed Project may result in a significant environmental impact related to noise and vibration if the proposed Project would result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
b) Generation of excessive ground-borne vibration or ground-borne noise levels; and/or
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

The proposed Project would exceed the local standards and substantially increase temporary construction noise levels if construction activities would occur outside the hours allowed in the AMC. The allowable hours of construction in the AMC include 7:00 a.m. to dusk Monday through Friday. A significant stationary noise impact would occur if construction equipment generates noise in excess of 65 dBA at the site boundary and is located within 100 feet of occupied residences. Additionally, an increase of 5 dBA or more above the ambient noise level is considered a significant impact, as this is the incremental increase in noise at which Project noise may be become audible and disruptive. For other permanent operational noise, a significant impact would result if the proposed Project would increase noise levels at sensitive receptors by 3 dBA for the noise standards shown in **Table 1**. A construction vibration impact would occur if vibration equipment produces a particle velocity greater than or equal to 0.2 inches per second measure at or beyond the lot line.

EXISTING SETTING

The proposed Project site is located in a rural environment with few substantial sources of noise. It is anticipated that audible noise includes occasional traffic, aircraft flyovers, and existing helipad noise. The nearest sensitive receptors are two residences located approximately 1,000 feet to the southeast and 1,500 feet to the northeast of the site boundary. TAHA completed noise measurements in a similar rural environment for the LADWP Fairmont Treatment Plant Project. Those noise measurements indicate that rural noise levels typically range from 47.7 to 55.1 dBA L_{eq}. Sensitive receptors are shown in **Figure 3**.



Source: TAHA, 2021.

taha environmental planners
TAHA 2020-032

Adelanto Switching Station Expansion Project
Noise and Vibration Impacts Assessment

POWER ENGINEERS, INC.

FIGURE 3

NOISE SENSITIVE RECEPTORS

IMPACT ASSESSMENT

a) Would the proposed Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? (Less-than-Significant Impact with Mitigation Incorporated)

Construction

Noise impacts from construction of the proposed Project would fluctuate depending on the construction phase, equipment type and duration of use, distance between the noise source and receptor, and presence or absence of noise attenuation barriers. Construction activities typically require the use of numerous pieces of noise-generating equipment. Typical noise levels from various types of equipment that would be used during construction are listed in **Table 2**. Noise levels from individual pieces of equipment typically are between 67.7 and 94.3 dBA L_{eq} at 50 feet. **Table 3** takes into account that multiple pieces of construction equipment would be operating simultaneously. When considered as an entire process with multiple pieces of equipment, construction activity (i.e., ground clearing and site preparation) would generate noise levels between 78 and 89 dBA L_{eq} at 50 feet.

TABLE 2: NOISE LEVEL RANGES OF TYPICAL CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level at 50 feet (dBA)
Auger Drill Rig	77.4
Backhoe	73.6
Compressor (Air)	73.7
Concrete Mixer truck	74.8
Concrete Pump Truck	74.4
Crane	72.6
Dozer	77.7
Dump Truck	72.5
Excavator	76.7
Flat Bed Truck	70.3
Front End Loader	75.1
Gradall	79.4
Grader	81.0
Impact Pile Driver	94.3
Jackhammer	81.9
Man Lift	67.7
Pickup Truck	71.0
Roller	73.0

SOURCE: Federal Highway Administration, *Roadway Construction Noise Model*, Version 1.1, 2008.

Table 3 takes into account that multiple pieces of construction equipment would be operating simultaneously. When considered as an entire process with multiple pieces of equipment, construction activity (i.e., foundations and site preparation) would generate noise levels between 78 and 89 dBA L_{eq} at 50 feet.

TABLE 3: TYPICAL OUTDOOR CONSTRUCTION NOISE LEVELS	
Construction Method	**Noise Level at 50 feet (dBA, L_{eq})**
Ground Clearing	84
Site Preparation	89
Foundations	78
Structural	85
Finishing	89
SOURCE: USEPA, *Noise from Construction Equipment and Operations, Building Equipment and Home Appliances*, PB 206717, 1971.	

Construction activity would occur over approximately seven years with some overlapping construction. The analysis considers the closest construction activity that would occur as a conservative scenario. As construction occurs further interior to the site construction noise levels would be decreased. **Table 4** presents the estimated noise levels at the sensitive receptors nearest to the site for informational purposes. Construction noise related to typical use of construction equipment would result in a maximum increase of 1.1 dBA. For a noise increase to be audible and disruptive, typically the noise level must be 5 dBA above ambient. As construction noise would result in a less than 5 dBA increase, it is unlikely to result in a significant impact at nearby residences.

TABLE 4: TYPICAL CONSTRUCTION NOISE LEVELS AT RECEPTORS				
Sensitive Receptor	**Distance (feet) /a/**	**Existing Noise Level (dBA) /b/**	**Noise Level at Sensitive Receptor (dBA)**	**Increase (dBA)**
Residence to the northeast	1,800	51.0	50.1	Not Noticeable
Residence to the southeast	1,500	51.0	52.1	1.1
/a/ Distance to nearest construction activity. /b/ Based on measured rural noise levels. **SOURCE**: TAHA, 2021.				

Construction of the converter station would require the use of impact driven piles. Impact pile drivers generate a noise level of approximately 94.3 dBA L_{eq} at 50 feet, which is an elevated noise level compared to typical construction equipment. The converter station would be constructed in the center of the site and the analysis has been conducted based upon the distance of this activity to the nearest sensitive receptors. As shown in **Table 5**, pile driving activity would result in a maximum increase of 2.2 dBA. For a noise increase to be audible and disruptive, typically the noise level must be 5 dBA above ambient. As construction noise would result in a less than 5 dBA increase, it is unlikely to result in a significant impact at nearby residences.

TABLE 5: IMPACT PILE DRIVER CONSTRUCTION NOISE LEVELS AT RECEPTORS				
Sensitive Receptor	**Distance (feet) /a/**	**Existing Noise Level (dBA) /b/**	**Noise Level at Sensitive Receptor (dBA)**	**Increase (dBA)**
Residence to the northeast	3,500	51.0	48.2	Not Noticeable
Residence to the southeast	2,200	51.0	53.2	2.2
/a/ Distance to pile driving activity. /b/ Based on measured rural noise levels. **SOURCE**: TAHA, 2021.				

Early morning or nighttime construction may be required irregularly based on electrical system conditions and to account for the changing weather conditions (e.g., starting or ending the workday earlier in summer months to avoid work during the hottest part of the day for health and safety reasons). Early morning and nighttime construction would be most similar to typical construction noise. Ambient noise levels are often quitter than daytime hours, therefore an existing noise level of 45 dBA has been used for the analysis. As shown in **Table 6**, early morning/nighttime noise may result in increase of 5 dBA or more over the early morning/nighttime ambient noise level.

TABLE 6: EARLY MORNING/NIGHTIME CONSTRUCTION NOISE LEVELS AT RECEPTORS

Sensitive Receptor	Distance (feet) /a/	Existing Noise Level (dBA) /b/	Noise Level at Sensitive Receptor (dBA)	Increase (dBA)
Residence to the northeast	1,800	45.0	50.1	5.1
Residence to the southeast	1,500	45.0	52.1	7.1

/a/ Distance to construction activity.
/b/ Based on measured rural noise levels.
SOURCE: TAHA, 2021

The impact analysis is based on the regulations of the AMC. Construction activities would occur Monday through Saturday, and workers would typically be on-site for ten hours per day. For construction activities occurring on Saturdays and after dusk, LADWP would seek approval from the City of Adelanto Building Official, which would be in compliance with the AMC. Nonetheless, early morning and nighttime construction noise may result in increase of 5 dBA or more over the ambient noise level. Therefore, impacts related to on-site construction noise would be potentially significant.

Operations

Operational sources of noise would include helicopter noise, mechanical equipment and periodic maintenance activities. The proposed Project would relocate the existing helipad approximately 1,700 feet to the northeast on the site. Helicopter flight paths would not be significantly different from current flight paths and helicopter noise is not anticipated to be significantly different that of existing helicopter noise. On-site operational noise related to mechanical equipment would be limited to low humming sounds from equipment, which would not be audible past the site boundary. Noise generated at the site would not be audible at the nearest residence, which is approximately 1,000 feet away from the site boundary. Therefore, the proposed Project would result in a less-than-significant impact related to operational noise.

Mitigation Measures

N1 The use of heavy equipment and impact pile driving activities shall be prohibited before 7:00 a.m. and after dusk (approximately 5:30 p.m. during winter months and 6:30 p.m. during summer months)

Significance After Mitigation

Implementation of Mitigation Measure **N1** would reduce noise levels by limiting heavy equipment use and pile driving before 7:00 a.m. or after dusk. This would limit exposure of sensitive receptors to elevated noise levels during the more sensitive early morning and nighttime hours. After mitigation, early morning/nighttime construction noise levels would be most similar to structural work, which has a reference noise level of approximately 85 dBA L_{eq} at 50 feet. As shown in **Table 7**, the maximum increase would be 3.1 dBA, which would be less than 5 dBA. Therefore, with mitigation, the proposed Project would result in a less-than-significant impact related to on-site construction noise.

TABLE 7: MITIGATED EARLY MORNING/NIGHTIME CONSTRUCTION NOISE LEVELS AT RECEPTORS				
Sensitive Receptor	**Distance (feet) /a/**	**Existing Noise Level (dBA) /b/**	**Noise Level at Sensitive Receptor (dBA)**	**Increase (dBA)**
Residence to the northeast	1,800	45.0	46.1	1.1
Residence to the southeast	1,500	45.0	48.1	3.1

/a/ Distance to construction activity.
/b/ Based on measured rural noise levels.
SOURCE: TAHA, 2021

b) Would the proposed Project result in generation of excessive ground-borne vibration or ground-borne noise levels? (Less-than-Significant Impact)

Construction

Construction activity can generate varying degrees of vibration, depending on the procedure and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, and to slight damage at the highest levels. In most cases, the primary concern regarding construction vibration relates to damage. AMC Section 17.90.030 regulates vibration within the City and states that no ground vibration shall be permitted which can be felt without the aid of instruments at or beyond the property line, nor will any vibration be permitted which produces a particle velocity greater than or equal to 0.2 inches per second measure at or beyond the lot line.

The FTA provides vibration levels for various types of construction equipment with an average source level reported in terms of velocity.[2] Typical equipment anticipated to be used during construction and their associated vibration levels are shown in **Table 8**. The most vibration intensive equipment that would be utilized at the converter station site would be an impact pile driver. Pile driving generates a vibration level of 1.518 inches per second at 25 feet in the upper range of activity and 0.644 inches per second more typically. Typical construction would utilize equipment similar to a large bulldozer, which generates a vibration level of 0.089 inches per second. As shown in **Table 9**, the 0.2 inches per second perception threshold would not be exceeded at any property line of the site. Therefore, the proposed Project would result in a less-than-significant impact related to on-site construction vibration.

[2]Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, September 2018.

TABLE 8: VIBRATION LEVELS FOR CONSTRUCTION EQUIPMENT		
Equipment		**Vibration Level at 25 feet (Inches/Second)**
Impact Pile Driver	Upper Range	1.518
	Typical	0.644
Caisson Drilling		0.089
Loaded Trucks		0.076
Large Bulldozer		0.089
Small Bulldozer		0.003
SOURCE: FTA, *Transit Noise and Vibration Impact Assessment*, September 2018.		

TABLE 9: VIBRATION LEVELS AT PROPERTY LINE			
Activity	**Distance (feet) /a/**	**Reference Vibration Level (Inches/Second)**	**Vibration Level at Property Line (Inches/Second)**
Impact Pile Driver (Upper Range)	800	1.518	0.008
Large Bulldozer	100	0.089	0.011
/a/ Distance to nearest property line. **SOURCE**: TAHA, 2021			

Operations

The proposed Project would not include significant operational sources of vibration. Mechanical equipment and associated maintenance activities would not generate perceptible vibration beyond the site. Therefore, the proposed Project would result in a less-than-significant impact related to operational vibration. No mitigation measures would be necessary.

Mitigation Measures

No significant impacts have been identified related to construction or operational vibration. Therefore, no mitigation measures are required.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed Project expose people residing or working in the project area to excessive noise levels? (No Impact)

The site is not located within two miles of a public airport or private airstrip. The proposed Project is located within the Detailed Land Use Planning Area of the Southern California Logistics Airport, but is located outside of the airport's noise contours.[3] Therefore, no impact related to airport or airstrip noise would occur.

Mitigation Measures

No significant impacts have been identified related to the proposed Project. Therefore, no mitigation measures are required.

[3] Southern California Logistics Airport, *Comprehensive Land Use Plan*, September 2008.

REFERENCES

California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

City of Adelanto General Plan, *Noise Element*, November 1993.

City of Adelanto Municipal Code, *Section 17.90.020(b)*, *Noise Standards*, September 9, 2020.

City of Adelanto Municipal Code, *Section 17.90.020(c), Exempt Noises*, September 9, 2020.

City of Adelanto Municipal Code, *Section 17.90.020(d)*, *Construction Practices*, September 9, 2020.

City of Adelanto Municipal Code, *Section 17.90.030, Vibration*, September 9, 2020.

City of Adelanto Municipal Code, *Section 17.90.060, Mechanical and Electrical Equipment*, September 9, 2020.

Federal Highway Administration, *Roadway Construction Noise Model*, Version 1.1, 2008.

Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, September 2018.

Southern California Logistics Airport, *Comprehensive Land Use Plan*, September 2008

Appendix

Noise Formulas

Noise Distance Attenuation

Soft Site

Equation: Ni = No - 25(log Di/Do)

Di = distance to receptor (Di>Do)

Ni = attenuated noise level of interest

Do = reference distance

No = reference noise level

Summation of Noise Levels

Equation: Ns=10 x LOG10((10^(N1/10))+(10^(N2/10))+(10^(N3/10))+(10^(N4/10)))

Ns = Noise Level Sum
N1 = Noise Level 1
N2 = Noise Level 2
N3 = Noise Level 3
N4 = Noise Level 4

Source: California Department of Transportation, *Technical Noise Supplement* , 2013

Construction Noise Analysis

Typical Construction Activity					
Sensitive Receptor	**Distance (feet)**	**Reference Noise Level (dBA)**	**Max Construction Noise (dBA, Leq)**	**Existing Noise Level (dBA, Leq)**	**Increase**
Residences to the northeast	1800	89	50.1	51	-0.9
Residences to the south east	1500	89	52.1	51	1.1

Source: EPA. 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. PB 206717.

Impact Pile Driver Activity					
Sensitive Receptor	**Distance (feet)**	**Reference Noise Level (dBA)**	**Max Construction Noise (dBA, Leq)**	**Existing Noise Level (dBA, Leq)**	**Increase**
Residences to the northeast	3500	94.3	48.2	51	-2.8
Residences to the south east	2200	94.3	53.2	51	2.2

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2008.

Nightime Construction Activity					
Sensitive Receptor	**Distance (feet)**	**Reference Noise Level (dBA)**	**Max Construction Noise (dBA, Leq)**	**Existing Noise Level (dBA, Leq)**	**Increase**
Residences to the northeast	1800	89	50.1	45	5.1
Residences to the south east	1500	89	52.1	45	7.1

Source: EPA. 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. PB 206717.

Mitigated Nightime Construction Activity					
Sensitive Receptor	**Distance (feet)**	**Reference Noise Level (dBA)**	**Max Construction Noise (dBA, Leq)**	**Existing Noise Level (dBA, Leq)**	**Increase**
Residences to the northeast	1800	85	46.1	45	1.1
Residences to the south east	1500	85	48.1	45	3.1

Source: EPA. 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. PB 206717.

Vibration Formulas

Vibration PPV Attenuation

Equation: PPVequip = PPVref x (25/D)^1.5
PPV (equip) is the peak particle velocity in in/sec of the equipment adjusted for distance
PPV (ref) is the reference vibration level in in/sec at 25 feet from Table 12-2
D is the distance from the equipment to the receiver.

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

Vibration VdB Attenuation

Equation: Lv(D) = Lv(25 ft) – 30log(D/25)
D = Distance (feet)
Lv(D) = Vibration Level

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

Vibration Damage and Annoyance Analysis

Vibration Velocities for Construction Equipment		
Equipment	**PPV at 25 Feet (Inches/Second)**	**VdB at 25 feet (Micro-Inches/Second)**
Impact Pile Driver (Upper)	1.518	112
Impact Pile Driver (Typical)	0.644	104
Hoe Ram	0.089	87
Caisson Drilling	0.089	87
Jackhammer	0.035	79
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Small Bulldozer	0.003	58

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

Sensitive Receptor	**Distance (feet)**	**Vibration Level (Inches/Second)**
Pile Driving	800	0.008
Typical Construction	100	0.011

APPENDIX G

TRAFFIC STUDY

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LADWP

TRAFFIC STUDY FOR ADELANTO CONVERTER STATION

JANUARY 2021

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Rev 1 – JC01085

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Attachment

1. Introduction

This traffic study assesses the traffic impacts on the surrounding roadway system of construction activities for a proposed power distribution facility in the City of Adelanto in San Bernardino County. Constructing the facility will require a temporary working population and truck trips to deliver the materials and elements to and from the site. This study documents daily and peak period traffic generated by the project construction, along with the traffic's effects on local roadway congestion.

The study area focuses on eight roadway segments on major traffic arteries connecting the site with the surrounding community. The potential impacts of construction employee vehicle and delivery/haul truck trips on the roadway segments was analyzed.

A. Project Location

The proposed facility will be located near the intersection of Rancho Road and Raccoon Avenue, around 2.2 miles west of US Highway 395 in the City of Adelanto. The site is adjacent to an operating solar power plant. Delivery Trucks will travel between the site and a landfill facility in Rialto, CA via Interstate 15 and Highway 395, while employees will reach the site from surrounding communities via routes including US-395, Bellflower Road, Daisy Road and Aster Road.

B. Project Details

LADWP proposes to expand and upgrade the existing Adelanto Switching (or Converter) Station (the Project) on the Victorville-Rinaldi Transmission Line 1. The project consists of multiple components, including the installation of new switchyard equipment, rerouting of an existing transmission line segment, construction of new support structures and relocation of existing solar panel sections.

<u>Site Access</u>

Direct vehicular access to the Project site during construction and in the operations period would be provided on Rancho Road.

<u>Construction Duration and Intensity</u>

Construction of the proposed Project would occur over an approximate 43-month period, planned by LADWP to start in April 2021 and conclude in November 2024.

The Project construction activities would generate additional vehicle trips in the immediate area, based on necessary truck hauling/delivery trips and the construction employee population. More than 3,540 off-site dirt hauling truck trips or materials delivery trips are anticipated during the course of construction. Hauling truck trips are anticipated to occur over a 60-day period during the site preparation phase (a 26-month period lasting from April 2021 to June 2023). The calculated trip generation reflects anticipated daily soil- and dirt-haul truck traffic. The peak construction employee population of 275 employees and related vehicle trips was also included.

<u>Operations Phase Traffic</u>

The Project once constructed would generally be in operations 24 hours per day, 7 days per week, and the daily workforce will match that of existing conditions at the site. This maintenance and operations workforce would not generate a significant number of trips that would create impacts on the local transportation network or otherwise substantially affect levels of service in the area. Consequently, operations period trip generation is not discussed further in this report.

C. Project Study Area

This study quantitatively assesses Project construction impacts on roadway segments on the construction truck and employee vehicle trip route. Roadway segment counts were compiled from counts conducted along eight segments in the project vicinity. Six of the counts were conducted by Caltrans (as part of its annual traffic survey) and two of the counts were derived from the 2005 Victorville General Plan EIR. The following are the study roadway segments included in the traffic impact analysis:

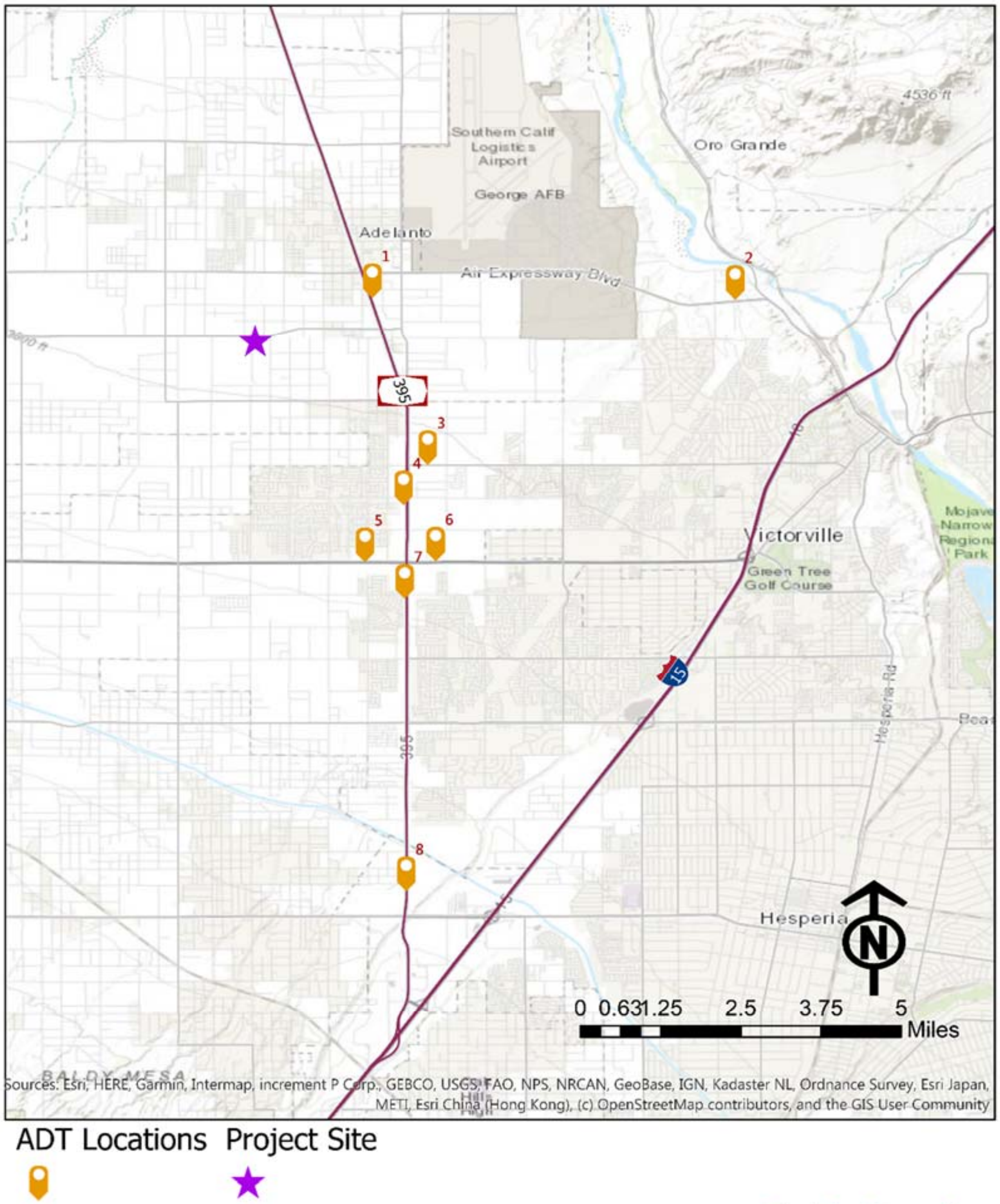
1. Route 395 South of Air Expressway
2. Air Expressway West of National Trails Highway
3. Mojave Drive East of State Route 395
4. Route 395 North of Route 18
5. Palmdale Road (State Route 18) West of State Route 395
6. Palmdale Road (State Route 18) East of State Route 395
7. Route 395 South of Route 18
8. Route 395 North of Phelan Road/Main Street

Figure 1 displays the study roadway segment locations. The daily traffic count summaries collected for these segments are provided in Attachment A. These volumes are analyzed in Section 4 of this report.

D. Analysis Methodology

KOA analyzed the roadway segment volumes and operations with and without construction activities. In the sections that follow, impacts of the proposed Project at the analyzed locations are discussed.

FIGURE 1- PROJECT LOCATION AND TRAFFIC STUDY AREA



2. Existing Conditions

The following describes the study area, along the primary routes to and from the Project site.

Direct vehicular access to the Project site during construction would be provided on Rancho Road. Running adjacent to the Project site, this roadway is a paved roadway with four travel lanes east of Mountain View Road and two travel lanes west of Mountain View Road, and a striped two-way center left-turn lane. The posted speed limit ranges from 45 to 55 mph.

US Highway 395, which provides access between Rancho Road and Interstate 15, is a federal highway running from Victorville up to Washington State. In the project area, the highway has one to two lanes in each direction, with dedicated right- and left-turn lanes at major intersections. The posted speed limit is 55 miles per hour.

Air Expressway and Mojave Drive connect the project area with Victorville and Hesperia, to the east. Air Expressway has two lanes in each direction and left- and right-turn lanes at major intersections. Mojave Drive has two to three lanes per direction, with a hard median or two-way left-turn lane for much of the roadway alignment. The posted speed limit is 65 miles per hour on Air Expressway and 60 miles per hour (in the project area) on Mojave Drive.

Finally Palmdale Road (or California Route 18) runs from east to west approximately 3.5 miles south of the project site. The roadway has two lanes west of US-395 and four lanes east of US-395, with additional turning and receiving lanes adjacent to major intersections. The posted speed limit is 55 miles per hour.

3. Project Construction Trips

This section focuses on the definition of construction truck and employee vehicle trip total that are expected to occur during the peak period of Project construction. The distribution and assignment of those trips to the study area roadway network is also discussed here.

A. Project Trip Generation Methodology

Project trip generation calculations included construction truck trip estimates and construction employee vehicle trips. The trip generation totals were based on the construction period which would generate the highest activity. Truck volumes were multiplied by a Passenger Car Equivalency (PCE) factor of 2.5 to estimate the real effect of total Project, consistent with truck studies in the area. The analysis assumed that the employees would commute by personal vehicle.

B. Trip Generation Totals

The total daily Project trips defined by Table 1 represent one-way inbound and outbound trips by both the construction personnel vehicles and construction trucks. 840 soil and 930 debris haul truckloads are anticipated during the course of the project, occurring over a 60-day period during the Site Preparation phase of the project. Each truck load consists of two truck trips (an outbound and an inbound trip) making for a total of 3,540 trips over the period or 59 trips per day, as shown in Table 1.

Table 1. Truck Trip Calculations

Truck Types	Total Truckloads[1]	Total Truck Trips	Workdays	Trips per Day
Soil Haul	840	1680	60	28
Debris Haul	930	1860		31
Total	**1770**	**3540**	**60**	**59**

Those trips were then multiplied by a Passenger Car Equivalency (PCE) rate of 2.5, consistent with area traffic models, with a total PCE trip number of 148.

During the peak period of construction, the Project will employee 275 workers. The workers would generate weekday daily total of 550 trips, based on one inbound trip and one outbound trip per day. Table 2 summarizes the overall project trip generation – with a total daily number of trips at 698, including 293 trips in the AM peak our and the same number in the PM peak hour.

Table 2. Project Construction Weekday Trip Generation

Trip Type	Average Daily Trips	AM Peak			PM Peak		
		Total	In	Out	Total	In	Out
Personnel	550	275	275	0	275	0	275
Soil/Debris Truck Hauling	59	7	0	7	7	7	0
Adjustment Factor							
Passenger Car Equivalent (Truck)	2.5						
Adjusted Values							
Personnel (Total)	**550**	**275**	**275**	**0**	**275**	**0**	**275**
Personnel by Private Vehicle	550	275	275	0	275	0	275
Soil/Debris Truck	**148**	**18**	**0**	**18**	**18**	**18**	**0**
Total	**698**	**293**	**275**	**18**	**293**	**18**	**275**

C. Project Trip Distribution

Construction employee and truck vehicle trip patterns were based on the local roadway network that would provide primary access to the project site.

4. Project Impacts Analysis

A. Study Area Analysis – Study Intersection

Based on the peak-hour volumes at the study intersections, existing lane configurations and traffic controls, study area roadway operations were analyzed with and without Project construction activities. The project construction period trip generation defined in the previous report section was applied to this analysis, and the trip distribution used the most direct routes to regional roadway corridors and highways.

The capacity of the study roadway segment was defined based on the number of lanes, with a single roadway lane assumed to have a capacity of 10,000 vehicles:

Existing volumes were taken from the Caltrans Traffic Census for segments on US-395 and State Route (SR) 18. Volumes were also compiled from the Victorville General Plan Environmental Impact Report. Counts from the former source were taken in the year 2018, while counts from the latter source were taken in the year 2005. The older counts were not used to define any impacts, but were included for informational purposes along with the other data. All counts were factored upward by an annual growth factor.

Passenger Car Equivalency(PCE) factors were applied to the truck volumes in each count, based on truck and truck-axle percentages provided by the Caltrans Traffic Census.

Table 3. Existing Counts and Sources

No	Total Raw	Name	Year	Count Source
1	26,967	Route 395 South of Air Expressway	2018	Caltrans Traffic Census Program (2018 AADT)
2	12,874	Air Expressway West of National Trails Highway	2005	Victorville General Plan EIR
3	15,566	Mojave Drive East of State Route 395	2005	Victorville General Plan EIR
4	26,995	Route 395 North of Route 18	2018	Caltrans Traffic Census Program (2018 AADT)
5	20,526	Palmdale Road (State Route 18) West of State Route 395	2018	Caltrans Traffic Census Program (2018 AADT)
6	9,722	Palmdale Road (State Route 18) East of State Route 395	2018	Caltrans Traffic Census Program (2018 AADT)
7	29,244	Route 395 South of Route 18	2018	Caltrans Traffic Census Program (2018 AADT)
8	33,919	Route 395 North of Phelan Road/Main Street	2018	Caltrans Traffic Census Program (2018 AADT)

The traffic count totals in Table 3 were factored by an annual growth rate of one percent to the year 2020 to define existing traffic conditions, analyzed in Table 4.

Table 4. Existing (2020) Conditions

	Roadway Segment	No. of Lanes	Weekday ADT	Weekday V/C	Weekday LOS
1	Route 395 South of Air Expressway	2	27,509	1.375	**F**
2	Air Expressway West of National Trails Highway	4	14,946	0.374	A
3	Mojave Drive East of State Route 395	4	18,072	0.452	A
4	Route 395 North of Route 18	2	27,538	1.377	**F**
5	Palmdale Road (State Route 18) West of State Route 395	2	20,939	1.047	**F**
6	Palmdale Road (State Route 18) East of State Route 395	4	9,917	0.248	A
7	Route 395 South of Route 18	4	29,832	0.746	C
8	Route 395 North of Phelan Road/Main Street	2	34,601	1.730	**F**

The year 2020 counts were then factored up by a growth rate of two percent per year to define the year-2023 future baseline conditions that are analyzed in Table 5.

Table 5. Future Baseline (2023) Conditions

	Roadway Segment	No. of Lanes	Weekday ADT	Weekday V/C	Weekday LOS
1	Route 395 South of Air Expressway	2	29,193	1.460	**F**
2	Air Expressway West of National Trails Highway	4	15,861	0.397	A
3	Mojave Drive East of State Route 395	4	19,178	0.479	A
4	Route 395 North of Route 18	2	29,223	1.461	**F**
5	Palmdale Road (State Route 18) West of State Route 395	2	22,220	1.111	**F**
6	Palmdale Road (State Route 18) East of State Route 395	4	10,524	0.263	A
7	Route 395 South of Route 18	4	31,658	0.791	C
8	Route 395 North of Phelan Road/Main Street	2	36,719	1.836	**F**

Finally, adding the daily employee and truck trips on each segment were added to the future baseline volumes to derive future post-project volumes, as analyzed in Table 6.

Table 6. Future Post-Project (2023) Conditions

	Roadway Segment	No. of Lanes	Weekday ADT	Weekday V/C	Weekday LOS	Employee Trips	Truck Trips
1	Route 395 South of Air Expressway	2	29,257	1.463	**F**	64	0
2	Air Expressway West of National Trails Highway	4	15,891	0.397	A	30	0
3	Mojave Drive East of State Route 395	4	19,227	0.481	A	49	0
4	Route 395 North of Route 18	2	29,431	1.472	**F**	60	148
5	Palmdale Road (State Route 18) West of State Route 395	2	22,240	1.112	**F**	20	0
6	Palmdale Road (State Route 18) East of State Route 395	4	10,544	0.264	A	20	0
7	Route 395 South of Route 18	4	31,846	0.796	C	40	148
8	Route 395 North of Phelan Road/Main Street	2	36,887	1.844	**F**	20	148

Four of the eight roadway segments (three of which are on US Highway 395) would operate at LOS F in all scenarios. Of the remaining segments, two (on Air Expressway and Mojave Drive) would operate at LOS A based on factored 2005 volumes, and one would operate at LOS C. Project truck and employee trips would cause the Volume-to-Capacity ratio to increase by the following percents on segments operating at LOS F:

- Route 395 South of Air Expressway – Volumes increase by 0.2 percent
- Route 395 North of Route 18 – Volumes increase by 0.7 percent
- Palmdale Road/SR18 West of Route 395 – Volumes increase by 0.1 percent
- Route 395 North of Phelan Road/Main Street – Volumes increase by 0.5 percent

Table 7 –Study Roadway Segments Impact Analysis

	Roadway Segment	Number of Lanes	Capacity	Existing (2020)			Future (2023) No Project			Future (2023) with Project Construction		
				ADT	V/C	LOS	ADT	V/C	LOS	ADT	V/C	LOS
1	Route 395 South of Air Expressway	2	20,000	27,509	1.375	**F**	29,193	1.460	**F**	29,257	1.463	**F**
2	Air Expressway West of National Trails Highway	4	40,000	14,946	0.374	A	15,861	0.397	A	15,891	0.397	A
3	Mojave Drive East of State Route 395	4	40,000	18,072	0.452	A	19,178	0.479	A	19,227	0.481	A
4	Route 395 North of Route 18	2	20,000	27,538	1.377	**F**	29,223	1.461	**F**	29,431	1.472	**F**
5	Palmdale Road (State Route 18) West of State Route	2	20,000	20,939	1.047	**F**	22,220	1.111	**F**	22,240	1.112	**F**
6	Palmdale Road (State Route 18) East of State Route 395	4	40,000	9,917	0.248	A	10,524	0.263	A	10,544	0.264	A
7	Route 395 South of Route 18	4	40,000	29,832	0.746	C	31,658	0.791	C	31,846	0.796	C
8	Route 395 North of Phelan Road/Main Street	2	20,000	34,601	1.730	**F**	36,719	1.836	**F**	36,887	1.844	**F**

All of the volume increases at the segments with LOS F conditions would be less than one percent with project construction. These small increases were considered to represent less than significant impacts.

C. Vehicle Miles Traveled CEQA Measures

California Environmental Quality Act (CEQA) guidelines have recently changed to require vehicle miles traveled (VMT) metrics in CEQA transportation analysis efforts and not level of service (LOS). LOS metrics can continue to be used under local agency review of traffic circulation, but automobile delay cannot be the determinant of impacts.

VMT analysis is required under CEQA for review of impacts that could be caused by development projects. VMT metrics are not an appropriate measurement of project construction activity, however, and as indicated in Section 15064.3, Determining the Significance of Transportation Impacts, of the CEQA guidelines it is stated “For many projects, a qualitative analysis of construction traffic may be appropriate.”

VMT data focuses on trip type, automobile use, transit use, walking and bicycling, and general auto trip reduction qualities of development and the management of travel to and from development sites. As project construction activities involve necessary travel to and from the site by construction employees and the necessary use of construction truck delivery and hauling operations, VMT is not an appropriate analysis tool and has been excluded from this analysis.

ATTACHMENT A –

STUDY ROADWAY SEGMENT 24-HOUR TRAFFIC COUNT SUMMARIES

2018 Daily Truck Traffic

RTE	DIST	CNTY	POST MILE	LEG	DESCRIPTION	VEHICLE AADT TOTAL	TRUCK AADT TOTAL	TRUCK % TOT VEH	TRUCK AADT ------By Axle------ 2	3	4	5+	% TRUCK AADT -------By Axle------ 2.00	3.00	4.00	5+	EAL 2-WAY (1000)	YEAR VER/ EST
395	02	MOD	.055	O	LASSEN/MODOC COUNTY LINE	850	233	27.47	17	16	10	189	7.46	7.02	4.39	81.14	71	16E
395	02	MOD	3.216	B	LIKELY, JESS VALLEY RD	990	330	33.33	79	8	4	239	24.00	2.29	1.14	72.57	92	17V
395	02	MOD	3.216	A	LIKELY, JESS VALLEY RD	1100	284	25.81	24	17	8	235	8.49	5.90	2.95	82.66	89	16E
395	08	SBD	**11.18**	**A**	**PALMDALE RD; JCT. RTE. 18**	**22000**	**3806**	**17.30**	**617**	**194**	**0**	**2,995**	**16.20**	**5.10**	**0.00**	**78.70**	**1,073**	**93V**
395	08	SBD	**11.18**	**B**	**PALMDALE RD; JCT. RTE. 18**	**25000**	**3350**	**13.40**	**683**	**194**	**0**	**2,472**	**20.40**	**5.80**	**0.00**	**73.80**	**895**	**93V**
395	08	SBD	**15.707**	**B**	**GEORGE AIR FORCE BASE RD**	**22000**	**3784**	**17.20**	**613**	**193**	**0**	**2,978**	**16.20**	**5.10**	**0.00**	**78.70**	**1,067**	**93E**
395	**08**	**SBD**	**R3.981**	**A**	**JCT. RTE. 15**	**26500**	**5830**	**22.00**	**1,236**	**181**	**76**	**4,338**	**21.20**	**3.10**	**1.30**	**74.40**	**1,568**	**90V**
395	02	LAS	R4.615	B	JCT. RTE. 70 WEST	10100	745	7.38	131	41	22	551	17.58	5.50	2.95	73.96	198	18V
395	02	LAS	R4.615	A	JCT. RTE. 70 WEST	6400	1001	15.64	139	59	35	769	13.87	5.85	3.47	76.81	276	16V
395	02	LAS	R61.094	A	JCT. RTE. 36 WEST	4000	403	10.08	53	21	15	313	13.23	5.29	3.70	77.78	110	16V
395	02	LAS	R61.094	B	JCT. RTE. 36 WEST	8800	960	10.91	127	50	28	755	13.18	5.25	2.91	78.66	286	16V
395	02	LAS	R76.927	A	WENDEL RD	1100	324	29.49	27	17	12	269	8.22	5.14	3.77	82.88	101	16V
395	02	LAS	R76.927	B	WENDEL RD	1200	372	30.96	39	22	17	295	10.39	5.90	4.49	79.21	112	16V

	Pct by Axle		
% Tot	2	3	4+
0.173	0.162	0.051	0.787
0.134	0.204	0.058	0.738
0.172	0.162	0.051	0.787
0.22	**0.212**	**0.031**	**0.757**