Appendix A

Air Quality/Greenhouse Gas Impact Memo

ALBERT A. WEBB ASSOCIATES

Technical Memorandum

To: Arturo Vela, P.E., Director of Public Works

From: Eliza Laws, Senior Environmental Analyst
Noemi Avila, Assistant Environmental Analyst

Date: January 2, 2024

Re: Air Quality/Greenhouse Gas Analysis for the NP-2 Booster Station and Reservoir Project

The following air quality assessment was prepared to evaluate whether the expected criteria air pollutant emissions generated as a result of construction and operation of the proposed Project would cause exceedances of the South Coast Air Quality Management District's (SCAQMD) thresholds for air quality in the Project area. The greenhouse gas (GHG) assessment was prepared to evaluate whether the construction and operation of the proposed Project would exceed the SCAQMD draft GHG screening thresholds. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.). The methodology follows the *CEQA Air Quality Handbook* prepared by the SCAQMD for quantification of emissions and evaluation of potential impacts to air resources. As recommended by SCAQMD staff, the **Cal**ifornia **E**missions **E**stimator **Mod**el® version 2022.1 (CalEEMod) was used to quantify Project-related emissions.

The analysis herein evaluates the NP-2 Booster Station and Reservoir Project ("Project") located on an approximately 7.1-acre parcel south of West Lincoln Street, within the City of Banning, in Riverside County, California. The Project consists of grading, construction, operation, and maintenance of a new non-potable water storage reservoir with a capacity of approximately 60,910 gallons, associated appurtenances, on-site access road, and the construction and operation of a new booster pump station designed for the future ultimate flow of 2,500 gallons per minute (gpm). The booster station will be equipped with two electric pumps with space for a third future pump. Each pump will be rated at 75 horsepower.

▪ Regional Significance Thresholds

The thresholds contained in the *SCAQMD CEQA Air Quality Handbook*[1] (SCAQMD 1993) and posted in a supplemental table as mass daily thresholds on SCAQMD's website[2] are considered regional thresholds and are shown in **Table 1 – SCAQMD CEQA Daily Regional Significance Thresholds**, below. These regional thresholds were developed based on the SCAQMD's treatment of a major stationary source.

Table 1 – SCAQMD CEQA Daily Regional Significance Thresholds

Emission Threshold	Units	VOC	NO_X	CO	SO_X	PM-10	PM-2.5
Construction	lbs/day	75	100	550	150	150	55
Operation	lbs/day	55	55	550	150	150	55

[1] South Coast Air Quality Management District, *CEQA Air Quality Handbook*, November 1993. (Available at SCAQMD.)
[2] Air Quality Analysis Handbook (aqmd.gov)

Air quality impacts can be described in a short- and long-term perspective. Short-term impacts occur during site grading and Project construction and consist of fugitive dust and other particulate matter, as well as exhaust emissions generated by construction-related vehicles. Long-term air quality impacts occur once the Project is in operation. Operational emissions sources are limited because the booster station pumps are electric. The primary source of operational emissions is the routine visits by vehicles driven by maintenance personnel and are considered negligible.

The Project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rule 403 establishes these procedures. Compliance with this rule is achieved through application of standard best management practices in construction and operation activities, such as the application of water or chemical stabilizers to disturbed soils, reducing haul road dust by application of water, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 mph, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph and establishing a permanent, stabilizing ground cover on finished sites. In addition, projects that disturb 50 or more acres or more of soil, or move 5,000 cubic yards of materials per day are required to submit a Fugitive Dust Control Plan or a Large Operation Notification Form to SCAQMD. Based on the size of this Project's footprint (approximately 0.48 acres total), a Fugitive Dust Control Plan or a Large Operation Notification Form would not be required.

Short-Term Analysis

Short-term emissions from Project construction were evaluated using the CalEEMod program. The estimated construction period for the proposed Project is approximately 12 months, as identified below. The default parameters within CalEEMod were used, except as identified below, and these default values generally reflect a worst-case scenario, which means that Project emissions are expected to be equal to or less than the estimated emissions. In addition to the default values used (shown in the CalEEMod output Attachment to this memo), assumptions for the Project relevant to model inputs for short-term construction emission estimates used are:

- Construction is anticipated to begin no sooner than August 2024. The construction of the reservoir (tank) will overlap with the construction of the booster station. The modeled construction schedule for the Project is shown below:

Construction Activity	Start Date	End Date	Total Working Days
Grading	August 1, 2024	October 2, 2024	45 days
Booster Station Construction	October 3, 2024	January 22, 2025	80 days
Tank Construction	December 1, 2024	May 17, 2025	120 days
Tank Coating	May 18, 2025	July 19, 2025	45 days
Paving	July 20, 2025	August 1, 2025	10 days

- The off-road equipment to be used for each activity during the construction of the Project is shown below and based on City engineering estimates. The engine tier for each piece of equipment is calculated using CalEEMod defaults for the statewide fleet average emissions factors.

Construction Activity	Off-Road Equipment	Unit Amount	Hours per Day
Grading	Rubber Tired Dozers	1	8
	Tractor/Loader/Backhoes	2	8
Booster Station Construction	Concrete/Industrial Saw	1	8
	Crane	1	8
	Tractor/Loader/Backhoes	1	8

Construction Activity	Off-Road Equipment	Unit Amount	Hours per Day
Tank Construction	Cranes	1	8
	Forklift	1	8
	Tractor/Loader/Backhoes	1	8
	Welder	1	8
Tank Coating	Air Compressor	1	8
	Pump (Dehumidifier, 11hp)[1]	1	24
Paving	Pavers	1	8
	Rollers	1	8
	Tractor/Loader/Backhoes	1	8

Note: [1] The CalEEMod equipment list does not include a dehumidifier. The Pump was used as a proxy for the dehumidifier because it most closely resembles the dehumidifier. While the precise specifications for the dehumidifier are currently unknown, it is anticipated to be an industrial sized piece of equipment that is diesel fueled. The dehumidifier will only be required for a single day but will run for 24 hours. For modeling purposes, this equipment was assumed to operate the entire duration of this activity, which provides a worst-case scenario.

- To evaluate Project compliance with SCAQMD Rule 403 for fugitive dust control, the Project utilized the option of watering the Project site three times daily which achieves a control efficiency of 74 percent for PM-10 and PM-2.5 emissions. Two (2) one-way vendor trips per day were added to the Grading, Booster Station Construction, Tank Construction and Paving activities to account for water truck trips.

- Four (4) one-way vendor trips per day added to the Tank Construction, Booster Station Construction and Paving activities to account for material delivery and removal.

- Approximately 9,050 square feet was assumed to be paved for on-site and off-site street improvements.

- Architectural coating includes both the coating of the interior and exterior of the new tank being constructed. The surface area to be coated for both the interior and exterior tank surfaces was calculated and entered into CalEEMod to estimate the emissions from these activities.

- The Project site will require 317 cubic yards of soil import. Based on the CalEEMod default truck capacity of 16 cubic yards, approximately 64 total truck trips would occur during grading, or approximately 32 truckloads of soil would be delivered. The import site is approximately 1.5 miles from the Project site.

- The CalEEMod default for worker trips for Booster Station Construction, Tank Construction and Tank Coating were zero because typical building construction is not proposed. Therefore, worker trips for the Tank and Booster Station Construction and Tank Coating were estimated at a rate of 1.25 workers per piece of off-road equipment, which is the CalEEMod default rate for other construction activities (i.e., grading) contained in the User Guide Appendix C.

The results of this analysis are summarized below in **Table 2**.

Table 2 – Unmitigated Estimated Daily Construction Emissions

Activity	Peak Daily Emissions (lb/day)					
	VOC	NO_X	CO	SO_2	PM-10	PM-2.5
SCAQMD Daily Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
2024	**1.60**	**14.70**	**15.90**	**0.03**	**2.39**	**1.43**
2025	1.50	13.70	15.80	0.03	0.84	0.55
Maximum	**1.60**	**14.70**	**15.90**	**0.03**	**2.39**	**1.43**
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Notes: See the detailed model output reports attached herewith. Numbers are the maximum of summer or winter emissions in a given year and may not match due to rounding within the model.

As shown in **Table 2**, above, the emissions from construction of the Project are below the SCAQMD daily construction thresholds for all the criteria pollutants in 2024 and 2025.

Long-Term Analysis

Long-term air quality impacts occur once the Project is in operation. Operational emissions refer to a full range of activities that can or may generate pollutant emissions when a project is functioning in its intended use, and typically include vehicle emissions, area source emissions that include stationary combustion of natural gas used for space and water heating, landscape maintenance, use of consumer products, and energy use.

Operational emissions related to the proposed reservoir and booster station would be primarily from the electric pumps and from the routine visits by vehicles driven by maintenance personnel and are considered negligible because the electricity consumption does not result in direct on-site emissions and this Project will be part of the City's routine maintenance operations. As such, the proposed Project's facilities are not anticipated to increase the frequency of ongoing maintenance routines.

▪ Localized Significance Threshold Analysis

Background

As part of the SCAQMD's environmental justice program, attention has been focused on localized effects of air quality. Staff at SCAQMD has developed localized significance threshold (LST) methodology[3] that can be used by public agencies to determine whether or not a project may generate significant adverse localized air quality impacts (both short- and long-term). LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area (SRA). The Project is located in SRA 29.

Short-Term Analysis

According to the LST methodology, only on-site emissions need to be analyzed. Emissions associated with vendor and worker trips are mobile source emissions that occur off site. The emissions analyzed under the LST methodology are NO_2, CO, PM-10, and PM-2.5. SCAQMD has provided LST lookup tables[4] to allow users to readily determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts for projects five acres or smaller. The LST tables can be used as a screening tool to determine if dispersion modeling would be necessary. If project-related emissions are below the LST table emissions, no further analysis is necessary.

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[3] South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology*, Revised July 2008. (Available at http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds, accessed January 2024.)

[4] http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds

The SCAQMD's Fact Sheet for Applying CalEEMod to Localized Significance Thresholds is used to determine the maximum site acreage that is actively disturbed.[5] Based on this SCAQMD guidance, the Project will disturb approximately one acre per day during grading. Therefore, the one-acre LST was used to compare the on-site emissions estimated by CalEEMod.

The LST thresholds are estimated using the maximum daily disturbed area (in acres) and the distance of the Project to the nearest sensitive receptors (in meters). The nearest sensitive receptors are residential properties adjacent to and west of the Project site. Residential uses are also located north and northwest of the Project site, across Lincoln Street. According to LST methodology, projects with boundaries closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters. Therefore, a receptor distance of 25 meters (85 feet) was used to ensure a conservative analysis. The results are summarized below **Table 3**.

Table 3 – Unmitigated LST Results for Daily Construction Emissions

Pollutant	Peak Daily Emissions (lb/day)			
	NO_x	CO	PM-10	PM-2.5
LST for 1-acre at 25 meters	**103**	**1,000**	**6**	**4**
Grading-2024	12.80	12.30	**2.27**	**1.40**
Booster Station Construction-2024	**6.79**	**6.93**	0.26	0.24
Booster Station Construction -2025	6.31	6.88	0.23	0.21
Tank Construction-2024	**7.38**	**7.78**	0.31	0.28
Tank Construction-2025	6.84	7.72	0.27	0.25
Tank Coating-2025	3.04	2.81	0.11	0.11
Paving-2025	3.58	4.97	0.17	0.15
Maximum[1]	**14.17**	**14.71**	**2.27**	**1.40**
Exceeds Threshold?	**No**	**No**	**No**	**No**

Note: [1] Maximum emissions are the greater of either each activity along or the sum of Booster Station Construction and Tank Construction in 2024 or 2025 as these activities overlap. Maximum emissions are shown in bold.

As shown in **Table 3,** emissions from construction of the Project are below the LST established by SCAQMD.

Long-Term Analysis

The Project involves construction of a new non-potable water reservoir and booster station. The long-term emissions from the booster station, as discussed previously, are primarily from the pumps and in the form of mobile source emissions, with no stationary sources of emissions present. The new booster station pumps are electric powered. The booster station will also have a diesel-powered emergency generator. According to the LST methodology, LSTs only apply to the operational phase if a project includes stationary sources or on-site mobile equipment generating on-site emissions. Because the emergency generator will only be used during emergency power outages and routine testing, emissions would be negligible. The City of Banning will be required to obtain an SCAQMD permit to install and operate the emergency generator. The SCAQMD permitting process would ensure that the Project meets regulatory requirements through the application review process and by placing specific operating conditions on the permit such as operating hour limits. As such, no further analysis of the emergency generator was prepared.

[5] http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf?sfvrsn=2

▪ Greenhouse Gas Analysis

Greenhouse gases (GHG) are not presented in lbs/day like criteria pollutants; they are typically evaluated on an annual basis using the metric system. Several agencies, at various levels, have proposed draft GHG significance thresholds for use in CEQA documents. One of those agencies is the SCAQMD, which was working on GHG thresholds for development projects. In December 2008, the SCAQMD adopted a threshold of 10,000 metric tonnes per year of carbon dioxide equivalents ($MTCO_2E$/yr) for stationary source projects where SCAQMD is the lead agency. The most recent draft proposal was in September 2010[6] and included screening significance thresholds for residential, commercial, and mixed-use projects at 3,500, 1,400, and 3,000 $MTCO_2E$/yr, respectively. Alternatively, a lead agency has the option to use 3,000 $MTCO_2E$/yr as a threshold for all non-industrial projects. Although both options are recommended by SCAQMD, a lead agency is advised to use only one option and to use it consistently. The SCAQMD significance thresholds also evaluate construction emissions by amortizing them over an expected project life of 30 years.

Short-Term Analysis

Construction-Related Emissions

The CalEEMod model calculates GHG emissions from fuel usage by construction equipment and construction-related activities, like construction worker trips, for the Project. CalEEMod also calculates the indirect GHG emissions related to electricity consumption (CalEEMod Version 2022.1 User's Guide, p. 2). The CalEEMod output results for construction-related GHG emissions provide for CO_2, methane (CH_4), nitrous oxide (N_2O), refrigerants (R), and CO_2E[7] as shown on **Table 4**.

Table 4 – Project Construction Equipment GHG Emissions

Year	Metric Tons per year (MT/yr)				
	Total CO_2	Total CH_4	Total N_2O	Total R	Total CO_2E
2024	116	0.00	0.00	0.02	117
2025	114	0.00	0.00	0.03	115
Total	**230**	**0.00**	**0.00**	**0.05**	**232**
				Amortized[1]	**7.73**

Note: [1]Construction emissions were amortized over a 30-year period, as recommended by SCAQMD.

Results indicate that an estimated 232 $MTCO_2E$ will occur from Project construction equipment over the course of the estimated approximately 12-month construction period, which is approximately 7.73 $MTCO_2E$ amortized for a project lifetime of 30 years.

Long-Term Analysis

Energy-Related Emissions

GHG emissions from the operation of the electric pumps for the proposed booster station were calculated outside of CalEEMod using the estimated annual electricity consumption from the new booster station and the Banning Electric Utility [8]carbon intensity data from CalEEMod (455 pounds of CO_2E per megawatt-hour (MWh)). Two pumps will be constructed (one for standby) and space for a third pump will be provided. The total estimated energy consumption for three pumps is estimated to be approximately 11,332 MWh per year.[9] Therefore, the estimated GHG emissions from operation of the proposed booster station will be approximately 2,340 $MTCO_2E$ per year. There will also be limited lighting on the Project site. However, the GHG emissions from electricity usage will be negligible.

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[6] http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-main-presentation.pdf?sfvrsn=2

[7] CO_2E is the sum of CO_2 emissions estimated plus the sum of CH_4, N_2O and refrigerant emissions estimated multiplied by their respective global warming potential (GWP).

[8] CalEEMod's default statewide average carbon intensity was utilized because the Banning Electric Utility was not available.

[9] 11.332 MWh per year is an engineering estimate, which assumes that each pump operates at 3,777,408 kilowatts (kW) per year (six hours daily).

The proposed Project does not fit into the categories provided (industrial, commercial, and residential) in either the draft thresholds from SCAQMD. The Project's GHG emissions do not exceed the SCAQMD recommended screening level of 3,000 MTCO2E/year. Due to the estimated amount of emissions from Project construction and booster station pump electricity usage during operations we well as nominal emissions from routine maintenance, site lighting and electricity use, the proposed Project will not generate GHG emissions that exceed the draft screening thresholds.

Conclusion

The conclusion of this analysis indicates that construction of the proposed Project will not exceed criteria pollutant thresholds established by SCAQMD on a regional or localized level. The Project will also not generate a substantial amount of GHG emissions. No mitigation is required.

Should you have any questions, please contact me at (951) 686-1070.

CalEEMod Output Files

Banning NP-2 Booster Station and Reservoir Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Banning NP-2 Booster Station and Reservoir
Construction Start Date	8/1/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	19.2
Location	33.92141057528512, -116.89859684921888
County	Riverside-South Coast
City	Banning
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5635
EDFZ	11
Electric Utility	City of Banning Electric Department
Gas Utility	Southern California Gas
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Parking Lot	9.05	1000sqft	0.21	0.00	—	—	—	—

Other Non-Asphalt Surfaces	11.8	1000sqft	0.27	0.00	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

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

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.59	1.33	12.9	12.9	0.02	0.57	1.82	2.39	0.52	0.90	1.43	—	2,135	2,135	0.09	0.05	1.04	2,147
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.91	1.60	14.7	15.9	0.03	0.58	1.82	2.39	0.53	0.90	1.43	—	3,770	3,770	0.15	0.09	0.05	3,801
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.41	0.38	3.30	3.41	0.01	0.14	0.26	0.40	0.13	0.12	0.25	—	700	700	0.03	0.02	0.16	705
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.08	0.07	0.60	0.62	< 0.005	0.02	0.05	0.07	0.02	0.02	0.04	—	116	116	< 0.005	< 0.005	0.03	117

2.2. Construction Emissions by Year, Unmitigated

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

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

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.59	1.33	12.9	12.9	0.02	0.57	1.82	2.39	0.52	0.90	1.43	—	2,135	2,135	0.09	0.03	0.61	2,147
2025	0.95	1.03	7.09	8.56	0.02	0.27	0.18	0.46	0.25	0.04	0.30	—	1,965	1,965	0.08	0.05	1.04	1,982
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.91	1.60	14.7	15.9	0.03	0.58	1.82	2.39	0.53	0.90	1.43	—	3,770	3,770	0.15	0.09	0.05	3,801
2025	1.79	1.50	13.7	15.8	0.03	0.51	0.33	0.84	0.47	0.08	0.55	—	3,760	3,760	0.15	0.09	0.05	3,791
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.41	0.35	3.30	3.41	0.01	0.14	0.26	0.40	0.13	0.12	0.25	—	700	700	0.03	0.01	0.13	705
2025	0.37	0.38	2.67	3.11	0.01	0.10	0.07	0.17	0.09	0.02	0.11	—	691	691	0.03	0.02	0.16	696
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.08	0.06	0.60	0.62	< 0.005	0.02	0.05	0.07	0.02	0.02	0.04	—	116	116	< 0.005	< 0.005	0.02	117
2025	0.07	0.07	0.49	0.57	< 0.005	0.02	0.01	0.03	0.02	< 0.005	0.02	—	114	114	< 0.005	< 0.005	0.03	115

3. Construction Emissions Details

3.1. Tank Construction (2024) - Unmitigated

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

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

Off-Road Equipment	0.95	0.79	7.38	7.78	0.02	0.31	—	0.31	0.28	—	0.28	—	1,641	1,641	0.07	0.01	—	1,646
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.45	0.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	99.5	99.5	< 0.005	< 0.005	—	99.9
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	16.5	16.5	< 0.005	< 0.005	—	16.5
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.06	0.63	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	132	132	0.01	< 0.005	0.01	134

Vendor	0.01	0.01	0.22	0.07	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	186	186	< 0.005	0.03	0.01	195
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.13	8.13	< 0.005	< 0.005	0.01	8.24
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.01	11.8
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.35	1.35	< 0.005	< 0.005	< 0.005	1.36
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.87	1.87	< 0.005	< 0.005	< 0.005	1.96
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Tank Construction (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.89	0.74	6.84	7.72	0.02	0.27	—	0.27	0.25	—	0.25	—	1,641	1,641	0.07	0.01	—	1,646
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.89	0.74	6.84	7.72	0.02	0.27	—	0.27	0.25	—	0.25	—	1,641	1,641	0.07	0.01	—	1,646
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	0.20	1.83	2.07	< 0.005	0.07	—	0.07	0.07	—	0.07	—	440	440	0.02	< 0.005	—	441
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.04	0.33	0.38	< 0.005	0.01	—	0.01	0.01	—	0.01	—	72.8	72.8	< 0.005	< 0.005	—	73.1
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.77	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	141	141	0.01	< 0.005	0.52	143
Vendor	0.01	< 0.005	0.20	0.06	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	184	184	< 0.005	0.03	0.52	193
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.58	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	130	130	0.01	< 0.005	0.01	131
Vendor	0.01	< 0.005	0.21	0.06	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	184	184	< 0.005	0.03	0.01	192
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.2	35.2	< 0.005	< 0.005	0.06	35.7
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	49.2	49.2	< 0.005	0.01	0.06	51.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.82	5.82	< 0.005	< 0.005	0.01	5.91
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.15	8.15	< 0.005	< 0.005	0.01	8.53
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2024) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.54	1.29	12.8	12.3	0.02	0.57	—	0.57	0.52	—	0.52	—	1,959	1,959	0.08	0.02	—	1,966
Dust From Material Movement	—	—	—	—	—	—	1.70	1.70	—	0.88	0.88	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.54	1.29	12.8	12.3	0.02	0.57	—	0.57	0.52	—	0.52	—	1,959	1,959	0.08	0.02	—	1,966
Dust From Material Movement	—	—	—	—	—	—	1.70	1.70	—	0.88	0.88	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.19	0.16	1.58	1.51	< 0.005	0.07	—	0.07	0.06	—	0.06	—	242	242	0.01	< 0.005	—	242
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.29	0.28	< 0.005	0.01	—	0.01	0.01	—	0.01	—	40.0	40.0	< 0.005	< 0.005	—	40.1
Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.63	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	108	108	< 0.005	< 0.005	0.43	110

Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	62.1	62.1	< 0.005	0.01	0.17	65.1
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.99	5.99	< 0.005	< 0.005	0.01	6.30
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	99.2	99.2	< 0.005	< 0.005	0.01	100
Vendor	< 0.005	< 0.005	0.07	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	62.1	62.1	< 0.005	0.01	< 0.005	65.0
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.02	6.02	< 0.005	< 0.005	< 0.005	6.32
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.4	12.4	< 0.005	< 0.005	0.02	12.6
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.66	7.66	< 0.005	< 0.005	0.01	8.01
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.74	0.74	< 0.005	< 0.005	< 0.005	0.78
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.05	2.05	< 0.005	< 0.005	< 0.005	2.08
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.27	1.27	< 0.005	< 0.005	< 0.005	1.33
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.12	0.12	< 0.005	< 0.005	< 0.005	0.13

3.7. Booster Station Construction (2024) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.85	0.71	6.79	6.93	0.01	0.26	—	0.26	0.24	—	0.24	—	1,525	1,525	0.06	0.01	—	1,530

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	1.20	1.22	< 0.005	0.05	—	0.05	0.04	—	0.04	—	269	269	0.01	< 0.005	—	270
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.22	0.22	< 0.005	0.01	—	0.01	0.01	—	0.01	—	44.5	44.5	< 0.005	< 0.005	—	44.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.47	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	99.2	99.2	< 0.005	< 0.005	0.01	100
Vendor	0.01	0.01	0.22	0.07	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	186	186	< 0.005	0.03	0.01	195
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.7	17.7	< 0.005	< 0.005	0.03	17.9
Vendor	< 0.005	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	32.8	32.8	< 0.005	< 0.005	0.04	34.3
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.93	2.93	< 0.005	< 0.005	0.01	2.97
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.43	5.43	< 0.005	< 0.005	0.01	5.69
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Booster Station Construction (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.80	0.67	6.31	6.88	0.01	0.23	—	0.23	0.21	—	0.21	—	1,525	1,525	0.06	0.01	—	1,530
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.03	0.27	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	65.7	65.7	< 0.005	< 0.005	—	65.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	10.9	10.9	< 0.005	< 0.005	—	10.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.04	0.03	0.04	0.44	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	97.2	97.2	< 0.005	< 0.005	0.01	98.4
Vendor	0.01	< 0.005	0.21	0.06	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	184	184	< 0.005	0.03	0.01	192
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.24	4.24	< 0.005	< 0.005	0.01	4.30
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.91	7.91	< 0.005	< 0.005	0.01	8.28
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.70	0.70	< 0.005	< 0.005	< 0.005	0.71
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.31	1.31	< 0.005	< 0.005	< 0.005	1.37
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Site Improvements (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.47	0.39	3.58	4.97	0.01	0.17	—	0.17	0.15	—	0.15	—	748	748	0.03	0.01	—	751
Paving	—	0.05	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.01	0.01	0.10	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	20.5	20.5	< 0.005	< 0.005	—	20.6
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.39	3.39	< 0.005	< 0.005	—	3.40
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.03	0.58	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	106	106	< 0.005	< 0.005	0.39	107
Vendor	0.01	< 0.005	0.20	0.06	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	184	184	< 0.005	0.03	0.52	193
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.70	2.70	< 0.005	< 0.005	< 0.005	2.73
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.03	5.03	< 0.005	< 0.005	0.01	5.27
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.45	0.45	< 0.005	< 0.005	< 0.005	0.45
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.83	0.83	< 0.005	< 0.005	< 0.005	0.87
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Tank Coating (2025) - Unmitigated

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

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.51	0.42	3.04	2.81	0.01	0.11	—	0.11	0.11	—	0.11	—	423	423	0.02	< 0.005	—	424
Architectural Coatings	—	0.59	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.38	0.35	< 0.005	0.01	—	0.01	0.01	—	0.01	—	52.1	52.1	< 0.005	< 0.005	—	52.3
Architectural Coatings	—	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.63	8.63	< 0.005	< 0.005	—	8.66
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.02	0.39	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	70.5	70.5	< 0.005	< 0.005	0.26	71.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.09	8.09	< 0.005	< 0.005	0.01	8.20
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.34	1.34	< 0.005	< 0.005	< 0.005	1.36
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

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

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

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

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

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

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

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

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

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

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

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

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Tank Construction	Site Preparation	12/1/2024	5/17/2025	5.00	120	Tank Construction
Grading	Grading	8/1/2024	10/2/2024	5.00	45.0	—
Booster Station Construction	Building Construction	10/3/2024	1/22/2025	5.00	80.0	—
Site Improvements	Paving	7/20/2025	8/1/2025	5.00	10.0	—
Tank Coating	Architectural Coating	5/18/2025	7/19/2025	5.00	45.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Tank Construction	Cranes	Diesel	Average	1.00	8.00	367	0.29
Tank Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Tank Construction	Forklifts	Diesel	Average	1.00	8.00	82.0	0.20
Tank Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37

Booster Station Construction	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Booster Station Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Booster Station Construction	Cranes	Diesel	Average	1.00	8.00	367	0.29
Site Improvements	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Site Improvements	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Site Improvements	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
Tank Coating	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
Tank Coating	Pumps	Diesel	Average	1.00	24.0	11.0	0.74

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Tank Construction	—	—	—	—
Tank Construction	Worker	10.0	18.5	LDA,LDT1,LDT2
Tank Construction	Vendor	6.00	10.2	HHDT,MHDT
Tank Construction	Hauling	0.00	20.0	HHDT
Tank Construction	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	7.50	18.5	LDA,LDT1,LDT2
Grading	Vendor	2.00	10.2	HHDT,MHDT
Grading	Hauling	0.89	1.50	HHDT
Grading	Onsite truck	—	—	HHDT
Booster Station Construction	—	—	—	—
Booster Station Construction	Worker	7.50	18.5	LDA,LDT1,LDT2

Booster Station Construction	Vendor	6.00	10.2	HHDT,MHDT
Booster Station Construction	Hauling	0.00	20.0	HHDT
Booster Station Construction	Onsite truck	—	—	HHDT
Site Improvements	—	—	—	—
Site Improvements	Worker	7.50	18.5	LDA,LDT1,LDT2
Site Improvements	Vendor	6.00	10.2	HHDT,MHDT
Site Improvements	Hauling	0.00	20.0	HHDT
Site Improvements	Onsite truck	—	—	HHDT
Tank Coating	—	—	—	—
Tank Coating	Worker	5.00	18.5	LDA,LDT1,LDT2
Tank Coating	Vendor	0.00	10.2	HHDT,MHDT
Tank Coating	Hauling	0.00	20.0	HHDT
Tank Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Tank Coating	0.00	0.00	2,487	2,015	1,248

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)

Tank Construction	—	—	0.00	0.00	—
Grading	317	—	22.5	0.00	—
Site Improvements	0.00	0.00	0.00	0.00	0.48

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	3	74%	74%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Parking Lot	0.21	100%
Other Non-Asphalt Surfaces	0.27	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	453	0.03	< 0.005
2025	0.00	453	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

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

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

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

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	31.8	annual days of extreme heat
Extreme Precipitation	5.45	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	23.6	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	4	1	1	4
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

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

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

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

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	97.0
AQ-PM	45.3
AQ-DPM	53.7
Drinking Water	59.0
Lead Risk Housing	41.8
Pesticides	0.00
Toxic Releases	20.7
Traffic	79.7
Effect Indicators	—
CleanUp Sites	53.4
Groundwater	0.00
Haz Waste Facilities/Generators	81.5
Impaired Water Bodies	0.00
Solid Waste	25.7
Sensitive Population	—
Asthma	89.4
Cardio-vascular	98.2

Low Birth Weights	26.6
Socioeconomic Factor Indicators	—
Education	82.8
Housing	30.2
Linguistic	47.1
Poverty	87.6
Unemployment	77.8

7.2. Healthy Places Index Scores

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

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	25.92069806
Employed	1.000898242
Median HI	28.89772873
Education	—
Bachelor's or higher	27.90966252
High school enrollment	100
Preschool enrollment	4.260233543
Transportation	—
Auto Access	44.50147568
Active commuting	21.84011292
Social	—
2-parent households	53.68920826
Voting	36.84075452
Neighborhood	—
Alcohol availability	73.73283716

Park access	22.95649942
Retail density	14.44886437
Supermarket access	40.24124214
Tree canopy	1.642499679
Housing	—
Homeownership	52.86795842
Housing habitability	69.62658796
Low-inc homeowner severe housing cost burden	47.17053766
Low-inc renter severe housing cost burden	91.21006031
Uncrowded housing	34.15886052
Health Outcomes	—
Insured adults	21.67329655
Arthritis	0.0
Asthma ER Admissions	8.2
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	33.4
Cognitively Disabled	30.7
Physically Disabled	12.7
Heart Attack ER Admissions	0.0
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0

Pedestrian Injuries	88.4
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.9
SLR Inundation Area	0.0
Children	56.6
Elderly	42.0
English Speaking	60.7
Foreign-born	38.6
Outdoor Workers	41.1
Climate Change Adaptive Capacity	—
Impervious Surface Cover	90.7
Traffic Density	62.4
Traffic Access	23.0
Other Indices	—
Hardship	63.7
Other Decision Support	—
2016 Voting	39.7

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	72.0

Healthy Places Index Score for Project Location (b)	13.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

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

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Per City
Construction: Off-Road Equipment	Per City
Construction: Trips and VMT	Two (2) daily vendor trips added for water trucks during grading, booster station and tank construction, and paving activities. Four (4) daily truck trips are assumed for material delivery and removal during tank construction, booster station construction and paving. One-way trip length for soil hauling trucks is approximately 1.5 miles. Worker trips added for booster station construction, tank construction and tank coating because no defaults were generated by model. Worker trips estimated per CalEEMod User Guide Section 4.6.1 default for workers based on equipment list.
Construction: Architectural Coatings	Tank surface area to be painted estimated for based on CalEEMod User Guide for nonresidential use.

Appendix B

Biological Technical Report and MSHCP Consistency Analysis

BIOLOGICAL TECHNICAL REPORT and MSHCP CONSISTENCY ANALYSIS

For:

City of Banning

NP-2 Booster Pump Station and Reservoir Project

Prepared By:

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January 19, 2024

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EXECUTIVE SUMMARY

Albert A Webb Associates (WEBB) has prepared this Biological Technical Report (BTR) for the proposed NP-2 Booster Pump Station and Reservoir Project ("Project") as requested by the City of Banning Public Works Department (City) located in Riverside County, California.

The objective of this BTR is to provide an assessment of the existing biological conditions within the Project footprint (1.39 acres) and the surrounding biological study area (BSA; 100-foot survey buffer) for a total area of 4.53 acres. The BTR includes an analysis of the Project's potential impacts to common and sensitive biological resources and potentially jurisdictional water resources. This report serves as the necessary biological resources documentation for the City's review process under the California Environmental Quality Act (CEQA).

The BSA contains a total of four land cover types and vegetation communities, including Urban/Developed lands, Disturbed Habitat, Riversidean alluvial fan sage scrub (RAFSS), and Unvegetated Channel. Additionally, a steeply incised ephemeral channel called Montgomery Creek bisects the northeastern corner of the BSA but does not intersect with the Project footprint. The Project footprint contains only Urban/Developed land and Disturbed Habitat. No special-status biological resources were observed during the field assessment, and none are expected to occur in the Project footprint. Further, no potentially jurisdictional water resources are present in the Project footprint.

The Project proposes permanent impacts to 0.09-acre of Urban/Developed lands and 0.39-acre of Disturbed habitat. Temporary impacts will occur to 0.01-acre of Urban/Developed lands and 0.90-acre of Disturbed habitat.

The Project is located within the boundaries of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The City of Banning is a permittee to the MSHCP and the Project is consistent with the MSHCP.

Recommendations of this BTR include temporary construction fencing, construction Best Management Practices, and nesting bird and raptor avoidance measures.

1.0 INTRODUCTION

This Biological Technical Report (BTR) presents the findings of a study conducted by Albert A. Webb Associates (WEBB) for the NP-2 Booster Pump Station and Reservoir Project (Project) proposed by the City of Banning Public Works Department (City) located in Banning, Riverside County, California. The purpose of the BTR is to provide the City, resource agencies, and the public with current biological data required for the review of the project under the California Environmental Quality Act (CEQA), as well as to ensure compliance with federal, state, and local regulations for biological resources.

The BTR provides an overview of the Project site's existing biological conditions, including vegetation communities, and documents the plant and wildlife species observed or detected during surveys. It identifies sensitive resources within the Project area and highlights the potential presence of special-status species. Additionally, this BTR assesses the impacts of the Project and provides recommendations to address potential adverse effects on sensitive biological resources that may occur as a result of Project implementation.

1.1 PROJECT LOCATION

The proposed Project is located in the City of Banning, California, within the County of Riverside (Figure 1 - Regional Map; all figures are provided in Appendix A). The Project is located just south of West Lincoln Street, approximately 0.2 miles south of Interstate-10 and one mile east of Sunset Avenue (Figure 2- Project Vicinity). The Project site falls within Sections 8 of Township 3 South, Range 1 East, as depicted in the Beaumont 7.5-minute quadrangle map on Assessor Parcel Number (APN) 538-280-001 and totals 7.51 acres (Figure 3 – USGS Topo Map). Photos of the Project site are located in Appendix B.

1.2 PROJECT DESCRIPTION

The City is proposing to expand the non-potable water system through the construction and operation of a new non-potable water storage reservoir that is 24-feet in diameter and 21-feet tall with a capacity of approximately 60,910 gallons, associated appurtenances, on-site access road, and the construction and operation of a new booster pump station designed for the future ultimate flow of 2,500 gallons per minute (gpm). The total area of disturbance, including Project construction footprint and construction staging area is 1.39 acre. A 100-foot survey buffer was surveyed as part of this study making the total biological study area (BSA) 4.53 acres.

2.0 METHODS

2.1 Literature Review

Literature and authoritative database queries were performed to assist in determining the presence or potential occurrences of special-status plant and animal species on the Project site or vicinity of the Project site. The following resources were reviewed:

- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles (Beaumont, Cabazon, El Casco, Yucaipa, Forest Falls, San Gorgonio Mountain, Lake Fulmor, San Jacinto, Lakeview) (USGS 2023A)
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2023)
- Western Riverside Multiple Species Habitat Conservation Plan (MSHCP 2004)
- California Department of Fish Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CNDDB 2023)
- the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants (CNPS 2023)
- U.S Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPAC 2023A)
- USFWS National Wetlands Inventory (USFWS 2023B)
- USGS National Hydrography Dataset (USGS 2023B)

2.2 General Biological Survey

On June 2nd, 2023, WEBB Senior Biologist Marshall Paymard, conducted a reconnaissance-level field assessment of the proposed Project footprint, including a 100-foot survey buffer, herein defined as the biological study area (BSA). The BSA plus Project footprint totals 4.53 acres. The field assessment was conducted on-foot to systematically assess and document the BSA for sensitive biota and their habitats, including other environmental attributes such as: topography, soil type, water features, and vegetation communities. Table 1 below provides the date, time, and average weather field conditions of the field assessment.

Table 1. General Biological Field Survey Conditions

Date/Time	Climatic Conditions
June 2nd 2023 / 0900-1200	Air Temperature: 64-66°F; Wind: 0-1 miles per hour (MPH); Cloud Cover: 10%

Vegetation Community and Land Cover Mapping

Vegetation communities and land cover types present in the BSA were mapped directly in the field on a 200-foot scale, aerial satellite imagery-based field map. Following completion of the

field assessment, all vegetation communities were digitized and quantified using ArcGIS Pro software. Vegetation communities were mapped according to Holland (1986).

Plants

Plant species observed during the field assessment of the BSA were identified by morphology and recorded in a standard field notebook. Plant species that could not be identified immediately in the field were identified in the laboratory using taxonomic keys. Latin and common names for plant species included in this report follow, The Jepson Manual: Vascular Plants of California (Baldwin et al. 2012).

Wildlife

Wildlife species detected during field assessments by sight, calls, tracks, scat, or other signs were recorded in a standard field notebook. General information regarding wildlife species present in the region was obtained Center of North American Herpetology (2023) for amphibians and reptiles, the American Ornithologists' Union (2023) for birds, the North American Butterfly Association (NABA 2023) for butterflies, and Bradley et al. (2014) for mammals.

Jurisdictional Non-Wetland Waters and Wetlands

Satellite aerial imagery and USGS topographic maps were reviewed prior to the field survey to detect any potential Waters of the United States, including wetlands, under the jurisdiction of the U.S. Army Corps of Engineers (USACE), pursuant to Section 404 of the federal Clean Water Act; Waters of the State under the jurisdiction of the California Regional Water Quality Control Board (RWQCB), pursuant to Section 401 of the federal Clean Water Act and the Porter–Cologne Act; and Streambeds under the jurisdiction of California Department of Fish and Wildlife (CDFW), pursuant to Section 1602 of the California Fish and Game Code. All potential jurisdictional resources, if present in the BSA, were mapped in the field and then digitized using ArcGIS Pro software.

2.3 Special-Status Biological Resources

Special-status biological resources are defined herein as follows: plant or animal species listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or candidates for possible future listing as threatened or endangered under the ESA; plants and animals considered by CDFW to be rare, threatened, endangered, or a Species of Special Concern (SSC) in California, which includes plants and animals tracked by CNDDB, and plants tracked by the CNPS as California Rare Plant Rank (CRPR) 1, 2, 3, or 4; plants and animals considered locally significant in local or regional plans, policies, or ordinances; habitat areas or plant communities that are unique, are of relatively limited distribution, or are of particular value to wildlife; jurisdictional wetlands and non-wetland waters; and, wildlife corridors and habitat linkages.

A list of special-status plants and wildlife species evaluated for the BSA is provided as Appendix C to this report; the animal list is derivative of a nine-quad search performed in CNDDB (CNDDB 2023) and the plant list is derivative of a nine-quad search performed in CNDDB (2023) and CNPS (2023).

3.0 REGULATORY SETTING

3.1 Federal Regulations

Federal Endangered Species Act (FESA)

The FESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing FESA are the USFWS and the U.S National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. Actions that jeopardize endangered or threatened species and the habitats upon which they rely are considered a “take” under the FESA. Section 9(a) of the FESA defines take as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.” “Harm” and “harass” are further defined in federal regulations and case law to include actions that adversely impair or disrupt a listed species’ behavioral patterns.

FESA Section 7 is called "Interagency Cooperation," and it is the mechanism by which Federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species. A Section 7 consultation (formal or informal) is required when there is a nexus between endangered species’ use of a site and there is an associated federal action for a proposed impact.

Under the provisions of FESA Section 10(a), permits may be issued for the incidental take of endangered or threatened species, accompanied by the preparation of a Habitat Conservation Plan (HCP), regardless of the presence of a federal nexus. The term "incidental" denotes taking that is secondary to, and not the primary purpose of, a lawful activity. To obtain Section 10(a) permits, an HCP must be submitted, demonstrating how the taking will be minimized and ensuring the species' survival. For instance, the MSHCP serves as a regional HCP developed in accordance with FESA Section 10(a), allowing for the take of listed species, provided the project is in compliance with the MSHCP.

The USFWS designates critical habitat for endangered and threatened species. Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not inhabited by the species at the time of listing but are crucial to its conservation. Critical habitat designations affect only Federal agency actions or federally funded or permitted activities. Critical habitat designations do not affect activities by private landowners if there is no Federal “nexus”, or no Federal funding or authorization associated with a project. Federal agencies are required to avoid “destruction” or “adverse modification” of designated critical habitat.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) prohibits the take of protected migratory bird species without prior authorization by the USFWS. Additionally, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," requires that any project with federal involvement address impacts of federal actions on migratory birds with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). The list of migratory bird species protected by the law is primarily based on bird families and species included in the four international treaties (Canada 1916, Mexico 1936, Japan 1972, and Russia 1976). In the Code of Federal Regulations one can locate this list under Title 50 Part 10.13 (10.13 list). The 10.13 list was updated in 2020, incorporating the most current scientific information on taxonomy and natural distribution.

A migratory bird species is included on the list if it meets one or more of the following:

- It occurs in the United States or U.S. territories as the result of natural biological or ecological processes and is currently, or was previously listed as, a species or part of a family protected by one of the four international treaties or their amendments.
- Revised taxonomy results in it being newly split from a species that was previously on the list, and the new species occurs in the United States or U.S. territories as the result of natural biological or ecological processes.
- New evidence exists for its natural occurrence in the United States or U.S. territories resulting from natural distributional changes and the species occurs in a protected family.

The Migratory Bird Treaty Reform Act of 2004 (MBTRA) amended the MBTA by stating the MBTA applies only to migratory bird species that are native to the United States or U.S. territories, and that a native migratory bird species is one that is present as a result of natural biological or ecological processes (USFWS 2023C). The MBTRA requires the USFWS to publish a list of all non-native, human-introduced bird species to which the MBTA does not apply, and an updated list was published in 2020. The 2020 update identifies species belonging to biological families referred to in treaties the MBTA implements but are not protected because their presence in the United States or U.S. territories is solely the result of intentional or unintentional human-assisted introductions (USFWSC 2023).

In general, the MBTA is used to place restrictions on disturbance of active bird nests during the nesting season (generally February 1 to August 31). In addition, the USFWS commonly places restrictions on disturbances allowed near active raptor nests. Currently, birds are considered to be nesting under the MBTA when there are eggs or chicks, which are dependent are on the nest.

Clean Water Act

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource

projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects (EPA 2023). Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

Proposed activities are regulated through a permit review process. An individual permit is required for potentially significant impacts. Individual permits are reviewed by the U.S. Army Corps of Engineers or an approved State/Tribal 404(g) Program which evaluates applications under a public interest review, as well as the environmental criteria set forth in the CWA Section 404(b)(1) Guidelines, regulations promulgated by EPA (EPA 2023).

For most discharges that will have only minimal adverse effects, a general permit may be suitable. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. The general permit process eliminates individual review and allows certain activities to proceed with little or no delay, provided that the general or specific conditions for the general permit are met. For example, minor road activities, utility line backfill, and bedding are activities that can be considered for a general permit (EPA 2023).

3.2 State Regulations

California Endangered Species Act (CESA)

Originally enacted in 1970, CESA was repealed and replaced by an updated version in 1984 and amended in 1997. Plant and animal species may be designated threatened or endangered under CESA after a formal listing process by the California Fish and Game Commission (CDFW 2023). Approximately 250 species are currently listed under CESA. A CESA-listed species, or any part or product of the plant or animal, may not be imported into the state, exported out of the state, “taken” (i.e., killed), possessed, purchased, or sold without proper authorization. CESA Section 2053 requires that state agencies may not approve projects that will jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy (CDFW 2023). The CESA authorizes that private entities may “take” plant or wildlife species listed as endangered or threatened under the FESA and CESA, pursuant to a federal Incidental Take Permit if the CDFW certifies that the incidental take is consistent with CESA (CFG Code Section 2080.1[a]). For state-only listed species, Section 2081 of CFG Code authorizes the CDFW to issue an Incidental Take Permit for state listed threatened and endangered species if specific criteria are met. “Take” is defined in Section 86 of the California Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” The California ESA allows for take incidental to otherwise lawful development projects.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) serves to: inform governmental decision makers and the public about the potential significant environmental effects of proposed

activities; identify ways that environmental damage can be avoided or significantly reduced; prevent significant, avoidable damage to the environment by requiring feasible project alternatives and mitigation measures; and disclose to the public the reasons for a governmental approval despite the project causing significant environmental effects. Moreover, CEQA affords protections to threatened and endangered species that are not listed on the federal or state list of protected species, and may consider some species as, rare or endangered if the species can be shown to meet certain specified criteria. CEQA Guidelines Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors" (14 CCR 15000 et seq.). A rare animal or plant is defined in CEQA Guidelines Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or …the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the Federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c). CEQA also requires identification of a project's potentially significant impacts on riparian habitats (such as wetlands, bays, estuaries, and marshes) and other sensitive natural communities, including habitats occupied by endangered, rare, and threatened species.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) was enacted in 1977 and allows the Fish and Game Commission to designate native plants as rare or endangered. There are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, unless authorized by CDFW via a permit or other agreement pursuant to the applicable regulations, or under certain other limited circumstances. The CESA of 1984 (Fish and Game Code Section 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the California Fish and Game Code (California Fish and Game Code §§ 1900-1913).

Fully Protected Species

The State of California first began to designate species as "fully protected" prior to the creation of the FESA and the CESA. The designation and protection of fully protected species is established by FGC sections 3511, 4700, 5050, and 5515. Except in very limited circumstances such as pursuant to necessary scientific research, including efforts to recover a species, or an approved Natural Community Conservation Plan (NCCP), fully protected species may not be taken or possessed.

California Fish and Game Code

The California Fish and Game Code regulates the taking of birds, mammals, fish, amphibians, and reptiles, as well as natural resources such as wetlands and waters of the state. According

to Section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. Section 3513 states that is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA. CDFW currently defines an active nest as one that is under construction or in use and includes existing nests that are being modified. For example, if a hawk is adding to, or maintaining an existing stick nest in a tree, then the nest is deemed active and protected under these Fish and Game Code Sections.

In Section 1602 of the Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife. A Streambed Alteration Agreement is required for impacts to jurisdictional wetlands in accordance with Section 1602 of the California Fish and Game Code.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (the Act) is a California state law that was enacted in 1969 to protect and manage the state's water resources. The intent of the Porter–Cologne Water Quality Control Act is to protect water quality and the beneficial uses of water, and it applies to both surface water and groundwater. The Act establishes a framework for regulating discharges of pollutants into the state's waters and provides for the issuance of permits to regulate discharges. Under this Act, the State Water Resources Control Board (SWRCB) develops statewide water quality plans, and the Regional Water Quality Control Boards (RWQCB) develop basin plans that identify beneficial uses, water quality objectives, and implementation plans. The RWQCBs have the primary responsibility to implement the provisions of both statewide and basin plans.

Projects with impacts to jurisdictional waters must demonstrate compliance with the goals of the Act by developing Stormwater Pollution Prevention Plans, Standard Urban Storm Water Mitigation Plans, and other measures to obtain a CWA Section 401 certification.

Under the Porter-Cologne Act, the SWRCB and the RWQCBs have the authority to:

- Regulate the discharge of pollutants into the state's waters.
- Establish water quality objectives and standards for surface waters.
- Develop and implement programs to protect and improve water quality.
- Conduct investigations and take enforcement actions to prevent violations of water quality standards and regulations.
- Regulate the use of groundwater to prevent contamination of surface waters.
- Regulate activities that may impact the quality of the state's waters, such as land use activities and mining operations.

3.3 Local Regulations

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is a long-term conservation plan designed to protect and manage a diverse array of plant and animal species and their habitats in western Riverside County, California. The City of Banning is Permittee to the MSHCP. The MSHCP was developed through a collaborative effort between federal, state, and local agencies, along with conservation groups, landowners, and other stakeholders. The plan covers an area of over 1.26 million acres and provides for the conservation and management of over 146 plant and animal species. The MSHCP includes several conservation measures, such as habitat restoration, enhancement, and creation, as well as the preservation of key wildlife corridors and the acquisition of conservation easements and fee title interests. The MSHCP also includes provisions for monitoring and adaptive management to ensure that the conservation measures are effective in achieving their intended goals.

, Because the City is a Permittee to the MSHCP, the Project must not conflictwith the local adopted habitat conservation plans, such as the MSHCP. An MSHCP Consistency Analysis is provided in Section 6 of this report.

4.0 RESULTS

4.1 Land Uses

The majority of the BSA is characterized by a disturbed and undeveloped vacant lot. In the western boundary of the BSA, there are single-family homes and in the eastern section of the BSA, is Montgomery Creek, a steeply incised channel is present. The northern part of the BSA consists of West Lincoln Street and additional single-family homes (Figure 2).

4.2 Soils

The NRCS Web Soil Survey (USDA 2023) identifies four soil map units in the BSA (Figure 4-USDA Soils). The soils present in the BSA are as follows:

- RaB2 Ramona sandy loam, 2 to 5 percent slopes, eroded
- GyC2 Greenfield sandy loam, 2 to 8 percent slopes, eroded
- TeG Terrace escarpments
- RaC2 Ramona sandy loam, 5 to 8 percent slopes, eroded

4.3 Vegetation and Land Cover Types

The BSA contains a total of four land cover types and vegetation communities; including, Urban/Developed lands, Disturbed habitat, Riversidian Alluvial Fan Sage Scrub, and Unvegetated Channel (Figure 5-Vegetation Communities and Land Cover Types). These land cover types and vegetation communities are summarized in Table 2 and discussed below. (Representative photos are provided in Appendix B).

Table 2. Vegetation Communities and Land Cover Types in BSA

Vegetation Community/ Land Cover Type	Total (acres)
Urban/Developed (URB/DEV)	1.88
Disturbed Habitat (DH)	2.56
Riversidian Alluvial Fan Sage Scrub (RAFSS)	0.06
Unvegetated Channel (UVC)	0.03
Total	**4.53**

Urban/Developed Lands (DEV)

According to Holland (1986), urban/developed lands refer to areas that have undergone construction or significant physical alterations, to an extent that native vegetation is no longer supported. These lands are typically characterized by the presence of permanent or semi-

permanent structures, pavement, hardscape, and landscaped areas featuring various ornamental plants.

Urban/developed lands occupy approximately 1.88-acres in the BSA. These lands are characterized by single-family residences, a paved roadway (i.e., West Lincoln Street), and ornamental plantings.

Disturbed Habitat (DH)

Disturbed Habitat refers to areas that have not been developed but have experienced physical disturbances caused by human activities. These areas still retain a soil substrate and are primarily covered by non-native species (Holland 1986).

A total of 2.56-acres of Disturbed Habitat dominates the BSA. Disturbed Habitat within the BSA is characterized by bare and gravel grounds with an herbaceous cover dominated by non-native species, such as, foxtail brome (*Bromus rubens*), dove weed (*Croton setiger*), horse weed (*Erigeron canadensis*) short-pod mustard (*Hirschfeldia incana*), foxtail barley (*Hordeum murinum*), and *Erodium spp*. Areas mapped as Disturbed Habitat within the BSA show evidence of repeated mowing.

Riversidian Alluvial Fan Sage Scrub (RAFSS)

Riversidian alluvial fan sage scrub (RAFSS) usually occurs on alluvial fans in southern California, particularly in Riverside and San Diego counties. This variant of sage scrub is adapted to the unique conditions found on alluvial fans, which typically have well-drained, rocky soils.

A total of 0.06-acre of RAFSS occurs in the BSA within the banks of Montogomery Creek and none is present in the Project footprint. This community is dominated by California buckwheat, California sage brush, and an occasional single scale broom (*Lepidospartum squamatum*).

Unvegetated Channel (UVC)

Unvegetated channel refers to a sandy, gravelly, or rocky area along waterways or flood channels where vegetation does not typically grow on a permanent basis. The presence of variable water lines inhibits the establishment and growth of vegetation, although some weedy grass species may be found along the outer edges of the channel. Vegetation cover in these areas is usually less than 10% (Holland 1986).

A total of 0.03-acre of unvegetated channel occurs in the BSA as the bed of Montgomery Creek and none occurs in the Project footprint.

4.4 Common Plants

Common plant species observed in the BSA were typical of disturbed habitat and included: foxtail brome, dove weed, horse weed, short-pod mustard, foxtail barley, *Erodium spp*., and occasional patches of California buckwheat and California sagebrush.

4.5 Common Wildlife

Common wildlife species observed in the BSA during the field assessment include, American crow (*Corvus brachyrhynchos*), mourning dove (*Zenaida macroura*), western fence lizard (*Sceloporus occidentalis*), house finch (*Haemorhous mexicanus*), and song sparrow (*Melospiza melodia*).

4.6 Jurisdictional Non-Wetland Waters and Wetlands

Montgomery Creek (Creek), an ephemeral channel exhibiting steeply incised banks, traverses the eastern portion of the BSA (Figure-5). This feature is considered an MSHCP riverine resource which is also discussed in Section 6.3.1 of this report. Within this reach, the Creek exhibits eroded banks with vertical spans surpassing 25 feet, while active flood plain maintains an average width of approximately 4 feet. The Creek's southern ingress into the BSA is facilitated by two 3-foot corrugated steel culverts originating beneath West Lincoln Road. The Creek intersects the BSA, however it should be noted that the Creek is absent from the Project footprint and therefore no impacts are anticipated to this feature.

4.7 Special-Status Biological Resources

4.7.1 Sensitive Vegetation Communities

The CDFW assesses the rarity of vegetation communities, also known as natural communities, using the NatureServe's Heritage Methodology. This methodology evaluates communities at both the global level, encompassing their full natural range within and outside of California, and the state level, focusing specifically on their occurrence within California. Each community is assigned a single rank, denoted as G (global) and S (state), on a scale of 1 to 5. A rank of 1 indicates a community that is very rare and threatened, while a rank of 5 signifies a community that is demonstrably secure.

When a vegetation community receives a Rarity Ranking of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable), the CDFW considers it a sensitive natural community. These sensitive communities are to be addressed during the environmental review process of CEQA and its equivalent regulations.

Vegetation community descriptions used by the CDFW follow the National Vegetation Classification System (NVCS) using the Manual of California Vegetation (MCV), 2nd Edition (Sawyer et al. 2009). The MCV classifies vegetation communities based on floristic and structural details that are represented as alliances and associations. Vegetation communities mapped within the BSA, and described within this report, follow the descriptions and classifications as defined in Holland (1986). However, all Holland (1986) classifications used in this report were translated to the comparable classification unit under MCV to determine the sensitivity of the vegetation community being analyzed. If a natural community described under Holland (1986) did not have an appropriate direct translation within MCV, then professional judgement was used by the biologist to find the best corresponding association or alliance that would not jeopardize the conservation value of the vegetation community being analyzed.

RAFSS is classified as a sensitive vegetation community with a state ranking of S3 and a global ranking of G3. Due to its sensitivity, any potential impacts to this community would necessitate mitigation measures. However, no impacts are anticipated on this community as a result of the Project implementation.

4.7.2 Special-Status Plant Species

Special status plant species are defined herein as, plants listed or proposed for listing as threatened or endangered under the FESA or candidates for possible future listing as threatened or endangered under the FESA; plants considered by CDFW to be "rare, threatened or endangered in California", which includes plants tracked by the CNDDB and the CNPS as CRPR 1 or 2; plants that may warrant consideration on the basis of declining trends, recent taxonomic information, or other factors, which may include plants tracked by the CNDDB and CNPS as CRPR 3 or 4; and plants considered locally significant or plants that are not rare from a statewide perspective but are rare or uncommon in a local context such as within a county or region, or as designated in local or regional plans (e.g., MSHCP), policies, or ordinances.

No special-status plant species were observed during the general habitat assessment. Most of the BSA and all of the impact footprint is composed of disturbed lands that lack suitable habitat for special-status plants.

4.7.3 Special-Status Wildlife Species

Special-status wildlife species are defined herein as, animal species listed or proposed for listing as threatened or endangered under the FESA or candidates for possible future listing as threatened or endangered under the FESA; animals considered by CDFW to be "rare, threatened, endangered, or a SSC in California", which includes animals tracked by the CNDDB; and, animals considered locally significant in local or regional plans, policies, or ordinances.

No special-status wildlife species were observed during the habitat assessment and no special-status wildlife species are expected to occur.

4.8 Nesting Birds

The Project footprint does not contain vegetation that could provide suitable nesting habitat for bird species protected under the MBTA and the Fish and Game Code. There are no trees or bushes within the Project footprint. Ground nesters are unlikely on the Project because of the regular frequency of mowing that occurs on the Project footprint. Limited suitable vegetation for foraging is within the Creek but are few in number and spread out. Because of the regular frequency of mowing and lack of brush or trees, nesting birds are not expected to occur in the BSA.

4.9 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that join large spans of natural open space that enable the movement of animals throughout the landscape. Habitat linkages are areas that provide connectivity between habitat patches as well as opportunities for foraging, reproduction, and dispersal habitat for plants and animals. Habitat linkages help minimize the effects of habitat fragmentation as they function as steppingstones for wildlife dispersal.

The Project site is not located within designated wildlife corridors or habitat linkages identified in the South Coast Missing Linkages analysis conducted by South Coast Wildlands (2008). The proposed Project is located within the disturbed lands that are adjacent to a predominantly urban landscape. Because the Project is not located in or adjacent to an MSHCP Conservation area and no MSHCP linkages are identified in the Project area.

5.0 IMPACTS ANALYSIS

The purpose of the impact analysis presented in this report is to identify potential direct and indirect impacts that may arise from the implementation of the Project. The analysis has been conducted in accordance with the requirements of CEQA and the MSHCP.

Pursuant to the CEQA Guidelines, three types of impacts or effects are defined:

Direct impacts, also known as primary effects, are actions caused by the Project that occur at the same time and place. These impacts involve the loss, modification, or disturbance of habitats, directly affecting the flora and fauna within those habitats. Additionally, direct impacts encompass the destruction of individual plants or animals. Permanent impacts are direct impacts.

Indirect impacts, also referred to as secondary effects, are reasonably foreseeable and caused by the Project but occur at different times or locations. The CEQA Guidelines describe indirect impacts as follows: "An indirect physical change in the environment is a physical change... which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect change in the environment" (Section 15064 (d)(2)). Examples of indirect impacts include increased ambient levels of noise or light, predation by domestic pets, competition with exotic plants and animals, introduction of toxins (including pesticides), and human disturbances such as hiking, off-road vehicle use, or unauthorized dumping.

Cumulative impacts or effects refer to the combined effects of two or more individual impacts that, when considered together, are substantial or contribute to the amplification of other environmental impacts. Cumulative impacts can arise from multiple effects of the same Project or from several different projects. They can result from individually minor but collectively significant actions occurring over a period of time.

The impact analysis in this report examines these three types of impacts to provide a comprehensive understanding of the potential consequences associated with the Project. Permanent and temporary impacts to vegetation communities and land cover types as a result of Project implementation are quantified and summarized in Table 3 (Figure 5).

Table 3. Summary of Impacts to Vegetation Communities and Land Cover Types

Vegetation Community / Land Cover Type	Permanent (acre)	Temporary (acre)	Total
Urban/Developed (URB/DEV)	0.09	0.01	0.1
Disturbed Habitat (DH)	0.39	0.90	1.29
Total Project Footprint	**0.48**	**0.91**	**1.39**

5.1 Impacts to Vegetation Communities and Land Cover Types

5.1.1 Direct Impacts

As shown in Table 3, the Project footprint supports two of the four land cover types and vegetation communities within the BSA: Urban/Developed lands and Disturbed Habitat. Neither of these vegetation habitat types are considered sensitive. Permanent impacts total 0.48 acre and temporary impacts total 0.91 acre within these land cover types.

5.1.2 Indirect Impacts

No indirect impacts outside of the Project footprint, within the BSA, are anticipated to occur to sensitive vegetation communities. Although approximately 0.06-acre of RAFSS related to Montgomery Creek occurs in the BSA, the project permanent and temporary impact areas do not affect the RAFSS.

To ensure construction activities avoid the RAFSS associated with Montgomery Creek, recommendation **BIO-1** (Temporary Exclusionary/Construction Fencing) is provided in Section 7 of this report. This measure will minimize the risk of accidental impacts to the RAFFS within the BSA.

5.2 Impacts to Special-Status Plant Species

5.2.1 Direct Impacts

As shown in Table 3, Project impacts affect Urban/Developed lands and Disturbed Habitat, which do not provide suitable habitat for special-status plants. In addition, no special-status plants were identified during the biological assessment or focused wildlife surveys conducted within the Project footprint. Therefore, no direct impacts are expected to occur to special-status plant species because of Project implementation.5.2.2 Indirect Impacts

No special-status plants occur in the Project within the Project BSA. As such, no indirect impacts are anticipated to occur to special-status plants.

5.3 Impacts to Special-Status Wildlife Species

5.3.1 Direct Impacts

No special-status wildlife species were observed during the habitat assessment and no special-status wildlife species are expected to occur given the disturbed nature of the site and associated habitat types. Therefore, no direct impacts to special status wildlife are expected to occur.

5.3.2 Indirect Impacts

No special-status wildlife species were observed during the habitat assessment and no special-status wildlife species are expected to occur within the BSA. Therefore, no indirect impacts are expected to occur to special status wildlife species.

5.4 Impacts to Jurisdictional Non-Wetland Waters and Wetlands

5.4.1 Direct Impacts

No potentially jurisdictional waters occur in the Project footprint. Therefore, no direct impacts are anticipated.

5.4.2 Indirect Impacts

Montgomery Creek occurs in the BSA. Therefore, indirect impacts to Montgomery Creek could occur as a result of Project implementation if Project activities stray outside the Project footprint and the appropriate measures are not taken. As such, Recommendations **BIO-1** (Temporary Exclusionary/Construction Fencing) and **BIO-2** (Construction Best Management Practices) are included in Section 7.0 to avoid indirect impacts to Montgomery Creek.

5.5 Impacts to Wildlife Corridors and Habitat Linkages

5.5.1 Direct Impacts

No wildlife corridors or linkages occur within the Project footprint or BSA. As such, no direct impacts or interferences are anticipated to occur to wildlife corridors and habitat linkages.

5.5.2 Indirect Impacts

No wildlife corridors or linkages occur within the BSA. As such, no indirect impacts or indirect interferences are anticipated to occur to wildlife corridors and habitat linkages.

5.6 Impacts to Nesting Birds

No suitable habitat for nesting birds is located within the BSA, including the Project footprint. Ground nesters are not expected in the Project footprint because of frequent mowing. There is limited suitable habitat for foraging birds within the Creek. Because Project impacts are limited to the Project footprint and the quality of vegetation is scarce in the Creek and more suitable for foraging then nesting, no impacts to nesting birds are anticipated to occur.

5.7 Cumulative Impacts

It is anticipated that the proposed Project will not result in cumulative impacts on the biological resources within the Project area or the surrounding region. This conclusion is based on several factors. Firstly, the Project is situated within an already established semi-urban environment where urban and developed lands dominate. Secondly, the impacts associated with the Project will occur in existing disturbed lands. Therefore, the overall cumulative effects on the biological resources are expected to be minimal.

6.0 REGIONAL RESOURCE PLANNING / MSHCP CONSISTENCY ANALYSIS

To check consistency of the proposed Project with the MSHCP, a consistency analysis was conducted as part of this BTR. Shapefiles obtained from the Riverside County Mapping Portal (Riverside 2023) were downloaded and integrated into GIS to determine if the Project site falls within the MSHCP Criteria Area, Public/Quasi Public Lands (PQP Lands), or intersects with any required biota survey areas, including Sub Area Plan boundaries.

6.1 Reserve Assembly Analysis

The Project is a Public Project (Permittee-sponsored) and does not occur in the Criteria Area; therefore, a Reserve Assembly Analysis is not required. The Project will not conflict with Section 3.0 of the MSCHP.

6.2 Public Quasi-Public Lands in Reserve Assembly Analysis

The proposed Project does not occur in, or adjacent to, PQP Lands. No direct or indirect impacts will occur to PQP lands.

6.3 Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools (MSHCP Section 6.1.2)

6.3.1 Riparian / Riverine

Riparian/riverine areas are lands which contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year (MSHCP 2004).

Results: Riparian/riverine resources were assessed during the biological assessment in the Project footprint and BSA, as described in Section 2.2 of this report. No riparian/riverine resources are present in the Project impact footprint and therefore no direct impacts to MSHCP riparian habitat are anticipated. However, riverine resources (i.e., Montgomery Creek with 0.06-acre of RAFSS) do occur in the Project BSA outside of the direct impact footprint and could be subject to indirect impacts if Project activities stray outside the Project footprint. No riparian habitat is within the Project footprint and BSA. Recommendations **BIO-1** and **BIO-2** are included in Section 7.0 to avoid indirect impacts to riparian/riverine resources. Therefore, because no impacts directly or indirectly are proposed to Montgomery Creek which is the area of the BSA that has riverine resources, no DBESP or mitigation is necessary.

6.3.2 Vernal Pools

Vernal pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (i.e., soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or

vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetland plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season.

Results: The project site does not support soils or plants suitable to support vernal pools. Additionally, no areas of seasonal ponding identified during aerial photo reviews, nor vernal pools were identified in the Project footprint or the BSA during the site investigation. Therefore, no direct or indirect impacts are expected to occur.

6.3.3 Fairy Shrimp

No vernal pools or other suitable fairy shrimp habitat (i.e., ponding or suitable soils) were found in the Project footprint or BSA during the site investigation and historical aerial reviews. Therefore, fairy shrimp surveys were not conducted as part of the Project evaluation due to the absence of suitable habitat. No impacts to listed fairy shrimp species are expected to occur.

6.3.4 Riparian Birds

No suitable habitat is present for riparian bird species (i.e., least Bell's vireo, southwestern willow flycatcher, or yellow-billed cuckoo) in the Project footprint or BSA. Therefore, no direct or indirect impacts are expected to occur to riparian birds.

6.4 Narrow Endemic Plant Species (MSHCP Section 6.1.3)

The Project footprint and BSA are not located in a Narrow Endemic Plant Species Survey Area. Therefore, the Project would not conflict with Section 6.1.3 of the MSHCP.

6.5 Additional Survey Needs and Procedures (MSHCP Section 6.3.2)

6.5.1 Criteria Area Plant Species

The proposed Project footprint and BSA is not located in a Section 6.3.2 mapped survey area for Criteria Area Plant species. Therefore, the Project would not conflict with Section 6.3.2 of the MSHCP.

6.5.2 Amphibians

The proposed Project footprint and BSA is not located in a survey area for amphibians. Therefore, the Project would not conflict with Section 6.3.2 of the MSHCP, addressing amphibians.

6.5.3 Burrowing Owl

The proposed Project footprint and BSA is not located in a survey area for burrowing owl. Therefore, the Project would not conflict with Section 6.3.2 of the MSHCP.

6.5.4 Mammals

The proposed Project footprint and BSA is not located in a survey area for mammals. Therefore, the Project would not conflict with Section 6.3.2 of the MSHCP.

6.6 Information on Other Species

6.6.1 Delhi Sands Flower Loving Fly

The proposed Project is not located within an area with mapped Delhi soils. No suitable habitat is present for this species within the BSA or Project footprint. Therefore, the Project would not conflict with Section 6.3.2 of the MSHCP, addressing the Delhi sands flower-loving fly.

6.6.2 Coastal California Gnatcatcher

The BSA contains RAFSS; however, the Project footprint does not contain RAFSS, therefore suitable habitat for coastal California gnatcatcher will not be directly or indirectly impacted and the Project would not conflict with Section 6.3.2 of the MSHCP.

6.6.3 Species Not Adequately Covered

No suitable habitat for the MSHCP Table 9-3 species (a total of 28 species) is present on the Project site, and none of the species were observed on the Project footprint or BSA during the field investigation. Therefore, the Project would not directly or indirectly impact species not adequately covered listed in Table 9-3.

6.7 Guidelines Pertaining to the Urban/Wildlands Interface (MSHCP Section 6.1.4)

The proposed Project does not have any adjacency or on-site connection to existing MSHCP Conservation areas or lands designated for conservation purposes. The Project will not conflict with Section 6.1.4 of the MSHCP.

6.8 Construction Guidelines (MSHCP Section 7.5.3)

The Project is not located in the Criteria Area or PQP Lands, therefore the construction guidelines of Section 7.5.3 are not applicable.

6.9 Best Management Practices (MSHCP Volume I, Appendix C)

The Best Management Practices (BMPs) listed in MSHCP Volume 1, Appendix C and replicated below, are applicable to all projects.

1. A condition shall be placed on grading permits requiring a qualified biologist to conduct a training session for project personnel prior to grading. The training shall include a description of the species of concern and its habitats, the general provisions of the Endangered Species Act (Act) and the MSHCP, the need to adhere to the provisions of

the Act and the MSHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

2. Water pollution and erosion control plans shall be developed and implemented in accordance with RWQCB requirements.

3. The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible.

4. The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.

5. Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.

6. Projects that cannot be conducted without placing equipment or personnel in sensitive habitats should be timed to avoid the breeding season of riparian identified in MSHCP Global Species Objective No. 7.

7. When stream flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing of other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments offsite. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from reentering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.

8. Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including but not limited to applicable jurisdictional city, FWS, and CDFG, RWQCB and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

9. Erodible fill material shall not be deposited into water courses. Brush, loose soils, or other similar debris material shall not be stockpiled within the stream channel or on its banks.

10. The qualified project biologist shall monitor construction activities for the duration of the project to ensure that practicable measures are being employed to avoid incidental disturbance of habitat and species of concern outside the project footprint.

11. The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species.

12. Exotic species that prey upon or displace target species of concern should be permanently removed from the site to the extent feasible.

13. To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s).

14. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.

15. The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions including these BMPs.

7.0 RECOMMENDATIONS

BIO-1 Temporary Exclusionary/Construction Fencing

To protect Montgomery Creek sensitive habitats (RAFSS) and the riverine habitat which are adjacent to the Project footprint, within the BSA, temporary exclusionary construction fencing will be installed at the Project footprint boundary where they are adjacent to Montgomery Creek with the Project Biologist present to ensure the fencing is placed in the correct areas of the site (see Figure 6 – Exclusionary Fencing of this report). The purpose of fencing shall be to prevent disturbances to adjacent sensitive habitats and to avoid the spread of debris from the construction zone into adjacent areas.

BIO-2 Construction Best Management Practices

Implement appropriate Best Management Practices (BMPs) to control erosion, manage stormwater runoff, and minimize the release of pollutants. Examples of BMPs include sediment and erosion control measures, including fiber rolls and silt fencing placed around off-site aquatic features in a manner to deter sediment deposition and potential pollutant run-off.

Implement measures to prevent the discharge of pollutants into storm drains or nearby water bodies. This may include proper storage and handling of construction materials, spill prevention and response procedures, and regular site clean-up.

Provide training to construction personnel in BMP implementation, and the importance of preventing pollution. Ensure all employees are aware of their responsibilities in implementing BMPs for stormwater protection.

Establish procedures for monitoring the effectiveness of the SWPP plan, including regular inspections, and reporting any incidents or deviations from the plan. Make necessary adjustments to the plan as needed.

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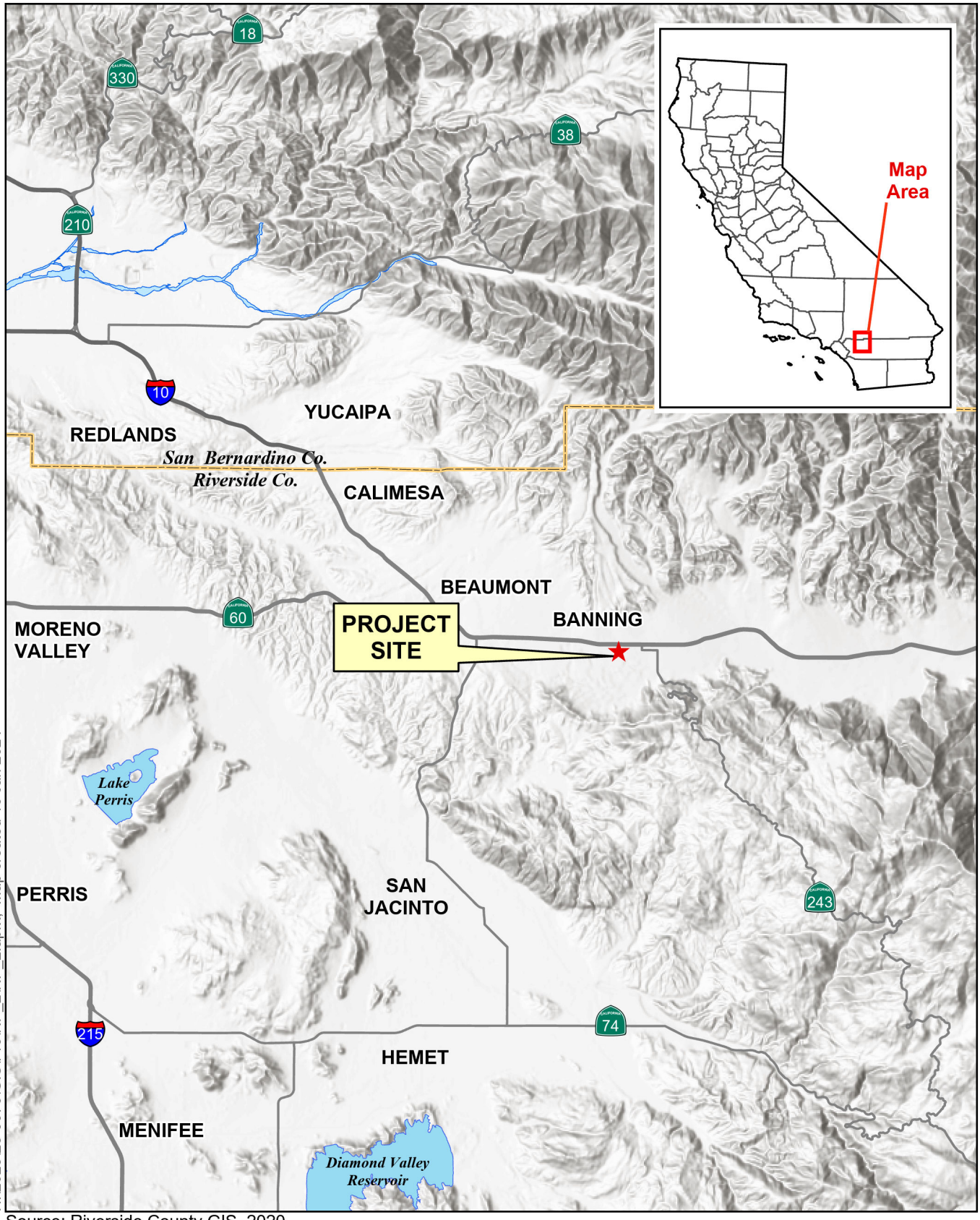
APPENDIX A



Source: Riverside County GIS, 2020

0 2 4 6 Miles

Figure 1 - Regional Map

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES

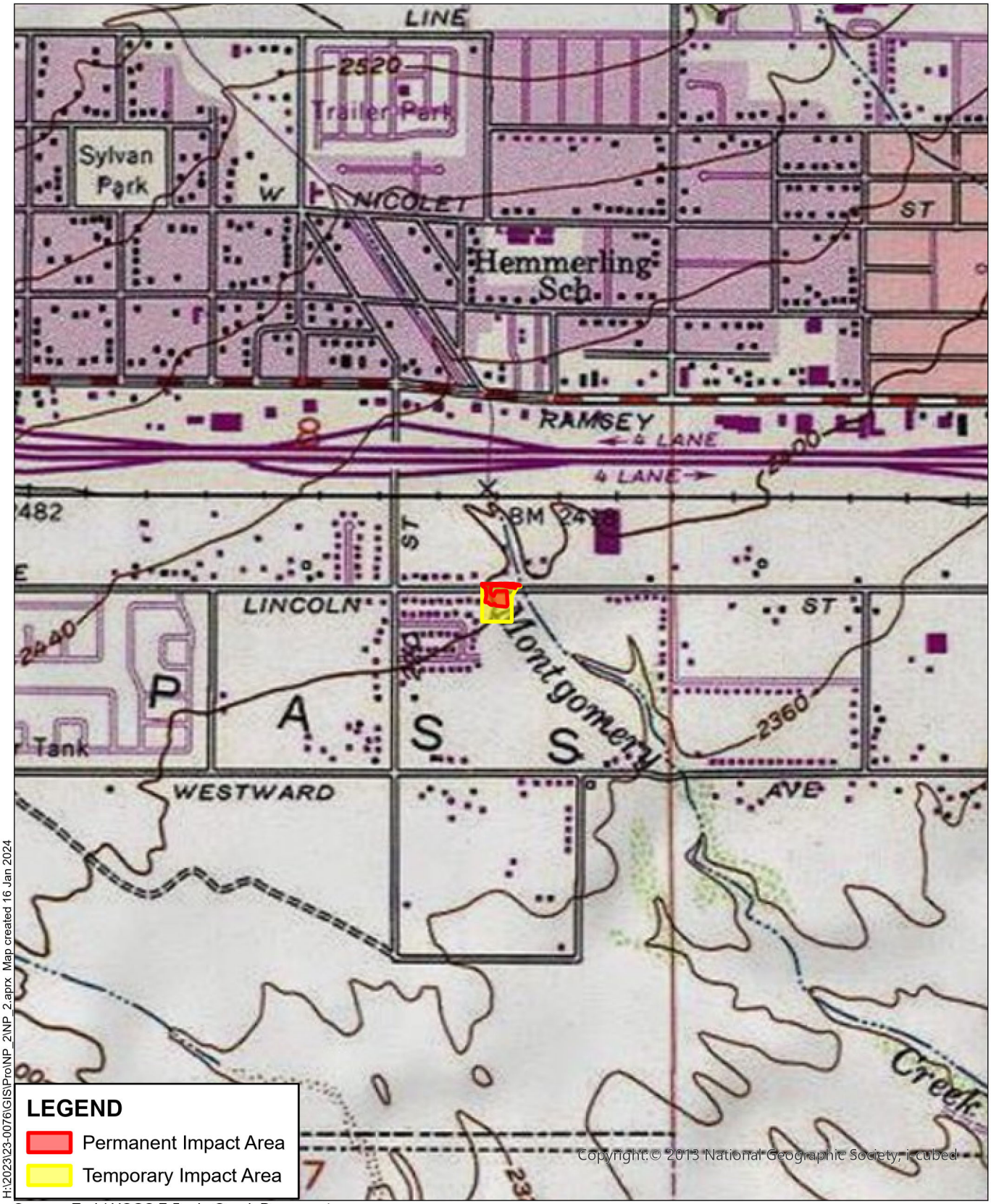
Source: Esri imagery, 2024.

Figure 2 - Vicinity Map

NP-2 Booster Pump Station and Reservoir Project

0 500 1,000 1,500 Feet

ALBERT A. WEBB ASSOCIATES



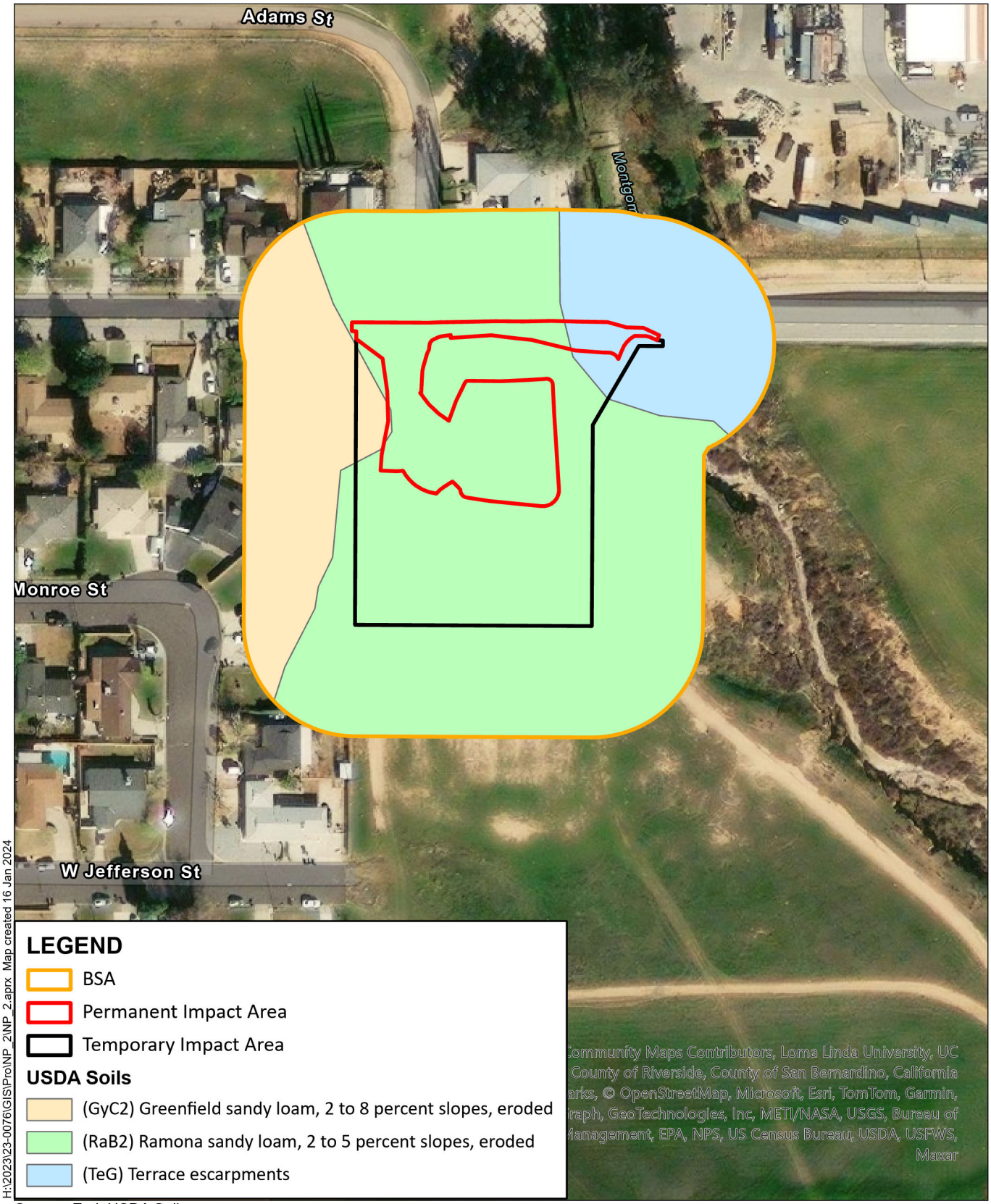
Source: Esri / USGS 7.5 min Quad: Beaumont,
Township: 3, Section: 8, Range: 1.

0 500 1,000 1,500 Feet

Figure 3 - USGS Map

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES



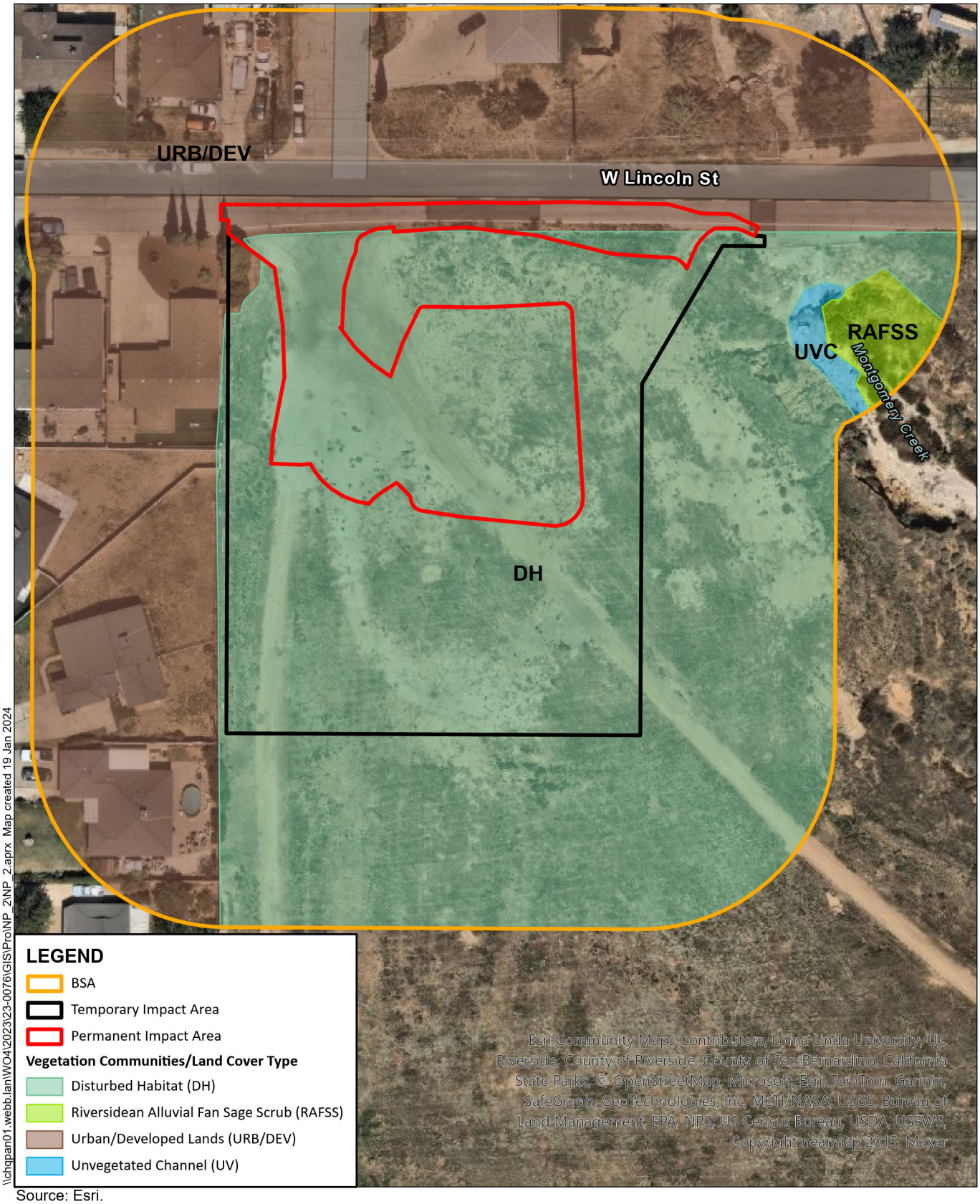
Source: Esri, USDA Soils.

0 100 200 300 Feet

Figure 4 - Soils Map

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES



Source: Esri.

Figure 5 - Vegetation Communities and Land Cover Types

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES

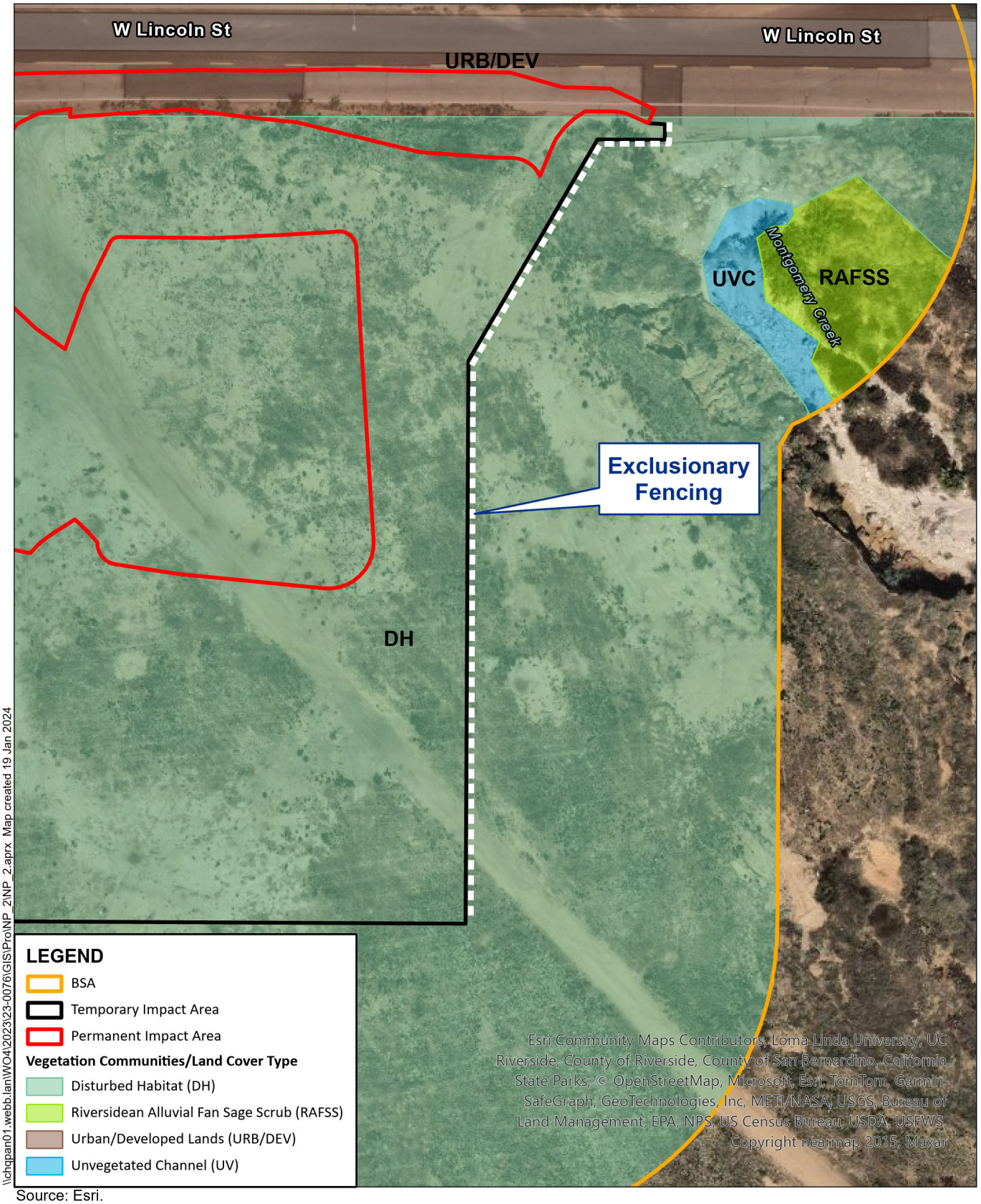
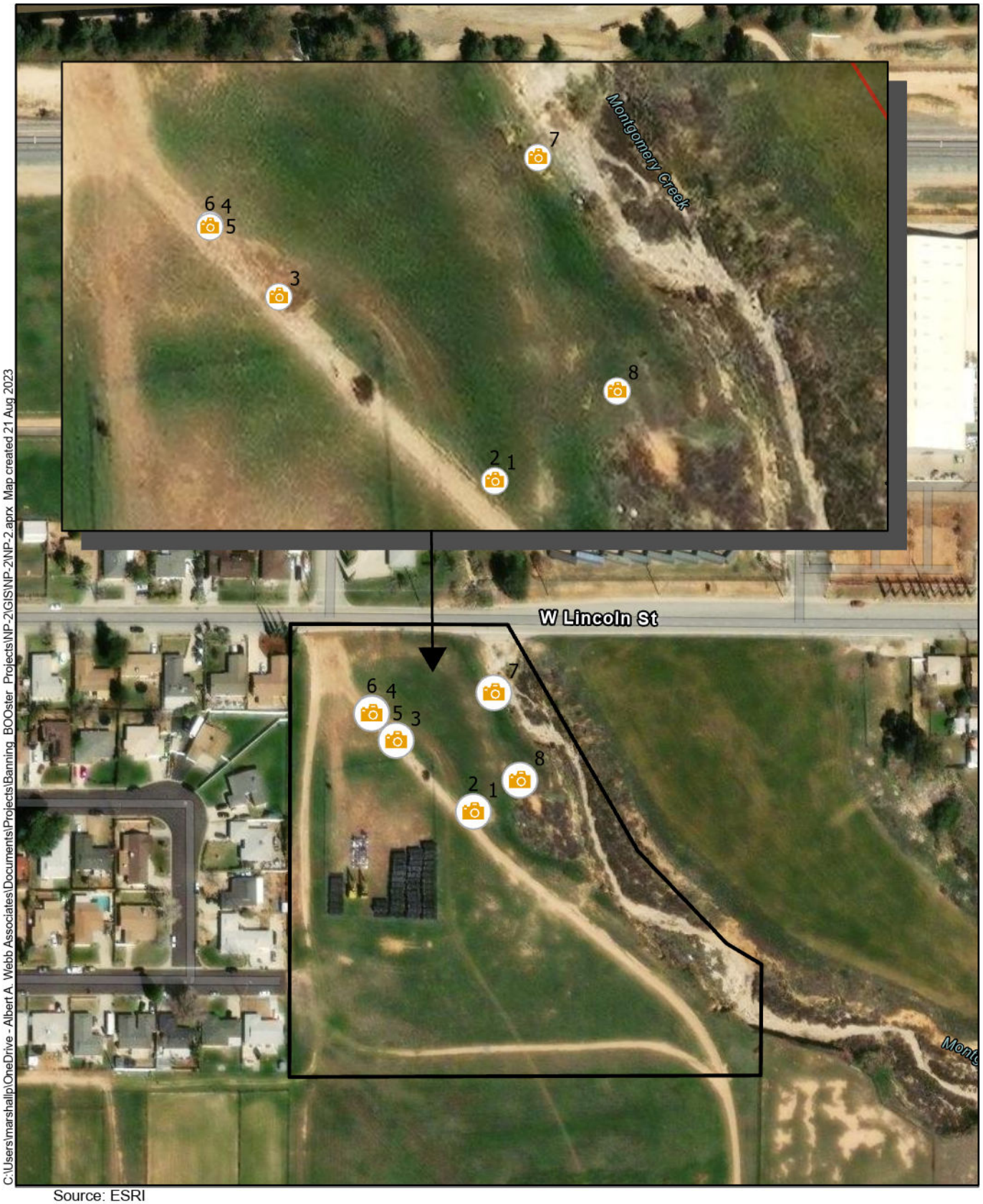


Figure 6 - Exclusionary Fencing

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES

APPENDIX B



C:\Users\marshallp\OneDrive - Albert A. Webb Associates\Documents\Projects\Banning_BOOster_Projects\NP-2\GIS\NP-2\NP-2.aprx Map created 21 Aug 2023

Source: ESRI

not to scale

Appendix B-Photograph Index

NP-2 Booster Pump Station and Reservoir Project

ALBERT A. WEBB ASSOCIATES

Albert A. Webb Associates PHOTOGRAPHIC RECORD	
Client: City of Banning	**Job Number:** 2023-0076
Site Name: NP-2 Booster Pump Station and Reservoir Project	**Location:** Banning CA
Photographer: Marshall Paymard	**Date:** June 2, 2023

Photograph No. 1

Photo 1: Facing northwest in disturbed habitat.

Photograph No. 2

Photo 2: Facing west in disturbed habitat.

Albert A. Webb Associates PHOTOGRAPHIC RECORD	
Client: City of Banning	**Job Number:** 2023-0076
Site Name: NP-2 Booster Pump Station and Reservoir Project	**Location:** Banning CA
Photographer: Marshall Paymard	**Date:** June 2, 2023

Photograph No. 3

Photo 3: Facing west. View of disturbed habitat and urban/developed.

Photograph No. 4

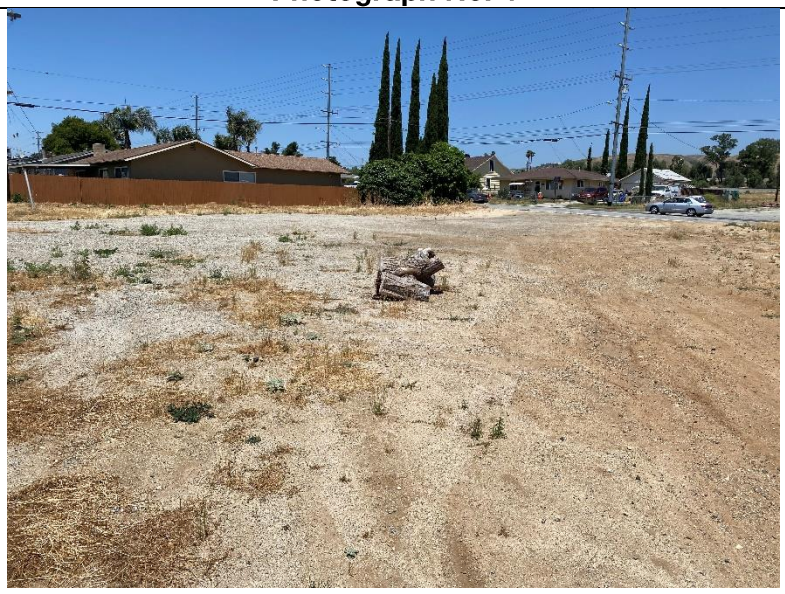


Photo 4: Facing northwest. View of disturbed habitat and urban/developed.

Albert A. Webb Associates PHOTOGRAPHIC RECORD	
Client: City of Banning	**Job Number:** 2023-0076
Site Name: NP-2 Booster Pump Station and Reservoir Project	**Location:** Banning CA
Photographer: Marshall Paymard	**Date:** June 2, 2023

Photograph No. 5

Photo 5: Facing south west. View of disturbed habitat and urban/developed.

Photograph No. 6

Photo 6: Facing east. View of disturbed habitat and urban/developed

Albert A. Webb Associates PHOTOGRAPHIC RECORD	
Client: City of Banning	**Job Number:** 2023-0076
Site Name: NP-2 Booster Pump Station and Reservoir Project	**Location:** Banning CA
Photographer: Marshall Paymard	**Date:** June 2, 2023

Photograph No. 7

Photo 7: Facing south. View of disturbed habitat channel bank

Photograph No. 8

Photo 8: Facing south. View of Riversidean sage scrub and channel.

APPENDIX C

Appendix C: Special-Status Plant Species Evaluated

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Abronia villosa var. aurita/ chaparral sand-verbena	1B.1/None/None	(Jan)Mar-Sep/ 245-5250	Chaparral, Coastal scrub, Desert dunes. Sandy	Not expected to occur. No suitable habitat present.
Acanthoscyphus parishii var. cienegensis/ Cienega Seca oxytheca	1B.3/None/None	(May)Jun-Sep/ 6905-8040	Joshua tree "woodland", Pinyon and juniper woodland, Upper montane coniferous forest (granitic, sandy).	Not expected to occur. No suitable habitat present.
Allium marvinii/ Yucaipa onion	1B.2/None/None	Apr-May/ 2495-3495	Chaparral (clay, openings).	Not expected to occur. No suitable habitat present.
Antennaria marginata/ white-margined everlasting	2B.3/None/None	May-Aug/ 6955-11000	Lower montane coniferous forest, Upper montane coniferous forest.	Not expected to occur. No suitable habitat present.
Arenaria lanuginosa var. saxosa/ rock sandwort	2B.3/None/None	Jul-Aug/ 4775-8530	Subalpine coniferous forest, Upper montane coniferous forest. Mesic, Sandy	Not expected to occur. No suitable habitat present.
Astragalus hornii var. hornii/ Horn's milk-vetch	1B.1/None/None	May-Oct/ 195-2790	Meadows and seeps, Playas. Alkaline, Lake Margins	Not expected to occur. No suitable habitat present.
Astragalus lentiginosus var. borreganus/ Borrego milk-vetch	4.3/None/None	Feb-May/ 100-2935	Mojavean desert scrub, Sonoran desert scrub. Sandy	Not expected to occur. No suitable habitat present.
Astragalus lentiginosus var. coachellae/ Coachella Valley milk-vetch	1B.2/None/FE	Feb-May/ 130-2150	Desert dunes, Sonoran desert scrub (sandy).	Not expected to occur. No suitable habitat present.
Astragalus pachypus var. jaegeri/ Jaeger's milk-vetch	1B.1/None/None	Dec-Jun/ 1200-3200	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Rocky (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Atriplex coronata var. notatior/ San Jacinto Valley crownscale	1B.1/None/FE	Apr-Aug/ 455-1640	Playas, Valley and foothill grassland (mesic), Vernal pools. Alkaline	Not expected to occur. No suitable habitat present.
Atriplex parishii/ Parish's brittlescale	1B.1/None/None	Jun-Oct/ 80-6235	Chenopod scrub, Playas, Vernal pools. Alkaline	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Atriplex serenana var. davidsonii/ Davidson's saltscale	1B.2/None/None	Apr-Oct/ 35-655	Coastal bluff scrub, Coastal scrub. Alkaline	Not expected to occur. No suitable habitat present.
Boechera parishii/ Parish's rockcress	1B.2/None/None	Apr-May/ 5805-9810	Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. Carbonate (sometimes), Rocky	Not expected to occur. No suitable habitat present.
Boechera peirsonii/ San Bernardino rockcress	1B.2/None/None	Mar-Aug/ 8860-10500	Subalpine coniferous forest (rocky).	Not expected to occur. No suitable habitat present.
Botrychium crenulatum/ scalloped moonwort	2B.2/None/None	Jun-Sep/ 4160-10760	Bogs and fens, Lower montane coniferous forest, Marshes and swamps (freshwater), Meadows and seeps, Upper montane coniferous forest.	Not expected to occur. No suitable habitat present.
Brodiaea filifolia/ thread-leaved brodiaea	1B.1/CE/FT	Mar-Jun/ 80-3675	Chaparral (openings), Cismontane woodland, Coastal scrub, Playas, Valley and foothill grassland, Vernal pools. Clay (often)	Not expected to occur. No suitable habitat present.
Calochortus palmeri var. palmeri/ Palmer's mariposa-lily	1B.2/None/None	Apr-Jul/ 2330-7840	Chaparral, Lower montane coniferous forest, Meadows and seeps. Mesic	Not expected to occur. No suitable habitat present.
Calochortus plummerae/ Plummer's mariposa-lily	4.2/None/None	May-Jul/ 330-5580	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland. Granitic, Rocky	Not expected to occur. No suitable habitat present.
Castilleja lasiorhyncha/ San Bernardino Mountains owl's-clover	1B.2/None/None	May-Aug/ 4265-7840	Chaparral, Meadows and seeps, Pebble (Pavement) plain, Riparian woodland, Upper montane coniferous forest. Mesic	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Castilleja montigena/ Heckard's paintbrush	4.3/None/None	May-Aug/ 6400-9185	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest.	Not expected to occur. No suitable habitat present.
Caulanthus simulans/ Payson's jewelflower	4.2/None/None	(Feb)Mar-May (Jun)/ 295-7220	Chaparral, Coastal scrub. Granitic, Sandy	Not expected to occur. No suitable habitat present.
Centromadia pungens ssp. laevis/ smooth tarplant	1B.1/None/None	Apr-Sep/ 0-2100	Chenopod scrub, Meadows and seeps, Playas, Riparian woodland, Valley and foothill grassland. Alkaline	Not expected to occur. No suitable habitat present.
Chorizanthe leptotheca/ Peninsular spineflower	4.2/None/None	May-Aug/ 985-6235	Chaparral, Coastal scrub, Lower montane coniferous forest. Granitic	Not expected to occur. No suitable habitat present.
Chorizanthe parryi var. parryi/ Parry's spineflower	1B.1/None/None	Apr-Jun/ 900-4005	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Openings, Rocky (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Chorizanthe xanti var. leucotheca/ white-bracted spineflower	1B.2/None/None	Apr-Jun/ 985-3935	Coastal scrub (alluvial fans), Mojavean desert scrub, Pinyon and juniper woodland. Gravelly (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Deinandra mohavensis/ Mojave tarplant	1B.3/CE/None	(Jan-May) Jun-Oct/ 2100-5250	Chaparral, Coastal scrub, Riparian scrub. Mesic	Not expected to occur. No suitable habitat present.
Deinandra paniculata/ paniculate tarplant	4.2/None/None	(Mar)Apr-Nov/ 80-3085	Coastal scrub, Valley and foothill grassland, Vernal pools. Sandy (sometimes), Vernally Mesic (usually)	Not expected to occur. No suitable habitat present.
Delphinium parishii ssp. subglobosum/ Colorado Desert larkspur	4.3/None/None	Mar-Jun/ 1970-5905	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Sonoran desert scrub.	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Delphinium parryi ssp. purpureum/ Mt. Pinos larkspur	4.3/None/None	May-Jun/ 3280-8530	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland.	Not expected to occur. No suitable habitat present.
Diplacus clevelandii/ Cleveland's bush monkeyflower	4.2/None/None	Apr-Jul/ 1475-6560	Chaparral, Cismontane woodland, Lower montane coniferous forest. Disturbed areas (often), Gabbroic, Openings, Rocky	Not expected to occur. No suitable habitat present.
Diplacus johnstonii/ Johnston's monkeyflower	4.3/None/None	May-Aug/ 3200-9580	Lower montane coniferous forest (disturbed areas, gravelly, roadsides, rocky, scree).	Not expected to occur. No suitable habitat present.
Dodecahema leptoceras/ slender-horned spineflower	1B.1/CE/FE	Apr-Jun/ 655-2495	Chaparral, Cismontane woodland, Coastal scrub (alluvial fans). Sandy	Not expected to occur. No suitable habitat present.
Eriastrum densifolium ssp. sanctorum/ Santa Ana River woollystar	1B.1/CE/FE	Apr-Sep/ 300-2000	Chaparral, Coastal scrub (alluvial fans). Gravelly (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Erigeron breweri var. jacinteus/ San Jacinto Mountains daisy	4.3/None/None	Jun-Sep/ 8860-9515	Subalpine coniferous forest, Upper montane coniferous forest. Rocky	Not expected to occur. No suitable habitat present.
Eriogonum kennedyi var. alpigenum/ southern alpine buckwheat	1B.3/None/None	Jul-Sep/ 8530-11485	Alpine boulder and rock field, Subalpine coniferous forest. Granitic, Gravelly	Not expected to occur. No suitable habitat present.
Eriogonum umbellatum var. minus/ alpine sulfur-flowered buckwheat	4.3/None/None	Jun-Sep/ 5905-10065	Subalpine coniferous forest, Upper montane coniferous forest. Gravelly	Not expected to occur. No suitable habitat present.
Eriophyllum lanatum var. obovatum/ southern Sierra woolly sunflower	4.3/None/None	Jun-Jul/ 3655-8205	Lower montane coniferous forest, Upper montane coniferous forest. Loam, Sandy	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Erythranthe diffusa/ Palomar monkeyflower	4.3/None/None	Apr-Jun/ 4005-6005	Chaparral, Lower montane coniferous forest. Gravelly (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Galium angustifolium ssp. jacinticum/ San Jacinto Mountains bedstraw	1B.3/None/None	Jun-Aug/ 4430-6890	Lower montane coniferous forest.	Not expected to occur. No suitable habitat present.
Galium californicum ssp. primum/ Alvin Meadow bedstraw	1B.2/None/None	May-Jul/ 4430-5580	Chaparral, Lower montane coniferous forest. Granitic, Sandy	Not expected to occur. No suitable habitat present.
Galium jepsonii/ Jepson's bedstraw	4.3/None/None	Jul-Aug/ 5055-8205	Lower montane coniferous forest, Upper montane coniferous forest. Granitic, Gravelly (sometimes), Rocky (sometimes)	Not expected to occur. No suitable habitat present.
Galium johnstonii/ Johnston's bedstraw	4.3/None/None	Jun-Jul/ 4005-7545	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland, Riparian woodland.	Not expected to occur. No suitable habitat present.
Gentiana fremontii/ Fremont's gentian	2B.3/None/None	Jun-Aug/ 7875-8860	Meadows and seeps (mesic), Upper montane coniferous forest.	Not expected to occur. No suitable habitat present.
Gilia leptantha ssp. leptantha/ San Bernardino gilia	1B.3/None/None	Jun-Aug/ 4920-8400	Lower montane coniferous forest (gravelly, sandy).	Not expected to occur. No suitable habitat present.
Heuchera parishii/ Parish's alumroot	1B.3/None/None	Jun-Aug/ 4920-12470	Alpine boulder and rock field, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Carbonate (sometimes), Rocky	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Hordeum intercedens/ vernal barley	3.2/None/None	Mar-Jun/ 15-3280	Coastal dunes, Coastal scrub, Valley and foothill grassland (depressions, saline flats), Vernal pools.	Not expected to occur. No suitable habitat present.
Horkelia cuneata var. puberula/ mesa horkelia	1B.1/None/None	Feb-Jul (Sep)/ 230-2660	Chaparral (maritime), Cismontane woodland, Coastal scrub. Gravelly (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.
Hulsea vestita ssp. callicarpha/ beautiful hulsea	4.2/None/None	May-Oct/ 3000-10005	Chaparral, Lower montane coniferous forest. Granitic, Gravelly (sometimes), Rocky (sometimes)	Not expected to occur. No suitable habitat present.
Hulsea vestita ssp. parryi/ Parry's sunflower	4.3/None/None	Apr-Aug/ 4495-9500	Lower montane coniferous forest, Pinyon and juniper woodland, Upper montane coniferous forest. Carbonate (sometimes), Granitic (sometimes), Openings, Rocky	Not expected to occur. No suitable habitat present.
Hulsea vestita ssp. pygmaea/ pygmy hulsea	1B.3/None/None	Jun-Oct/ 9300-12795	Alpine boulder and rock field, Subalpine coniferous forest. Granitic, Gravelly	Not expected to occur. No suitable habitat present.
Imperata brevifolia/ California satintail	2B.1/None/None	Sep-May/ 0-3985	Chaparral, Coastal scrub, Meadows and seeps (often alkali), Mojavean desert scrub, Riparian scrub. Mesic	Not expected to occur. No suitable habitat present.
Juglans californica/ Southern California black walnut	4.2/None/None	Mar-Aug/ 165-2955	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland.	Not expected to occur. No suitable habitat present.
Juncus duranii/ Duran's rush	4.3/None/None	Jul-Aug/ 5800-9200	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Mesic	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Lasthenia glabrata ssp. coulteri/ Coulter's goldfields	1B.1/None/None	Feb-Jun/ 5-4005	Marshes and swamps (coastal salt), Playas, Vernal pools.	Not expected to occur. No suitable habitat present.
Lepidium virginicum var. robinsonii/ Robinson's pepper-grass	4.3/None/None	Jan-Jul/ 5-2905	Chaparral, Coastal scrub.	Not expected to occur. No suitable habitat present.
Lilium humboldtii ssp. ocellatum/ ocellated Humboldt lily	4.2/None/None	Mar-Jul(Aug)/ 100-5905	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland. Openings	Not expected to occur. No suitable habitat present.
Lilium parryi/ lemon lily	1B.2/None/None	Jul-Aug/ 4005-9005	Lower montane coniferous forest, Meadows and seeps, Riparian forest, Upper montane coniferous forest. Mesic	Not expected to occur. No suitable habitat present.
Malaxis monophyllos var. brachypoda/ white bog adder's-mouth	2B.1/None/None	Jun-Aug/ 7220-9000	Bogs and fens, Meadows and seeps, Upper montane coniferous forest. Mesic	Not expected to occur. No suitable habitat present.
Mentzelia tricuspis/ spiny-hair blazing star	2B.1/None/None	Mar-May/ 490-4200	Mojavean desert scrub. Gravelly, Sandy, Slopes, Washes	Not expected to occur. No suitable habitat present.
Monardella macrantha ssp. hallii/ Hall's monardella	1B.3/None/None	Jun-Oct/ 2395-7200	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland.	Not expected to occur. No suitable habitat present.
Monardella nana ssp. leptosiphon/ San Felipe monardella	1B.2/None/None	Jun-Jul/ 3935-6085	Chaparral, Lower montane coniferous forest.	Not expected to occur. No suitable habitat present.
Muhlenbergia californica/ California muhly	4.3/None/None	Jun-Sep/ 330-6560	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadows and seeps. Mesic, Seeps, Streambanks	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Muilla coronata/ crowned muilla	4.2/None/None	Mar-Apr(May)/ 2200-6430	Chenopod scrub, Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland.	Not expected to occur. No suitable habitat present.
Myosurus minimus ssp. apus/ little mousetail	3.1/None/None	Mar-Jun/ 65-2100	Valley and foothill grassland, Vernal pools (alkaline).	Not expected to occur. No suitable habitat present.
Nama stenocarpa/ mud nama	2B.2/None/None	Jan-Jul/ 15-1640	Marshes and swamps (lake margins, riverbanks).	Not expected to occur. No suitable habitat present.
Navarretia fossalis/ spreading navarretia	1B.1/None/FT	Apr-Jun/ 100-2150	Chenopod scrub, Marshes and swamps (shallow freshwater), Playas, Vernal pools.	Not expected to occur. No suitable habitat present.
Oreonana vestita/ woolly mountain-parsley	1B.3/None/None	Mar-Sep/ 5300-11485	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Gravelly (sometimes), Talus (sometimes)	Not expected to occur. No suitable habitat present.
Oxytropis oreophila var. oreophila/ rock-loving oxytrope	2B.3/None/None	Jun-Sep/ 11155-12470	Alpine boulder and rock field, Subalpine coniferous forest. Gravelly (sometimes), Rocky (sometimes)	Not expected to occur. No suitable habitat present.
Packera ionophylla/ Tehachapi ragwort	4.3/None/None	Jun-Jul/ 4920-8860	Lower montane coniferous forest, Upper montane coniferous forest. Granitic, Rocky	Not expected to occur. No suitable habitat present.
Parnassia cirrata var. cirrata/ San Bernardino grass-of-Parnassus	1B.3/None/None	Aug-Sep/ 4100-8005	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Mesic, Streambanks	Not expected to occur. No suitable habitat present.
Petalonyx linearis/ narrow-leaf sandpaper-plant	2B.3/None/None	(Jan-Feb) Mar-May (Jun-Dec)/- 80-3660	Mojavean desert scrub, Sonoran desert scrub. Rocky (sometimes), Sandy (sometimes)	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Piperia leptopetala/ narrow-petaled rein orchid	4.3/None/None	May-Jul/ 1245-7300	Cismontane woodland, Lower montane coniferous forest, Upper montane coniferous forest.	Not expected to occur. No suitable habitat present.
Pseudognaphalium leucocephalum/ white rabbit-tobacco	2B.2/None/None	(Jul)Aug-Nov(Dec)/ 0-6890	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. Gravelly, Sandy	Not expected to occur. No suitable habitat present.
Quercus engelmannii/ Engelmann oak	4.2/None/None	Mar-Jun/ 165-4265	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland.	Not expected to occur. No suitable habitat present.
Rupertia rigida/ Parish's rupertia	4.3/None/None	Jun-Aug/ 2295-8205	Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Pebble (Pavement) plain, Valley and foothill grassland.	Not expected to occur. No suitable habitat present.
Saltugilia latimeri/ Latimer's woodland-gilia	1B.2/None/None	Mar-Jun/ 1310-6235	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland. Granitic (often), Rocky (sometimes), Sandy (sometimes), Washes (sometimes)	Not expected to occur. No suitable habitat present.
Sedum niveum/ Davidson's stonecrop	4.2/None/None	Jun-Aug/ 6810-9845	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Rocky	Not expected to occur. No suitable habitat present.
Senecio astephanus/ San Gabriel ragwort	4.3/None/None	May-Jul/ 1310-4920	Chaparral, Coastal bluff scrub. Rocky, Slopes	Not expected to occur. No suitable habitat present.
Sidalcea hickmanii ssp. parishii/ Parish's checkerbloom	1B.2/CR/None	(May)Jun-Aug/ 3280-8200	Chaparral, Cismontane woodland, Lower montane coniferous forest.	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Sidalcea malviflora ssp. dolosa/ Bear Valley checkerbloom	1B.2/None/None	May-Aug/ 4905-8810	Lower montane coniferous forest (meadows, seeps), Meadows and seeps, Riparian woodland, Upper montane coniferous forest (meadows, seeps).	Not expected to occur. No suitable habitat present.
Sidalcea neomexicana/ salt spring checkerbloom	2B.2/None/None	Mar-Jun/ 50-5020	Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Playas. Alkaline, Mesic	Not expected to occur. No suitable habitat present.
Sidotheca caryophylloides/ chickweed oxytheca	4.3/None/None	Jul-Sep(Oct)/ 3655-8530	Lower montane coniferous forest (sandy).	Not expected to occur. No suitable habitat present.
Silene krantzii/ Krantz's catchfly	1B.2/None/None	Apr-Sep/ 10615-11515	Alpine dwarf scrub. Gravelly (usually), Rocky (sometimes), Sandy (usually)	Not expected to occur. No suitable habitat present.
Solorina spongiosa/ fringed chocolate chip lichen	2B.2/None/None	Blank/ 9500-9500	Meadows and seeps, Subalpine coniferous forest (seeps). Carbonate	Not expected to occur. No suitable habitat present.
Streptanthus bernardinus/ Laguna Mountains jewelflower	4.3/None/None	May-Aug/ 2200-8205	Chaparral, Lower montane coniferous forest.	Not expected to occur. No suitable habitat present.
Streptanthus campestris/ southern jewelflower	1B.3/None/None	(Apr)May-Jul/ 2955-7545	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland. Rocky	Not expected to occur. No suitable habitat present.
Symphyotrichum defoliatum/ San Bernardino aster	1B.2/None/None	Jul-Nov/ 5-6695	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps, Valley and foothill grassland (vernally mesic). Streambanks	Not expected to occur. No suitable habitat present.
Taraxacum californicum/ California dandelion	1B.1/None/FE	May-Aug/ 5315-9185	Meadows and seeps (mesic).	Not expected to occur. No suitable habitat present.

Scientific Name / Common Name	CRPR / CESA / FESA	Blooming Period/ Elevation Range (AMSL; In Feet)	Habitat/ Microhabitat	Occurrence
Tortula californica/ California screw moss	1B.2/None/None	Blank/ 35-4790	Chenopod scrub, Valley and foothill grassland. Sandy	Not expected to occur. No suitable habitat present.
Trichocoronis wrightii var. wrightii/ Wright's trichocoronis	2B.1/None/None	May-Sep/ 15-1425	Marshes and swamps, Meadows and seeps, Riparian forest, Vernal pools. Alkaline	Not expected to occur. No suitable habitat present.

CRPR-CALIFORNIA RARE PLANT RANK
1A- Plants presumed extirpated in California and either rare or extinct elsewhere
1B- Plants rare, threatened, or endangered in California and elsewhere
2A- Plants presumed extirpated in California but common elsewhere
2B- Plants rare, threatened, or endangered in California but more common elsewhere
3- Review List: Plants about which more information is needed
4- Watch List: Plants of limited distribution
0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)
STATE DESIGNATIONS CE-STATE ENDANGERED
FEDERAL DESIGNATION FE-FEDERALLY ENDANGERED, FT-FEDERALLY THREATENED

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Amphibians			
Rana muscosa southern mountain yellow-legged frog	Endangered/WL	Aquatic. Often encountered within a few feet of water. Tadpoles may require 2 - 4 yrs to complete their aquatic development.	No suitable habitat present.
Spea hammondii western spadefoot	None/ SSC	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland. Vernal pools are essential for breeding and egg-laying.	No suitable habitat present.
Birds			
Accipiter cooperii cooper's hawk	None/ WL	Cismontane woodland, riparian forest, riparian woodland, upper montane coniferous forest. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	No suitable habitat present.
Agelaius tricolor tricolored blackbird	None/Threatened	Freshwater marsh, marsh & swamp, swamp, wetland. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	No suitable habitat present.
Aimophila ruficeps canescens southern California rufous-crowned sparrow	None/WL	Chaparral, coastal scrub. frequents relatively steep, often rocky hillsides with grass and forb patches.	No suitable habitat present.
Aquila chrysaetos golden eagle	None/FP	Broadleaved upland forest, cismontane woodland, coastal prairie, great basin grassland, great basin scrub, lower montane coniferous forest, pinon & juniper woodlands, upper montane coniferous forest, valley & foothill grassland. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	No suitable habitat present.
Artemisiospiza belli belli Bell's sparrow	None/ SSC	Chaparral, coastal scrub.	No suitable habitat present.
Athene cunicularia burrowing owl	None/None/S	Coastal prairie, coastal scrub, great basin grassland, great basin scrub, Mojavean desert scrub, Sonoran desert scrub, valley & foothill grassland. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	No suitable habitat present.
Buteo regalis ferruginous hawk	None/WL	Great Basin grassland, great basin scrub, pinon & juniper woodlands, valley & foothill grassland.	No suitable habitat present.
Buteo swainsoni Swainson's hawk	None/Threatened	Great Basin grassland, riparian forest, riparian woodland, valley & foothill grassland. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	No suitable habitat present.

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	None/ SSC	Coastal scrub. Wrens require tall opuntia cactus for nesting and roosting.	No suitable habitat present.
Coccyzus americanus occidentalis western yellow-billed cuckoo	Threatened/Endangered	Riparian forest. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	No suitable habitat present.
Cypseloides niger black swift	None/SSC	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	No suitable habitat present.
Elanus leucurus white-tailed kite	None/FP	Cismontane woodland, marsh & swamp, Riparian woodland, valley & foothill grassland, wetland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	No suitable habitat present.
Empidonax traillii extimus southwestern willow flycatcher	Endangered/Endangered	Riparian woodland.	No suitable habitat present.
Eremophila alpestris actia California horned lark	None/ WL	Marine intertidal & splash zone communities, meadow & seep. Short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, alkali flats.	No suitable habitat present.
Icteria virens yellow-breasted chat	None/ SSC	Riparian forest, riparian scrub, riparian woodland. nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	No suitable habitat present.
Lanius ludovicianus loggerhead shrike	None/ SSC	Broadleaved upland forest, desert wash, Joshua tree woodland, Mojavean desert scrub, pinon & juniper woodlands, riparian woodland, Sonoran desert scrub. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	No suitable habitat present.
Plegadis chihi white-faced ibis	None/ WL	Marsh & swamp, wetland. Dense tule thickets for nesting, interspersed with areas of shallow water for foraging.	No suitable habitat present.
Polioptila californica californica coastal California gnatcatcher	Threatened/ SSC	Coastal bluff scrub, Coastal scrub. Low, coastal sage scrub in arid washes, on mesas and slopes.	No suitable habitat present.
Progne subis purple martin	None/ SSC	Broadleaved upland forest, lower montane coniferous forest. Nests in old woodpecker cavities mostly; also in human-made structures. Nest often located in tall, isolated tree/snag.	No suitable habitat present.
Setophaga petechia yellow warbler	None/ SSC	Riparian forest, riparian scrub, riparian woodland. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	No suitable habitat present.

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Toxostoma lecontei Le Conte's thrasher	None/SSC	Desert wash, Mojavean desert scrub, Sonoran desert scrub. Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	No suitable habitat present.
Vireo bellii pusillus least Bell's vireo	Endangered/Endangered	Riparian forest, riparian scrub, riparian woodland. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, *Baccharis*, mesquite.	No suitable habitat present.
Xanthocephalus xanthocephalus yellow-headed blackbird	None/SSC	Marsh & swamp, wetland. Nests only where large insects such as Odonata are abundant, nesting timed with maximum emergence of aquatic insects.	No suitable habitat present.
Fish			
Oncorhynchus mykiss irideus pop 10 steelhead - southern California DPS	Endangered/Candidate Endangered	Aquatic, south coast flowing waters. Southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions.	No suitable habitat present.
Rhinichthys osculus ssp8 Santa Ana speckled dace	None/ SSC	Aquatic, south coast flowing waters. Requires permanent flowing streams with summer water temps of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	No suitable habitat present.
Insect			
Bombus crotchii Crotch bumble bee	None/Candidate Endangered	Grasslands, shrublands, and chapparal. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum*.	No suitable habitat present.
Diplectrona californica California diplectronan caddisfly	None/None	Aquatic.	No suitable habitat present.
Halictus harmonius haromonius halictid bee	None/None	Chapparal	No suitable habitat present.
Palaeoxenus dohrni Dohrn's elegant eucnemid beetle	None/None	Chapparal	No suitable habitat present.
Stenopelmatus cahuilaensis Coachella Valley jerusalem cricket	None/None	Desert dunes. Found in the large, undulating dunes piled up at the north base of Mt San Jacinto.	No suitable habitat present.
Mammals			
Antrozous pallidus pallid bat	None/ SSC	Chaparral, coastal scrub,desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub , Riparian woodland , Sonoran desert scrub , Upper montane coniferous forest , Valley & foothill grassland. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	No suitable habitat present.

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Chaetodipus californicus femoralis Dulzura pocket mouse	None/ SSC	Chaparral, Coastal scrub, valley & foothill grassland. Attracted to grass-chaparral edges.	No suitable burrows/ habitat present.
Chaetodipus fallax fallax northwestern San Diego pocket mouse	None/ SSC	Chaparral, coastal scrub. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	No suitable burrows/habitat present.
Chaetodipus fallax pallidus pallid San Diego pocket mouse	None/ SSC	Desert wash, Pinon & juniper woodlands, Sonoran desert scrub. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	No suitable burrows/habitat present.
Corynorhinus townsendii Townsend's big-eared bat	None/ SSC	Broadleaved upland forest , chaparral , chenopod scrub , Great Basin grassland , Great Basin scrub , Joshua tree woodland , Lower montane coniferous forest , meadow & seep , Mojavean desert scrub , riparian forest , riparian woodland , Sonoran desert scrub , Sonoran thorn woodland , upper montane coniferous forest , valley & foothill grassland. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	No suitable habitat present.
Dipodomys merriami parvus San Bernardino kangaroo rat	Endangered/Candidate Endangered	Coastal scrub. Needs early to intermediate seral stages.	No suitable habitat present.
Dipodomys stephensi Stephens' kangaroo rat	Threatened/Threatened	Coastal scrub, valley & foothill grassland. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	No suitable burrows/habitat present.
Glaucomys oregonensis californicus San Bernardino flying squirrel	None/SSC	Broadleaved upland forest, lower montane coniferous forest. Needs cavities in trees/snags for nests and cover. Needs nearby water.	No suitable habitat present.
Lasiurus xanthinus western yellow bat	None/ SSC	Desert wash. Roosts in trees, particularly palms. Forages over water and among trees.	No suitable habitat present.
Leptonycteris yerbabuenae lesser long-nosed bat	Delisted /SSC	Mojavean desert scrub , Sonoran desert scrub , upper Sonoran scrub. Caves and mines are used as day roosts. Caves, mines, rock crevices, trees and shrubs, and abandoned buildings are used as night roosts for digesting meals. Nectar, pollen, and fruit eating bat; primarily feeding on agaves, saguaro, and organ pipe cactus.	No suitable habitat present.

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Lepus californicus bennettii San Diego black-tailed jackrabbit	None/ None	Coastal scrub. Coastal sage scrub habitats in Southern California.	No suitable habitat present.
Neotamias speciosus speciosus lodgepole chipmunk	None/ None	Chaparral , upper montane coniferous forest. Habitat is usually lodgepole pine forests in the San Bernardino Mts and chinquapin slopes in the San Jacinto Mts.	No suitable habitat present.
Neotoma lepida intermedia San Diego desert woodrat	None/ SSC	Coastal scrub. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.	No suitable habitat present.
Nyctinomops femorosaccus pocketed free-tailed bat	None/ SSC	Joshua tree woodland, Pinon & juniper woodlands, riparian scrub, Sonoran Desert scrub. Rocky areas with high cliffs.	No suitable habitat present.
Onychomys torridus ramona southern grasshopper mouse	None/ SSC	Chenopod scrub.	No suitable habitat present.
Perognathus longimembris brevinasus Los Angeles pocket mouse	None/ SSC	Coastal scrub. Open ground with fine, sandy soils. May not dig extensive burrows, hiding under weeds and dead leaves instead.	No suitable habitat present.
Taxidea taxus American badger	None/ SSC	Alkali marsh, broadleaved upland forest, chaparral, chenopod scrub, cismontane woodland, closed-cone coniferous forest, coastal prairie, coastal scrub, desert dunes, desert wash, freshwater marsh, grassland, lower montane coniferous forest, Mojavean desert scrub, Montane dwarf scrub, Pavement plain, Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	No suitable habitat present.
Xerospermophilus tereticaudus chlorus Palm Springs round-tailed ground squirrel	None/ SSC	Chenopod scrub , Sonoran desert scrub. Prefers open, flat, grassy areas in fine-textured, sandy soil. Density correlated with winter rainfall.	No suitable habitat present.
Reptiles			
Anniella stebbinsi Southern California legless lizard	None/ SSC	Broadleaved upland forest, chaparral, coastal dunes, coastal scrub. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	No suitable habitat present.
Arizona elegans occidentalis California glossy snake	None/ SSC	Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	No suitable habitat present.
Aspidoscelis hyperythra orange-throated whiptail	None/ WL	Chaparral, cismontane woodland, coastal scrub. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.	No suitable habitat present.
Aspidoscelis tigris stejnegeri coastal whiptail	None/ SSC	Ground may be firm soil, sandy, or rocky.	No suitable habitat present.

Species	Status: Federal/State	Habitat/Micro Habitat	Potential to Occur
Charina umbratica southern rubber boa	None/Threatened	Meadow & seep , riparian forest , riparian woodland, upper montane coniferous forest , wetland. Found in vicinity of streams or wet meadows; requires loose, moist soil for burrowing; seeks cover in rotting logs, rock outcrops, and under surface litter.	No suitable habitat present.
Crotalus ruber red-diamond rattlesnake	None/ SSC	Chaparral, Mojavean desert scrub, Sonoran desert scrub. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	No suitable habitat present.
Diadophis punctatus modestus San Bernardino ringneck snake	None/ None	Avoids moving through open or barren areas by restricting movements to areas of surface litter or herbaceous veg.	No suitable habitat present.
Phrynosoma blainvillii coast horned lizard	None/SSC	Chaparral, cismontane woodland, coastal bluff scrub, coastal scrub, desert wash, pinon & juniper woodlands, riparian scrub, riparian woodland, valley & foothill grassland. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	No suitable habitat present.
Salvadora hexalepis virgultea coast patch-nosed snake	None/ SSC	Coastal scrub. Require small mammal burrows for refuge and overwintering sites.	No suitable habitat present.
Thamnophis hammondii two-striped gartersnake	None/ SSC	Marsh & swamp , riparian scrub , riparian woodland, Wetland. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	No suitable habitat present.

State Abbreviations
- FP: Fully Protected
- S: Sensitive
- SSC: Species of Special Concern
- WL: Watch List

Appendix C

Cultural Resource Investigation

Cultural Resource Investigation for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California

Andrew DeLeon

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November 2023
draft

USGS 7.5-Minute Topographic Quadrangle: Beaumont, CA
Level of Investigation: CEQA Phase I
Key Words: City of Banning; APN 538-280-001; 7.5 acres

MANAGEMENT SUMMARY

The City of Banning (City) proposes construction of a reservoir and booster pump station for the Banning NP-2 Booster Pump Station and Reservoir Project (Project). The Project is within Assessor's Parcel Number 538-280-001 (approximately 7.51 acres) located east of 22nd Avenue and immediately south of Lincoln Street in the city of Banning, Riverside County, California. Under contract to Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) conducted a cultural resource investigation of the Project in accordance with the California Environmental Quality Act (CEQA). The City is the lead agency for compliance with CEQA.

This report summarizes the methods and results of the cultural resource investigation including a records search and literature review, communication with Native American tribal representatives, and an archaeological survey of the Project area. The purpose of the investigation was to determine the potential for the proposed Project to impact historical resources eligible for or listed in the California Register of Historical Resources.

The literature and records search at the Eastern Information Center of the California Historical Resources Information System indicates 46 cultural resources have been documented within a 0.5-mile radius of the Project area. None of these previously identified cultural resources is within the Project area.

As part of the cultural resource investigation, Æ sent a request to the Native American Heritage Commission (NAHC) for a search of the Sacred Lands File. Results of the search indicate there are no known Native American cultural resources within the Project area. Per the NAHC's request, Æ contacted Native American individuals and organizations to elicit information on Native American resources within the Project area, if any. Of the 11 groups and/or individuals contacted, Æ received responses from representatives of two tribes—Agua Caliente Band of Cahuilla Indians, and Augustine Band of Cahuilla Indians. Their comments are summarized in the report that follows.

Æ Archaeologist Andrew DeLeon completed an intensive pedestrian archaeological survey of the approximately 7.5-acre Project area on August 23, 2023. No cultural resources were encountered within the Project area during the survey. The terrain throughout most of the Project area has been previously plowed and disturbed. In addition, geological data indicate no Ab (buried) horizons, which typically have an environment conducive to preserving buried archaeological deposits. Due to the low likelihood that archaeological deposits or features will be found during construction, no further cultural resource management of the Project area is recommended.

However, if potentially significant archaeological materials are encountered during construction activities, all work must be halted in the vicinity of the discovery until a qualified archaeologist can visit the site and assess the significance and integrity of the find. Additionally, Health and Safety Code Section 7050.5, CEQA Guidelines Section 15064.5(e), and Public Resources Code Section 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of human remains in a location other than a dedicated cemetery.

Field notes documenting the current investigation are on file at Æ's Hemet office. A copy of this report will also be submitted to the Eastern Information Center.

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1
INTRODUCTION

The City of Banning (City) proposes construction of a reservoir and booster pump station for the Banning NP-2 Booster Pump Station and Reservoir Project (Project). The Project area is within Assessor's Parcel Number (APN) 538-280-001 (approximately 7.51 acres) located east of 22nd Avenue and immediately south of Lincoln Street in the city of Banning, Riverside County, California. Under contract to Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) conducted a cultural resource investigation of the Project in accordance with the California Environmental Quality Act (CEQA). The City is the lead agency for compliance with CEQA.

Æ Principal Investigator M. Colleen Hamilton (M.A., Registered Professional Archaeologist [RPA] 12588), was responsible for overall quality control for the Project. Æ Senior Archaeologist Joan George (B.S., RPA 28093) served as project manager. Fieldwork was conducted by Æ Associate Archaeologist Andrew DeLeon (M.A., RPA 17087).

1.1 PROJECT LOCATION AND DESCRIPTION

The Project is within the southwestern portion of the city of Banning in Riverside County (Figure 1-1). Specifically, the Project is within Section 8 of Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey (USGS) Beaumont, California 7.5-minute topographic quadrangle map (Figure 1-2). The elevation is approximately 2,400 feet above mean sea level.

The Project involves construction of a booster pump facility and reservoir tank. The station will consist of a housing facility designed to contain vertical turbine pumps capable of transmitting 2,500 gallons of non-potable water per minute. The associated reservoir tank is an above-ground structure which will store approximately 60,910 gallons of non-potable water during operation. All these facilities are water system improvements needed to supply non-potable water to Lions Park, Banning High School, Dysart Park, and the Sun Lakes development near Highland Home Road. The maximum depth of ground disturbance during Project construction is not expected to exceed 10 feet. Project construction is expected to disturb only approximately 0.5 acres of the total parcel.

1.2 REGULATORY CONTEXT

1.2.1 California Environmental Quality Act

The Project requires discretionary approval from the City and is therefore subject to the requirements of CEQA. The CEQA Statute and Guidelines directs lead agencies to determine whether a project will have a significant impact on historical resources. A cultural resource considered "historically significant" is considered a "historical resource," if it over 50 years of age and is included in a local register of historical resources or is listed in or determined eligible for listing in the California Register of Historical Resources under any one of the following criteria (California Code of Regulations [CCR], Title 14, §15064.5):

Figure 1-1 Project vicinity in Riverside County, California.

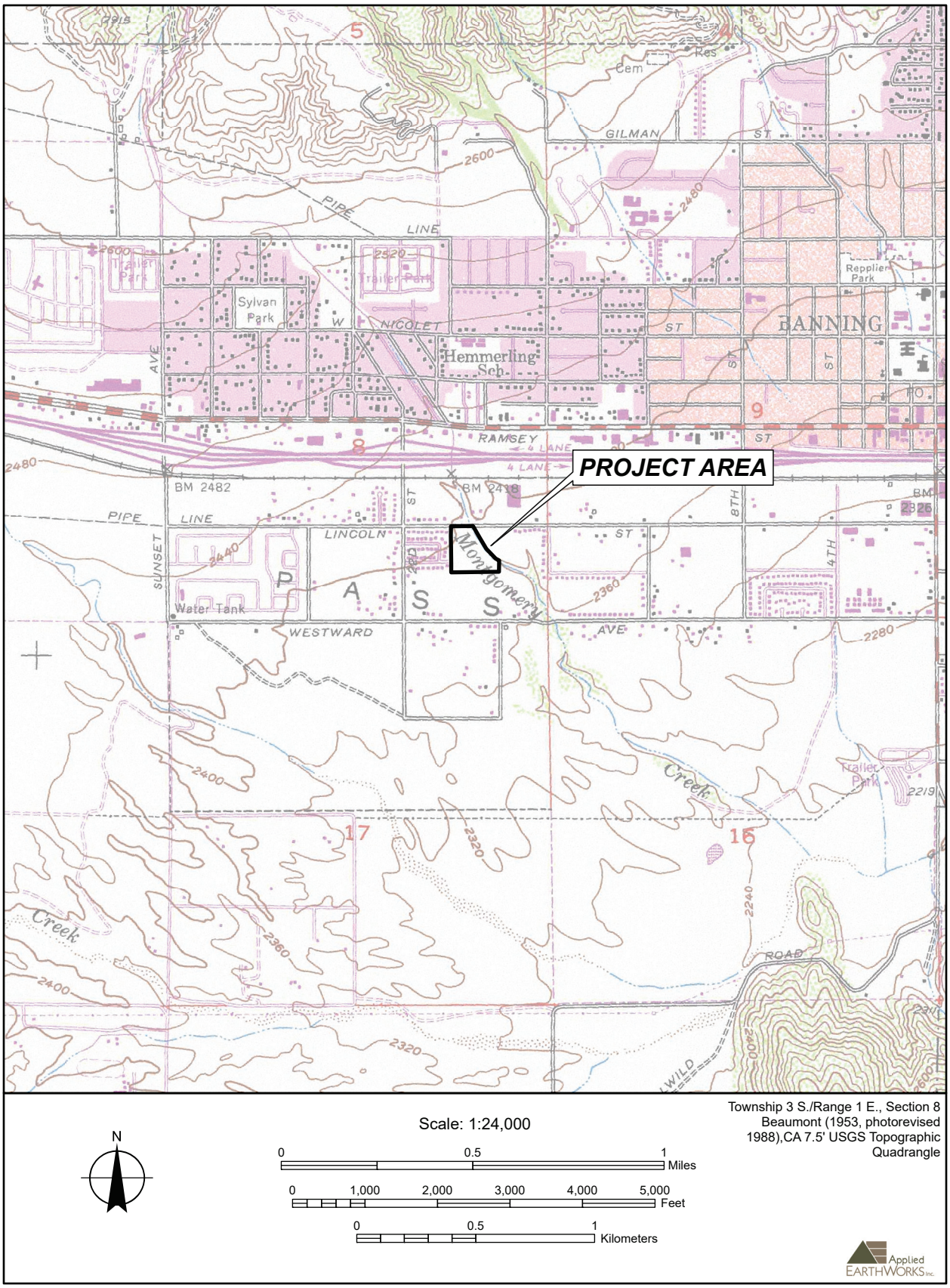

Figure 1-2 Project location on USGS Beaumont 7.5-minute topographic quadrangle.

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with the lives of persons important in our past;

3. 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; or,

4. Has yielded, or may be likely to yield, information important in prehistory or history.

Compliance with CEQA's cultural resource provisions typically involves several steps. Briefly, archival research and field surveys are needed, and identified cultural resources are inventoried and evaluated in prescribed ways. Prehistoric and historical archaeological sites, as well as standing structures, buildings, and objects deemed historically significant and sufficiently intact (i.e., historical resources), must be considered in project planning and development.

A project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment (14 CCR §15064.5[b]) and the lead agency is responsible for identifying potentially feasible measures to mitigate significant adverse changes in the significance of a historical resource (14 CCR §15064.5[b]4).

1.3 REPORT ORGANIZATION

This report documents the results of a cultural resource investigation of the proposed Project area. Chapter 1 has described the Project and its location, defined the scope of the cultural resource investigation, and stated the regulatory context. Chapter 2 summarizes the natural and cultural setting of the Project area and surrounding region. Chapter 3 presents the results of the archaeological literature and records search. Chapter 4 summarizes the Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC) and Native American communications. The field survey methods and results are discussed in Chapter 5. Cultural resource management recommendations are provided in Chapter 6, and bibliographic references are cited in Chapter 7. Results of the SLF search and correspondence with Native American groups are included as Appendix A.

2
SETTING

This chapter describes the prehistoric, ethnographic, and historical cultural setting of the Project to provide a context for understanding the nature and significance of cultural resources identified within the region. Prehistorically, ethnographically, and historically, the nature and distribution of human activities in the region have been affected by such factors as topography and the availability of water and natural resources. Therefore, prior to a discussion of the cultural setting, the environmental setting of the area is summarized below.

2.1 ENVIRONMENTAL SETTING

The Project is in western Riverside County and is situated on the interfluvial plain immediately north of Smith Creek. Annual precipitation in the area ranges from 18 to 20 inches. Surrounding sediments are composed of older Quaternary Alluvium deposits, derived as fan deposits from the San Bernardino Mountains to the north and possibly from the San Jacinto Mountains to the south. The Project lies within the South Coast Bioregion and is sparsely vegetated with scrub brush and grasses and populated by a variety of reptiles, small mammals, birds, and insects.

The natural setting of the Project area has been summarized by McLean et al. (2006). The Project is located in the San Gorgonio Pass (elevation 2,616 feet), which forms a natural break between the San Bernardino Mountains to the north and the San Jacinto Mountains to the south. It is an east-west trending lowland between the two mountain ranges. The surface of the lowland is composed of alluvial fan deposits, mainly from the San Bernardino Mountains. The northern foothills are underlain by upper Cenozoic nonmarine and marine sedimentary deposits (Morton 1999).

The San Bernardino Mountains are in the Transverse Ranges geomorphic province (Norris and Webb 1990:330). The Transverse Ranges are an east-west trending mountain range at the northeast end of the Los Angeles Basin. This range has some of the highest peaks south of the Sierra Nevada range (Norris and Webb 1990:330). The San Bernardino Mountains are about 65 miles long and 30 miles wide at their widest point. The San Jacinto Mountains are the northernmost of the Peninsular Ranges, which run 900 miles from Southern California to the southern tip of the Baja California Peninsula. At an elevation of 10,834 feet, San Jacinto Peak is the highest peak in the range (California State Parks 2002).

Soils in the Project area, as mapped by the U.S. Department of Agriculture Natural Resources Conservation Service, include two soil series. The Greenfield and Ramona soils are Alfisols, a taxonomic class of soil that typically retains water well for three months out of the year during warm seasons, which fosters sufficient plant growth (Soil Survey Staff 1999). None of the soil series mapped in the Project area include buried A (Ab) horizons.

2.2 PREHISTORIC SETTING

The prehistory of inland Southern California is less thoroughly understood than in the adjacent desert and coastal regions. This is partially a result of historical circumstances, such as ease of access, the location of universities, and public versus private land ownership, and partly due to

the nature of archaeological research in these interior valleys and mountains of Southern California (Goldberg and Arnold 1988). In the absence of absolute chronological indicators for inland sites, researchers generally employ typological cross-dating from either coastal or desert sequences, often as the sole means for assigning age to archaeological sites within the interior valleys, including the Project area.

Two large reservoir projects, Perris Reservoir project (O'Connell et al. 1974) and Eastside Reservoir project (ESRP) (Goldberg et al. 2001), generated large data sets to provide a basis for resolving some of these regional chronological sequencing problems. It is difficult to extrapolate the geographic extent of the prehistoric cultural patterns discerned from excavations at these two reservoirs, which are 12 miles apart in central western Riverside County. The ESRP is approximately 16 miles southwest of the Project, and it is almost certain that prehistoric patterns are similar to those discerned for the ESRP studies.

This discussion of the Project's prehistoric cultural setting is drawn from the cultural sequence developed for the ESRP. This chronology was based first on artifact cross-dating, and then refined with radiocarbon and obsidian hydration dates (Onken and Horne 2001; Robinson 1998, 2001); however, the ESRP chronology draws heavily on a cultural sequence defined by Warren (1984) for Southern California, which is based largely on archaeological work conducted in the Colorado and Mojave deserts. Because Warren's chronology used period names that suggest links to the Mojave, these were replaced in the ESRP chronology by value neutral terms. Because no sites dating to the Paleoindian Period (circa 12,000–9500 before present [B.P.]) have been documented within the region, the discussion below begins with the Early Archaic Period.

2.2.1 Early Archaic Period (circa 9500–7000 B.P.)

During this period, the environment of the interior deserts was more favorable for human occupation than the cismontane valleys of Southern California, where the Project is located. Populations in the interior valleys would have been tethered to the few reliable, drought-resistant water sources such as Lake Elsinore, Mystic Lake, and possibly the Cajalco Basin. In general, small, highly mobile groups traveled widely, utilizing highly portable tool kits to procure and process critical resources, with brief and anticipated intervals of seasonal sedentism near predictable water locations. Due to isolated locations where the conditions for occupation were met, Early Archaic Period sites are rare compared to later periods of prehistory (Goldberg et al. 2001; Grenda 1997; Horne and McDougall 2008; McDougall 1995).

2.2.2 Middle Archaic Period (circa 7000–4000 B.P.)

A gradual transition from wet pluvial conditions to arid desert conditions during the Early Holocene marks the transition to the Middle Archaic Period. Middle Archaic Period sites in Southern California include two in the ESRP, one at Lake Elsinore, the Stahl Site in Owens Valley, desert sites in Death Valley, Salt Springs, and at Pinto Basin in Joshua Tree National Park. Middle Archaic Period sites are associated with the margins of pluvial lakes and with now-extinct springs. Pinto-series projectile points, a type of basally notched or bifurcate base dart point, are the most distinctive artifact type of this period (Justice 2002). Other artifacts found at Middle Archaic Period sites include leaf-shaped bifacial knives, split cobble choppers and scrapers, scraper-planes, and small milling slabs and manos. With a few exceptions in the ESRP

area and the Stahl Site, most sites of this age are small surface deposits of lithic artifacts, suggestive of temporary and perhaps seasonal occupation by small groups of people.

2.2.3 Late Archaic Period (circa 4000–1500 B.P.)

The Late Archaic Period was one of cultural intensification coinciding with the Little Pluvial, a period when increased moisture allowed for more extensive occupation of the region. Sedentism likely increased during this period, with large occupation sites located adjacent to permanent water sources such as perennial springs and streams. Projectile points diagnostic of this period include Humboldt, Gypsum, and Elko-series dart points (Warren 1984), although Rose Spring arrow points appeared late within this period in the deserts. The mortar and pestle, used for processing acorns and hard seeds, also first appeared. A warming and drying trend began around 2100 B.P., leading to intensification of use of certain resources (Goldberg et al. 2001).

2.2.4 Saratoga Springs Period (circa 1500–750 B.P.)

Occupants of the region continued to adapt to the arid environment in the deserts (Warren 1984). Lake Cahuilla likely refilled the Coachella Valley around 1450 B.P. and was the focus of exploitation of fish and wetland resources. Occupation around large local water sources declined as these dried, however, and people became tethered to springs (Goldberg et al. 2001). Cultural trends continued from the Late Archaic Period, as Saratoga Springs projectile points, also associated with early use of the bow and arrow, appeared. The sparse assemblages found within the region obscure the timing of local adoption of the bow and arrow (Goldberg et al. 2001). Shoshonean language speakers likely moved into Southern California at this time. Brown and Buff Ware pottery first appeared on the lower Colorado River at about 1200 B.P. and started to diffuse across the California deserts by about 1100 B.P. (Moratto 1984). The warmer and drier Medieval Warm Period set in throughout the Southwest by about 1060 B.P. (Stine 1994; Warren 1984) and led to the withdrawal of Native American populations from marginal desert areas.

2.2.5 Late Prehistoric Period (circa 750–410 B.P.)

A period of lower temperatures and increased precipitation known as the Little Ice Age resulted in increased resource productivity in the region and subsequent population increase. Cottonwood Triangular points appear in inland assemblages and Obsidian Butte glass became much more common (Goldberg et al. 2001). Lake Cahuilla began to recede (Waters 1983), and the large Patayan populations occupying its shores moved westward to areas such as Anza Borrego, Coyote Canyon, the Upper Coachella Valley, the Little San Bernardino Mountains, and the San Jacinto Plain (Wilke 1976). The final recession of Lake Cahuilla, which had occurred by approximately 400 B.P., resulted in a population shift away from the lakebed into the Peninsular Ranges to the west and the Colorado River regions to the east.

2.2.6 Protohistoric Period (circa 410–180 B.P.)

Sedentism intensified during the Protohistoric Period. Increased hunting with bow and arrow and widespread exploitation of acorns, other hard nuts, and berries (indicated by the abundance of mortars and pestles) provided reliable and storable food resources. Reliable food sources likely prompted the establishment of small, completely sedentary villages with resource catchment areas around them (True 1966, 1970). Ceramic technology first appeared in the region around

350 B.P. Cottonwood Triangular points were supplemented by Desert Side-notched points. This period ended in 1769 A.D. when Spanish settlement began in Upper California.

2.3 ETHNOGRAPHIC SETTING

The Project area lies immediately west and north of the Morongo Indian Reservation. The Morongo Band of Mission Indians are a mixture of several different groups of California Native Americans, including Cahuilla, Serrano, and Cupeño. The native languages spoken by these groups are all part of the larger Takic family of Uto-Aztecan languages. An ethnographic overview of each of these groups is provided below.

2.3.1 Cahuilla

Ethnographically, the Project area lies within the traditional territory of the Pass (or Wanakik) Cahuilla. A wealth of information exists regarding traditional and historic Cahuilla society and culture (Bean 1978; Bean and Toenjes 2011). The Cahuilla language, divided into Desert, Pass, and Mountain dialects, has been assigned to the Cupan subfamily of the Takic branch of the Uto-Aztecan linguistic family. Territory traditionally claimed by the Cahuilla was topographically complex, including mountain ranges, passes, canyons, valleys, and desert. Bean (1978) described it as, ". . . from the summit of the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of the Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west."

The Cahuilla in precontact times had nonpolitical, nonterritorial patrimoieties that governed marriage patterns, as well as patrilineal clans and lineages. The Cahuilla words for these moieties mean "Coyote" and "Wildcat." The Cahuilla had "political-ritual-corporate units (clans) composed of 3 to 10 lineages, dialectically different, named, claiming a common genitor, with one lineage recognized as the founding one" (Bean 1978). Clans owned a large territory in which each lineage owned a village site with specific resource areas. Clan lineages cooperated in defense, in large communal subsistence activities, and in performing rituals. Founding lineages often owned the office of ceremonial leader, the ceremonial house, and a ceremonial bundle (Bean 1978). Settlements, occupied by one or more lineages, could be politically autonomous or allied with several villages under one chief. The hereditary chiefs had religious, economic, and military power and were role models for their people. They were aided in their duties by one or more assistants. The chiefs and their families, along with the very wealthy, were the elites of the society. The acquisition of wealth was important, but the acquisition of extreme material wealth was prevented by the custom of burning or burying the possessions of the deceased.

The Cahuilla were, for the most part, hunting, collecting, harvesting, and protoagricultural peoples. A diverse habitat provided an immense variety of floral resources, which the Cahuilla used for food, medicine, and manufacture of tools and shelter (Bean 1978:578). Acorns, screw beans, mesquite, pinyon, cactus fruits, seeds, wild berries, tubers, roots, and greens were valuable food resources. Acorns and hard berries were pounded in stone mortars, while hard seeds were ground on stone metates. Softer foods, like honey mesquite, were pounded in wooden mortars. Various basket and pottery forms were used to process and cook plant foods. Stone-lined pit ovens were used to cook yucca, agave, and tule-potatoes. At ancient Lake Cahuilla in the Coachella Valley, periods of high lake stands brought Cahuilla from the mountain areas

down to the valley floor to exploit the freshwater aquatic resources such as fish, shellfish, waterfowl, and shoreline vegetation (Wilke 1976:8, from Blake 1856:98).

Cahuilla pottery was manufactured by the coil method and paddle-and-anvil technique and was often painted or incised. Their pottery forms included cooking pots, ollas, bowls, dishes, and tobacco pipes. Basketry was produced by a stitched coil method, and forms included flat plates or trays for winnowing seeds, both shallow and deep baskets, conical baskets, and round flat-bottomed baskets, which were often decorated with cosmological motifs (Bean 1978:579). Arrow-shaft straighteners were made of soapstone and incised with designs that reflected ownership. Bows were made of willow or mesquite and were strung with mescal fiber or sinew. Ceremonial items included charmstones, bull-roarers, clappers, rattles, feathered headdresses, wands, and eagle feather skirts and capes. Clothing included sandals made of mescal fiber, rabbit skin or other hide blankets, and skirts made of tule, or the soft inner bark of mesquite or cottonwood.

2.3.2 Serrano

The Serrano, or "mountaineers" in Spanish, occupied the territory of the San Bernardino Mountains east to Mount San Gorgonio, the San Gabriel Mountains west to Mount San Antonio, and portions of the desert to the north and the fringe of the San Bernardino Valley to the south (Kroeber 1925:615–616). Numbering no more than perhaps 1,500 people, the Serrano were scattered over a rugged, expansive landscape. The Serrano were Shoshonean peoples, speakers of languages in the Takic subfamily of the larger Uto-Aztecan language family, and their ancestors are presumed to have entered Southern California some 1,500 years ago from the Great Basin (Kroeber 1925:578–579). Their most intensive cultural contacts were with the Pass Cahuilla, who occupied the territory to the southeast, and the Gabrielino, who occupied the lands westward to the Pacific coast.

Serrano clans were politically autonomous and both patrilineal and exogamous. A moiety structure conditioned Serrano social life, all clans belonging to either the Coyote or Wildcat moiety. These moieties were exogamous. Each Serrano clan had a hereditary leader, or *kika*, and an assistant who was a ceremonial leader, or *paha* (Strong 1929:17–18). These individuals were central to the ritual life of the Serrano, providing leadership during yearly ceremonial periods. Kroeber (1925:617) indicated that villages were generally where streams emerged from the foothills. Bean et al. (1981:85–86) indicated groups of lineages lived in villages at the valley margins in the winter and in smaller encampments at higher elevations in the summer. Proximity to water sources and adequate arrays of resources predictably dictated settlement location choices. Bean et al. (1981:85) noted also that individual homes were quite scattered across the landscape in order to ensure privacy, to the extent that some "villages" covered up to 5 square miles. This clearly has important implications for archaeological interpretations of occupation sites.

Subsistence during winter months consisted mostly of reliance on stored foods (acorns, pinyon nuts, mesquite beans) and some fresh meats and greens. In the spring, agave, cacti, greens, and a mix of game provided the bulk of the food resources. Many fruits and seeds became available during the summer months, but perhaps the richest season was autumn, when major harvests of acorns, pinyon nuts, mesquite beans, and screwbeans occurred, and when communal rabbit hunts took place in the context of much feasting and ritual activity (Bean et al. 1981:86–87). In

addition to occupation sites and food procurement sites, rock cairns ("offerings" places along trails), cupule petroglyph sites, hot springs (sacred areas), sources of lithic materials suitable to produce stone tools and other artifacts, and trails represent important land uses by the Serrano.

2.3.3 Cupeño

The Cupeño are considered one of the smallest linguistic groups in Southern California (Bean and Smith 1978). The traditional territory of the Cupeño is located near the headwaters of the San Luis Rey River in northern San Diego County. Today, there are several Native American groups (Pala Band of Luiseño Indians, the Morongo Band of Mission Indians, and the Los Coyotes Band of Cahuilla and Cupeño Indians) that include Cupeño members. As discussed by Bean and Smith (1978:588), Cupeño social organization reflects an amalgamation of several different groups that dates back at least 800 years. Cahuilla elements of social organization found among the Cupeño include exogamous moieties, patrilineal clans, and ceremonial exchange parties. The Cupeño also practice some Chingichngish religious rituals that were acquired from the Luiseño, with additional ceremonies adopted from the Ipai.

Ethnographic information on the Cupeño indicates that clans owned the most productive food-gathering spots with communal ownership of intervening areas for hunting and gathering. The head of each clan lived in the clan's ceremonial dance house and was responsible for keeping the clan bundle. A hereditary office that usually passed from father to eldest son, the duties of the clan leader included controlling trade with non-Cupeño groups, overseeing the production and distribution of goods, regulating intra- and interclan relationships, and organizing ceremonies (Bean and Smith 1978:588–589). Clan leaders could also be shamans.

In terms of ritual, the most significant ceremonies for the Cupeño were those held in connection with deaths in the clan. Immediately following the death of an individual, the body was burned. This was followed by the burning of the deceased's possessions a few weeks to several months later. An annual or biannual image-burning ceremony was held at a later point, in which images of all those who had died since the last ceremony were burned (Bean and Smith 1978:589). Another ceremony held in memory of the dead was the eagle-killing ritual, which was held once a year.

2.4 HISTORICAL SETTING

The Spanish occupation of Alta California and the founding of the San Diego de Alcalá mission in San Diego occurred in 1769 resulting availability of written records. The following historic context of California was taken primarily from Clark and Smallwood (2015). Exploration of the California coast in the sixteenth and seventeenth centuries was the basis for the Spanish claim to the region. In the eighteenth century, Spain recognized that to strengthen its claim, it would have to settle Alta California to preclude encroachment by the Russians and British traders. Therefore, in the latter half of the eighteenth century, Spain and the Franciscan Order founded a series of presidios, or military camps, and 21 missions along the California coast, beginning at San Diego in 1769. The Spanish also carried out exploratory expeditions into the interior regions, including the Mojave Desert, to identify travel routes to the coast and to establish interior agricultural settlements.

With the signing of the Treaty of Guadalupe-Hidalgo on February 2, 1848, California formally became an American territory, and two years later, on September 9, 1850, California became the thirty-first state in the Union. Between those two years came a large influx of eastern immigrants seeking their fortunes; the catalyst for this influx was James Marshall's 1848 discovery of gold at Sutter's Mill (Starr 2005). The population and wealth in the early statehood years were concentrated in the northern part of the state. Ranching was the main occupation in the southern counties providing meat and supplies to the north. The floods and drought of the 1860s brought that era to a close, and the completion of the transcontinental railroad in 1869 opened California to agricultural settlement.

Southern California was promoted as an ideal agricultural area, with fertile soil and a mild climate. Contemporary reviews of California painted beautiful pictures that appealed to both Americans and Europeans alike. There were three land booms tied to railroad expansion: (1) after the transcontinental railroad was completed, enabling easy travel to California; (2) late 1870s after the Southern Pacific Railroad (SPRR) was completed; and (3) 1886–1888, when the Santa Fe transcontinental line was completed. Competition between these lines incited a rate war, and both tourists and potential settlers took advantage of the low fares to come to California (Lech 2004:222).

2.4.1 Local History

Banning is located in the San Gorgonio Pass, the principle opening between the San Bernardino Mountains to the north and the San Jacinto Mountains to the south that allows east-west travel between the coast and desert regions. Therefore, it was the route of early trails and stage roads, as well as the SPRR and Interstate 10.

Banning, originally Moore City, was founded in early 1877, near the "confluence" of the railroad and the flume (Lech 2004:254). By July of the same year, the name was changed to Banning. The 1886 Land Office map clearly shows Banning located north of the SPRR, as a town of about four blocks east-west and three blocks north-south. The Banning Land and Water Company flume is depicted traveling north from town along what is now San Gorgonio Avenue. Grain fields and isolated cabins and houses are depicted around Banning, particularly southwest of town. The Bradshaw Stage Route, which was located north of Banning, is no longer shown on the map (General Land Office 1886). The first commercial grain crop was barley; subsequently both oats and wheat were also successful cash crops (Hughes 1938:205). At the same time that farmers and ranchers settled in Banning, it also became known as a health resort. In 1888, the town was described as "unsurpassed" as a resort, with water "as pure as ever flowed from Nature's fountain" (quoted in Lech 2004:259). In 1890, the Sisters of St. Joseph founded the St. Boniface Indian School near Banning (Deferrari 1942:541).

Incorporated in 1913, Banning was similar to many other small towns throughout Southern California and the country, proud of every achievement, eager for further growth and development in a positive way, and full of hope for the future. Banning continued to grow both as an agricultural area and as a resort. In the 1920s, Banning's population was around 3,000 (Banning Chamber of Commerce 1927). In that decade, almond trees, at the peak of their success in California, were grown on approximately 1,000 acres in and around Banning; the area was considered the largest almond-growing region in Southern California (Holtzclaw 2005:25, 41).

At the same time, Banning had maintained its reputation as a "health haven . . . as attested by the sanitariums and private rest homes in and near the city" (Hughes 1938:205).

In 1931, the news of the construction of the Colorado River Aqueduct by the Metropolitan Water District of Southern California (MWD) was well-received in Banning. In anticipation of the economic boost the city would receive, "Banning staged a victory jubilee in celebration of the voting of bonds for aqueduct construction" (Hughes 1938:59). The MWD field headquarters were located at the intersection of San Gorgonio Avenue and the Union Pacific Railroad. Construction work for MWD headquarters began in 1932. Through the years of the Great Depression, Banning was home to the MWD engineer's field office. In addition, the concrete testing laboratory was located in Banning. Boring the San Jacinto Tunnel began in 1933 and continued until the "holing through" on November 18, 1938. During these seven years, the headquarters provided a boost to the local economy, as did the construction workers who lived in the town and commuted to work.

At the beginning of World War II, General George C. Patton established the Desert Training Center in the Mojave Desert in eastern Riverside and San Bernardino counties. In Banning, a 1,000-bed hospital, aid station, and artillery range contributed to the training effort. During the war, 1.6 million people moved to California to work in war industries, and many of the servicemen trained in the state settled in Banning after the war was over (Starr 2005:237). By 1962, California had the highest population of any state.

Banning's growth continues to rise into the present day due to investments in capital improvements projects, which include over 1,673 new housing units (City of Banning 2023). Currently, the city of Banning is home to an estimated population of 30,683, according to the U.S. Census Bureau (2022).

3
CULTURAL LITERATURE AND RECORDS SEARCH

On August 9, 2023, prior to the field survey of the Project area, Æ conducted a literature and records search at the Eastern Information Center (EIC) of the California Historical Resource Information System, housed at the University of California, Riverside. The objective of this records search was to determine whether any prehistoric or historical cultural resources had been recorded previously within the Project area and a 0.5-mile search radius of the proposed Project.

Results of the records search indicated eight cultural resource studies have been conducted previously within the 0.5-mile search radius (Table 3-1). Three of the previous studies involved the Project area. As a result, 100 percent of the Project area has been investigated previously.

Table 3-1
Previous Cultural Resource Studies in the 0.5-Mile Search Radius

EIC Reference #	Authors(s)	Date	Title
RI-02210	Underwood, J., J. Cleland, C. M. Wood, and R. Apple	1986	Preliminary Cultural Resources Survey Report for the US Telecom Fiber Optic Cable Project, from San Timoteo Canyon to Socorro, Texas; The California Segment
RI-07339[a]	Tang, Bai "Tom", Josh Smallwood, and Melissa Hernandez	2007	Identification and Evaluation of Historic Properties: Wastewater Treatment Plant Expansion and Recycled Water System, City of Banning, Riverside, California
RI-08374	Eckhardt, William T., Stacie Wilson, Carol Serr, and Karolina Chmiel	2009	Final—Cultural Resources Inventory of the Proposed SCE Devers to Valley Substation Project, Riverside County, California: Volume I
RI-08449[a]	Tang, Bai "Tom", Michael Hogan, Josh Smallwood, and Terri Jacquemain	2004	Cultural Resources Technical Report City of Banning General Plan
RI-08668	Bonner, Wayne H. and Arabesque Said	2011	Letter Report: Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidates IE24909-H
RI-08978	DeCarlo, Matthew M.	2013	Cultural Resources Inventory of Late Engineering Construction Components, Southern California Edison (SCE) Devers-Palo Verde 2 (DPV2) Project, Riverside County, California
RI-09167	McLean, Roderic, Natalie Brodie, Jacqueline Hall, Shannon Carmack, Phil Fulton, Ingri Quon, Erin Martinelli, Richard Erickson, and Jay Michals	2013	Cultural Resources Assessment and Class III Inventory Volume I West of Devers Project San Bernardino and Riverside Counties, California.
RI-09540[a]	Brunzell, David	2013	Cultural Resources Assessment Rancho San Gorgonio Planned Community Project City of Banning, Riverside County, Riverside County, California

a - Study overlaps with the Project area.

The records search resulted in the identification of 46 previously recorded cultural resources within the 0.5-mile search radius. All five of the archaeological resources are historical: one water diversion system, one concrete foundation, one refuse scatter, one rubble deposit, and one concrete well box. In addition, 41 built-environment resources were identified within the 0.5-mile search radius (Table 3-2). None of the previously recorded cultural resources are documented within the Project area.

Table 3-2
Previously Recorded Cultural Resources in the 0.5-Mile Search Radius

Primary	Trinomial	Description
Historic Resources		
33-014366	CA-RIV-7815	Water diversion system
33-014367	CA-RIV-7816	Concrete foundations
33-014368	CA-RIV-7817	Refuse scatter
33-025807	—	Concrete and masonry rubble
33-025814	—	Concrete well box
Built-Environment Resources		
33-009150	—	Vernacular wood frame house
33-009159	—	1915 Vernacular wood frame house
33-015809	—	1950 California Ranch–style house
33-015810	—	1950 California Ranch–style house
33-015811	—	1947 Doolittle House
33-015813	—	1947 Altered Spanish Eclectic–style house
33-015814	—	1947 Vernacular-style house
33-015815	—	1959 California Ranch–style house
33-015816	—	1959 California Ranch–style house
33-015817	—	1960 California Ranch–style house
33-015818	—	1956 California Ranch–style house
33-015819	—	1959 California Ranch–style house
33-015820	—	1926 Craftsman Bungalow–style house
33-015821	—	1959 California Ranch–style house
33-015822	—	1961 California Ranch–style house
33-015823	—	1957 California Ranch–style house
33-015824	—	1950s California Ranch–style house
33-015825	—	1961 California Ranch–style house
33-015826	—	1961 California Ranch–style house
33-015827	—	1961 California Ranch–style house
33-015828	—	1947 California Ranch–style house
33-015829	—	1960 California Ranch–style house
33-015830	—	1961 California Ranch–style house
33-015831	—	1961 California Ranch–style house
33-015833	—	1940s Minimal Traditional–style house

Table 3-2
Previously Recorded Cultural Resources in the 0.5-Mile Search Radius

Primary	Trinomial	Description
33-015835	—	1959 California Ranch–style house
33-015837	—	1950 California Ranch–style house
33-015838	—	1961 California Ranch–style house
33-015839	—	1951 Vernacular-style commercial building
33-015840	—	1958 Vernacular-style house
33-015841	—	1950s California Ranch–style house
33-015842	—	1958 California Ranch–style house
33-017729	—	1960s Vernacular-style house
33-017731	—	1962 California Ranch–style house
33-017732	—	1962 California Ranch–style house
33-017733	—	1967 Vernacular-style farmhouse
33-017734	—	1967 Vernacular-style farmhouse
33-017742	—	1955 Cinder block commercial building
33-017744	—	1965 Commercial building
33-017745	—	1960s Commercial building
33-017748	—	1950s Vernacular-style commercial building

3.1 HISTORICAL MAP REVIEW

A series of historical maps were consulted to assess land use and development in the Project area. Maps consulted included USGS topographic quadrangle maps: San Jacinto 1901 30 minute, Southern California 1901 30 minute, Banning 1943 (photorevised 1952) 15 minute, Beaumont 1953 (photorevised 1988) 7.5 minute, Banning 1956 (photorevised 1961) 15 minute, and Santa Ana 1965 30 minute.

The Southern Pacific Railroad appears north of the Project area on all of the examined maps. All of the maps after 1901 also exhibit several buildings outside of the Project area north and south of modern-day Lincoln Street. The structures also appear on aerial photographs, viewed on historicaerials.com/viewer, as early as 1966. No other buildings, structures, or features of interest are shown in the Project area on any of the historical maps or photographs examined.

4
NATIVE AMERICAN COMMUNICATIONS

Æ contacted the NAHC on June 22, 2023, for a review of their SLF to determine if any known Native American cultural properties (e.g., traditional use or gathering areas, places of religious or sacred activity) are present within or adjacent to the Project area. The NAHC responded on July 19, 2023, stating the SLF search was completed with negative results. The NAHC requested Æ contact Native American individuals and organizations to elicit information regarding cultural resource issues related to the proposed Project, if any.

Upon review of the Native American contact list and after removing redundancies, Æ narrowed the list to 11 individuals and organizations traditionally and culturally affiliated with the geographic region of the Project area. Æ sent out Project scoping letters via email and U.S. Postal Service on September 8, 2023, describing the Project and asking these individuals and organizations for their input. Copies of the letters, the list of contacts, and received responses are included in Appendix A. Æ sent follow up email correspondence on September 22, 2023, to the organizations who had not responded to the initial request on September 8, 2023.

Individuals/organizations contacted include:

- Patricia Garcia-Plotkin, Director of the Tribal Historic Preservation Office for the Agua Caliente Band of Cahuilla Indians
- Amanda Vance, Chairperson of the Augustine Band of Cahuilla Indians
- Doug Welmas, Chairperson of the Cabazon Band of Mission Indians
- Bobby Ray Esparza, Cultural Director for the Cahuilla Band of Indians
- Ray Chapparosa, Chairman of the Los Coyotes Band of Cahuilla and Cupeño Indians
- Ann Brierty, Tribal Historic Preservation Officer for the Morongo Band of Mission Indians
- Jill McCormick, Historic Preservation Officer for the Quechan Tribe of the Fort Yuma Reservation
- John Gomez, Environmental Coordinator for the Ramona Band of Cahuilla
- Lovina Redner, Tribal Chair of the Santa Rosa Band of Cahuilla Indians
- Joseph Ontiveros, Tribal Historic Preservation Officer for the Soboba Band of Luiseño Indians
- Cultural Committee of the Torres-Martinez Desert Cahuilla Indians

As of October 17, 2023, Æ has received two responses. The Agua Caliente Band of Cahuilla Indians notes the Project falls within the Tribe's Traditional Use Area and a records check of the tribal registry indicates this area has not been previously surveyed for cultural resources. Therefore, the Tribe requests: A cultural resources inventory of the Project area by a qualified archaeologist before any development activities occur in the area, copies of any cultural resource documentation (report and site records) generated in connection with the Project, and a copy of the records search with associated survey reports and site records from the Information Center. The Augustine Band of Cahuilla Indians are unaware of any cultural resources that would be affected by the Project but wish to be contacted immediately if any resources are discovered during development. Complete responses from each Tribe are in Appendix A.

5
CULTURAL RESOURCE SURVEY METHODS AND RESULTS

This chapter details the methods and results of the intensive pedestrian survey of the Project area. Approximately 90 percent of the Project area was accessible during the survey. The intensive survey was completed by Æ Archaeologist Andrew DeLeon on August 23, 2023.

5.1 SURVEY METHODS

DeLeon began the survey on the northwest corner of the Project area (Figure 5-1). From there, the survey proceeded southward. The survey was conducted in 15-meter transects oriented north–south, moving eastward through the Project area. While surveying, DeLeon photographed the Project area at various locations to document its current condition.

5.2 SURVEY RESULTS

The entire Project area is highly disturbed and appears to have been previously plowed. There are several dirt pathways along the perimeters of the Project area, which are also visible on aerial satellite imagery. The center area of the Project appears to have been used as a staging area in the past, and the ground surface soils in that area contained more gravel. DeLeon also observed several pieces of asphalt debris on the northeastern edge of the Project which appear to have been dumped, as no other evidence of roadway or pavement debris was observed anywhere else

Figure 5-1 Overview from northwest corner of Project area, facing southeast.

within the Project area. The Project area also encompasses part of a steep drainage running along the eastern edge. The drainage channel was approximately 40 feet deep with steep sidewalls and was unable to be surveyed on foot.

Visibility throughout the Project area was generally poor at 15 percent, as the ground surface was covered in straw grasses, ragweed, and dove weed (Figure 5-2). The eastern side of the Project area contained patches of California buckwheat. When possible, DeLeon inspected exposed areas of soil within the Project area that consisted of a yellowish brown (10YR 5/4) sandy loam. The topography of the Project is relatively flat and uniform. DeLeon observed sparce patches of modern refuse throughout the Project area. No cultural resources were encountered within the Project area during the survey.

Figure 5-2 Overview from southeast corner of Project area facing northwest.

6
MANAGEMENT RECOMMENDATIONS

Æ did not encounter any cultural resources within the Project area during the intensive pedestrian survey. The entire Project area is highly disturbed and appears to have been previously plowed. Geological data indicate that soil series mapped within the Project area contain no Ab (buried) horizons which often produce an environment conducive to intact buried archaeological deposits. While the Greenfield and Ramona soil series contain well-developed A and B horizons, the integrity of those stratigraphic layers is questionable considering modern disturbances. Due to the low likelihood that archaeological deposits or features will be found during construction, no further cultural resource management of the Project area is recommended.

It should be noted that the Project is within Agua Caliente Band of Cahuilla Indian's Traditional Use Area and the Tribe requested a copy of the records search, survey reports, and site records from the Information Center, copies of any cultural resource documentation generated from the current Project, and shapefiles of the Project area. The Augustine Band of Cahuilla Indians are unaware of any cultural resources that would be affected by the Project but wish to be contacted immediately if any resources are discovered during development.

If potentially significant archaeological materials are encountered during any future construction activities, all work must be halted in the vicinity of the discovery until a qualified archaeologist can visit the site and assess the significance and integrity of the find. If intact and significant archaeological remains are encountered, the impacts of the Project must be mitigated appropriately. Any such discoveries, and subsequent evaluation and treatment, should be documented in a cultural resource report, which should be submitted to the EIC for archival purposes.

Additionally, Health and Safety Code Section 7050.5, CEQA Guidelines Section 15064.5(e), and Public Resources Code Section 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of human remains in a location other than a dedicated cemetery. Finally, if the Project area is expanded to include areas not covered by this survey or other recent cultural resource studies, additional cultural resource studies may be required.

7
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APPENDIX A

Native American Communications

LIST OF NATIVE AMERICAN CONTACTS AND RECORD OF RESPONSES

Name	Date	Responses
Patricia Garcia-Plotkin THPO Agua Caliente Band of Cahuilla Indians	September 8, 2023 September 15, 2023	Scoping letter sent via email. Email response received from Claritsa Duarte- Cultural Resources Analyst. The tribe states that the project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area. Records check of the ACBCI registry indicates this area has not been surveyed for cultural resources. The tribe requests a cultural resources inventory of the project area by a qualified archaeologist before any development activities in this area—copies of any cultural resource documentation (report and site records) generated in connection with this project. A copy of the records search with associated survey reports and site records from the information center.
Amanda Vance Chairperson Augustine Band of Cahuilla Mission Indians	September 8, 2023 September 11, 2023	Scoping letter sent via email. Email response received from Geramy Martin, Tribal Secretary. The tribe states they are unaware of specific cultural resources that may be affected by the proposed project. However, if AE should discover any cultural resources during the development of this project, please contact their office immediately for further evaluation.
Doug Welmas Chairperson Cabazon Band of Mission Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.
BobbyRay Esparza Cultural Director Cahuilla Band of Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.
Ray Chapparosa Chairperson Los Coyotes Band of Cahuilla and Cupeno Indians	September 8, 2023 September 22, 2023	Scope letter sent via post. Follow up message via phone call, left voicemail. No response received.
Ann Brierty Tribal Historic Preservation Officer Morongo Band of Mission Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.

Name	Date	Responses
Jill McCormick Historic Preservation Officer Quechan Tribe of the Fort Yuma Reservation	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.
John Gomez Environmental Coordinator Ramona Band of Cahuilla	September 8, 2023 September 22, 2023	Scope letter sent via post and email. Follow up sent via email. No response received.
Lovina Redner Tribal Chair San Manuel Band of Mission Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.
Joseph Ontiveros cc Jessica Valdez Tribal Historic Preservation Officer Soboba Band of Luiseno Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.
Cultural Committee Torres-Martinez Desert Cahuilla Indians	September 8, 2023 September 22, 2023	Scoping letter sent via email. Follow up sent via email. No response received.

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
916-373-3710
916-657-5390 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Date: 6/22/23

Project: City of Banning Np-2 Booster Pump Station Reservoir Project

County: Riverside

USGS Quadrangle Name: Beaumont

Township: 3S **Range:** 1E **Section(s):** 8

Company/Firm/Agency: Applied EarthWorks, Inc.

Contact Person: Andrew DeLeon

Street Address: 3550 East Florida Avenue, Suite H

City: Hemet **Zip:** 92544

Phone: (951) 766-2000 ext.520

Fax: (951) 766-0020

Email: adeleon@appliedearthworks.com

Project Description: The Project involves the construction of a reservoir and booster pump station over an approximately 7.51 acre area. Ground disturbance is expected as a result of construction activities.

NATIVE AMERICAN HERITAGE COMMISSION

ACTING CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Sara Dutschke
Miwok

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Miwok, Nisenan

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1550 Harbor Boulevard
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nahc@nahc.ca.gov
NAHC.ca.gov

July 19, 2023

Andrew DeLeon
Applied EarthWorks, Inc.

Via Email to: adeleon@appliedearthworks.com

Re: City of Banning Np-2 Booster Pump Station Reservoir Project, Riverside County

Dear Mr. DeLeon:

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

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

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Riverside County
7/19/2023

Tribe Name	Fed (F) Non-Fed (N)	Contact Person	Contact Address	Phone #	Fax #	Email Address	Cultural Affiliation	Counties	Last Updated
Agua Caliente Band of Cahuilla Indians	F	Reid Milanovich, Chairperson	5401 Dinah Shore Drive Palm Springs, CA, 92264	(760) 699-6800	(760) 699-6919	laviles@aguacaliente.net	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Agua Caliente Band of Cahuilla Indians	F	Patricia Garcia-Plotkin, Director	5401 Dinah Shore Drive Palm Springs, CA, 92264	(760) 699-6907	(760) 699-6924	ACBCI-THPO@aguacaliente.net	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Augustine Band of Cahuilla Mission Indians	F	Amanda Vance, Chairperson	84-001 Avenue 54 Coachella, CA, 92236	(760) 398-4722	(760) 369-7161	hhaines@augustinetribe.com	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Cabazon Band of Mission Indians	F	Doug Welmas, Chairperson	84-245 Indio Springs Parkway Indio, CA, 92203	(760) 342-2593	(760) 347-7880	jstapp@cabazonindians-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Cahuilla Band of Indians	F	BobbyRay Esaprza, Cultural Director	52701 CA Highway 371 Anza, CA, 92539	(951) 763-5549		besparza@cahuilla-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	6/28/2023
Cahuilla Band of Indians	F	Anthony Madrigal, Tribal Historic Preservation Officer	52701 CA Highway 371 Anza, CA, 92539	(951) 763-5549		anthonymad2002@gmail.com	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	6/28/2023
Cahuilla Band of Indians	F	Daniel Salgado, Chairperson	52701 CA Highway 371 Anza, CA, 92539	(951) 972-2568	(951) 763-2808	chairman@cahuilla-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	6/28/2023
Los Coyotes Band of Cahuilla and Cupeño Indians	F	Ray Chapparosa, Chairperson	P.O. Box 189 Warner Springs, CA, 92086-0189	(760) 782-0711	(760) 782-0712		Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Morongo Band of Mission Indians	F	Ann Brierty, THPO	12700 Pumarra Road Banning, CA, 92220	(951) 755-5259	(951) 572-6004	abrierty@morongo-nsn.gov	Cahuilla Serrano	Imperial,Los Angeles,Riverside,San Bernardino,San Diego	
Morongo Band of Mission Indians	F	Robert Martin, Chairperson	12700 Pumarra Road Banning, CA, 92220	(951) 755-5110	(951) 755-5177	abrierty@morongo-nsn.gov	Cahuilla Serrano	Imperial,Los Angeles,Riverside,San Bernardino,San Diego	
Quechan Tribe of the Fort Yuma Reservation	F	Jill McCormick, Historic Preservation Officer	P.O. Box 1899 Yuma, AZ, 85366	(928) 261-0254		historicpreservation@quechantrib e.com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023
Quechan Tribe of the Fort Yuma Reservation	F	Jordan Joaquin, President, Quechan Tribal Council	P.O.Box 1899 Yuma, AZ, 85366	(760) 919-3600		executivesecretary@quechantrib e.com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023
Quechan Tribe of the Fort Yuma Reservation	F	Manfred Scott, Acting Chairman - Kw'ts'an Cultural Committee	P.O. Box 1899 Yuma, AZ, 85366	(928) 210-8739		culturalcommittee@quechantribe com	Quechan	Imperial,Kern,Los Angeles,Riverside,San Bernardino,San Diego	5/16/2023

Native American Heritage Commission
Native American Contact List
Riverside County
7/19/2023

Ramona Band of Cahuilla	F	John Gomez, Environmental Coordinator	P. O. Box 391670 Anza, CA, 92539	(951) 763-4105	(951) 763-4325	jgomez@ramona-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	8/16/2016
Ramona Band of Cahuilla	F	Joseph Hamilton, Chairperson	P.O. Box 391670 Anza, CA, 92539	(951) 763-4105	(951) 763-4325	admin@ramona-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	
Santa Rosa Band of Cahuilla Indians	F	Lovina Redner, Tribal Chair	P.O. Box 391820 Anza, CA, 92539	(951) 659-2700	(951) 659-2228	lsaul@santarosa-nsn.gov	Cahuilla	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	
Soboba Band of Luiseno Indians	F	Jessica Valdez, Cultural Resource Specialist	P.O. Box 487 San Jacinto, CA, 92581	(951) 663-6261	(951) 654-4198	jvaldez@soboba-nsn.gov	Cahuilla Luiseno	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	7/14/2023
Soboba Band of Luiseno Indians	F	Joseph Ontiveros, Tribal Historic Preservation Officer	P.O. Box 487 San Jacinto, CA, 92581	(951) 663-5279	(951) 654-4198	jontiveros@soboba-nsn.gov	Cahuilla Luiseno	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	7/14/2023
Torres-Martinez Desert Cahuilla Indians	F	Cultural Committee,	P.O. Box 1160 Thermal, CA, 92274	(760) 397-0300	(760) 397-8146	Cultural-Committee@torresmartinez-nsn.gov	Cahuilla	Imperial,Riverside,San Bernardino,San Diego	

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resour Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed City of Banning Np-2 Booster Pump Station Reservoir Project, Riverside Cou

Record: PROJ-2023-003574
Report Type: List of Tribes
Counties: Riverside
NAHC Group: All

Applied EARTHWORKS Inc.

3550 E. Florida Ave., Suite H
Hemet, CA 92544-4937
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www.appliedearthworks.com

September 8, 2023

Ray Chapparosa
Chairperson
Los Coyotes Band of Cahuilla and Cupeno Indians
P.O. Box 189,
Warner Springs, CA, 92086-0189

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Chapparosa:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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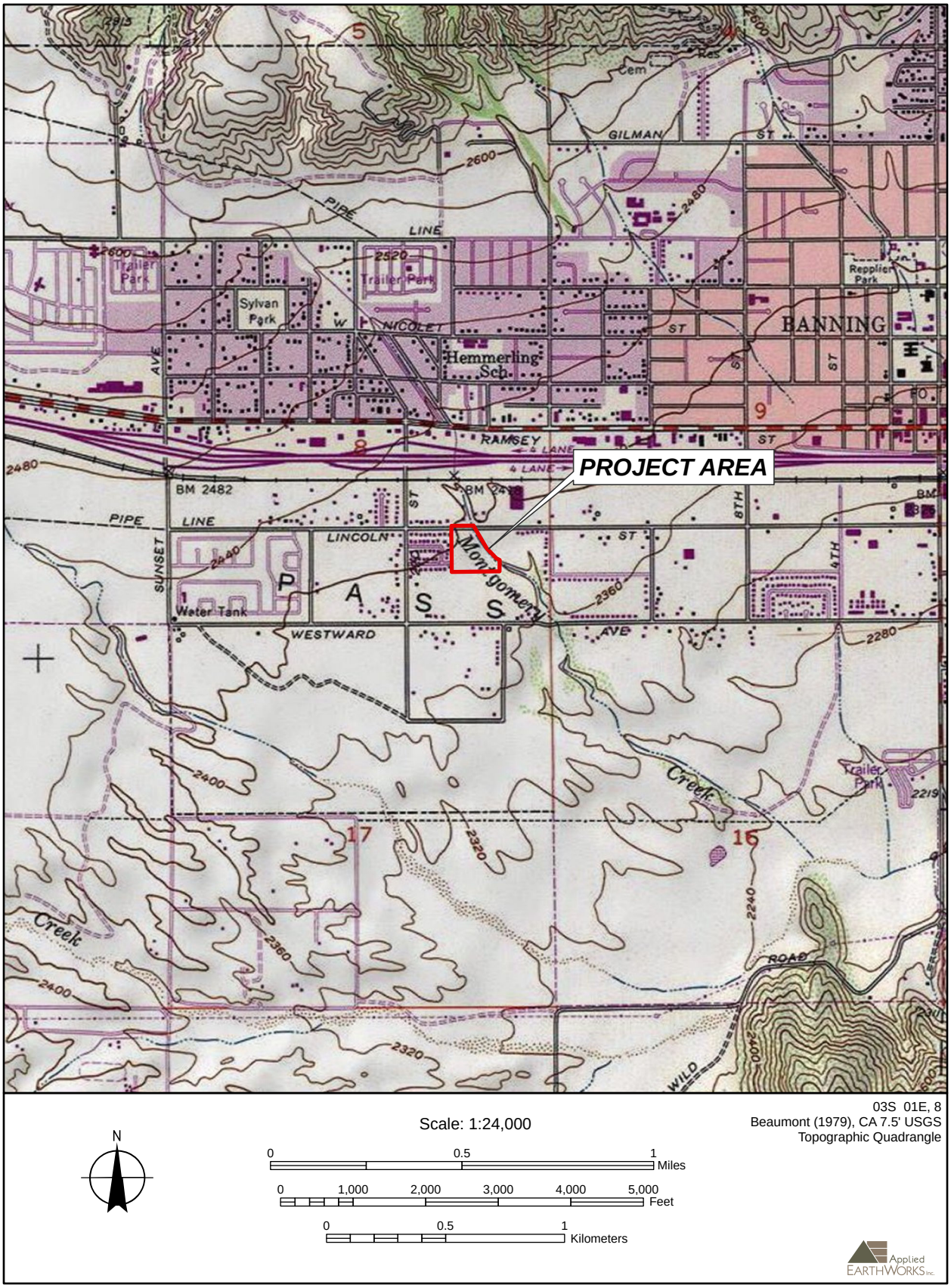
Please be aware that your comments and concerns are very important to us, as well as to the successful completion of this Project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc



Project location map for the *Project - AE4506*.

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September 8, 2023

Cultural Committee
Torres-Martinez Desert Cahuilla Indians
P.O. Box 1160
Thermal, CA, 92274

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Cultural Committee:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Respectfully yours,

Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Joseph Hamilton
Chairperson
Ramona Band of Cahuilla
P. O. Box 391670
Anza, CA, 92539

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Hamilton:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Respectfully yours,

Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Robert Martin
Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA, 92220

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Martin:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Reid Milanovich
Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive,
Palm Springs, CA, 92264

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Milanovich:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Respectfully yours,

Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Joseph Ontiveros
Tribal Historic Preservation Officer
Soboba Band of Luiseno Indians
P.O. Box 487,
San Jacinto, CA, 92581

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Ontiveros:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Lovina Redner
Tribal Chair
Santa Rosa Band of Cahuilla Indians
P.O. Box 391820
Anza, CA, 92539

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Ms. Redner:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Staff Archaeologist
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September 8, 2023

Daniel Salgado
Chairperson
Cahuilla Band of Indians
52701 CA Highway 371
Anza, CA, 92539

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Salgado:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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Hemet, CA 92544-4937
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September 8, 2023

Manfred Scott
Acting Chairman
Quechan Tribe of the Fort Yuma Reservation
P.O. Box 1899
Yuma, AZ, 85366

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Scott:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

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September 8, 2023

Amanda Vance
Chairperson
Augustine Band of Cahuilla Mission Indians
84-001 Avenue 54
Coachella, CA, 92236

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Ms. Vance:

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September 8, 2023

Doug Welmas
Chairperson
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway,
Indio, CA, 92203

Re: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California.

Dear Mr. Welmas:

On behalf of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study for the Banning NP-2 Booster Pump Sation and Reservoir Project (Project). The Project involves the construction of a reservoir and booster pump station within Assessor's Parcel Number 538-280-001 on approximately 7.51 acres west of 22nd Avenue and immediately south of Lincoln Street in the City of Banning. The Project is subject to the California Environmental Quality Act (CEQA) and the City of Banning is the lead CEQA agency. As indicated on the attached map, the Project is located within Sections 8 and 17, Township 3 South, Range 1 East, as depicted on the U.S. Geological Survey Beaumont, California 7.5-minute topographic quadrangle map.

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Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

03-020-2023-004

September 15, 2023

[VIA EMAIL TO:jcochrane@appliedearthworks.com]
Applied Earthworks
Jessica Cochrane
3550 E. Florida Ave
Hemet, CA 92544

Re: Banning NP-2 Booster Pump Station and Reservoir

Dear Jessica Cochrane,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the Banning NP-2 Booster Pump Station and Reservoir project. The project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area.A records check of the ACBCI registry indicates this area has not been surveyed for cultural resources. In consultation, the ACBCI THPO requests the following:

*A cultural resources inventory of the project area by a qualified archaeologist prior to any development activities in this area.

*Copies of any cultural resource documentation (report and site records) generated in connection with this project.

*A copy of the records search with associated survey reports and site records from the information center.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760) 883-1134. You may also email me at ACBCI-THPO@aguacaliente.net.

Cordially,

Claritsa Duarte

Claritsa Duarte
Cultural Resources Analyst
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

AUGUSTINE BAND OF CAHUILLA INDIANS
84-481 Avenue 54, Coachella CA 92236
Telephone: (760) 398-4722
Fax (760) 369-7161
Tribal Chairperson: Amanda Vance
Tribal Vice-Chairperson: Victoria Martin
Tribal Secretary: Geramy Martin

Date: 09/11/2023

Dear: Jessica Cochrane, BA
Staff Archaeologist
Applied EarthWorks, Inc

SUBJECT: Cultural Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project, City of Banning, Riverside County, California

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources have resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time, we are unaware of specific cultural resources that may be affected by the proposed project, however, in the event, you should discover any cultural resources during the development of this project please contact our office immediately for further evaluation.

Very truly yours,

Geramy Martin

Geramy Martin, Tribal Secretary
Augustine Band of Cahuilla Indians

Appendix D

Energy Tables

Table 1 – Total Construction-Related Fuel Consumption

NP-2 Booster Station and Reservoir Project

Fuel	Consumption	
Diesel		
On-Road Construction Trips[1]	1,922	Gallons
Off-Road Construction Equipment[2]	18,388	Gallons
Diesel Total	**20,310**	**Gallons**
Gasoline		
On-Road Construction Trips[1]	1,777	Gallons
Off-Road Construction Equipment[3]	-	Gallons
Gasoline Total	**1,777**	**Gallons**

Notes:

1. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod for construction in 2024 and fleet-average fuel consumption in gallons per mile from EMFAC2021 web based data for South Coast Air Basin. See Table 2 for calculation details.
2. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based on SCAQMD CEQA Air Quality Handbook, Table A9-3E.
3. All emissions from off-road construction equipment were assumed to be diesel.

Table 2 – On-Road Construction Trip Estimates

NP-2 Booster Station and Reservoir Project

Trip Type	Trips	Trip length	Vehicle Miles Traveled (VMT)	Fuel Efficiency	Annual Fuel Usage[1]	
	(trips)	(miles)	(miles)	(mpg)	(Fuel)	(gallon)
Worker[2,3]	2,438	18.5	45,094	25.9	Gasoline	1,777
Vendor[4]	1,350	10.2	13,770	7.5	Diesel	1,912
Hauling[5]	40	1.5	60	6.0	Diesel	10

Notes:

1. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod output for construction and fleet-average fuel consumption in gallons per mile from EMFAC2021 web based data for 2024 in South Coast Air Basin.
2. Worker trips were assumed to be 100% gasoline powered vehicles.
3. Per CalEEMod, worker Trips were assumed to be 25% LDA, 50% LDT1, and 25% LDT2.
4. Vendor trips were assumed to be 50% MHDT and 50% HHDT, split evenly between the MHDT and HHDT construction categories.
5. Per CalEEMod, hauling trips were assumed to be 100% HHDT.

Appendix E.1

Supplemental Geotechnical Investigation

APPROVED AS SUBMITTED

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION

OFFSITE BOOSTER PUMP STATION ATWELL DEVELOPMENT BANNING, CALIFORNIA

APPROVED BY
CITY OF BANNING
MAR 23 2023
PUBLIC WORKS DEPT

GEOCON
WEST, INC.
GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

TRIPOINTE HOMES
CORONA, CALIFORNIA

FEBRUARY 9, 2023
PROJECT NO. T2305-22-10G

GEOCON
WEST, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. T2305-22-10G
February 9, 2023

TriPointe Homes
1250 Corona Pointe Court, Suite 600
Corona, California 92879

Attention: Mr. Michael Heishman, Director of Land Development

Subject: SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
OFFSITE BOOSTER PUMP STATION
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

Dear Mr. Heishman:

In accordance with our Work Order Authorization, dated December 20, 2022, Geocon West, Inc. (Geocon) performed a supplemental geotechnical investigation for the booster pump station located south of the intersection of Lincoln Street and Adams Street in the City of Banning, California. The accompanying geotechnical report presents the results of our study and includes our conclusions and recommendations pertaining to the geotechnical aspects of the design and construction of the proposed booster station site. Based on the results of our 2018 geotechnical investigation, our 2021 geotechnical update, and this study, it is our opinion that the sites are suitable for the proposed improvements, provided the recommendations of this report are followed.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON WEST, INC.

Luke C. Weidman
GIT 891

Andrew T. Shoashekan
PE 93940

Joseph J. Vettel
GE 2401

Lisa A. Battiato
CEG 2316

LCW:ATS:LAB:JJV:hd

Distribution: Addressee (email)
MDS Consulting, Inc. Attention: Barrett Bruchhauser

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RECOMMENDED GRADING SPECIFICATIONS

UPDATED GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the findings of a supplemental geotechnical investigation for booster pump station improvements located south of the intersection of Lincoln Street and Adams Street in Banning, California, as depicted on the *Vicinity Map*, Figure 1. A booster pump station and reservoir tank are proposed at the project location.

The purpose of the investigation was to perform an assessment of the geologic conditions, identify potential geologic hazards, collect material samples, perform laboratory testing on select samples, and, based on the conditions encountered, provide recommendations regarding the geotechnical aspects of constructing the improvements at the site as presently proposed.

The site was originally explored by Geocon on August 28, 2018, including the drilling of one geotechnical boring within the booster pump station site, as documented in our *Preliminary Geotechnical Investigation* (dated September 20, 2018). The boring log associated with the previous drilling is included in Appendix A with pertinent laboratory data included in Appendix B. An *Updated Geotechnical Investigation* (dated April 2, 2021) was prepared to satisfy 2019 CBC requirements.

This supplemental investigation included performing a site reconnaissance and Underground Service Alert mark out and notification, drilling and logging of three geotechnical borings, performing laboratory testing, performing geotechnical analyses, reviewing published geotechnical/geologic reporting and data, and preparing of this report. A summary of the information reviewed for this study is presented in the *List of References.* The approximate locations of the exploratory excavations are depicted on the *Geologic Map (*Figure 2). A detailed discussion of the field investigation, including boring logs is presented in Appendix A.

Laboratory testing was performed on samples obtained from the exploratory borings to evaluate maximum dry density and optimum moisture content, expansion index, corrosivity, consolidation characteristics, in-situ and remolded shear strength properties, and in-situ moisture content and dry density. Details of the laboratory testing are presented in Appendix B.

2. SITE AND PROJECT DESCRIPTION

The booster pump station site is located on a vacant lot immediately south of Lincoln Street and its intersection with Adams Street at latitude 33.9214 degrees and longitude -116.8979 degrees. The lot has been vacant and relatively natural since at least 1966. Site elevations range from a high of 2,405 feet MSL at the northwestern corner to a low of 2,400 feet MSL in the southeastern corner. Montgomery Creek channel is at an approximate elevation of 2,375 feet MSL approximately 120 feet east of the booster station pad.

Based on the *Preliminary Site Plan Segment-B Booster Station* (MDS, 2020c), we understand that the proposed construction at the booster station will generally consist of a booster station building that will house three booster pumps and appurtenant systems. Proposed ancillary improvements include a sidewalk ALONG Lincoln Street, an aggregate access road from Lincoln Street A transformer and electrical conduit, sewer sump, and valve vault and valves, will be located outside of the booster station building. The booster station building and lot will be surrounded by a 6-foot masonry block wall with 24-inch tubular steel fence along the block wall. Based on the *Lincoln Street NP Booster and Reservoir Site Plan* (Steven Andrews Engineering, 2022), we understand the proposed reservoir tank at the booster pump station site will be a 24-foot-diameter and 24 feet tall bolted steel tank with 12-inch-diameter inlet and outlet systems.

Preliminary structural loading information for the booster station building and reservoir tank has not been provided to us at this time. We expect the proposed booster station building will be a masonry block building supported by conventional shallow foundations with a slab-on-grade floor, and the reservoir tank will be a bolted steel tank constructed on a shallow perimeter ring and slab foundation system. We expect that column loads for the proposed booster station will be up to 25 kips and wall loads will be up to 3 kips per linear foot. We expect the reservoir tank perimeter ring loads will be up to 3 kips per linear foot. If the booster station or reservoir details or loading vary significantly from those described herein, Geocon should be contacted to evaluate the necessity for review and possible revision of this report.

3. GEOLOGIC SETTING

The project site is located in the San Gorgonio Pass at the northern margin of the Peninsular Ranges Geomorphic Province. The Peninsular Ranges are bounded on the north by the Transverse Ranges (San Gabriel and San Bernardino Mountains) and on the east by the San Andreas Fault. The Peninsular Ranges Province extends southward into Mexico and westward past the Channel Islands. Geologic units within the Peninsular Ranges consist of granitic and metamorphic bedrock highlands and deep and broad alluvial valleys.

Locally, the sites lie within the valley between the San Jacinto and San Bernardino Mountains, west of the San Gorgonio River. Active drainages such as Smith and Montgomery Creeks flow southeast from the north before merging along the base of the San Jacinto mountains and continuing east to join the San Gorgonio River. This broad valley is filled with older alluvial fan materials consisting of sand, gravel and granitic detritus shed from the San Bernardino Mountains dissected by active stream channels with sand and gravel deposits.

4. GEOLOGIC MATERIALS

Site geologic materials encountered consist of topsoil and Pleistocene-age Young Alluvial Fan Deposits and Older Alluvial Fan Deposits. Across the site, topsoil was encountered within the upper 1 foot in all borings, however due to the thickness of the soil, it is not a mapped geologic unit. Geologic units and descriptions follow that of Dibblee (2003). Descriptions of the soil and geologic conditions are shown on the boring logs located in *Appendix A* and are generally described herein in order of increasing age.

4.1 Young Alluvial Fan Deposits (Qf)

Young Alluvial Fan Deposits were encountered below the topsoil to a depth of 5 feet in Boring B-5. These deposits consist primarily of clayey sand. The unit can be characterized as loose, dry , and is yellowish brown. Varying amounts of gravel may exist within the unit.

4.2 Older Alluvial Fan Deposits (Qof)

Older Alluvial Fan Deposits were encountered below the topsoil and Young Alluvial Fan Deposits to the maximum depths explored.. These deposits consist of silty sand with lesser amounts of poorly-graded sand, clayey sand, silty sand, and sandy clay, which is characterized as dense to very dense / hard, dry to damp, and is various shades of brown, with varying amounts of gravel and cobbles.

5. GROUNDWATER

Groundwater was not encountered during this investigation. We obtained well data from the California Water Library Well 03S01E14A at the site of the pump station. The well depth is reported to be 735 feet deep, screened from 460 to 680 feet and have a water depth of 425 feet. (DWR, 2021). Based on the valley geometry and sediments, we expect similar groundwater conditions throughout the project areas. Groundwater elevations are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result.

6. GEOLOGIC HAZARDS

6.1 Surface Fault Rupture

The numerous faults in southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Geological Survey (CGS, formerly known as CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (Bryant and Hart, 2007). By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive.

The site is not located within a State of California Fault Hazard Zone. The mapped fault closest to the project is the San Gorgonio Pass fault which is located approximately 4,900 feet north of the booster pump station (Treiman, 1994). Faults within a 50-mile radius of the site are listed in Table 6.1a. Historic earthquakes in southern California of magnitude 6.0 and greater, their magnitude, distance, and direction from the site are listed in Table 6.1b.

Table 6.1a
Active Faults within 50 Miles of the Site

Fault Name	Maximum Magnitude (Mw)	Geometry (Slip Character)	Slip Rate (mm/yr)	Information Source	Distance from Site (mi)	Direction from Site
San Gorgonio Pass	7.0	THRUST	n/a	a	1	N
South Branch San Andreas	7.5	RL-SS	24.0	a	12	E
Pinto Mountain	7.2	LL-SS	2.5	a	12	NE
San Jacinto (Clark)	7.2	RL-SS	12.0	a	14	SW
San Jacinto (Casa Loma)	6.9	RL-SS	12.0	a	16	SW
North Branch San Andreas	7.4	RL-SS	30.0	a	17	E
San Andreas (San Bernardino)	7.5	RL-SS	24.0	a	18	NW
Johnson Valley	6.7	RL-SS	0.6	a	29	NE
North Frontal	7.2	R	1.0	a	30	N
Burnt Mountain	6.5	RL-SS	0.6	a	31	NE
Lenwood	7.5	RL-SS	0.6	a	31	NE
Helendale	7.3	RL-SS	0.6	a	31	N
Elsinore (Wildomar)	6.8	RL-SS	5.0	a	32	SW
Elsinore Fault (Glen Ivy)	6.8	RL-SS	5.0	a	34	SW
Glen Helen	6.7	RL-SS	12.0	a	36	NW
San Andreas Coachella Valley Branch	7.2	RL-SS	25.0	a	37	SE
Hildago/Calico	7.3	RL-SS	0.6	a	43	NE
Camp Rock/Emerson	7.0	RL-SS	0.6	a	44	NE
Chino	6.7	RL-R-O	1.0	a	46	W
San Jacinto (Coyote Creek)	6.8	RL-SS	4.0	a	47	SE
Cucamonga	6.9	R	5.0	a	49	NW

Geometry: BT = blind thrust, LL = left lateral, N = normal, O = oblique, R = reverse, RL = right lateral, SS = strike slip.
Information Sources: a = Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Wills, C.J., 2003, The Revised 2002 California Probabilistic Seismic Hazard Maps, including Appendices A, B, and C, dated June; b = online Fault Activity Map of California website, maps.conservation.ca.gov/cgs/fam/, as of 1/2017.
n/a = data not available

Table 6.1b
Historic Earthquake Events with Respect to the Segment-B/C Booster Site

Earthquake (Oldest to Youngest)	Date of Earthquake	Magnitude	Distance to Epicenter (Miles)	Direction to Epicenter
Near Redlands	July 23, 1923	6.3	23	WNW
Long Beach	March 10, 1933	6.4	67	WSW
Tehachapi	July 21, 1952	7.5	144	WNW
San Fernando	February 9, 1971	6.6	95	WNW
Whittier Narrows	October 1, 1987	5.9	71	W
Sierra Madre	June 28, 1991	5.8	70	WNW
Landers	June 28, 1992	7.3	31	NE
Big Bear	June 28, 1992	6.4	20	N
Northridge	January 17, 1994	6.7	98	WNW
Hector Mine	October 16, 1999	7.1	58	NE
Ridgecrest China Lake Fault	July 5, 2019	7.1	135	NNW

6.2 Liquefaction and Seismic Settlement

Liquefaction is a phenomenon in which loose, saturated, relatively cohesion-less soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Seismically induced settlement may occur whether the potential for liquefaction exists or not.

The current standard of practice as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California* (SCEC, 1999) requires a liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

According to the Riverside County Information Technology *Map My County* online GIS system, the site is located within areas mapped as having a "moderate" potential for liquefaction.

Due to the lack of shallow groundwater and the dense nature of alluvial soils, neither liquefaction nor seismic "dry-sand" settlement is a design consideration for the site.

6.3 Expansive Soil

The surficial soils at the site generally consist of silty sand. Laboratory testing of site soils indicated these soils are "non-expansive" (Expansion Index [EI] less than 20) as defined by 2019 CBC Section 1803.5.3, with an Expansion Index of 7 and 11 for the site which is classified as 'very low' (EI between 0 and 20) in accordance with ASTM D4829.

6.4 Hydrocompression

Hydrocompression is the tendency of unsaturated soil structure to collapse upon wetting resulting in the overall settlement of the affected soil and overlying foundations or improvements supported thereon. Potentially compressible soils underlying the site are typically removed and recompacted during remedial site grading. However, if compressible soil is left in-place, a potential for settlement due to hydrocompression of the soil exists.

We tested soil samples obtained during our investigation of the sites for hydrocompression, which exhibited a collapse potential of approximately 2.2 percent under high-pressure loading conditions. We expect remedial grading and appropriate drainage measures will effectively reduce the collapse potential of site soils that could impact proposed improvements.

6.5 Landslides

The site is located within a broad alluvial valley. No hills are located on or adjacent to the site. No landslides are geologically mapped in the descending slopes of the San Jacinto Mountains to the south (Dibblee, 2004). The potential for landslides at the site is not a design consideration.

6.6 Slope Stability

Based on the relatively level topography at the project site, the proposed grading of the site is not expected to include the construction of significant cut or fill slopes. In general, permanent, graded fill slopes constructed of on-site soils with gradients of 2:1 (horizontal to vertical) or flatter and vertical heights of 5 feet or less are expected possess factors of safety of 1.5 or greater.

6.7 Rock Fall Hazards

The project area is located within a broad valley. No hill slopes or boulders are situated above the sites. Therefore, rock fall is not considered a hazard for the sites.

6.8 Tsunamis and Seiches

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). The site is located 56 miles from the nearest coastline with two mountain ranges between at an elevation of more than 2,000 feet MSL, therefore, the risk associated with tsunamis is not a design consideration.

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The project sites are not located adjacent to a body of water, therefore, seiches are not a design consideration for the sites.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 Neither soil nor geologic conditions were observed which would preclude the construction of improvements at the site as presently proposed, provided that the recommendations of this report are followed and implemented during design and construction.

7.1.2 Potential geologic hazards at the sites consist of seismic shaking. Based on our investigation and available geologic information, active, potentially active, or inactive faults are not present underlying or trending toward the sites.

7.1.3 Samples tested for hydrocompression exhibited some collapse potential under high-pressure loading conditions. We expect remedial grading and appropriate drainage measures will effectively reduce the collapse potential of site soils that could impact proposed improvements.

7.1.4 The upper portion of the young alluvial fan deposits are considered unsuitable for the support of newly compacted fill or settlement-sensitive improvements. Remedial grading of the surficial soils will be required as discussed herein. New compacted fill and competent undisturbed alluvial fan deposits are considered suitable to support the proposed improvements.

7.1.5 The laboratory tests indicate that the site soils are non-expansive, and have a "very low" expansion potential (expansion index of 0 to 20) in accordance with ASTM D4829. The foundation recommendations in this report assume that the structures are founded in non-expansive material. Additional testing should be conducted during earthwork to confirm the expansion potential and additional recommendations provided, as needed.

7.1.6 Proper drainage should be maintained in order to preserve the engineering properties of the compacted fill in planned improvement areas. Recommendations for site drainage are provided herein.

7.1.7 Proposed structures can be supported on conventional shallow foundations with concrete slab floors.

7.1.7 Once design or civil grading plans are made available, the recommendations within this supplemental report should be reviewed and revised, as necessary. Additionally, as the project design progresses toward a final design, changes in the design, location, or elevation of any proposed improvement should be reviewed by this office. Geocon should be contacted to evaluate the necessity for review and possible revision of this report.

7.2 Soil and Excavation Characteristics

7.2.1 The in-situ soils at the site should generally be excavatable with moderate to heavy effort, using conventional earth moving equipment in proper functioning order.

7.2.2 Based on the material classifications and laboratory testing by Geocon, site soils generally possess a "very low" expansion potential, expansion index (EI) of 0 to 20, and are considered "non-expansive" as defined by 2019 CBC Section 1803.5.3. Table 7.2.2 presents soil classifications based on the EI.

TABLE 7.2.2
SOIL CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2019 CBC Expansion Classification
0 – 20	**Very Low**	**Non-Expansive**
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 Excavations on the order of 3 feet or less are expected to meet finished grades for the site. Excavations should be performed in conformance with Cal-OSHA requirements. Some of the site soils may have little cohesion and may be subject to caving in un-shored excavations. The contractor should evaluate the necessity for layback of vertical cut areas.

7.2.4 Laboratory testing of select soil samples indicate that site soils possess a sulfate content of 0.0014 percent (14 parts per million [ppm]) equating to a S0 sulfate exposure to concrete structures, as defined by 2019 CBC Section 1904.3 and ACI 318-19. Table 7.2.4 presents a summary of concrete requirements set forth by 2019 CBC Section 1904.3 and ACI 318-19. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 7.2.4
REQUIREMENTS FOR CONCRETE
EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Exposure Class	Water-Soluble Sulfate (SO4) Percent by Weight	Cement Type (ASTM C150)		Maximum Water to Cement Ratio by Weight1	Minimum Compressive Strength (psi)
S0	**SO_4<0.10**	**No Type Restriction**		**N/A**	**2,500**
S1	0.10≤SO_4<0.20	II		0.50	4,000
S2	0.20≤SO_4≤2.00	V		0.45	4,500
S3	SO_4>2.00	Option 1	V+Pozzolan or Slag	0.45	4,500
		Option 2	V	0.40	5,000

7.2.5 Laboratory testing indicates the site soils have a minimum electrical resistivity of 3,500 ohm-cm, possess 72 parts per million (ppm) chloride, 14 ppm sulfate, and have a pH of 7.1. As shown in Table 7.2.5, the sites would not be classified as "corrosive" to buried improvements in accordance with the Caltrans *Corrosion Guidelines* (Caltrans, 2021).

TABLE 7.2.5
CALTRANS CORROSION GUIDELINES

Corrosion Exposure	Resistivity (ohm-cm)	Chloride (ppm)	Sulfate (ppm)	pH
Corrosive	<1,500	500 or greater	1,500 or greater	5.5 or less

7.2.6 Geocon does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements that could be susceptible to corrosion are planned.

7.3 Grading

7.3.1 Earthwork should be observed, and compacted fill tested by representatives of Geocon.

7.3.2 Grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix C and the Grading Ordinances of the City of Banning.

7.3.3 Prior to commencing grading operations, a preconstruction conference should be held at the site with a representative of the City of Banning, owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.3.4 Site preparation should begin with the removal of deleterious material, debris, trash, and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site. If encountered, rock over 6 inches in diameter should be screened and removed, and not used in the fill.

7.3.5 The topsoil and upper portion of the alluvial fan deposits within a 1:1 (h:v) projection of the limits of grading should be removed to expose competent alluvium. Removals should extend at least 5 feet below existing grades or 3 feet below the bottom of the planned foundations, whichever is deeper. Removal bottoms should extend until encountering alluvium with 85 percent or greater relative compaction when compacted to the laboratory maximum dry density in accordance with ASTM D1557. Removals in pavement and walkway areas should extend at least 2 feet beneath the pavement or flatwork subgrade elevation. Areas of loose, dry, or compressible soils will require deeper excavation and processing prior to fill placement. The actual depth of removal should be evaluated by the engineering geologist during grading operations. Where over excavation and compaction is to be conducted, the excavations should be extended laterally a minimum distance of 5 feet beyond the foundation footprint or for a distance equal to the depth of removal, whichever is greater. The bottom of the excavations should be scarified to a depth of at least 1 foot, moisture conditioned near to slightly above optimum moisture content, and properly compacted.

7.3.6 Geocon should observe the removal bottoms to check the competence of the exposed soil. Deeper excavations may be required if dry, loose, soft, or porous materials are present at the base of the removals.

7.3.7 The fill placed within 3 feet of proposed foundations should possess a “very low” to “low” expansion potential (EI of 50 or less).

7.3.8 If perched groundwater or saturated materials are encountered during remedial grading, extensive drying and mixing with dryer soil may be required, if the saturated material is to be utilized as fill material in achieving finished grades. The excavated materials should then be moisture conditioned near to slightly above optimum moisture content prior to placement as compacted fill.

7.3.9 The site should be brought to finish grade elevations with fill compacted in layers. Oversize materials (greater than 6 inches in dimension) should be removed from the excavated soils prior to use as fill. Layers of fill should be no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density and moisture conditioned near to slightly above optimum moisture content as evaluated by ASTM D1557. Fill materials placed below the recommended moisture content may require additional moisture conditioning prior to placing additional fill.

7.3.10 If required, import fill should consist of granular materials with a "very low" to "low" expansion potential (EI of 50 or less), non-corrosive, generally free of deleterious material, and contain rock no larger than 6 inches. Geocon should be notified of the import soil source and should be afforded the opportunity to perform laboratory testing of the import soil prior to its arrival at the site to evaluate its suitability as fill material.

7.4 Earthwork Grading Factors

7.4.1 Estimates of shrinkage factors are based on empirical judgments comparing the material in its existing or natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates as rough approximations. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximately 10 percent range of control over the fill volume. Due to the variations in the actual shrinkage/bulking factors, a balance area should be provided to accommodate variations.

7.5 Utility Trench Backfill

7.5.1 Utility trenches should be properly backfilled in accordance with the requirements of the City of Banning and the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). The pipes should be bedded with well-graded crushed rock or clean sands (Sand Equivalent greater than 30) to a depth of at least one foot over the pipe. The use of well-graded crushed rock should be used in conjunction with filter fabric to prevent the gravel from having direct contact with soil. The remainder of the trench backfill may be derived from onsite soil or approved import soil. Backfill of utility trenches should not contain rocks greater than 3 inches in diameter. The use of 2-sack slurry and controlled low strength material (CLSM) are also acceptable as backfill. However, consideration should be given to the possibility of differential settlement where the slurry ends and earthen backfill begins. These transitions should be minimized and additional stabilization should be considered at these transitions.

7.5.2 Utility trench backfill should be played in layers no thicker than will allow for adequate bonding and compaction. Utility backfill should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density and moisture conditioned near to slightly above optimum moisture content as evaluated by ASTM D1557. Backfill at the finish subgrade elevation of new pavements should be compacted to at least 95 percent of the maximum dry density. Backfill materials placed below the recommended moisture content may require additional moisture conditioning prior to placing additional fill.

7.6 Seismic Design Criteria

7.6.1 Table 7.6.1 summarizes site-specific seismic design criteria for the booster station site, obtained from the 2019 California Building Code (CBC; Based on the 2018 International Building Code [IBC] and ASCE 7-16), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The data was calculated using the computer program U.S. Seismic Design Maps, provided by the USGS. The short spectral response uses a period of 0.2 second. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2019 CBC and Table 20.3-1 of ASCE 7-16. The values presented below are for the risk-targeted maximum considered earthquake (MCER).

TABLE 7.6.1
2019 CBC BOOSTER STATION SITE SEISMIC DESIGN PARAMETERS

Parameter	Value	2019 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	2.160g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.743g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.2	Table 1613.3.3(1)
Site Coefficient, F_V	1.7*	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	2.593g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	1.264g*	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.728g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.843g*	Section 1613.3.4 (Eqn 16-40)

*Based on NEHRP-2015

7.6.2 Table 7.6.2 summarizes site-specific design criteria for the tank structure at the booster station site, obtained from the American Water Works Association (AWWA) Standard D100, Section 13, Seismic Design of Water Storage Tanks, (Based on ASCE 7-10). We evaluated the Site Class based on the discussion in Section 13.2.4 of the AWWA Standard D100. The values presented below are for the risk-targeted maximum considered earthquake (MCER).

TABLE 7.6.2
AWWA BOOSTER STATION RESERVOIR SEISMIC DESIGN PARAMETERS

Parameter	Value	AWWA D100 Reference
Site Class	D	Section 13.2.4
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.750g	Figure 5
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.750g	Figure 6
Site Coefficient, F_A	1.000	Table 26
Site Coefficient, F_V	1.500	Table 27
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.750g	Section 13.2.7.2 (Eqn 13-5)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	1.125g	Section 13.2.7.2 (Eqn 13-6)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.167g	Section 13.2.7.3 (Eqn 13-7)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.750g	Section 13.2.7.3 (Eqn 13-8)

7.6.3 Table 7.6.3 presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-16.

TABLE 7.6.3
2019 CBC BOOSTER STATION SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.883	Figure 22-7
Site Coefficient, F_{PGA}	1.2	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	1.059g	Section 11.8.3 (Eqn 11.8-1)

7.6.4 The Maximum Considered Earthquake Ground Motion (MCE) is the level of ground motion that has a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years. According to the 2019 California Building Code and ASCE 7-16, the MCE is to be utilized for the evaluation of liquefaction, lateral spread, and seismic settlements. We understand the intent of the Building code is to maintain "Life Safety" during an MCE event.

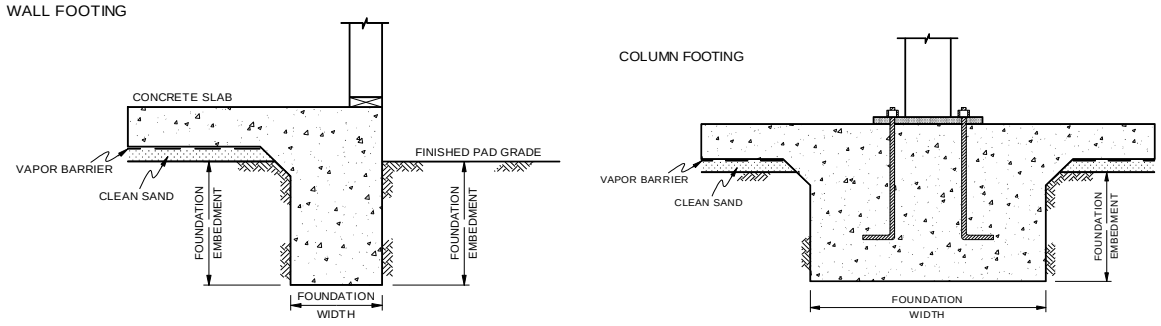
7.6.5 Deaggregation of the MCE peak ground acceleration was performed using the USGS online Unified Hazard Tool, Dynamic: Conterminous U.S. 2014 (update; 4.2.0). The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as a 7.06 magnitude event occurring at a hypocentral distance of 8.75 kilometers from the site.

7.6.6 Conformance to the criteria in the tables presented herein for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.7 Foundations and Concrete Slabs-On-Grade

7.7.1 The foundation recommendations presented herein are applicable to the proposed booster building and perimeter ring foundations of the reservoir tank subsequent to the recommended remedial grading operations assuming that the building is founded in soils with an expansion index of 50 or less. If soils with a higher expansion potential are placed within 3 feet of finish grade, then Geocon should be contacted for additional recommendations. We anticipate that proposed structures will be supported on foundations deriving support in newly placed engineered fill.

7.7.2 Foundations for the structures may consist of either continuous strip footings and/or isolated spread footings. Conventionally reinforced continuous footings should be at least 12 inches wide and extend at least 18 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 24 inches and should extend at least 18 inches below lowest adjacent pad grade. A graphic depicting the foundation embedment is provided below.



Wall/Column Footing Detail

7.7.3 From a geotechnical engineering standpoint, concrete slabs-on-grade for the structures should be at least 4 inches thick and be reinforced with No. 3 reinforcing bars spaced 24 inches center-to-center in both directions. The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slab for supporting equipment, water tank and storage loads. A thicker concrete slab may be required for heavier loading conditions. To reduce the effects of differential settlement on the foundation system, thickened slabs and/or an increase in steel reinforcement can provide a benefit to reduce concrete cracking offset.

7.7.4 Following remedial grading, foundations for the structures at the sites may be designed for an allowable soil bearing pressure of 3,000 pounds per square foot (psf) (dead plus live load). The allowable bearing pressure may be increased by one-third for transient loads due to wind or seismic forces.

7.7.5 The maximum expected static settlement for the planned structures supported on conventional foundation systems with the above allowable bearing pressures, and deriving support in engineered fill is estimated to be ¾ of an inch and to occur below the heaviest loaded structural element. Settlement of the foundation system is expected to occur on initial application of loading. Differential settlement is not expected to exceed ½ inch over a horizontal distance of 40 feet.

7.7.6 Once the design and foundation loading configuration proceeds to a more finalized plan, the estimated settlements within this report can be reviewed and revised, if necessary.

7.7.7 Steel reinforcement for continuous footings should consist of at least two No. 4 steel reinforcing bars placed horizontally in the footings, one near the top and one near the bottom. Steel reinforcement for the spread footings and slabs should be designed by the project structural engineer.

7.7.8 Foundation excavation bottoms must be observed and approved in writing by a qualified representative of Geocon, prior to placement of reinforcing steel or concrete.

7.7.9 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials (ACI 302.2R-06). The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

7.7.10 The bedding sand thickness should be evaluated by the project foundation engineer, architect, and/or developer. However, we should be contacted to provide recommendations if the bedding sand is thicker than 4 inches. Placement of 3 inches and 4 inches of sand is common practice in southern California for 5-inch and 4-inch-thick slabs, respectively. The foundation engineer should provide appropriate concrete mix design criteria and curing measures that may be utilized to assure proper curing of the slab to reduce the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.7.11 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.7.12 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular where re-entrant slab corners occur.

7.7.13 Geocon should be consulted to provide additional design parameters as required by the structural engineer.

7.8 Lateral Resistance

7.8.1 To resist lateral loads, a passive pressure exerted by an equivalent fluid weight of 300 pounds per cubic foot (pcf) should be used for the design of footings or shear keys poured neat against newly compacted fill or dense alluvial materials. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by slabs or pavement should not be included in design for passive resistance.

7.8.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between soil and concrete of 0.38 should be used for design.

7.8.3 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

7.9 Preliminary Pavement Design

7.9.1 The final pavement design should be based on R-value testing of soils at the subgrade following grading at the site. Paved areas at the sites should be designed in accordance with the City of Banning *Street Standards* when final Traffic Indices and R-Value test results of subgrade soil are completed. Roadway classifications and traffic indices are based on the County of Riverside *Ordinance 461*. The civil engineer should evaluate the final traffic index for the pavements. Based on the soils classifications, we used an assumed R-value of 30 for the preliminary pavement design recommendations. Preliminary flexible pavement sections and an alternative full-depth aggregate base section are presented in Table 7.9.1, based on the County of Riverside *Ordinance 461* and the Caltrans Highway Design Manual.

TABLE 7.9.1
PRELIMINARY FLEXIBLE PAVEMENT SECTIONS

Road Classification/Use	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (Inches)	Aggregate Base Materials (Inches)	Full-Depth Aggregate Base Materials (Inches)
Local Street / Parking Areas / Light Duty Vehicles	5.5	30	3.0	7.0	14
Collector / Medium Duty Vehicles	7.0	30	4.0	9.5	18
Industrial Collector / Heavy Duty Vehicles	8.0	30	5.0	10.5	20

7.9.2 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content.

7.9.3 The aggregate base materials and asphalt concrete materials should conform to Section 200-2 and Section 203-6, respectively, of the Greenbook. Base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.9.4 A rigid Portland cement concrete (PCC) pavement section should be placed in driveway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R *Guide for Design and Construction of Concrete Parking Lots* using the parameters presented in Table 7.9.4.

TABLE 7.9.4
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	125 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A, C, and D
Average daily truck traffic, ADTT	10, 100, and 700

7.9.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.9.5.

TABLE 7.9.5
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Access Lanes (TC=A)	5.5
Entrance / Driveway Aprons (TC=C)	7.0
Heavy Truck Areas (TC=D)	8.0

7.9.6 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch). Base material will not be required beneath concrete improvements.

7.9.7 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 9-inch-thick slab would have an 11-inch-thick edge). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

7.9.8 In order to control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab in accordance with the referenced ACI report.

7.9.9 Performance of the pavements is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement surfaces will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

7.10 Concrete Flatwork

7.10.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein assuming the subgrade materials possess an Expansion Index of 50 or less. Subgrade soils should be compacted to 90 percent relative compaction at a moisture content near to slightly above optimum as determined by ASTM D1557. Slab panels should be a minimum of 4 inches thick and when in excess of 8 feet square should be reinforced with 6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh or No. 3 reinforcing bars spaced 24 inches center-to-center in both directions to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the earthwork section prior to concrete placement. Subgrade soil should be properly compacted, and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete improvements.

7.10.2 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade or differential settlement. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork.

7.10.3 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs because of differential movement. However, even with the incorporation of the recommendations presented herein, concrete slabs will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.11 Temporary Excavations and Shoring

7.11.1 Excavations on the order of 5 to 10 feet in vertical height are expected during remedial grading and the construction of utilities. The contractor's competent person should evaluate the necessity for lay back of vertical cut areas. Vertical excavations up to 5 feet may be attempted where loose soils or caving sands are not present, and where not surcharged by existing structures or vehicle/construction equipment loads.

7.11.2 Vertical excavations greater than 5 feet will require sloping or shoring measures in order to provide a stable excavation. Due to the existing improvements within the roadways, we expect that shoring will be needed.

7.11.3 We expect that braced shoring, such as conventionally braced shields or cross-braced hydraulic shoring, will be utilized; however, the selection of the shoring system is the responsibility of the contractor. Shoring systems should be designed by a California licensed civil or structural engineer with experience in designing shoring systems.

7.11.4 We recommend that an equivalent fluid pressure based on the table below be utilized for design of shoring. These pressures are based on the assumption that the shoring is supporting a level backfill and there are no hydrostatic pressures above the bottom of the excavation.

TABLE 7.11.4
RECOMMENDED SHORING PRESSURES

HEIGHT OF SHORED EXCAVATION (FEET)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (ACTIVE PRESSURE)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (AT-REST PRESSURE)
Up to 10	30	50

7.11.5 Active pressures can only be achieved when movement in the soil (earth wall) occurs. If movement in the soil is not acceptable, such as adjacent to an existing structure or where braced shoring will be utilized, the at-rest pressure should be considered for design purposes.

7.11.6 Additional active pressure should be added for a surcharge condition due to sloping ground, construction equipment, vehicular traffic, or adjacent structures and should be designed for each condition as the project progresses.

7.11.7 In addition to the recommended earth pressure, the upper 10 feet of the shoring adjacent to roadways or driveway areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the shoring due to normal street traffic. If the traffic is kept back at least 10 feet from the shoring, the traffic surcharge may be neglected. Higher surcharge loads may be required to account for construction equipment.

7.11.8 It is difficult to accurately predict the amount of deflection of a shored embankment. Some deflection will occur. We recommend that the deflection be minimized to prevent damage to existing structures and adjacent improvements. Where public right-of-ways are present or adjacent offsite structures do not surcharge the shoring excavation, the shoring deflection should be limited to less than 1 inch at the top of the shored embankment. Where offsite structures are within the shoring surcharge area, we recommend the beam deflection be limited to less than ½ inch at the elevation of the adjacent offsite foundation, and no deflection at all if deflections will damage existing structures. The allowable deflection is dependent on many factors, such as the presence of structures and utilities near the top of the embankment and will be assessed and designed by the project shoring engineer.

7.12 Site Drainage and Moisture Protection

7.12.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.12.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.12.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

7.12.4 If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to infiltration devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeology study at the site. Downgradient and adjacent structures may be subjected to seeps, movement of foundations and slabs, or other impacts as a result of water infiltration.

7.13 Plan Review

7.13.1 Geocon should be provided the opportunity to review the structural foundation plans prior to final submittal to verify substantial conformance with the recommendations of this report.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in this investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that expected herein, Geocon West, Inc. should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon West, Inc.

This report is issued with the understanding that it is the responsibility of the owner, or of their representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The requirements for concrete and rebar presented in this report are preliminary recommendations from a geotechnical perspective. The Structural Engineer should provide the final recommendations for structural design of concrete and reinforcing steel for foundation systems, floor slabs, exterior concrete, or other systems where concrete and reinforcing steel are utilized, in accordance with the latest version of applicable codes.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project Geotechnical Engineer of Record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

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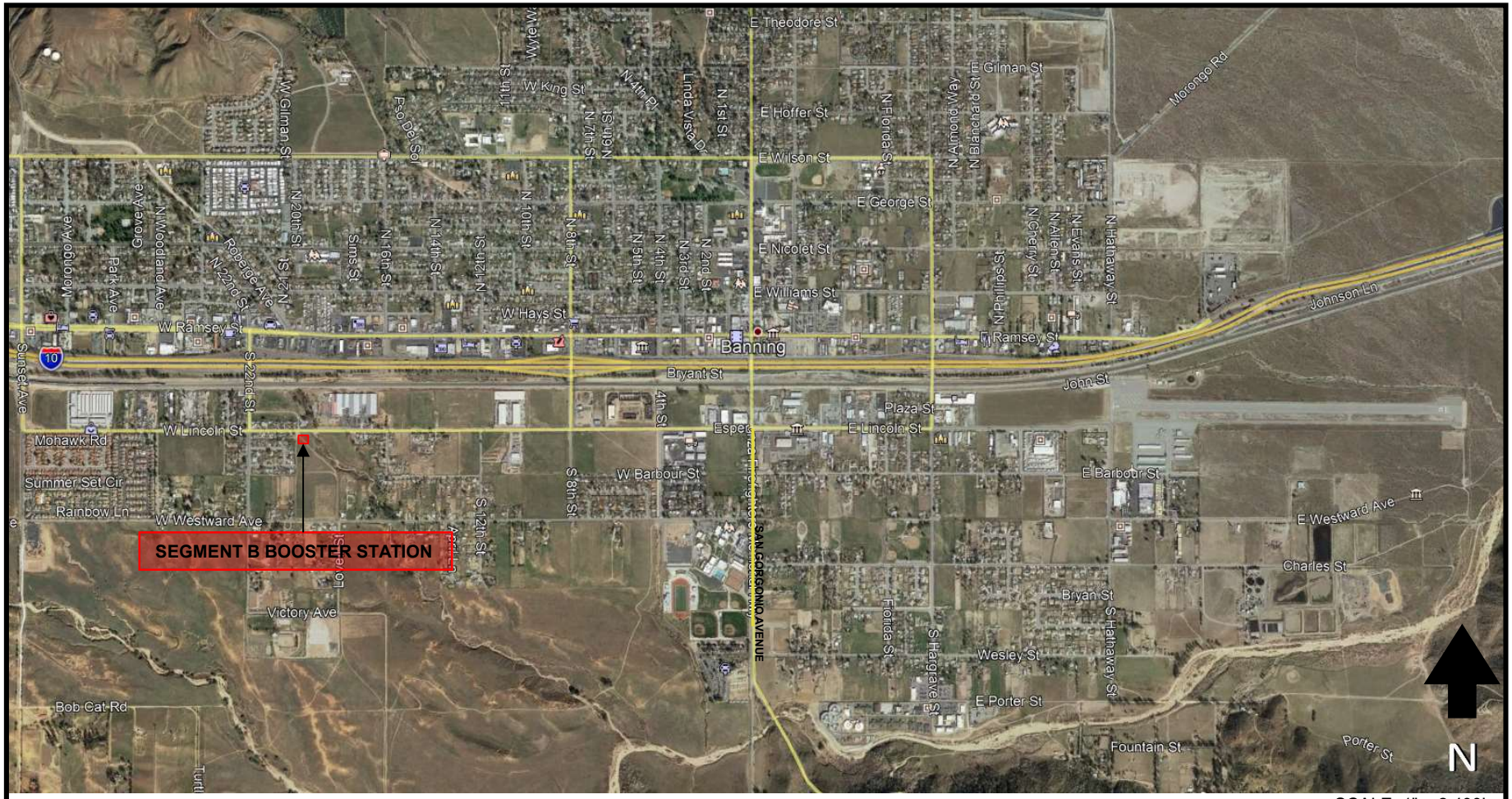


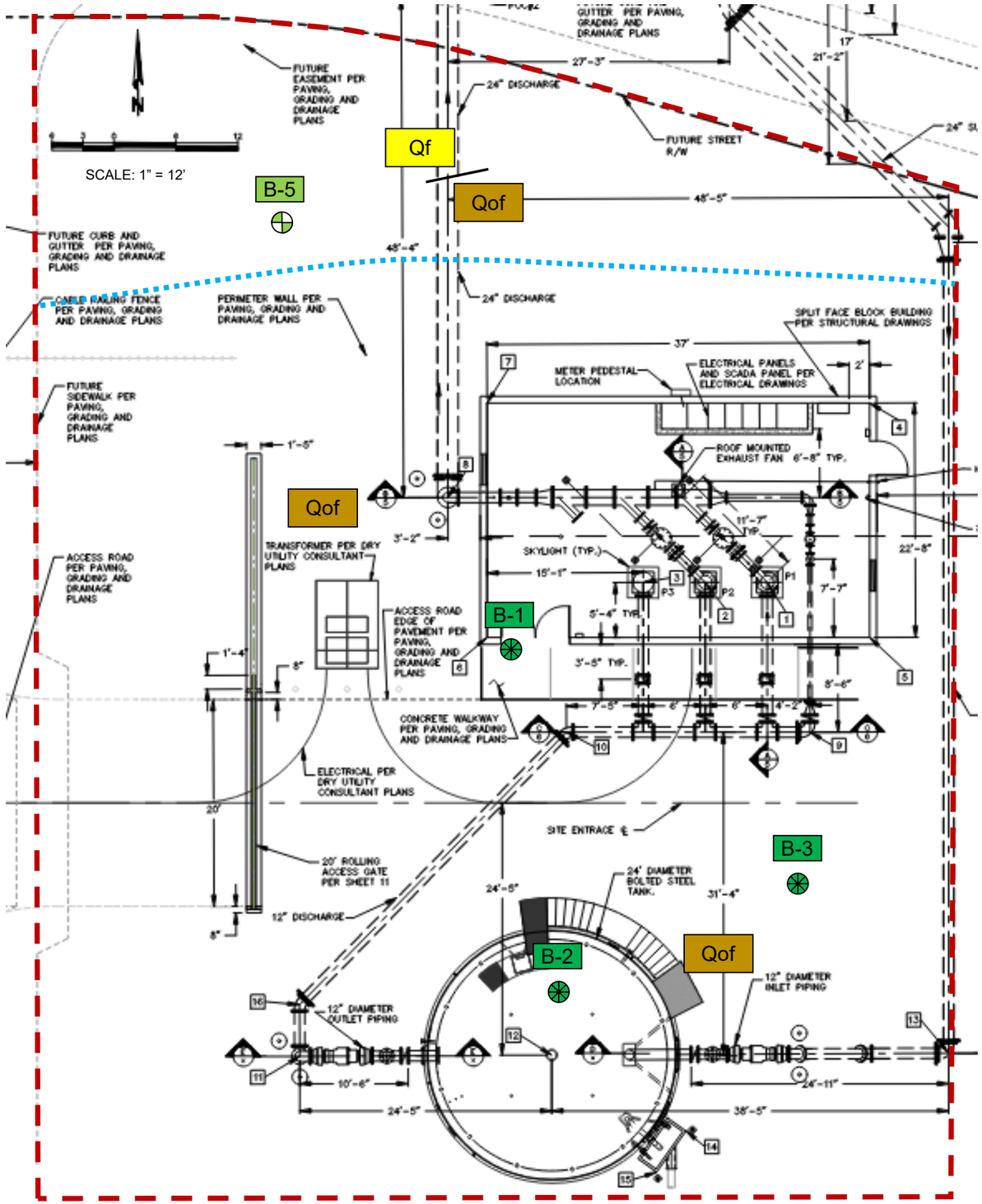
VICINITY MAP

GEOCON
WEST, INC.
GEOTECHNICAL CONSULTANTS
41571 CORNING PLACE SUITE 101 MURRIETA, CA 92562-7065
PHONE 951-304-2300 FAX 951-304-2392

LCW		

BOOSTER PUMP STATION
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

FEBURARY 2023	PROJECT NO. T2305-22-10G	FIG. 1



Source: Steven Andrews Engineering, *Lincoln Street NP Booster and Reservoir Site Plan*, dated March 3, 2022.

GEOCON LEGEND

Locations are approximate

B-3 ..... BORING LOCATION

B-5 ..... BORING LOCATION (GEOCON, 2018)

Qf ..... YOUNG ALLUVIAL FAN DEPOSITS

Qof ..... OLDER ALLUVIAL FAN DEPOSITS

..... PROJECT LIMITS

..... INFERRED GEOLOGIC CONTACT

GEOCON WEST, INC.
GEOTECHNICAL, ENVIRONMENTAL, MATERIALS
41571 CORNING PLACE #101, MURRIETA, CALIFORNIA 92562
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GEOLOGIC MAP

BOOSTER PUMP STATION AND RESERVOIR
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

LCW			FEBRUARY 2023	PROJECT NO. T2305-22-10G	FIG. 2

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

Geocon performed a field investigation in 2018 as part of a larger geotechnical study for the non-potable off-site water improvements, as documented in our referenced *Preliminary Geotechnical Investigation* (dated September 20, 2018). This study included the drilling of one hollow stem auger boring at the booster pump station site and is included as Figure A-4.

The field investigation for this study was conducted on January 4, 2023, and consisted of a site reconnaissance and the drilling of three exploratory borings. The borings were drilled to the maximum depth explored of approximately 50½ feet below the existing ground surface utilizing a truck mounted hollow-stem augur drill rig. We collected bulk samples, and relatively undisturbed samples from the borings by driving a 3-inch O. D. California Modified Sampler into the "undisturbed" soil mass with blows from a 140-pound auto-hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by 2$^{3}/_{8}$-inch inside diameter brass sampler rings to facilitate removal and testing. Relatively undisturbed samples and bulk samples of disturbed soils were transported to our laboratory for testing.

The soil conditions encountered in the borings were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). Figures A-1 through A-4 present logs of both the current borings and the boring excavated in 2018. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. Figure 2 indicates the approximate locations of the borings.

PROJECT NO. T2305-22-10G

BORING B-1

ELEV. (MSL.) **2405** DATE COMPLETED **1/4/23**

EQUIPMENT **HOLLOW STEM AUGER** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-1@0-5			SM	**TOPSOIL** Silty SAND, loose, wet, dark brown; fine to medium sand; some coarse sand			
2				SM	**OLDER ALLUVIAL FAN DEPOSITS (Qof)** Silty SAND, very dense, slightly moist, reddish brown; fine to medium sand; some coarse sand			
4	B-1@2.5				- Becomes light reddish brown	89-11"	99.9	5.1
6	B-1@5				- Becomes yellowish brown; few gravel	90-9"	98.9	9.4
8	B-1@7.5				- Becomes fine to coarse sand; little gravel; few larger clasts	81-12"	115.1	3.0
10	B-1@10				- Becomes strong reddish brown; little larger clasts	84-10"	124.6	2.4
12					- Becomes yellowish brown			
14	B-1@15				- Some larger clasts	84-12"	117.5	5.3
16								
18				SP	Poorly graded SAND, very dense, slightly moist, reddish to yellowish brown; medium to coarse sand; little fine sand; some gravel; some larger clasts; slightly oxidized			
20	B-1@20					75-11"	117.8	3.7
22								
24				SM	Silty SAND, very dense, slightly moist, reddish brown; fine to coarse sand; some gravel; moderately oxidized			
26	B-1@25					50-6"	121.9	3.7
28					- Completely weathered granitic clasts			
				SP	Poorly graded SAND, very dense, slightly moist, reddish brown; medium			

Figure A-1,
Log of Boring B-1, Page 1 of 2

T2305-22-10G BOOSTER PUMP TANK BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2305-22-10G

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-1** ELEV. (MSL.) **2405** DATE COMPLETED **1/4/23** EQUIPMENT **HOLLOW STEM AUGER** BY: **Weidman** MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-1@30				to coarse sand;few fine sand; some gravel; few larger clasts; slightly oxidized	89-10"	105.9	4.1
32								
34				SM	Silty SAND, very dense, slightly moist, reddish brown with olive brown; fine to coarse sand; little gravel; little larger clasts; moderately oxidized			
36	B-1@35					50-6"	111.6	3.5
38								
40	B-1@40				- Less silt; some larger clasts; some manganese staining; weathered clasts	82-10"	119.6	10.3
42								
44								
46	B-1@45				- Little manganese stainging; some gravel	50-6"	118.3	3.5
48								
50	B-1@50				- Poor recovery; little cohesion	50-4"	93.7	5.2
					Total Depth 50'-4" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled on 01/04/2023			

Figure A-1,
Log of Boring B-1, Page 2 of 2

T2305-22-10G BOOSTER PUMP TANK BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2305-22-10G

BORING B-2

ELEV. (MSL.) **2405** DATE COMPLETED **1/4/23**

EQUIPMENT **HOLLOW STEM AUGER** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Silty SAND, loose, wet, dark brown; fine to medium sand; few coarse sand			
				SM	**OLDER ALLUVIAL FAN DEPOSITS (Qof)** Silty SAND, very dense, slightly moist, dark reddish brown; fine to medium sand; little coarse sand; moderately oxidized			
2	B-2@2.5					73-12"	108.3	11.9
4								
6	B-2@5 B-2@5-10				- Becomes strong reddish brown; little larger clasts	81-11"	114.4	7.8
8	B-2@7.5				- Becomes yellowish brown; some coarse sand; slightly oxidized	92	130.8	3.9
10	B-2@10				- Becomes medium dense; fine to coarse sand; little gravel; some larger clasts	51	119.3	4.9
12								
14								
16	B-2@15				- Becomes dense; slightly more oxidized	75	120.1	3.4
18								
20	B-2@20				- Becomes dark reddish brown; moderately oxidized; fine to coarse sand; little gravel; many large clasts in various stages of weathering	78-11"	119.3	7.1
22								
24					- Larger quartz clast in shoe			
	B-2@25					84-11"	117.9	4.4
					Total Depth 25'-11" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled on 01/04/2023			

Figure A-2,
Log of Boring B-2, Page 1 of 1

T2305-22-10G BOOSTER PUMP TANK BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2305-22-10G

BORING B-3

ELEV. (MSL.) **2404** DATE COMPLETED **1/4/23**

EQUIPMENT **HOLLOW STEM AUGER** BY: **Weidman**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**TOPSOIL** Silty SAND, loose, moist, dark brown; fine to medium sand; little coarse sand			
2	B-3@2-7			SM	**OLDER ALLUVIAL FAN DEPOSITS (Qof)**			
	B-3@2.5				Silty SAND, very dense, slightly moist, reddish brown; fine to coarse sand - Becomes dark reddish brown; few larger clasts; slightly oxidized	82-12"	109.5	7.2
4								
6	B-2@5				- Becomes strong reddish brown; moderately oxidized; poor recovery	50-6"	90.2	7.4
8	B-3@7.5				- Becomes fine to medium sand; some coarse sand; little larger clasts; clusters of olive brown	80-12"	117.9	4.9
10	B-3@10				- Becomes yellowish to reddish brown; less silt; large clasts in various stages of weathering	87-12"	120.9	2.1
12								
14								
16	B-3@15				- Becomes medium dense, light reddish brown; slightly oxidized; fine to medium sand; few coarse sand; trace larger clasts	58	114.2	5.3
18								
20	B-3@20				- Becomes very dense, strong reddish brown; little coarse sand; moderately oxidized	50-6"	113.4	7.0
22								
24								
26	B-3@25				- Becomes yellowish to reddish brown; very little silt; fine to coarse sand; little gravel; few larger clasts	87-12"	119.7	3.3
					Total Depth 26' Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled on 01/04/2023			

Figure A-3,
Log of Boring B-3, Page 1 of 1

T2305-22-10G BOOSTER PUMP TANK BORING LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. T2305-22-10G

BORING B-5 (Segment-B/C Booster Station Site)

ELEV. (MSL.) **2398** DATE COMPLETED **8/28/2018**

EQUIPMENT **HOLLOW STEM AUGER** BY: **A. Shoashekan**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-5@0-5			SP SC	**TOPSOIL** Poorly-graded SAND, loose, dry, yellowish brown; fine to medium sand with occasional coarse sand; trace gravel; trace silt; rootlets			
2					**YOUNG ALLUVIAL FAN DEPOSITS (Qf)** Clayey SAND, loose, dry, dark yellowish brown; fine to medium sand with occasional coarse sand; trace gravel; trace silt			
4								
6	B-5@5 B-5@5-10			SC	**OLDER ALLUVIAL FAN DEPOSITS (Qof)** Clayey SAND, very dense, dry, brown; fine to coarse sand; gravel; trace calcium carbonate	92/11"	119.8	7.8
8								
10	B-5@10			SM	Silty SAND, very dense, dry, strong brown; medium sand with occasional coarse sand; trace mica; granitic clast; gravel	74		
12								
14								
16	B-5@15			SP	Poorly-graded SAND, very dense, dry, strong brown; fine sand; trace mica	50/6"	117.7	6.7
18								
20	B-5@20			CL	Sandy CLAY, hard, dry to damp, reddish brown; pores and pinholes; little coarse sand; trace calcium carbonate	50/6"		
22								
24								
26	B-5@25			SP	Poorly-graded SAND, very dense, dry, strong brown; fine to coarse sand; trace fine gravel	50/6"	120.2	4.9

Total Depth 26'
Groundwater not encountered
Penetration resistance for 140-lb. hammer falling 30" by auto-hammer
Backfilled on 08/28/2018

Figure A-4,
Log of Boring B-5 (Segment-B/C Booster Station Site), Page 1 of 1

T2305-22-10G BORING LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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APPENDIX B

APPENDIX B

LABORATORY TESTING

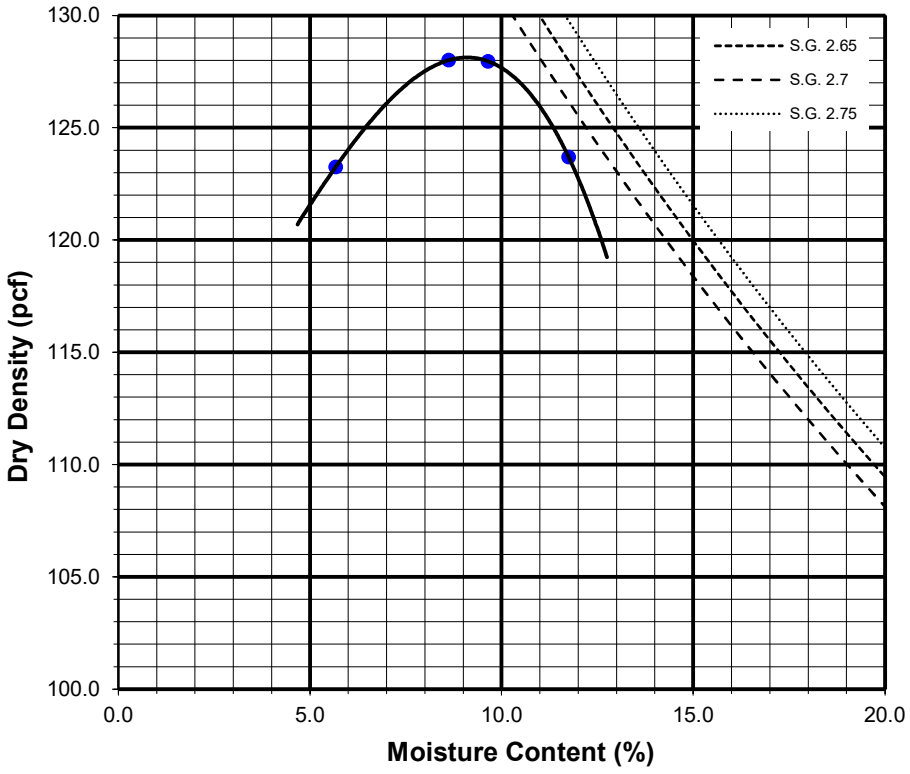
Laboratory tests were performed in general accordance with test methods of ASTM International (ASTM), Caltrans test methods, or other suggested procedures. Selected samples were tested to evaluate maximum dry density and optimum moisture content, expansion index, corrosivity, consolidation characteristics, remolded and in-situ shear strength properties, and in-situ moisture and density content. The results of our laboratory tests are presented on Figures B-1 through B-10. The in-place dry density and moisture content of the samples tested are presented on the boring logs in *Appendix A*.

Sample No:

B2@5-10	Silty SAND (SM), reddish brown

TEST NO.		1	2	3	4	5	6
Wt. Compacted Soil + Mold	(g)	6377	6345	6357	6224		
Weight of Mold	(g)	4257	4257	4257	4257		
Net Weight of Soil	(g)	2119	2088	2100	1967		
Wet Weight of Soil + Cont.	(g)	747.9	634.7	743.5	899.9		
Dry Weight of Soil + Cont.	(g)	704.8	595.3	705.0	865.5		
Weight of Container	(g)	258.1	260.0	258.4	258.8		
Moisture Content	(%)	9.6	11.8	8.6	5.7		
Wet Density	(pcf)	140.3	138.2	139.0	130.2		
Dry Density	(pcf)	128.0	123.7	128.0	123.2		

Maximum Dry Density (pcf)	**128.5**	**Optimum Moisture Content (%)**	**9.0**



Preparation Method: A

GEOCON

COMPACTION CHARACTERISTICS USING MODIFIED EFFORT TEST RESULTS

ASTM D-1557

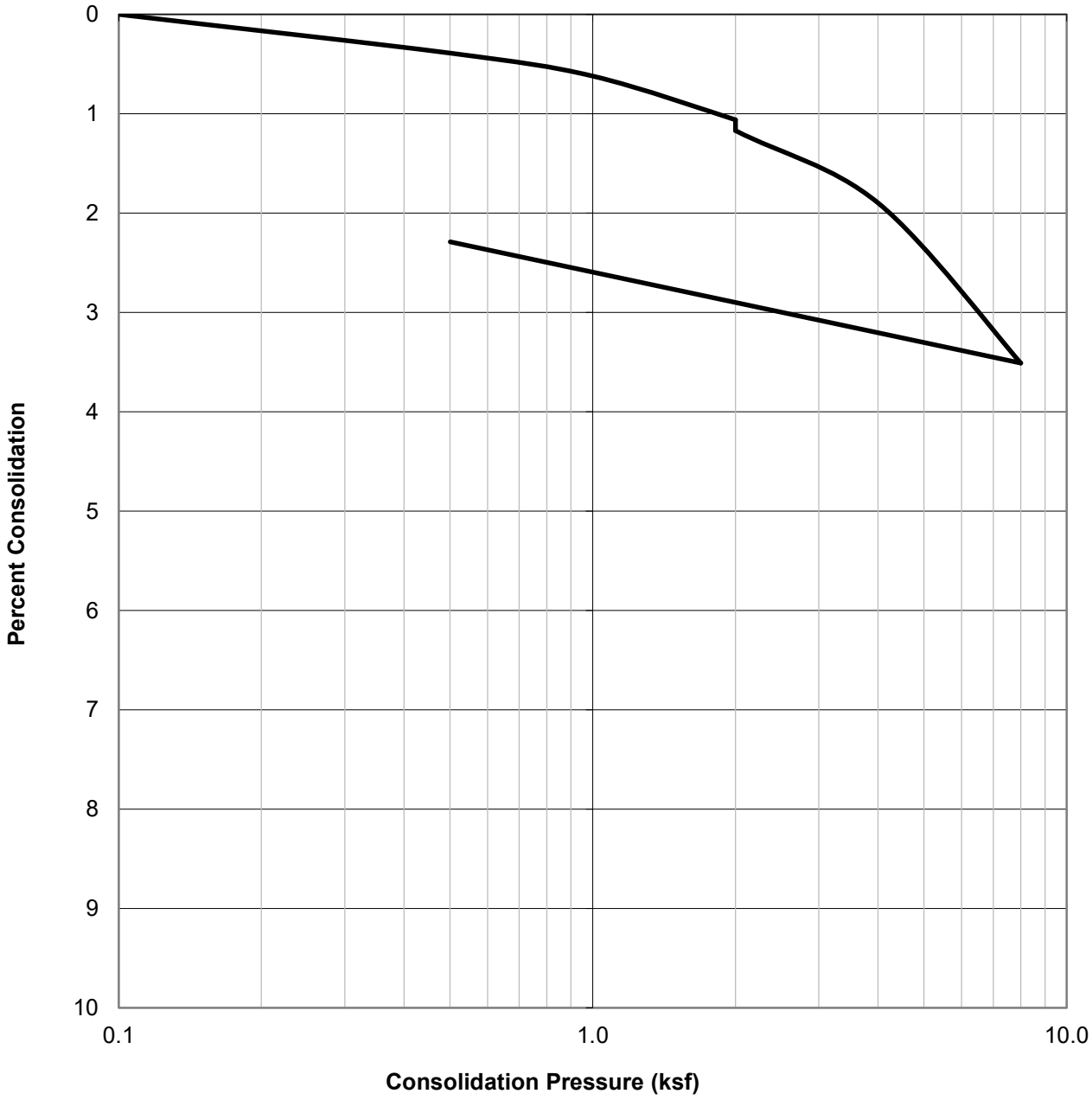
Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-1

WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B2@5-10	Silty SAND (SM), reddish brown	114.1	10.1	16.3

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

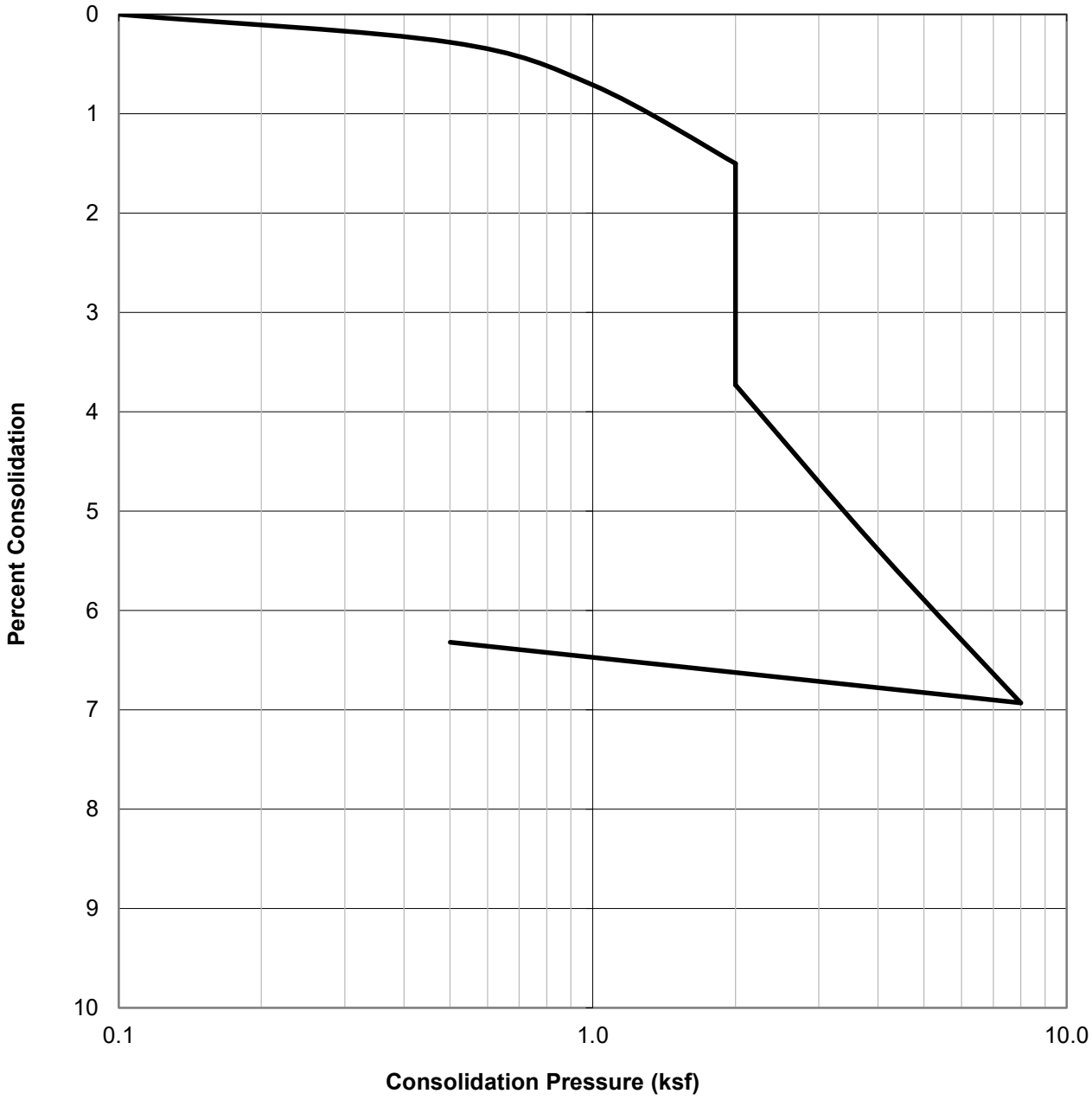
Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-2

WATER ADDED AT 2.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B2@10	Silty SAND (SM), yellowish brown	106.2	4.9	16.6

GEOCON

CONSOLIDATION TEST RESULTS

ASTM D-2435

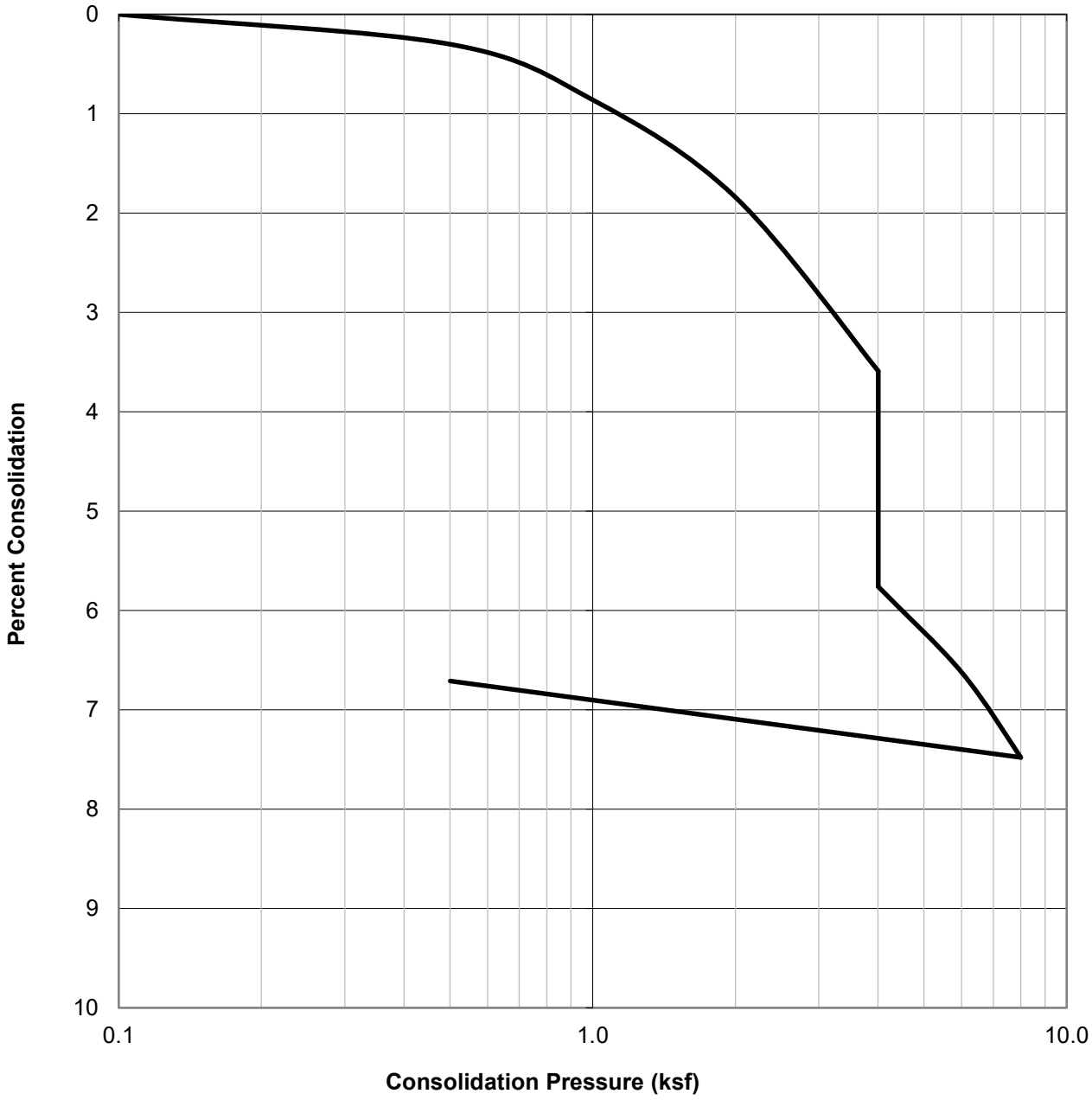
Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-3

WATER ADDED AT 4.0 KSF



SAMPLE ID.	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B3@15	Silty SAND (SM), light reddish brown	103.0	5.3	18.4

GEOCON

CONSOLIDATION TEST RESULTS

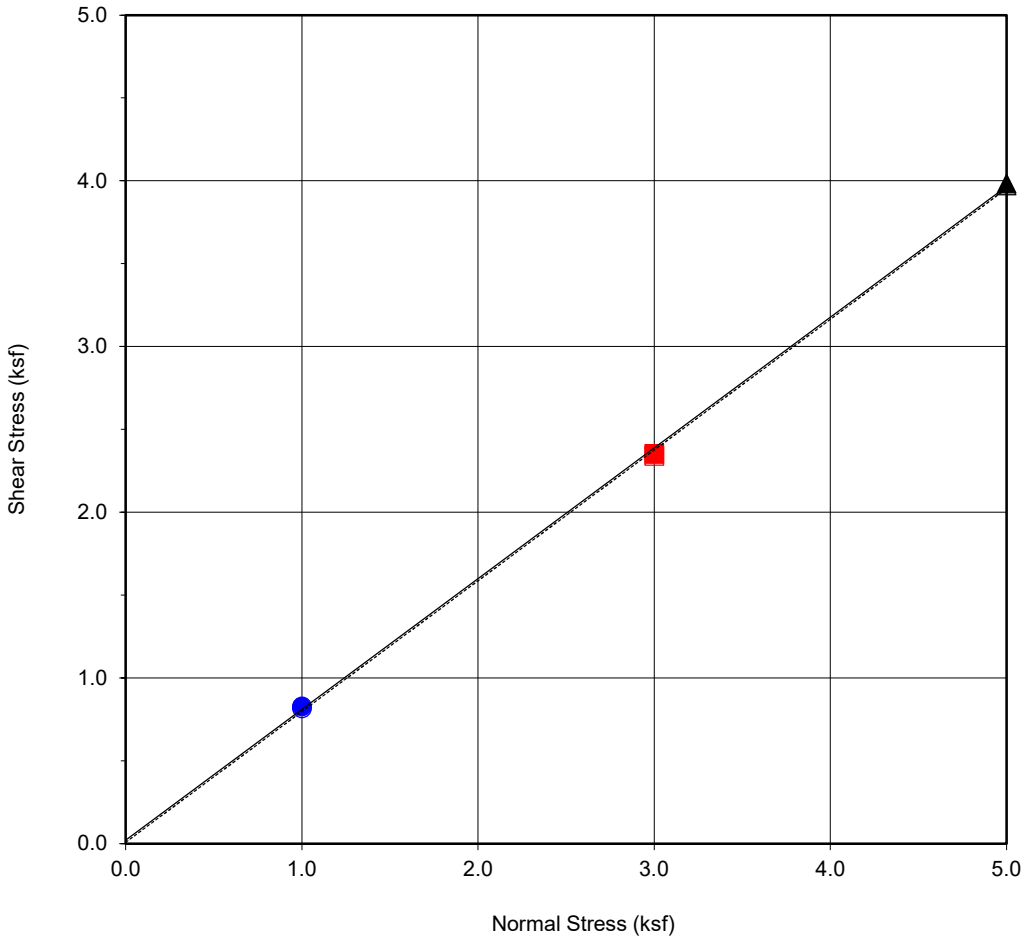
ASTM D-2435

Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-4



Boring No.	**B1**
Sample No.	**B1@5**
Depth (ft)	**5**
Sample Type:	Ring

Soil Identification:

Silty SAND (SM), yellowish brown

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	21	38
Ultimate	9	38

Normal Strest (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.83	■ 2.35	▲ 3.98
Shear Stress @ End of Test (ksf)	○ 0.82	□ 2.34	△ 3.97
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	8.4	9.1	9.4
Initial Dry Density (pcf)	99.5	96.6	100.1
Initial Degree of Saturation (%)	32.6	32.9	37.1
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	20.4	20.7	18.6

GEOCON

DIRECT SHEAR TEST RESULTS

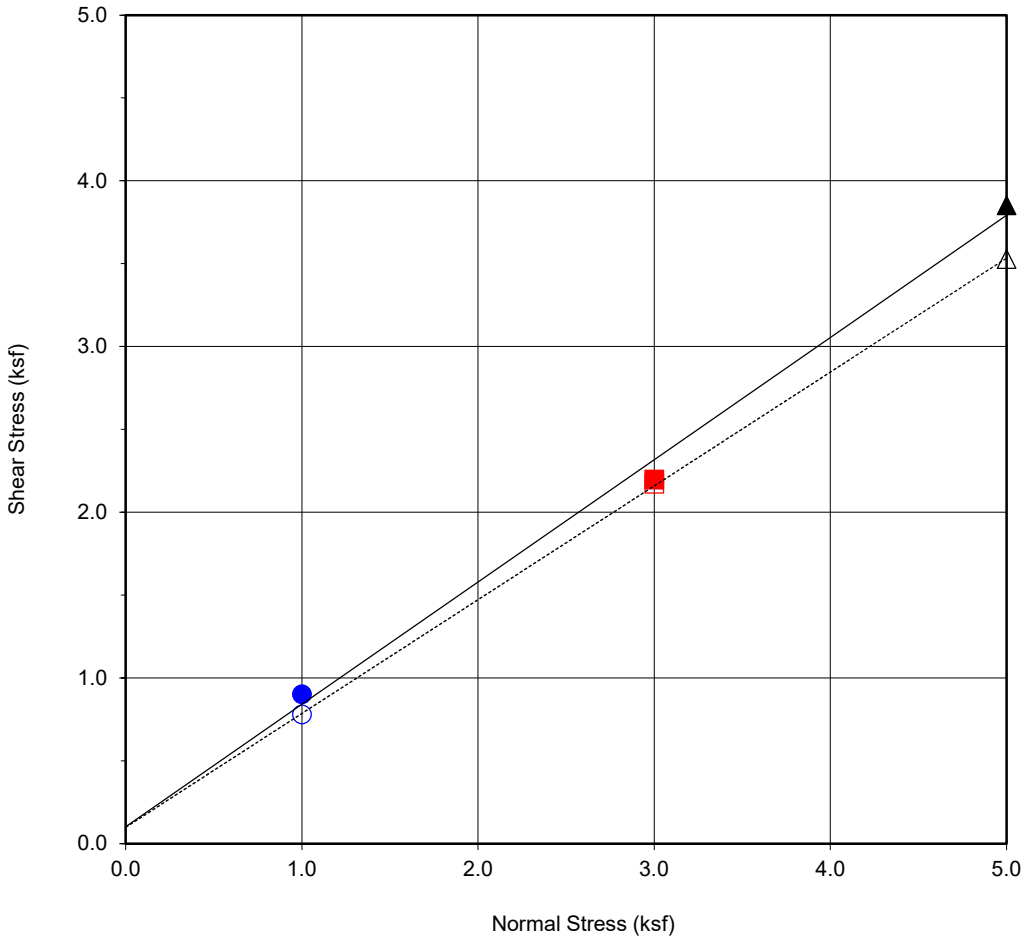
Consolidated Drained ASTM D-3080

Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-5



Boring No.	**B2**
Sample No.	**B2@2.5**
Depth (ft)	**2.5**
Sample Type:	Ring

Soil Identification:		
Silty SAND (SM), reddish brown		
Strength Parameters		
	C (psf)	ϕ (^{o})
Peak	102	36
Ultimate	99	34

Normal Strest (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.90	■ 2.20	▲ 3.85
Shear Stress @ End of Test (ksf)	○ 0.78	□ 2.17	△ 3.53
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	11.9	11.9	11.7
Initial Dry Density (pcf)	116.1	92.8	114.2
Initial Degree of Saturation (%)	71.0	39.4	66.3
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	18.5	13.2	15.7

GEOCON

DIRECT SHEAR TEST RESULTS

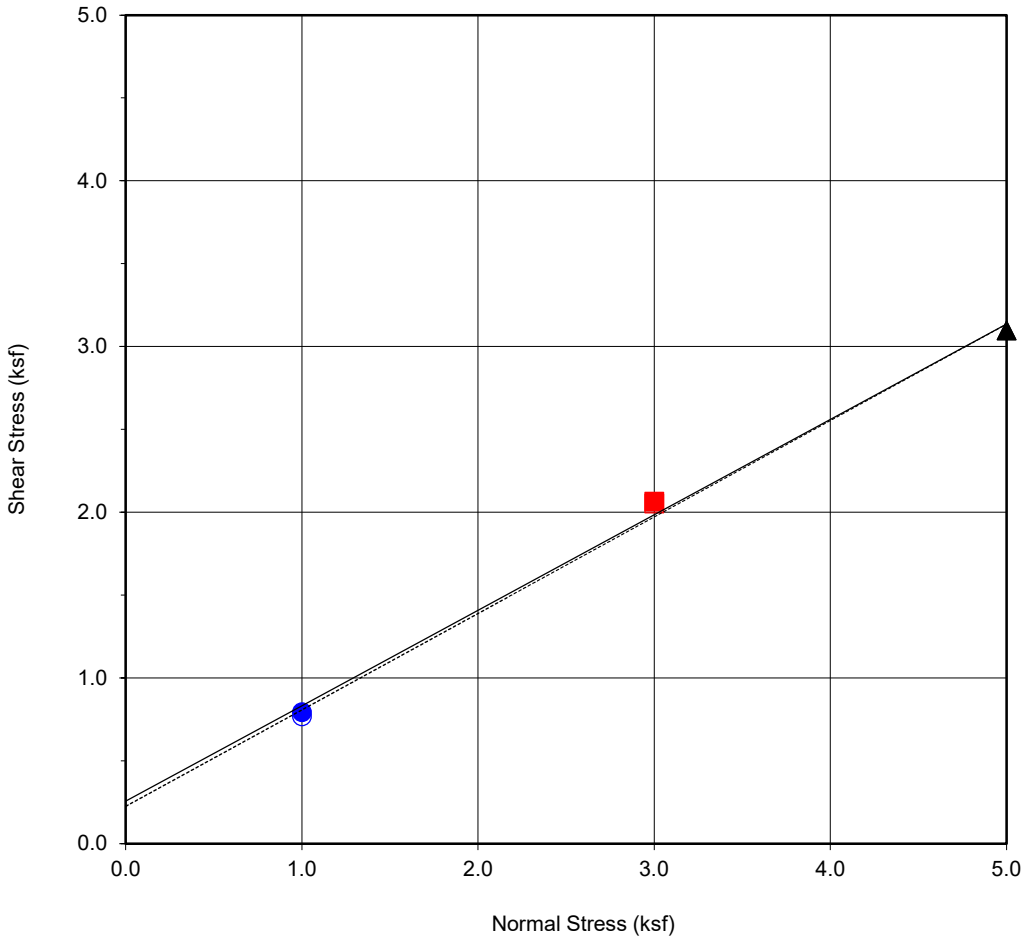
Consolidated Drained ASTM D-3080

Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-6



Boring No.	**B2**
Sample No.	**B2@5-10**
Depth (ft)	**5-10**
Sample Type:	Bulk

Soil Identification:

Silty SAND (SM), reddish brown

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	256	30
Ultimate	226	30

Normal Strest (kip/ft2)	1	3	5
Peak Shear Stress (kip/ft²)	● 0.79	■ 2.06	▲ 3.10
Shear Stress @ End of Test (ksf)	○ 0.77	□ 2.05	△ 3.10
Deformation Rate (in./min.)	0.05	0.05	0.05
Initial Sample Height (in.)	1.0	1.0	1.0
Ring Inside Diameter (in.)	2.375	2.375	2.375
Initial Moisture Content (%)	9.0	9.0	8.9
Initial Dry Density (pcf)	116.1	116.0	115.9
Initial Degree of Saturation (%)	53.9	53.5	52.7
Soil Height Before Shearing (in.)	1.2	1.2	1.2
Final Moisture Content (%)	15.0	14.1	12.5

GEOCON

DIRECT SHEAR TEST RESULTS

Consolidated Drained ASTM D-3080

Checked by: ATS

Project No.: T2305-22-10G

Booster Pump Station
Atwell Development
Banning, California

February 2023 Figure B-7

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% of dry wt.)
B-5 @ 0-5’	Clayey SAND (SC) trace gravel, Yellowish Brown	131.7	7.1

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D4829

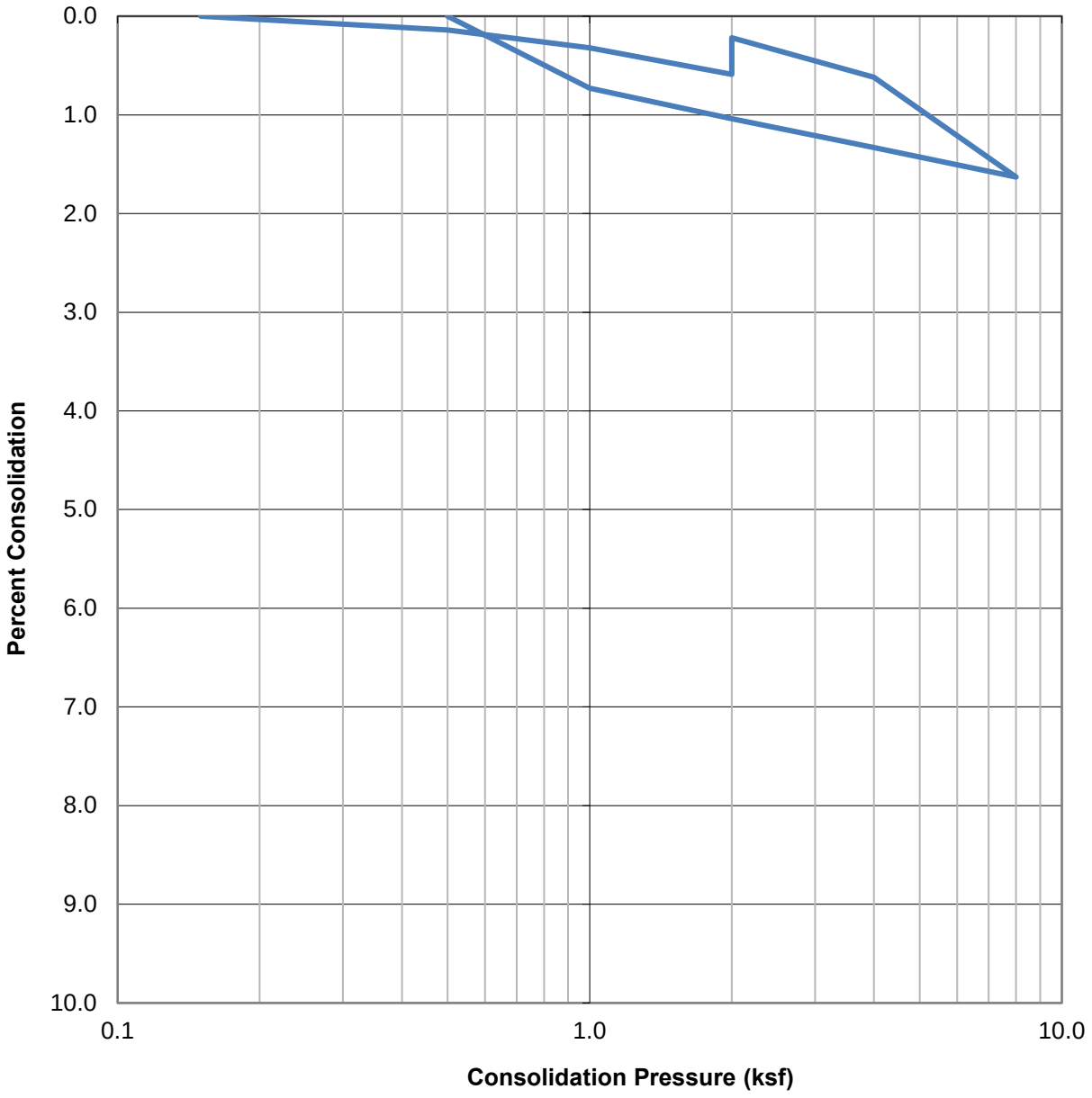
Sample No.	Moisture Content		After Test Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B-5 @ 0-5’	9.0	15.3	112.7	11
B-5 @ 5-10’	8.5	15.5	115.5	7

SUMMARY OF CORROSIVITY TEST RESULTS

Sample No.	Chloride Content (ppm)	Sulfate Content (%)	pH	Resistivity (ohm-centimeter)
B-5 @ 0-5’	72	0.001	7.1	3,5000

Chloride content determined by California Test 422.
Water-soluble sulfate determined by California Test 417.
Resistivity and pH determined by Caltrans Test 643.

WATER ADDED AT 2 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-5 @ 5'	SM	119.8	7.8	14.5

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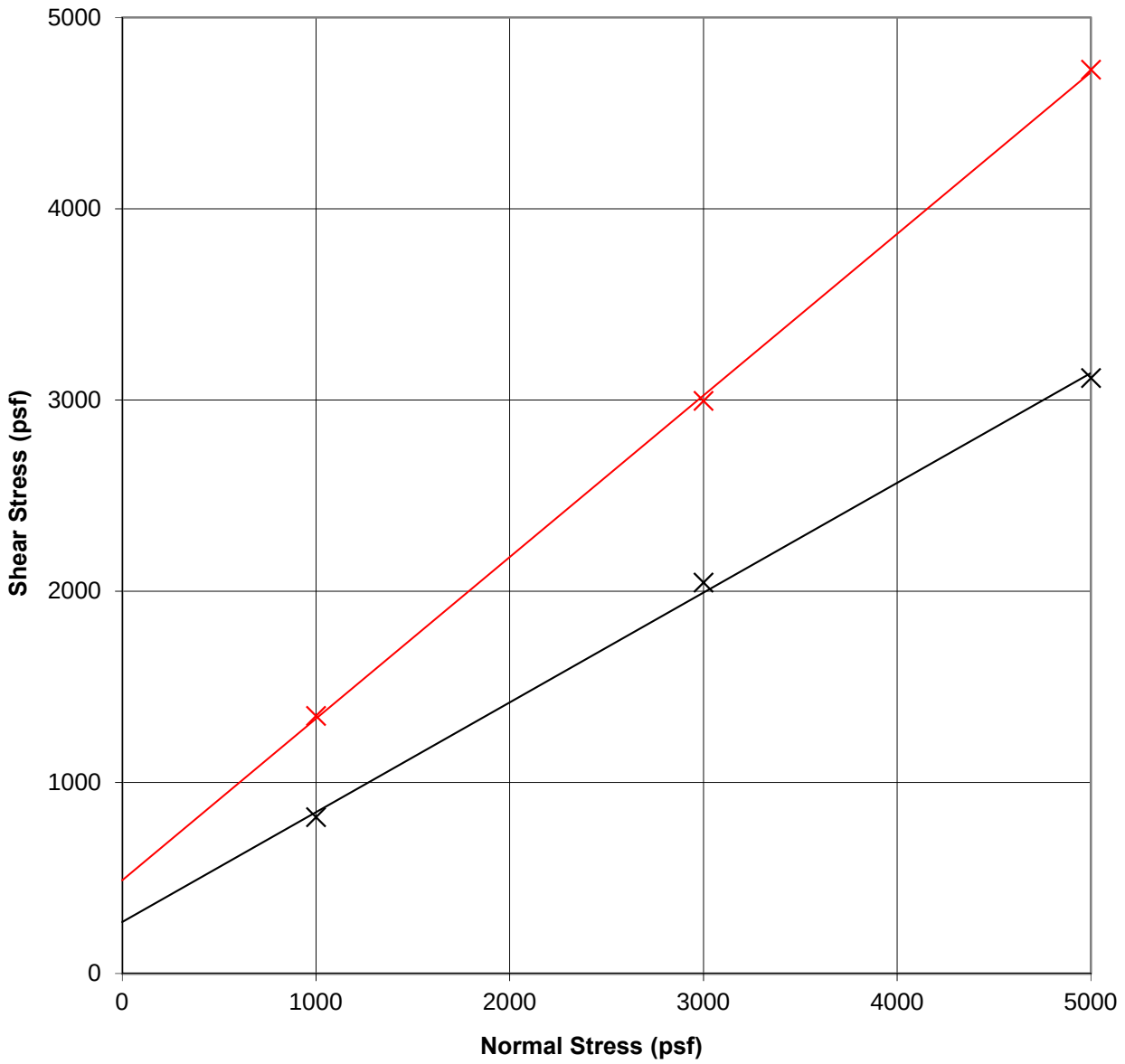
ATS

CONSOLIDATION TEST RESULTS

NON-POTABLE OFF-SITE WATER IMPROVEMENTS
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

SEPTEMBER, 2018 | PROJECT NO. T2305-22-10g | FIG B-9



SAMPLE ID	SOIL TYPE	INITIAL DRY DENSITY (pcf)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)	C (psf)	ϕ (deg)
*B-5 @ 0-5'	SC	117.0	7.5	13.1	270	30
B-7 @ 10'	SP-SM	110.9	3.9	16.0	490	40

*Sample remolded to approximately 90% of the test maximum dry density at optimum moisture content.

GEOCON
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ATS

DIRECT SHEAR TEST RESULTS

NON-POTABLE OFF-SITE WATER IMPROVEMENTS
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

SEPTEMBER, 2018 | PROJECT NO. T2305-22-10g | FIG B-10

APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

BOOSTER PUMP STATION
ATWELL DEVELOPMENT
BANNING, CALIFORNIA

PROJECT NO. T2305-22-10G

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

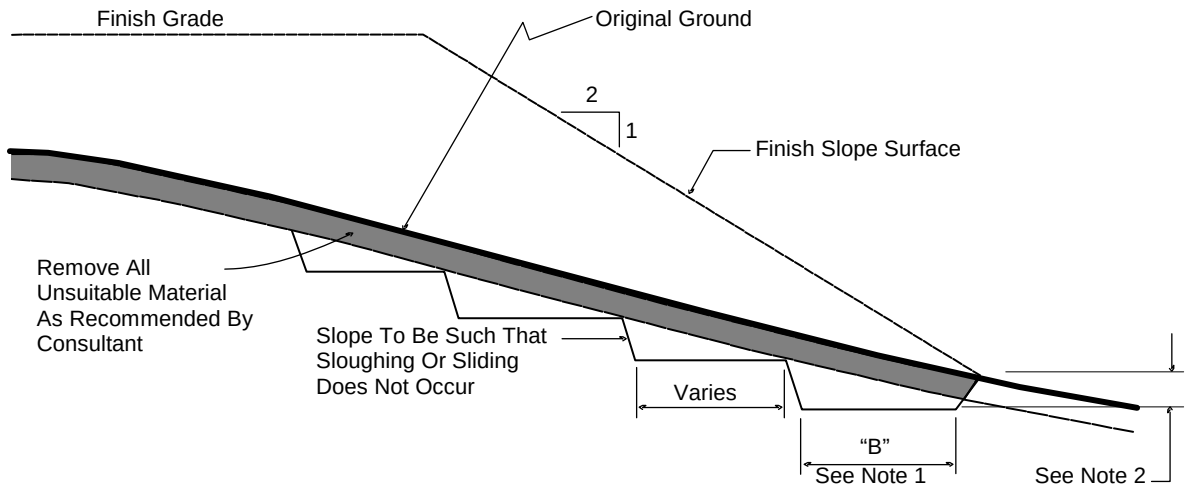
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

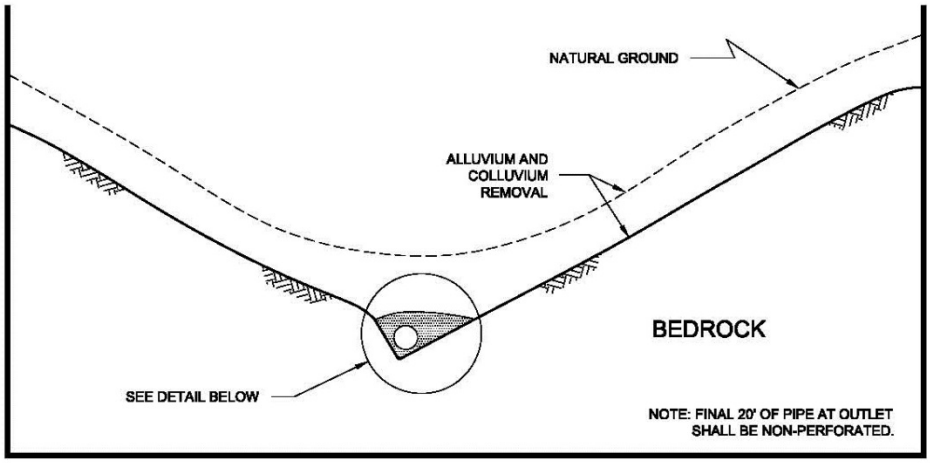
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

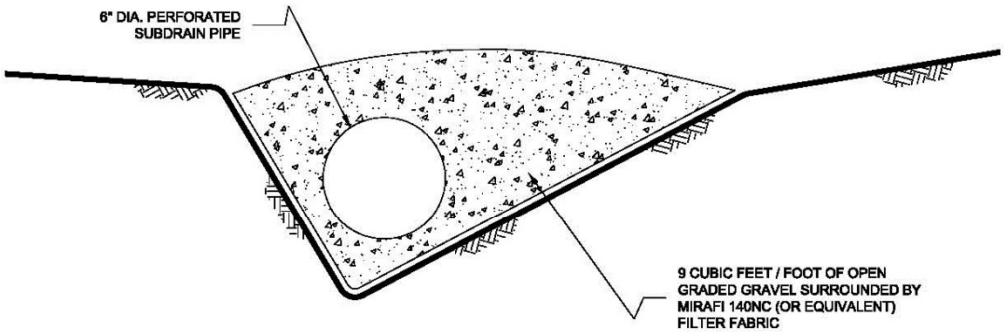
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

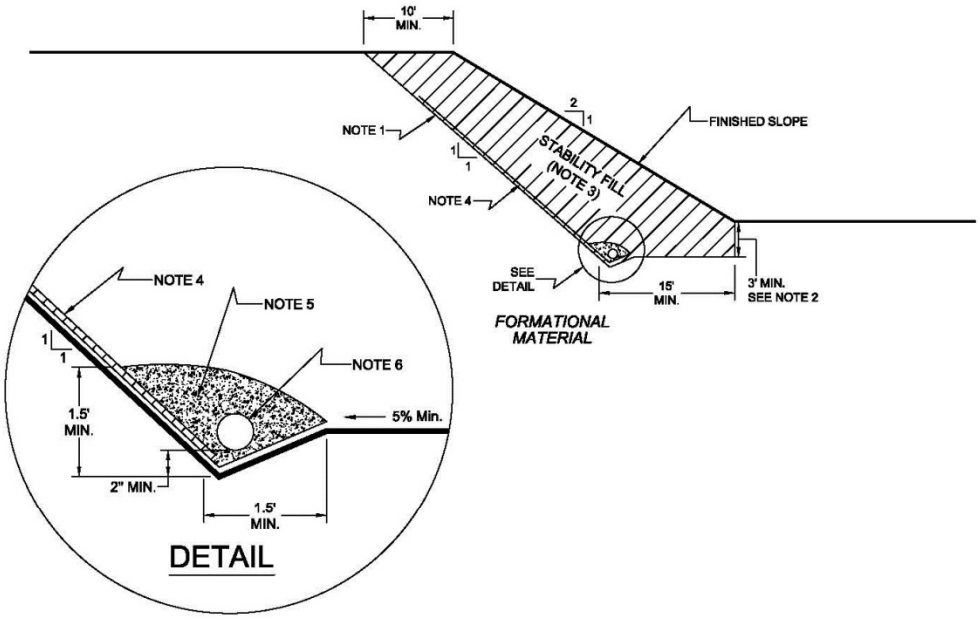
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

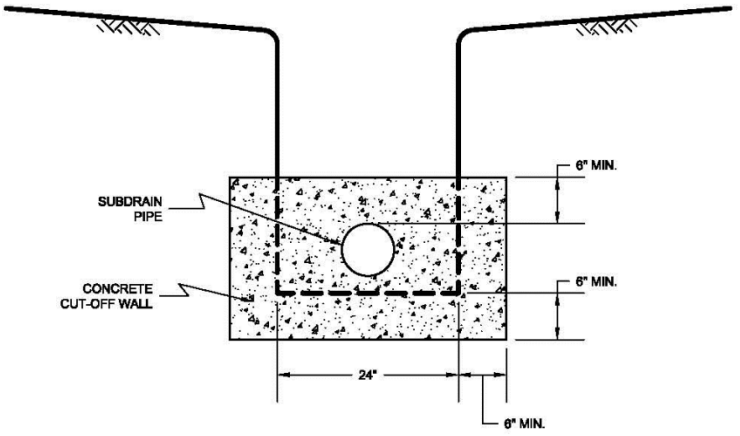
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

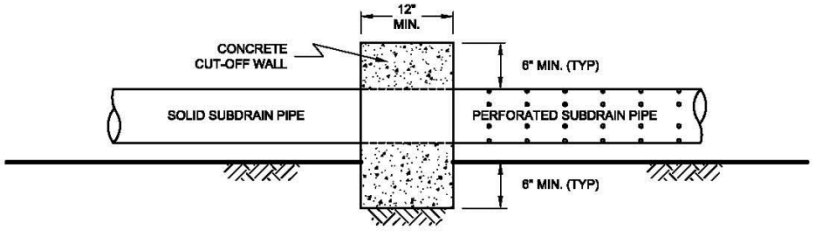
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

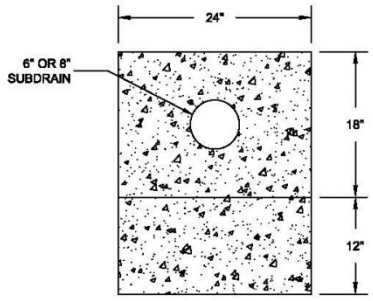


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

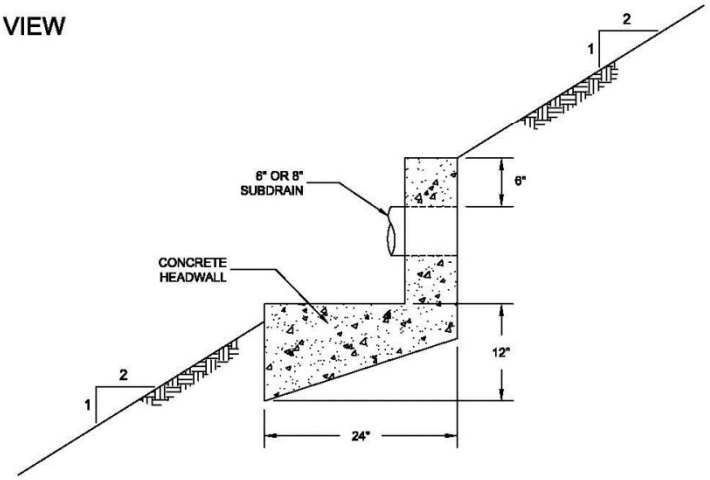
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE
OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an “as-built” map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

Appendix E.2

Paleontological Resource Assessment

Paleontological Resource Assessment for the Banning NP-2 Booster Pump Station and Reservoir Project City of Banning, Riverside County, California

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draft

MANAGEMENT SUMMARY

At the request of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) assessed the potential for impacts to significant paleontological resources for the Banning NP-2 Booster Pump Station and Reservoir Project (Project) in the city of Banning within Riverside County, California. The Project involves the construction of a booster pump facility and reservoir tank on approximately 7.51 acres of land in southwest Banning. Æ prepared this Paleontological Resource Assessment (PRA) in partial satisfaction of the California Environmental Quality Act (CEQA) requirements. The City of Banning is the lead agency for CEQA compliance.

This PRA was completed from a combination of desktop studies and fieldwork. The desktop studies included a review of published and unpublished literature and maps as well as museum records searches. The purpose of these studies was to identify the geologic units in the Project area and to determine whether previously recorded paleontological localities occur either within the Project area or within the same geologic units nearby but outside the Project area. As a result of the desktop studies and fieldwork, Æ has determined that the Project area has High A, High B, and Low Sensitivity based on Riverside County's sensitivity rankings.

Æ recommends preparation of a Paleontological Resource Impact Mitigation Program (PRIMP) by a qualified professional paleontologist (Paleontological Principal Investigator, Project Paleontologist) as defined by mitigation paleontology industry standards and/or the Society of Vertebrate Paleontology. The PRIMP will specify the steps to be taken to mitigate impacts to paleontological resources. For instance, Worker's Environmental Awareness Program training should be prepared prior to the start of Project-related ground disturbance and presented in person to all field personnel to describe the types of paleontological resources that may be found and the procedures to follow if any are encountered. The Project-specific PRIMP also will indicate where construction monitoring will be required and the frequency of required monitoring (i.e., full-time, spot-checks, etc.). to ensure adverse impacts to paleontological resources will be reduced to a less than significant level in accordance with CEQA.

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1
INTRODUCTION

At the request of Albert A. Webb Associates, Applied EarthWorks, Inc. (Æ) assessed the potential for impacts to significant paleontological resources for the Banning NP-2 Booster Pump Station and Reservoir Project (Project) in the city of Banning within Riverside County, California (Figure 1-1). Æ prepared this Paleontological Resource Assessment (PRA) in partial satisfaction of the requirements of the California Environmental Quality Act (CEQA). The City of Banning (City) is the lead agency for CEQA compliance.

1.1 PROJECT DESCRIPTION

The Project will be constructed on approximately 7.51 acres of land on the south side of West Lincoln Street, east of South 22nd Avenue in the southwestern portion of Banning. Specifically, the Project area is mapped in the southeast quarter of Section 8 of Township 3 South, Range 1 East, as shown on the Beaumont, California 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map (Figure 1-2).

The Project involves construction of a booster pump facility and reservoir tank. The station will consist of a housing facility designed to contain vertical turbine pumps capable of transmitting 2,500 gallons of nonpotable water per minute. The associated reservoir tank is an aboveground structure that will store approximately 60,910 gallons of nonpotable water during operation. All these facilities are water system improvements needed to supply nonpotable water to Lions Park, Banning High School, Dysart Park, and the Sun Lakes development near Highland Home Road. The maximum depth of ground disturbance during Project construction is not expected to exceed 10 feet below ground surface (bgs). Project construction is expected to disturb only approximately 0.5 acres of Assessor's Parcel Number 538-280-001.

1.2 PURPOSE OF INVESTIGATION

This PRA is designed to accomplish several goals: (1) identify the geologic units within the Project area and assess their paleontological resource potential; (2) determine whether the Project has the potential to adversely impact scientifically significant paleontological resources; (3) provide Project-specific management recommendations for paleontological resources, as necessary; and (4) demonstrate compliance with state laws and local regulations. Section 1.4 describes the ways in which this PRA meets the stated goals.

1.3 KEY PERSONNEL

Qualifications for Æ's key paleontology personnel can be found in Appendix A. Æ Paleontology Program Manager Amy Ollendorf served as the Principal Investigator for the paleontological investigation. She oversaw each task required for this PRA, including quality control. Ollendorf qualifies as a principal investigator for paleontology per industry standards (Murphey et al., 2019). She has interdisciplinary doctor of philosophy and master of science degrees involving geology and a bachelor of science degree in geology and anthropology (double major), all of which focused on paleontological subject matter. Ollendorf is the principal investigator for

Figure 1-1 Project vicinity in Riverside County, California.

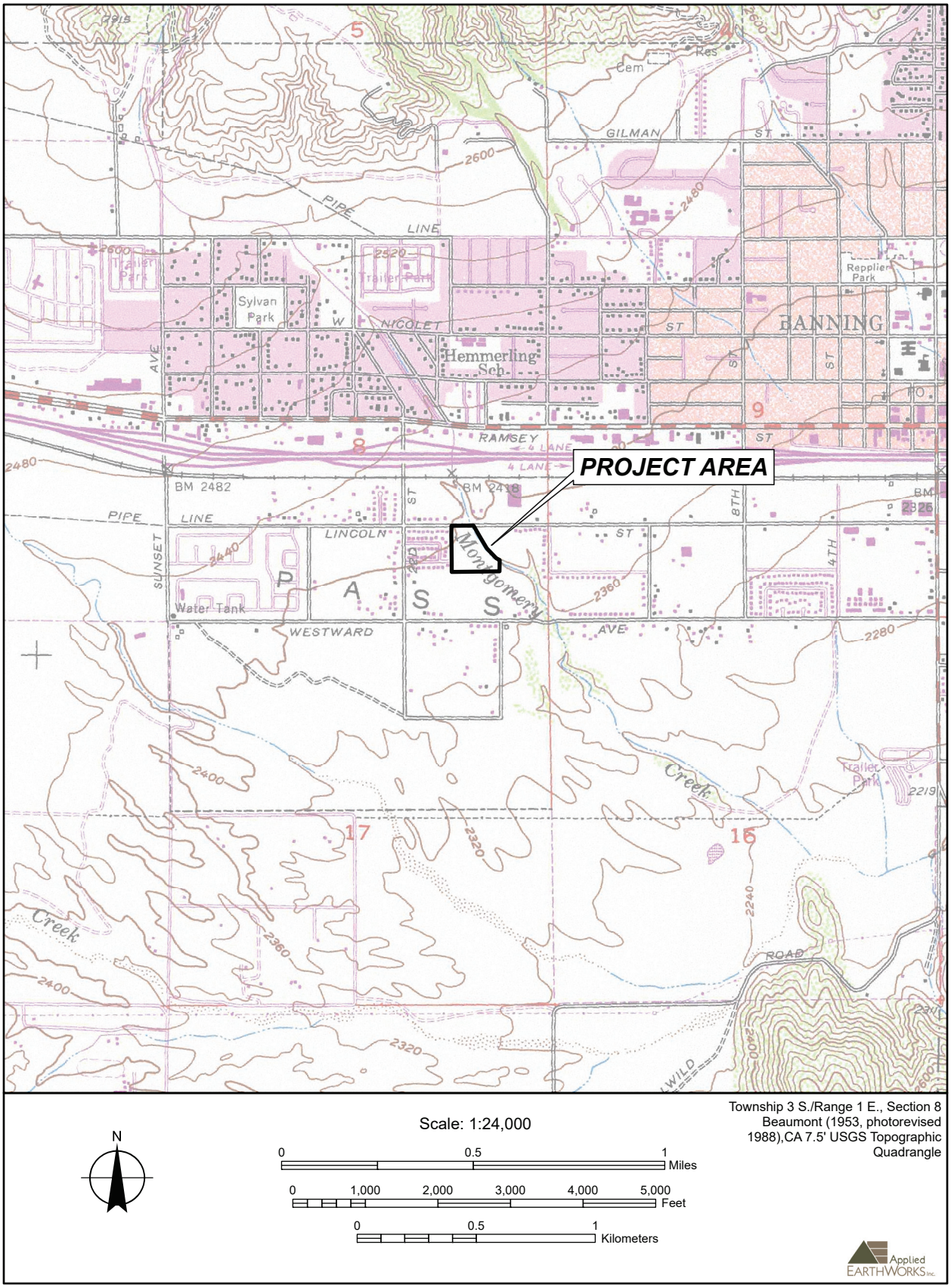

Figure 1-2 Project location on USGS Beaumont 7.5-minute topographic quadrangle.

paleontology on Æ's 2021–2024 California Statewide Paleontological Resource Use Permit (CA-21-06P) from the U.S. Bureau of Land Management (BLM). She also is a Registered Professional Archaeologist (RPA 12588) with over 40 years of experience.

Æ Senior Paleontologist Chris Shi completed the desktop research and wrote the PRA with contributions from Æ Cross-Trained Field Technician Aimee Montenegro. Shi has the necessary qualifications to meet the Society of Vertebrate Paleontology (SVP; 2010) and industry standards (Murphey et al., 2019) for a qualified professional paleontologist and is another principal investigator for paleontology on Æ's BLM permit. He has a master's degree in geology with a focus on paleobotany, and additional graduate studies in invertebrate paleontology. Additionally, he has over 14 years of experience in geology and paleontology, including the past 7 years in paleontological monitoring, recovery, and preparation of fossil remains, laboratory analysis, and report preparation. Montenegro has a bachelor's degree in anthropology as well as 6 years of professional paleontological experience, including management of museum fossil collections and paleontological monitoring.

Æ Geographic Information System (GIS) Analyst Cari Inoway and Æ Senior Paleontologist/GIS Analyst Melissa Macias prepared the figures for the report in coordination with Shi. Æ Paleontological Technician Andrew Vasquez completed the paleontological field survey.

1.4 REPORT ORGANIZATION

Chapter 1 has described the Project, defined the purpose of the investigation, and provided a description of Æ's key personnel for this PRA. Chapter 2 discusses the regulatory framework governing the Project. Chapter 3 presents the paleontological sensitivity criteria and resource guidelines used for this assessment. Chapter 4 provides the methods employed, and Chapter 5 describes the geology and paleontology of the Project area. The results of the desktop studies, and paleontological sensitivity assessment are presented in Chapter 6. Management recommendations can be found in Chapter 7, and references cited are listed in Chapter 8. Appendix A provides qualifications of key personnel.

2
REGULATORY ENVIRONMENT

Paleontological resources (i.e., fossils) are considered nonrenewable because when they are destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal, state, and local laws. This Project is not subject to federal laws. Consequently, all resources are protected under only state and local laws, as described in the following sections.

2.1 STATE

California is among the states that protect significant paleontological resources. CEQA is the legal framework through which this protection is accomplished. Enacted in 1970, CEQA does not directly regulate land uses but instead requires state and local agencies within California to follow a protocol of analysis and public disclosure of unavoidable environmental impacts of proposed projects and adopt all feasible measures to mitigate those impacts.

2.1.1 California Environmental Quality Act

This Project is subject to Section 15002(a)(3) of the Guidelines for Implementation of CEQA (Title 14, California Code of Regulations, Chapter 3), which states one of the basic purposes of CEQA is the intention to "prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible." Therefore, CEQA requires detailed studies that analyze the environmental effects of a proposed project.

If a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered. Specifically, Section VII(f) of Appendix G of the CEQA Guidelines, the Environmental Checklist Form, poses the question, "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" If paleontological resources are identified as being within the proposed project area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

2.1.2 CEQA Implementation

Guidelines for implementation of CEQA are codified in the California Code of Regulations, Title 14, Chapter 3, Section 15000 et seq., which requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. The various agencies within state government all have their own guidance documents to assist with CEQA compliance. The City is the government agency responsible for CEQA compliance for the Project.

2.2 LOCAL

In addition to state-level implementing regulations, policies, and guidance, various counties and municipalities throughout California also have developed environmental goals, policies, and guidance that pertain to paleontological resources. The following sections list all relevant goals, objectives, and policies.

2.2.1 County of Riverside

There are several policies covering paleontological resources within the County of Riverside (County) *General Plan*, *Multipurpose Open Space (OS) Element* (Riverside County Planning Department, 2015:OS-51):

> **OS 19.6:** Whenever existing information indicates that a site proposed for development has high paleontological sensitivity as shown on Figure OS-8, paleontological resource impact mitigation program (PRIMP) shall be filed with the Riverside County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.
>
> **OS 19.7:** Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown on Figure OS-8, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the Riverside County Geologist shall be notified and a paleontologist shall be retained by the project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.
>
> **OS 19.8:** Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-8, a report shall be filed with the Riverside County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.
>
> **OS 19.9:** Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the Western Science Center in the City of Hemet.

2.2.2 City of Banning

The City's General Plan does not include any goals or policies pertaining to paleontological resources. As such, this PRA provides recommendations based on the County's guidelines where relevant.

3
PALEONTOLOGICAL RESOURCE ASSESSMENT GUIDELINES

Protection of paleontological resources requires assessment of the potential for geologic units to yield significant paleontological resources that could be directly or indirectly impacted or destroyed during Project development. Successful protection also involves the formulation and implementation of appropriate management measures to mitigate impacts. Mitigation measures are proportional to the potential of individual areas to yield intact and significant paleontological resources.

3.1 DEFINITION OF PALEONTOLOGICAL RESOURCES AND SIGNIFICANCE CRITERIA

The SVP guidelines define paleontological resources as fossils and fossiliferous deposits (SVP, 2010). Fossils are the evidence of once-living organisms as preserved in the rock record. They include both the lithified remains of ancient plants and animals and the traces thereof (trackways, imprints, burrows, etc.). In general, the SVP considers fossils to be greater than 5,000 years old (older than middle Holocene[1]) and to typically be preserved in sedimentary rocks, although certain volcanic rocks and low-grade metamorphic rocks may be fossiliferous if formed under certain conditions.

Well-preserved and identifiable individual fossils are considered significant paleontological resources if they are a type specimen, rare, a complete specimen, or part of an important diverse fossil assemblage. Of particular importance are fossils found in situ, or undisturbed from their primary geologic context. These fossils are important because they are used to examine evolutionary relationships, provide insight on the development of and interaction between biological communities, establish time scales for geologic studies, and for many other scientific purposes, including investigation into paleoenvironments and paleoclimates (Scott and Springer, 2003; SVP, 2010). Among the various types of fossils, intact and in situ vertebrate fossils are usually assigned a greater significance than other types as they are comparatively rare. Consequently, more attention tends to be placed on the recovery of vertebrate fossils than other types.

3.2 PROFESSIONAL STANDARDS AND CLASSIFICATION OF PALEONTOLOGICAL RESOURCE SENSITIVITY

Most professional paleontologists in California adhere to the guidelines set forth by the SVP (2010) and industrywide standards (Murphey et al., 2019) to determine the course of paleontological mitigation for a given project unless specific city, county, state, or federal guidelines are available. The City does not have its own paleontological sensitivity guidelines. However, the County has developed a system that establishes detailed protocols for the assessment of the paleontological sensitivity of a project area and outlines measures to follow in

[1] Middle Holocene: the Holocene Epoch is subdivided into early (11,700 to 8,200 years ago), middle (8,200 to 4,200 years ago), and late (4,200 years ago to present) subepochs, (Cohen et al., 2023). The Quaternary Period also includes the older Pleistocene Epoch, which is also subdivided into early (2.6 million to 1.8 million years ago), middle (1.8 million to 77,400 years ago), and late (77,400 to 11,700 years ago) subepochs (Cohen et al., 2023).

order to mitigate adverse impacts to known or unknown fossil resources during project development (County of Riverside, 2015). Therefore, this PRA utilizes the County's ranking system and mitigation measures.

Following the County's established process, baseline information is used to assign the paleontological sensitivity of a geologic unit(s) (or members thereof) to one of four categories—Low, Undetermined, High A (Ha), and High B (Hb) (County of Riverside, 2015). Table 3-1 below shows the criteria for the categories in comparison with those of the SVP as well as mitigation recommendations for each category.

Table 3-1
Paleontological Sensitivity Classifications

Sensitivity/Potential			
County of Riverside	**SVP**	**Criteria[a]**	**Mitigation Recommendations[b]**
High A High B	High	Rock units from which vertebrate or significant specimens of other fossil types have been recovered are considered to have a high potential. Rock units with high potential also may include rock units that are temporally or lithologically suitable for the preservation of fossils (e.g., Middle Holocene and older, argillaceous and carbonate-rich paleosols, fine-grained marine sandstones, etc.). Rock units with High B Sensitivity are considered to have high potential at depths greater than 4 feet bgs.	Retain a qualified paleontologist and typically complete a field survey, PRIMP, and on-site construction monitoring. Any significant specimens discovered during monitoring will need to be prepared, identified, and curated into a museum. A final report documenting the significance of the finds will also be required.
Undetermined	Undetermined	In some cases, available literature on a particular rock unit will be scarce and a determination of whether or not it is fossiliferous or potentially fossiliferous will be difficult to make. Under these circumstances, further study is needed to determine the unit's paleontological resource potential.	A field survey is required to further assess the unit's paleontological potential. The survey may provide data for development of a PRIMP prior to construction.
Low	Low	Rocks units from which few fossils have been recovered or generally unsuitable for preservation of fossils are considered to have a low potential. These units typically yield fossils only on rare occasions and under unusual circumstances (e.g., basalt flows, recent colluvium, etc.).	Mitigation is not typically required; however, if an unanticipated paleontological resource is encountered, a qualified professional paleontologist (Principal Investigator, Project Paleontologist) may need to evaluate the resource to consider mitigation.
N/A	No Potential	Rock units that have no potential for paleontological resources are those that are formed under or exposed to immense heat and pressure, such as high-grade metamorphic rocks and plutonic igneous rocks.	No mitigation required.

a - Criteria based on County of Riverside (2015) and SVP (2010).
b - Recommendations based on County of Riverside (2015).

4
METHODS

This PRA was completed through desktop studies and a field survey. The twofold purpose of the off- and on-site research was: (1) to identify the geologic units in the Project area and immediate vicinity to determine whether previously recorded paleontological localities occur either within the Project area or within the same geologic units elsewhere nearby and (2) to determine the sensitivity of the geologic units in the Project area for their potential to yield paleontological resources.

4.1 LITERATURE REVIEWS AND MUSEUM RECORDS SEARCHES

In many areas, the near-surface layers of sediments and sedimentary rocks are broken down and converted to soil (pedogenesis) through chemical and physical weathering processes (Boggs, 2012). During pedogenesis, any fossils preserved within the near-surface layers often are destroyed or rendered unrecognizable. Therefore, intact and identifiable fossils are unlikely to be found in soil. Reviews of relevant geologic maps, regional geological publications, and unpublished reports are necessary to ascertain the geology and stratigraphy of a project area to determine the potential for significant subsurface paleontological resources.

To supplement the map and literature reviews, Æ requested searches of records of the invertebrate and vertebrate collections maintained by the Natural History Museum of Los Angeles County (NHMLAC) and the Western Science Center of Hemet (WSC). Æ also completed online searches of two databases readily available to the public—the Paleobiology Database (PBDB) and the database maintained by the University of California Museum of Paleontology (UCMP). All records searches were completed to identify known fossil localities within or near the Project area. In addition to the museum records searches, Æ examined the geotechnical investigation report for the Project (Weidman et al., 2023).

4.2 FIELD SURVEY

Prior to the field survey, Æ examined recent aerial photographs of the entire Project area in Google Earth to determine likely locations of geologic outcrops and potential survey routes. Andrew Vasquez conducted the paleontological field survey for the Project on August 31, 2023, alongside Æ Associate Archaeologist Andrew DeLeon, who conducted the cultural field survey. The purpose of the survey was to confirm presence or absence of exposed fossils on the ground surface and to evaluate geologic exposures for their potential to yield subsurface fossil material.

Vasquez started the survey at the northwest corner of the Project area and walked 15-foot north–south transects proceeding eastward. Vasquez completed the survey with a combination of close visual inspection and spot-checking. Close visual inspection was conducted where the ground surface was visible and intact sediments were exposed, including the West. Lincoln Street right-of-way and the streambed and banks of Montgomery Creek along the east boundary of the Project area. Vasquez spot-checked the remainder of the Project area where the ground surface was obscured by vegetation. He used a cellular Global Positioning System receiver to navigate through the Project area, kept notes on the geology observed, and took photographs to document the survey. Any fossils encountered were to be field-documented and not collected.

5
GEOLOGY AND PALEONTOLOGY

The following sections provide the geological context of the Project area, descriptions of the geologic units mapped as surface exposures within the boundaries of the Project area, and units exposed nearby and thought to be present in the subsurface. The section also includes any paleontological information reported from the units.

5.1 REGIONAL GEOLOGY

The Project area is in the northwest portion of the San Gorgonio Pass, which forms a major geologic divide between the Transverse Ranges and the Peninsular Ranges geomorphic provinces (California Geological Survey, 2002)[2]. North of the San Gorgonio Pass, the Transverse Ranges are an east–west-trending series of mountain ranges and valleys, which extend from the Northern Channel Islands in the west to the San Bernardino Mountains in the east (California Geological Survey, 2002). South of the San Gorgonio Pass, the Peninsular Ranges consist of several northwest-trending mountain ranges separated by valleys, extending from the Southern Channel Islands in the west to the Salton Trough in the east (California Geological Survey, 2002). The San Gorgonio Pass represents the single largest discontinuity along the San Andreas Fault, resulting from a system of irregular and discontinuous right-lateral, reverse, thrust, and oblique-normal faults (Yule, 2009). Together, these faults contribute to uplifting the San Bernardino Mountains and overall movement between the North American plate and the Pacific plate (Spotila et al., 1998).

The Banning Fault lies approximately 4 miles north of the Project area, dividing the basement rocks in the region into the Peninsular Ranges Assemblage south of the fault and the San Gabriel Mountains Assemblage north of the fault (Morton et al., 2006a, 2006b). In the vicinity of the Project area, rocks of the Peninsular Ranges Assemblage date from the Paleozoic to the present, with most of the assemblage represented by the Mesozoic[3] Peninsular Ranges batholith and prebatholithic metasedimentary and metavolcanic rocks (Jahns, 1954; Morton et al., 2006b). Thick sequences of Cenozoic[4] sediments and sedimentary rocks have accumulated above these, including the early Pliocene to early Pleistocene San Timoteo Formation and various Pleistocene

---

[2] A geomorphic province is a region of unique topography and geology that is readily distinguished from other regions based on its landforms and tectonic history (American Geological Institute, 1976).

[3] Mesozoic Era: Approximately 252 to 66 million years ago, subdivided into three periods—Triassic (252–201 million years ago), Jurassic (201–145 million years ago), and Cretaceous (145–66 million years ago) (Cohen et al., 2023).

[4] Cenozoic Era (formerly Tertiary): 66 million years ago to present, subdivided into three periods—Paleogene (66–23 million years ago), Neogene (23–2.6 million years ago), and Quaternary (2.6 million years ago to present). The Paleogene Period is subdivided into the Paleocene, Eocene, and Oligocene epochs; the Paleocene Epoch lasted from approximately 66 to 56 million years ago, the Eocene Epoch lasted from approximately 56 to 34 million years ago, and the Oligocene Epoch lasted from approximately 34 to 23 million years ago. The Neogene Period is subdivided into the Miocene and Pliocene epochs; the Miocene Epoch lasted from approximately 23 to 5.3 million years ago and the Pliocene Epoch lasted from approximately 5.3 to 2.6 million years ago. The Quaternary Period is subdivided into the Pleistocene and Holocene epochs; the Pleistocene Epoch, or last Ice Age, lasted from approximately 2.6 million to 11,700 years ago when the Holocene Epoch began; all dates according to Cohen et al. (2023).

and Holocene sedimentary units (Dibblee and Minch, 2003; Lancaster et al., 2012). The highly fossiliferous San Timoteo Formation is particularly well exposed in the badlands 4–5 miles west-southwest of the Project area.

5.2 GEOLOGY AND PALEONTOLOGY OF THE PROJECT AREA

The Project area is mapped at a scale of 1:24,000 by Dibblee and Minch (2003) and more recently at a scale of 1:100,000 by Lancaster et al. (2012) as part of the Geologic Compilation of Quaternary Surficial Deposits in Southern California (Bedrossian et al., 2012). Figure 5-1 is based on Lancaster et al. (2012) as it is the most recent map, but the following subsections may provide additional information on equivalent units from Dibblee and Minch (2003) where relevant. According to Lancaster et al. (2012), three geologic units are mapped in the Project area and vicinity: middle to late Pleistocene old alluvial fan deposits (Qof), early to middle Holocene young alluvial fan deposits (Qyf), and late Holocene alluvial wash deposits (Qw).

The geotechnical investigation report summarizes the findings from four borings completed at the northwest corner of the Project area, which reached depths of 26–50 feet bgs (Weidman et al., 2023). No geotechnical borings were completed elsewhere within the Project area.

5.2.1 Old Alluvial Fan Deposits (Qof)

According to Lancaster et al. (2012), middle to late Pleistocene old alluvial fan deposits (Qof) are mapped in the west to southwest and central to southeast portions of the Project area. These deposits consist of slightly to moderately consolidated and moderately dissected silts, sands, gravels, cobbles, and boulders issued from a confined valley or canyon. The unit may be temporally and lithologically equivalent to Pleistocene units Qof and Qf by Dibblee and Minch (2003), who note the grains are mostly composed of gneissic and plutonic detritus derived from the San Bernardino Mountains.

All boring logs from the geotechnical report show a 0.5–1.0-foot-thick layer of topsoil consisting of silty sand (Weidman et al., 2023). In three of the borings (B-1, B-2, and B-3), beds of dense brown clayey sand occur just below the topsoil and extend down to the maximum depths. The authors interpreted these to be deposits of Qof from Dibblee and Minch (Weidman et al., 2023). One of the borings near the northernmost edge of the Project area (B-5) also shows loose dark yellowish brown clayey sand below the topsoil from 0.5 to 5.0 feet bgs, which the authors interpreted as Qf from Dibblee and Minch (2023). The dense brown clayey sand beds occur throughout the remaining depth. Based on the boring locations, the dense beds may be equivalent to Qof from Lancaster et al. (2012). However, the loose beds they observed may instead be equivalent to the Holocene unit Qyf from Lancaster et al. (2012) rather than the Pleistocene unit Qf mapped by Dibblee and Minch (2003), which the latter interpret to cover the entire ground surface of the Project area. This is described in further detail under the next subsection.

Unit Qof is potentially fossiliferous because Pleistocene alluvial deposits are well documented to have yielded a wide variety of megafauna as well as numerous invertebrate and plant taxa throughout inland valleys of Riverside and San Bernardino counties (Reynolds and Reynolds, 1991; Scott, 2007; Springer et al., 2009). Additionally, the slightly older San Timoteo Formation, which is lithologically similar to unnamed Pleistocene alluvial deposits, occurs in the badlands to the west-southwest of the Project area (not shown in Figure 5-1). Numerous fossils of megafauna

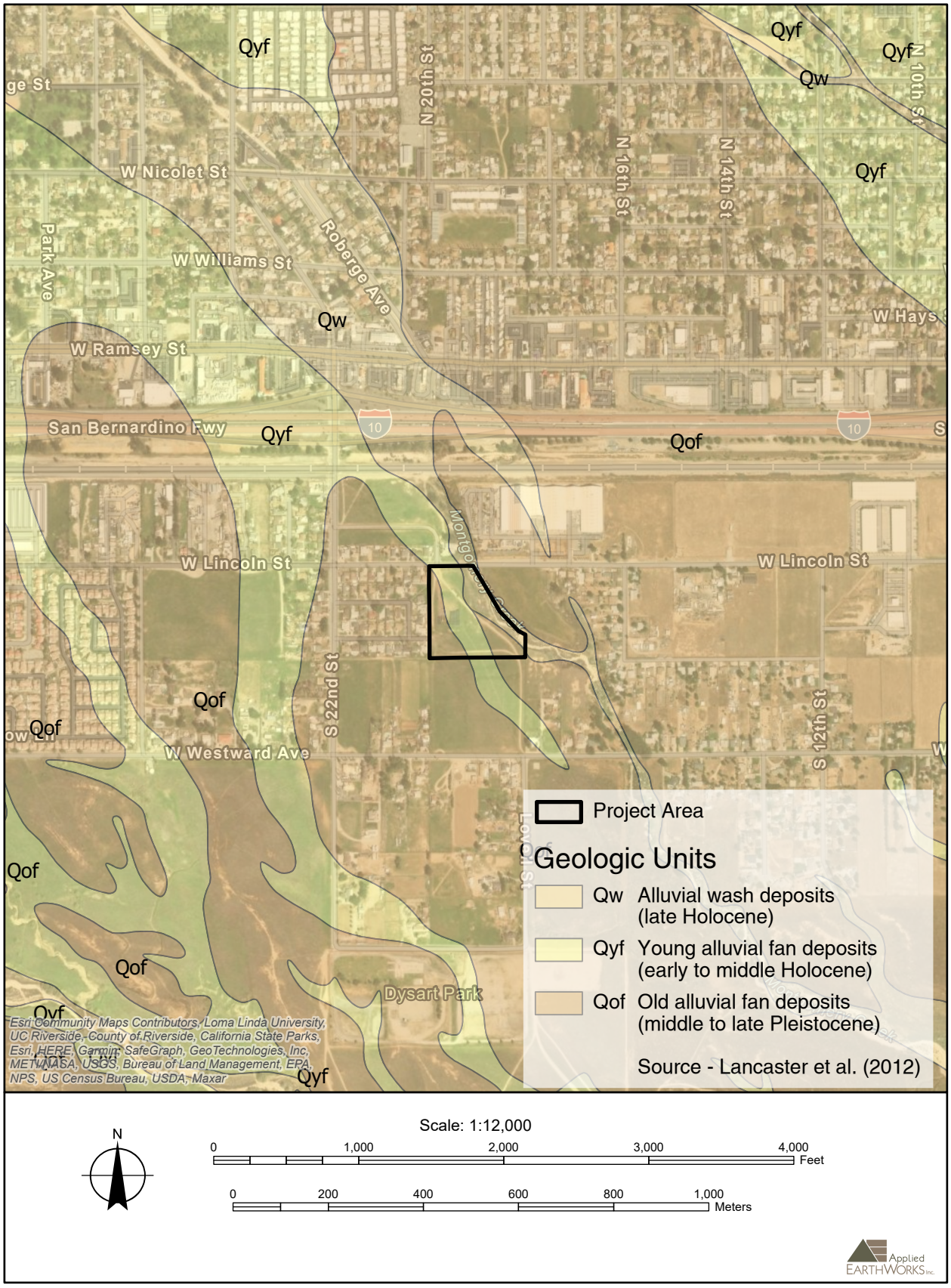

Figure 5-1 Geologic map for the Project area and vicinity.

and microfauna have been reported from this highly fossiliferous unit (Frick, 1921; Reynolds and Reynolds, 1991; Albright, 1999).

5.2.2 Young Alluvial Fan Deposits (Qyf)

Lancaster et al. (2012) show an approximately 250-foot-wide wedge of early to middle Holocene young alluvial fan deposits (Qyf) that bifurcates the Project area from the northwest corner through the south-central portion. They describe the deposits as unconsolidated to slightly consolidated and undissected to slightly dissected silts, sands, gravels, cobbles, and boulders issued from a confined valley or canyon. The unit is temporally and lithologically equivalent to Holocene unit Qa from Dibblee and Minch (2003). However, Dibblee and Minch do not map Qa within the Project area; rather, they mapped this unit 0.75 miles to the southeast.

The loose dark yellowish brown clayey sand seen in Boring B-5 of the geotechnical report more closely matches the descriptions of Qyf from Lancaster et al. (2012) and Qa from Dibblee and Minch (2003) than Qf from the latter, as both units are described as “unconsolidated” and “unindurated,” which contrasts from “weakly indurated” in the case of Qf (Weidman et al., 2023).

The early Holocene beds of Qyf are potentially fossiliferous, but those that are middle Holocene in age are typically too young for fossilization (Scott and Springer, 2003; Society of Vertebrate Paleontology, 2010). These Holocene deposits may overlie Pleistocene deposits at unknown depths with greater likelihood of preserving fossils, as described above for the adjacent unit Qof.

5.2.3 Alluvial Wash Deposits (Qw)

Late Holocene alluvial wash deposits (Qw) are mapped within Montgomery Creek, which occurs along the east boundary of the Project area (Lancaster et al., 2012). This unit consists of unconsolidated silts, sands, and gravels deposited in recently active stream and river channels. The unit is temporally and lithologically equivalent to Holocene unit Qg from Dibblee and Minch (2003), not shown in the Project area but mapped 1.25 miles to the southeast.

Unit Qw or its equivalent is not observed in the geotechnical investigation as the borings were only conducted in the northwest corner of the Project area and not where the unit is mapped along the east border (Weidman et al., 2023). More so than Qyf, the late Holocene Qw is too young for fossilization (Scott and Springer, 2003; Society of Vertebrate Paleontology, 2010) but may overlie deposits with greater likelihood of preserving fossils such as Qyf or Qof.

6
RESULTS AND ANALYSIS

This chapter reports on the results of the desktop studies and fieldwork completed for this Project. Paleontological sensitivity rankings also are assigned to the geologic units mapped at the ground surface as well as those likely present at unknown depths based on the available information.

6.1 GEOTECHNICAL REPORT

The geotechnical investigation for the Project included excavation of four hollow-stem auger borings (B-1, B-2, B-3, and B-5 [completed in 2018]) to depths of 26–50 feet bgs in the northwest corner of the Project area (Weidman et al., 2023). From the boring logs, a layer of topsoil with loose silty sand is present at 0.5–1.0 feet bgs, followed by dense clayey sand that the authors refer to as older alluvial fan deposits (Qof; Dibblee and Minch, 2003), which extend to the maximum depths of the borings. The only exception to this is in Boring B-5, which shows loose clayey sand interpreted as younger alluvial fan deposits (Qf; Dibblee and Minch, 2003) at 0.5–5.0 feet bgs between the topsoil and unit Qof. As discussed in the previous chapters, the Qof and Qf units of Dibblee and Minch (2003) may be equivalent to Qof and Qyf of Lancaster et al. (2012), respectively. No paleontological resources were encountered in the geotechnical borings.

6.2 RECORDS SEARCHES

The UCMP online database does not list any localities within a 10-mile radius of the Project area. The WSC records search does not list any localities within or near the Project area. Records search results from the PBDB and NHMLAC are detailed below in Table 6-1, which shows all listings within a 10-mile radius of the Project area. The PBDB online database does not list any fossil localities from Pleistocene alluvial deposits within the Project area but shows numerous localities from the upper member of the badlands 4–5 miles west-southwest of the Project area. This unit is included in the search as it is lithologically similar to the various unnamed Pleistocene alluvial deposits of Riverside County. The San Timoteo Formation localities are documented in published paleontological literature, including Frick (1921), Reynolds and Reynolds (1991), and Albright (1999), in which numerous fossil vertebrates are described. The NHMLAC records search results do not report any localities within the Project area, although several nearby localities to the south-southwest are listed from geologic units similar to those mapped in or in the vicinity of the Project area.

6.3 FIELD SURVEY RESULTS

Æ's close examinations of the surficial geology in the Project area were limited due to low ground visibility—overall approximately 15 percent (Figure 6-1). The ground surface was mostly obscured by vegetation, although Vasquez observed sediments in occasional patches of barren landscape, such as dirt recreational paths, and within the streambed and banks of Montgomery Creek. Much of the ground surface in the Project area likely has been previously disturbed by plowing. Because of the previous disturbances throughout most of the Project area, much of the geologic information from the survey came from stratigraphic observations within exposures along Montgomery Creek (Figure 6-2).

Table 6-1
Fossil Localities Reported near the Project Area

Locality No.	Geologic Unit (Date)	Taxa	Depth	Approx. Distance from Project Area
San Timoteo Badland Localities[a]	San Timoteo Formation, upper (Pleistocene)	Osteichthyes (bony fish) *Gasterosteus* (stickleback) *Equus* (horse) *Bison antiquus* (ancient bison) *Megalonyx* (ground sloth) *Mammuthus columbi* (Columbian mammoth) *Dipodomys* (kangaroo rat) Numerous other megafauna and microfauna	Unknown	4–5 miles
LACM[b] VP 1782	Unknown formation (Pleistocene)	Camelidae (camel family)	Unknown	5 miles
LACM[b] VP 4540	Unknown formation, gravel pit (Pleistocene)	Equidae (horse family)	Unknown	7 miles
LACM[b] VP 7618–7622, (CIT) 132, 133	San Timoteo Formation (Pliocene to Pleistocene)	Equidae (horse family) Camelidae (camel family)	Surface	7 miles
LACM[b] VP 1653, LACM IP 437	Unknown formation (Pleistocene)	*Squatina* (monkfish) *Gasterosteus* (stickleback) *Sobobapteron kirkbyae* (protoorthopteran insect)	Unknown	8 miles

a - PBDB.
b - NHMLAC collection.

Within the streambed and banks of the creek, Vasquez observed deposits of light gray (10YR 7/2) poorly sorted coarse-grained sand with angular gravel and pebbles at the north end of the Project that gradually shifted to brownish yellow (10YR 6/6) fine-grained sand toward the south end of the Project area (Figure 6-3). The depth of the streambed relative to the surrounding terrain ranged from 5 to 15 feet, deeper toward the south. Vasquez did not observe any vertical changes in lithology within the exposures. He observed refuse throughout the Project area with the heaviest concentrations found near Lincoln Street. Lastly, he encountered modern animal bones near burrows but did not observe any paleontological resources during the field survey.

Figure 6-1 Overview of the Project area from the south, facing northwest.

Figure 6-2 Overview of Montgomery Creek from the southeast corner of the Project area, facing northwest.

Figure 6-3 Detailed view of an approximately 8-foot-thick section of the southwest bank of Montgomery Creek at the east-central border of the Project area showing deposits of Qw.

6.4 DETERMINATION OF PALEONTOLOGICAL RESOURCE POTENTIAL WITHIN THE PROJECT AREA

Using information obtained from the desktop studies and field survey, Æ determined the paleontological resource potential of the Project area. Æ's paleontological sensitivity rankings follow the County of Riverside (2015) classification system. Based on the findings, Æ recommends the assignment of High A Sensitivity to locations mapped as Qof, High B Sensitivity to locations mapped as Qyf, and Low Sensitivity to locations mapped as Qw in the Project area (Figure 6-4).

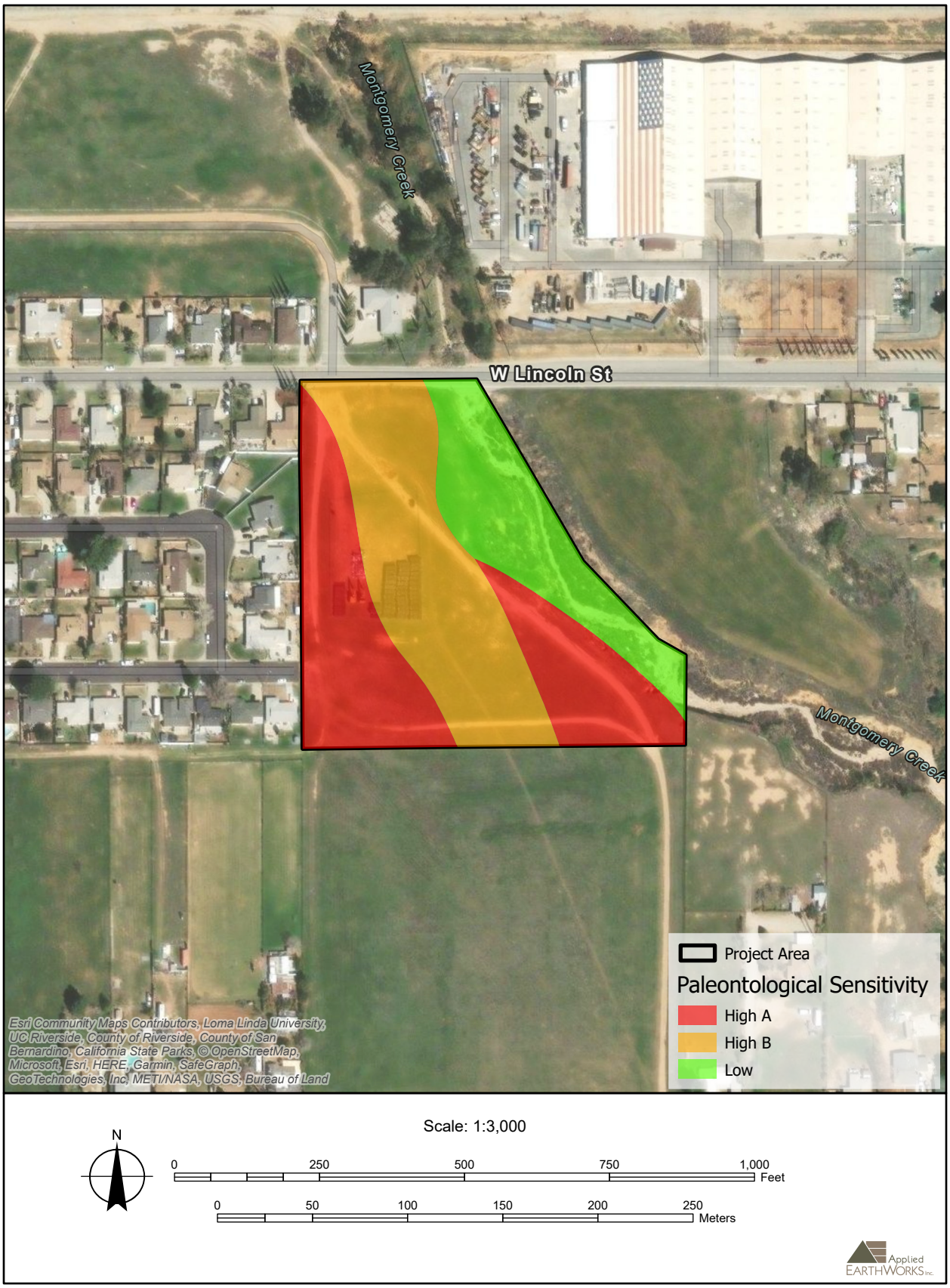

Figure 6-4 Paleontological sensitivity of the Project area.

Æ's desktop studies indicate Qof deposits mapped in the west and southwest portions of the Project area as well as in the center to southeast corner have a high potential of preserving significant paleontological resources. Weidman et al. (2023) described sediments matching the descriptions of Qof at a depth of 0.5–1.0 feet bgs, just below topsoil, in the northwest corner of the Project area. However, apart from a few locations without vegetation such as the previously disturbed dirt roads, Æ did not observe any diagnostic exposures of Qof deposits during the survey. Therefore, our ranking for Qof is based on the desktop studies alone. Similarly, Æ did not observe any diagnostic exposures of Qyf during the survey. Based on the desktop studies, these deposits have a low to moderate potential of preserving significant paleontological resources. The geotechnical boring data from Weidman et al. (2023) shows deposits matching the descriptions of Qyf within the upper 5 feet near the north border of the Project area. These are immediately underlain by deposits of Qof. As such, locations mapped as Qyf may have a high potential for preserving significant paleontological resources at depths greater than 4 feet bgs. Lastly, during the survey, Æ observed deposits of Qw, considered to have low potential for paleontological resources, within the streambed and banks of Montgomery Creek. Based on the thickness of the exposures within the creekbed and the lack of any changes in lithology within the exposures, Project-related ground-disturbing activities as presently proposed within locations mapped as Qw are unlikely to affect any fossiliferous deposits to a maximum depth of 15 feet bgs. Observations from construction monitoring can help to further refine the geology within the Project area.

7
RECOMMENDATIONS

Æ concludes that construction activities may impact significant paleontological resources in various locations throughout the Project area. Æ's desktop studies and field survey indicate the Project area has High A, High B, and Low Sensitivity for paleontological resources.

Prior to the issuance of grading permits and consistent with applicable policies (County of Riverside, 2015), Æ recommends a PRIMP be prepared by a qualified professional paleontologist (Paleontological Principal Investigator, Project Paleontologist) as defined by mitigation paleontology industry standards (Murphey et al., 2019) and/or the SVP (2010). The PRIMP will specify the steps to be taken to mitigate impacts to paleontological resources. For instance, Worker's Environmental Awareness Program training should be prepared prior to the start of Project-related ground disturbance and presented in person to all field personnel to describe the types of paleontological resources that may be found and the procedures to follow if any are encountered.

The Project-specific PRIMP also will indicate where construction monitoring will be required and the frequency of required monitoring (i.e., full-time, spot-checks, etc.). In addition to construction monitoring procedures, a PRIMP also will provide details about fossil collection, analysis, and preparation for permanent curation at an approved repository, such as the NHMLAC or WSC. Lastly, the PRIMP describes the different reporting standards to be used, such as monitoring with negative findings versus monitoring resulting in fossil discoveries.

8
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APPENDIX A

Qualifications of Key Personnel

CHRISTOPHER SHI

Senior Paleontologist/Project Manager

Areas of Expertise

- Paleontological resource technical and project management
- CEQA/NEPA compliance

Years of Experience

- 14

Education

Ph.D., Geology (studies), UCLA, 2012-2016

M.S., Geology, UCLA, 2011

B.S., Biology, University of Minnesota, Minneapolis, 2006

Registrations/Certifications

- Paleontologist Consultants List, Santa Cruz County (2022-present)
- Certified Paleontologist, Orange County (2020-present)
- Qualified Paleontologist, Riverside County (2019-present)

Permits

- Field Director, California BLM Statewide Paleontological Permit CA-21-06P

Classes/Training

- OSHA Excavation Competent Person Seminar, Mar. 11, 2019
- OSHA Hazardous Waste Operations Worker (HAZWOPER) Training, 40-Hour, January 20-23, 2020 and 8-Hour Refreshers, January 21, 2021, June 10, 2022, and June 20, 2023

Professional Experience

2020–	Senior Paleontologist/Project Manager, Applied EarthWorks, Inc., Pasadena, California.
2018–2020	Associate Paleontologist/Project Manager, Applied EarthWorks, Inc., Pasadena, California.
2016–2018	Paleontological Laboratory and Field Technician, Applied EarthWorks, Inc., Pasadena, California.
2017–2018	Lead Paleontology Monitor, Rincon Consultants, Los Angeles, California.

Technical Qualifications

Mr. Shi is a paleontologist and geologist with 14 years of experience in paleontology, evolutionary biology, mineralogy, and sedimentary geology, and meets the Society of Vertebrate Paleontology's (SVP) standards for a qualified professional paleontologist/project paleontologist/principal investigator. He has a background in plant and invertebrate taphonomy, and his master's thesis focused on the characterization of fossilized Eocene ferns using a novel three-dimensional imaging technique. Additionally, Mr. Shi spent several years working toward a Ph.D. in geology with research focused on the link between the trend in changing seawater chemistry and the evolution of the first animals to develop shells from calcium carbonate during the Cambrian explosion. He has completed several professional publications and presentations throughout his career.

Mr. Shi completes various tasks within the Paleontology Program of Applied EarthWorks. He coordinates and schedules paleontological monitors throughout Æ's 5 offices. In the field, Mr. Shi's responsibilities include stratigraphic analyses, geological and paleontological data collection, bulk-sediment sampling, collection paleontological resources, and documentation of fossil localities. In the lab, Mr. Shi picks microvertebrate fossils, identifies, analyzes, and prepares collected fossils for permanent curation, including jacketing of large vertebrate specimens. Mr. Shi also regularly completes paleontological desktop literature and map reviews and coordinates with various paleontology curators for museum records searches; authors paleontology monitoring plans, inventory and evaluation reports, resource impact management plans, and worker environmental awareness training materials. In the past, Mr. Shi served as Æ's lead monitor on construction monitoring projects for utility, transportation, and residential and commercial development projects.

Selected Project Experience

San Jacinto Master Drainage Plan Line E Project, City of San Jacinto, Riverside County, California. Project Paleontologist/Project Manager (2023). Will oversee ground-reconnaissance field survey and complete Paleontological Resource Assessment report (PRA) for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium. Client: Albert A. Webb Associates for City of San Jacinto.

California High-Speed Rail Construction Package 1, Madera and Fresno Counties, California. Project Manager (2023-present). Æ is providing multi-year paleontological monitoring during construction of the 32-mile segment from Avenue 19 in Madera County to East American Avenue in Fresno County with 12 grade separations, two viaducts, one tunnel, and a major crossing over the San Joaquin River. Overseeing paleontological resource monitoring for construction, completing daily quality control of field forms, and preparing biweekly summaries of fieldwork for client. Completing for CEQA compliance (California High-Speed Rail Authority) and NEPA compliance (Federal Railroad Administration). Paleontologically sensitive geologic units: Mehrten, Laguna, Tulare, Turlock Lake, Riverbank, and Modesto Formations; North Merced Gravel; and Pleistocene to Holocene alluvium. Client: formerly Tutor Perini Zachry Parsons, currently Wong+Harris, JV.

South Coast 101 HOV Lanes Segment 4D-4E North Project, Santa Barbara County, California. Project Paleontologist/Project Manager (2023–present). Completed Paleontological Mitigation Plan (PMP) for construction of a 3.2-mile HOV lane on South Coast 101 in Montecito. Will oversee Worker Environmental Awareness Program (WEAP) and paleontological resource monitoring for construction for CEQA compliance. Paleontologically sensitive geologic units: Casitas Formation, Pleistocene marine terrace deposits, Pleistocene to Holocene alluvium, and Holocene beach deposits. Client: ICF Jones & Stokes, Inc. for California Department of Transportation.

State Route 46 Widening Project, Wye Section, San Luis Obispo County, California. Project Paleontologist/Project Manager (2023–present). Completed PMP and oversaw WEAP for improvements along a 3.7-mile segment of State Route 46, including the interchange with State Route 41 north of Cholame. Overseeing paleontological resource monitoring for construction for CEQA compliance. Paleontologically sensitive geologic units: Temblor, Monterey, and Paso Robles Formations, and Pleistocene to Holocene alluvium. Client: ICF Jones & Stokes, Inc. for California Department of Transportation.

Eastern Municipal Water District Good Hope and Mead Valley Water-System Improvements Project, Riverside County, California. Project Paleontologist/Project Manager (2023). Co-authored paleontological technical memorandum for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium. Client: Albert A. Webb Associates for County of Riverside.

Westside Purple Line Extension Section 3 Project, City of Los Angeles, Los Angeles County, California. Project Paleontologist/Project Manager (2022-present). Oversaw and provided paleontological resource monitoring for construction over a 2.56-mile extension of the Purple Line along Wilshire Boulevard, including construction of two underground stations, for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium. Client: Kleinfelder for Los Angeles County Metropolitan Transportation Authority.

East San Fernando Valley Transit Corridor, City of Los Angeles, Los Angeles County, California. Project Paleontologist/Project Manager (2023). Oversaw and provided paleontological resource monitoring for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium. Client: Kleinfelder for Los Angeles County Metropolitan Transportation Authority.

600 Tank Farm Road Project, City of San Luis Obispo, San Luis Obispo County, California. Project Paleontologist/Project Manager (2023-present). Completed (PMP) and will oversee WEAP training and paleontological resource monitoring for construction for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium. Client: CoVelop, Inc.

Fairmead Landfill Expansion, City of Chowchilla, Madera County, California. Principal Paleontologist/Project Manager (2020-2023) and Project Manager (2019-2020). 121-acre fossil-rich landfill. Oversaw Worker Environmental Awareness Program (WEAP) training and paleontological resource monitoring

Selected Project Experience (continued)

for construction. Oversaw and assisted in identification and preparation of approximately 4,000 fossil specimens housed in the County of Madera's temporary repository as well as transfer of all significant specimens to the University of California Museum of Paleontology in Berkeley for accessioning. Completed quarterly paleontological findings reports for 2019 –2022 and annual reports for 2019 –2022 for CEQA compliance. Paleontologically sensitive geologic units: Turlock Lake, Riverbank, and Modesto Formations. Client: County of Madera.

Other Paleontological Research and Experience

Æ Annual Paleontologist/Cross-Trained Monitor Training. Senior Paleontologist (2020-present). Collaborated for the creation and implementation of an annual training program for all paleontological and cross-trained monitors. Topics varied by year: 2020 introduction to geology and paleontology, with an emphasis on fossil identification and field techniques; 2021 sedimentary geology, geologic descriptions, and field monitoring forms; 2022 federal and state laws and regulations regarding paleontology. Monitors completed two hours of training per session plus assessments, such as a quiz, sediment samples, or essay, and received a certificate of completion. Training sessions are ongoing and must be completed each year in order to mobilize for fieldwork. Co-collaborators were Melissa Macias and Amy Ollendorf.

Ph.D. Studies.

Establishing a link between the trend in changing seawater chemistry and the evolution of the first animals that built shells and skeletons from calcium carbonate during the Cambrian explosion. Advisor: Dr. Bruce N. Runnegar

M.S. Thesis.

Demonstrating the application of confocal laser scanning microscopy in the characterization of a fossil fern from the Eocene. Advisor: Dr. J. William Schopf

Relevant Publications

Shi, C. S. 2013. Use of Confocal Laser Scanning Microscopy for Studies in Paleobotany: Documentation of Stem Anatomy of the Eocene Fern *Dennstaedtiopsis aerenchymata* (Dennstaedtiaceae). LAP LAMBERT Academic Publishing: 88 p.

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Zheng, J., W. Zhuang, N. Yian, G. Kou, H. Peng, C. McNally, D. Erichsen, A. Cheloha, S. Herek, C. Shi, and Y. Shi. 2004. Classification of HIV-1 mediated neuronal dendritic and synaptic damage using Multiple Criteria Linear Programming. Neuroinformatics, Vol. 2, No. 3: p. 303-326.

Selected Presentations

Shi, C. S. and A. J. W. Hendy. "Pleistocene fossil assemblages from Ponte Vista, San Pedro, California: Contributions from Mitigation Paleontology. Prepared and delivered a 15-minute-long presentation for the 55th Annual Meeting of the Western Society of Malacologists, June 25, 2022.

Shi, C. S. 2022. "Paleontological Mitigation for the Ponte Vista Project" presentation. Prepared and delivered 30-minute-long presentation for the Southern California Paleontological Society, January 9, 2022.

Applied EarthWorks, Inc. Paleontology Program. 2020. "National Fossil Day" video. Co-created 5-minute-long video by paleontology staff (Aimee Montenegro, Chris Shi, Melissa Macias, and Amy Ollendorf). Posted to Facebook and LinkedIn; available for distribution.

Applied EARTHWORKS Inc.

AMY L. OLLENDORF

Vice President/Managing Principal/Paleontology Program Manager

Areas of Expertise

- Paleontology, mineralogy, and sedimentary geology
- CEQA/NEPA compliance
- Project management

Years of Experience

40

Education

Postdoctoral Research Associate, 2006–2007, World Heritage Studies, University of Minnesota

Ph.D., Ancient Studies, University of Minnesota, 1993

M.S., Ancient Studies, University of Minnesota, 1986

B.S., Anthropology and Geology, Beloit College, 1983

Registrations/Certifications

- Registered Professional Archaeologist 12588
- Licensed Professional Geologist, Minnesota #30084 (6/1998–6/2018, expired)
- Paleontologist Consultants List, Santa Cruz County (2022–present)
- Certified Paleontologist and Archaeologist, Orange County (2020–present)
- Paleontology and Cultural Consultant, Riverside County (2018–present)

Permits/Licenses

Principal Investigator, Nevada BLM Statewide Paleontological Permit N-090758

Principal Investigator, California BLM Statewide Paleontological Permit CA-21-06P

Professional Experience

2018–	Vice President (2022–present) and Managing Principal/ Paleontology Program Manager (2018–present), Applied EarthWorks, Inc.
2015–2018	President and Senior Project Manager, ALO Environmental Associates, LLC
2006–2015	Program Manager, Cultural Heritage Planning and Management, AECOM
2005–2008	President and Senior Project Manager, ALO Environmental Associates, LLC
2003–2005	Director, Cultural Resources Management, Peterson Environmental Consulting, Inc.
2000–2003	Director, Cultural Resources Management, HDR Engineering, Inc.
1996–2000	Director, Cultural Resources Management, Braun Intertec Corporation, Inc.

Technical Qualifications

Dr. Ollendorf has 40 years of experience in paleontology, paleoecology, environmental compliance, and geoarchaeology at the global, national, tribal, state, and local levels. She meets industry standards for principal investigator in paleontology and she is also a principal investigator on Æ's California and Nevada statewide Paleontological Resource Use Permits for paleontology from the U.S. Bureau of Land Management (BLM).

Dr. Ollendorf has supervised and/or participated in paleontological services, tribal negotiations, and agency coordination throughout her career. She also has managed Environmental Impact Statements (EIS) and Environmental Assessments (EA). Her project experience includes work in 35 states, including California and other western states, and abroad on a wide range of client projects across many different industry sectors.

During her career, Dr. Ollendorf has written or overseen hundreds of compliance reports in addition to having published multiple articles in peer-reviewed professional journals and presented to a wide variety of audiences, including professional peers.

Selected Project Experience

California High-Speed Rail Merced-to-Fresno Counties, California. Principal Investigator/Managing Principal, Paleontology and Cultural Resources (2023–present). Æ is providing as-needed multi-year paleontological services and occasional cultural resources services to support all environmental work within the approximately 57-mile-long corridor. Paleontologically sensitive geologic units: early to middle Pliocene-age Mehrten, Pliocene- to Pleistocene-age Laguna, Pliocene- to Holocene-age Tulare, early Pleistocene-age Turlock Lake, middle Pleistocene-age Riverbank, and late Pleistocene-age Modesto Formations; Pliocene- or Pleistocene-age North Merced Gravel; undifferentiated Modesto Formation and post-Modesto Holocene-age sediment; and Pleistocene-age non-marine sediment. Completing for CEQA compliance (California High-Speed Rail Authority) and NEPA compliance (Federal Railroad Administration). Working closely with paleontology staff (Chris Shi and Melissa Macias). Client: T.Y. Lin.

Recurrent Energy 350 MW Crimson Battery Energy Storage System, Riverside County, California. Principal Investigator/Paleontology Program Manager (2018–present). Directed paleontological services for construction of the Battery Energy Storage System (BESS) and generation tie-lines. Paleontologically sensitive geologic units: Pliocene- to Pleistocene-age alluvial deposits of the Mule Mountains and Pleistocene- to Holocene-age alluvial fan deposits. Provided QA/QC and finalized approvals of the Paleontological Resource Mitigation and Monitoring Plan (PRMMP); obtained all BLM fieldwork authorizations; oversaw completion and provided QA/QC of and Worker Environmental Awareness Program (WEAP) training materials; oversaw preconstruction- and construction-phase fossil collection; and oversaw fulltime construction monitoring over approximately 9 months on approximately 80 acres, resulting in 93 paleontological localities and 157 sediment samples. Presently overseeing laboratory analysis and preparation Also will provide QA/QC of all associated reporting. Completing for federal (BLM) and state (California Department of Fish & Wildlife [CDFW]) compliance. Client: AECOM (2021–present) and Recurrent Energy, LLC (2018 and 2020).

California High-Speed Rail Construction Package 1, Madera and Fresno Counties, California. Paleontology Program Manager and Project Manager (2018–present). Æ is providing multi-year paleontological monitoring during construction of the 32-mile segment from Avenue 19 in Madera County to East American Avenue in Fresno County with 12 grade separations, two viaducts, one tunnel, and a major crossing over the San Joaquin River. Overseeing daily construction monitoring and reporting; onsite and offsite screening of sediments and rock matrices; and offsite fossil analyses. Will complete treatment and preparation of significant fossils for permanent curation at UCMP. Paleontologically sensitive geologic units: early to middle Pliocene-age Mehrten, Pliocene- to Pleistocene-age Laguna, Pliocene- to Holocene-age Tulare, early Pleistocene-age Turlock Lake, middle Pleistocene-age Riverbank, and late Pleistocene-age Modesto Formations; Pliocene- or Pleistocene-age North Merced Gravel; undifferentiated Modesto Formation and post-Modesto Holocene-age sediment; and Pleistocene-age non-marine sediment. Completing for CEQA compliance (California High-Speed Rail Authority) and NEPA compliance (Federal Railroad Administration). Working closely with paleontology staff (Melissa Macias, Erik Pino, and Michael George). Client: Tutor Perini Zachry Parsons.

Pacific Gas and Electric Company (PG&E) Groundwater Remediation, Hinkley, San Bernardino County, California. Paleontology Program Manager and Project Manager (2018–present). Over a multi-year period, completing Release-To-Construction (RTC) project-by-project reviews for cultural and paleontological resource management. Tasks include assessing project areas for sensitivity for cultural and paleontological resources in previously surveyed areas and recorded locations of cultural resources. Also overseeing cultural and paleontological construction monitoring on a project-by-project basis. Requires project-specific reporting, annual reporting, regular client communication, and coordination with cultural and paleontological staff. Paleontologically sensitive geologic units: Pleistocene-age alluvium and middle to late Pleistocene-age lacustrine deposits associated with Pluvial Harper Lake. Reports to date include individual cultural and paleontological RTC reports of field findings as a result of preconstruction surveys and construction monitoring, and co-authored 2018-2021 Annual Reports. Completing for CEQA compliance (State of California's Lahontan Regional Water Quality Control Board) and NEPA compliance (U.S. Fish & Wildlife Service). Working closely with paleontology staff (Chris Shi). Client: Arcadis for PG&E.

Fairmead Landfill Expansion, City of Chowchilla, Madera County, California. Paleontology Program Manager (2019–present). Oversaw pre-construction WEAP training and construction monitoring over the 121-acre Project area immediately adjacent to the paleontologically diverse Fairmead Locality (Pleistocene, Irvingtonian). Continuing to oversee additional phases of preconstruction WEAP training and construction monitoring; recovered inventory, condition assessment, treatment, and transfer of over 4,000 fossils for permanent curation at University of California Museum of Paleontology (UCMP); quarterly and annual reports; and post-construction monitoring reports. Completed QA/QC of quarterly paleontological findings reports and annual reports for 2019–2021; completing QA/QC quarterly and annual reports through 2022. Paleontologically sensitive geologic units: early Pleistocene-age Turlock Lake, middle Pleistocene-age Riverbank, and late Pleistocene-age Modesto Formations. Completing for CEQA compliance (County). Working closely with paleontology staff (Chris Shi and Michael George). Client: County of Madera.

Purple Line Extension Section 3, Los Angeles Light-Rail, Los Angeles County, California. Paleontology Program Manager (2022–present). Supervising construction monitors for paleontological resources and will provide QA/QC of final construction monitoring report. Approximately 2.6-mile-long segment will add two new stations, including tunneling, at Wilshire/Westwood. Paleontologically sensitive geologic units: Pliocene- to middle Pleistocene-age Fernando Formation; early to late Pleistocene-age San Pedro Formation; and nonasphaltic Quaternary Period older alluvium. Completing for CEQA compliance (Metropolitan Transportation Authority [LA Metro]). Working closely with paleontology staff (Chris Shi, Melissa Macias). Client: Kleinfelder for LA Metro.

Phase 1A of the Port of Los Angeles (POLA) West Harbor Development Project in the Community of San Pedro, Los Angeles County, California. Paleontology Program Manager (2023–present). Oversaw WEAP training and overseeing construction monitoring for paleontological resources, and will complete QA/QC of final reporting for approximately 20-acre Project area along Harbor Boulevard. Paleontologically sensitive geologic units: Pleistocene-age San Pedro Sand and Quaternary Period Older Alluvium, including Palos Verdes Sand. Completing for CEQA compliance (POLA). Working closely with paleontology staff (Melissa Macias). Client: ICF Jones & Stokes.

State Route 46 (SR 46) Widening Project, Wye Segment, San Luis Obispo County, California. Managing Principal and Paleontology Program Manager (2023–present). Completed QA/QC and editing of Paleontological Monitoring Plan (PMP) for widening the northbound and southbound lanes of State Route (SR) 46 from Post Mile 54.1 to 57.8 and reconstructing the SR 41/SR 46 interchange (Caltrans District 5 Task Order 15 to prime contractor). Overseeing WEAP training and full-time monitoring for paleontological resources; will complete QA/QC and editing of Paleontological Mitigation Report (PMR) at the conclusion of construction. Paleontologically sensitive geologic units: Cretaceous-age Gravelly Flat and Panoche Formations, Miocene-age Temblor Formation and Monterey Shale, and Pleistocene-age Paso Robles Formation and older alluvial deposits. Completing for compliance with federal laws and CEQA. Working closely with paleontology staff (Chris Shi). Client: ICF Jones & Stokes.

Armet Residence and Accessory Dwelling Unit Project near Templeton, San Luis Obispo County, California. Managing Principal and Paleontology Program Manager (2023). Completed QA/QC and editing of Paleontological Resource Assessment (PRA) for new residence with outdoor swimming pool, accessory dwelling unit, and driveway on approximately 2 acres. Paleontologically sensitive geologic units: Miocene-age Monterey Shale, Pleistocene-age Paso Robles Formation, and Pleistocene-age older alluvial sediments. Completed for compliance with federal laws and CEQA. Worked closely with paleontology staff (Chris Shi). Client: Rick Armet.

South Coast U.S. Highway 101 High-Occupancy Vehicle Lanes Segments 4D & 4E, Santa Barbara County, California. Paleontology Program Manager (2023). Completed QA/QC and editing of Paleontological Monitoring Plan (PMP) covering northbound and southbound lanes from Post Mile 9.1 to 12.3 along U.S. Highway 101 (Caltrans District 5 Task Order 16 to prime contractor). Paleontologically sensitive geologic units: Pleistocene-age Older alluvial deposits, marine-terrace deposits, intermediate alluvial deposits-uncertain, and late Pleistocene- to Holocene-age alluvium and colluvium. Completed for compliance with federal laws and CEQA. Worked closely with paleontology staff (Melissa Macias). Client: ICF Jones & Stokes.

Applied EARTHWORKS Inc.

AIMEE MONTENEGRO

Cross-Trained Archaeological/Paleontological Field/Lab Technician

Areas of Expertise

- Mitigation paleontology
- Cultural resource management
- Prehistoric and historic archaeology

Years of Experience

- 6

Education

B.A., Anthropology, Biola University, La Mirada, California, 2017

Professional Affiliations

- Pacific Coast Archaeological Society
- Society for California Archaeology

Registrations/Certifications

- 40-Hour Hazardous Waste Operations Worker (HAZWOPER) and 8-Hour HAZWOPER Refreshers
- OSHA 10-Hour Construction Worker
- PG&E/ISNetWorld Safety
- Æ Annual Training for Paleontology/Cross-Trained Field Technicians, 2020 through 2023

Professional Experience

2019–	Cross-Trained Field/Lab Technician, Applied EarthWorks, Inc., Pasadena, California
2019–	Archaeological Crew Chief, Heritage Resource Consultants, Los Angeles, California
2018–2019	Archaeological Research and Collections Intern, Bowers Museum, Santa Ana, California
2017–2018	Paleontology Collections Intern, Department of Vertebrate Paleontology, Natural History Museum of Los Angeles
2015–2017	Research Assistant, Biola University Anthropology Department, La Mirada, California

Summary of Qualifications

Miss Montenegro is a cross-trained archaeologist/paleontologist with 6 years of professional experience in cultural resource management and mitigation paleontology throughout California. As a Cross-Trained Field/Lab Technician with Applied EarthWorks, Montenegro has served as a lead field technician on various surveys and construction monitoring projects for paleontological and archaeological resources in Los Angeles, Orange, San Bernardino, San Luis Obispo, and Riverside Counties. In the field, her responsibilities include the identification of paleontological and archaeological resources and documentation of stratigraphy. In the lab, her responsibilities include picking microvertebrates and other small fossils from paleontological sediment samples through wet-screen processing.

Montenegro has experience in survey, excavation, monitoring, curation, lab work, and reporting. As an undergraduate student, she participated in the on-campus excavation of a Columbian mammoth from the Rancholabrean North American Land Mammal Age. As a Collections Intern at the Natural History Museum of Los Angeles, she participated in the conservation and curation of vertebrate fossils, assisting in the fossil photography, jacketing of specimens for long term storage, and mapping of associated paleontological localities. Additionally, Montenegro served as an archaeological collections and research intern within Museo Egizio in Turin, Italy, and the Bowers Museum in Santa Ana, California.

Selected Project Experience

East San Fernando Transit Corridor, City of Los Angeles, Los Angeles County, California. Paleontological Field Technician (2023–present). The Los Angeles County Metropolitan Transportation Authority (Metro) is currently constructing a new rail line and 14 new stations between the G Line (Orange) Van Nuys Station and the Sylmar/San Fernando Metrolink Station located in Los Angeles County, California. Paleontologically sensitive geologic units: Pleistocene alluvium. Client: Kleinfelder.

Westside Purple Line Extension Section 3 Project, City of Los Angeles, Los Angeles County, California. Cross-Trained Field Technician (2022–present). The Los Angeles County Metropolitan Transportation Authority (Metro) is currently constructing two underground rail stations within the 2.6-mile Section 3 of the Purple Line Transit System along Wilshire Boulevard in West Los Angeles. Completing paleontological construction monitoring for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene alluvium. Client: Kleinfelder.

California High-Speed Rail Construction Package 1, Madera and Fresno Counties, California. Paleontological Technician (2020–present). Æ is providing multi-year paleontological monitoring during construction of the 32-mile segment from Avenue 19 in Madera County to East American Avenue in Fresno County. Providing support to Senior Paleontologist and assisting in general project management such as organization of daily construction monitoring and reporting and tracking of fossils and fossil localities. Paleontologically sensitive geologic units: early to middle Pliocene-age Mehrten, Pliocene- to Pleistocene-age Laguna, Pliocene- to Holocene-age Tulare, early Pleistocene-age Turlock Lake, middle Pleistocene-age Riverbank, and late Pleistocene-age Modesto Formations; Pliocene- or Pleistocene-age North Merced Gravel; undifferentiated Modesto Formation and post-Modesto Holocene-age sediment; and Pleistocene-age non-marine sediment. Completing for CEQA compliance (California High-Speed Rail Authority) and NEPA compliance (Federal Railroad Administration). Client: Tutor Perini Zachry Parsons.

Hinkley Remediation Project, Community of Hinkley, San Bernardino County, California. Cross-Trained Field Technician (2020–present). Completing archaeological surveys and construction monitoring for paleontological and archaeological resources for various Release to Construction projects for 30,000-acre groundwater remediation area. Completed for CEQA (State) and NEPA (USFWS) compliance. Paleontologically sensitive geologic units: Pleistocene to Holocene alluvium and lacustrine deposits. Client: Arcadis for Pacific Gas and Electric Company.

West Gen-Tie and 500-foot-wide Buffer Adjacent to the Crimson Solar Project, Riverside County, California. Cross-Trained Field Technician (2022). Completed ground-reconnaissance field survey for paleontological resources for federal (BLM) and state (California Department of Fish & Wildlife) compliance. Paleontologically sensitive geologic units: Alluvial deposits of the Mule Mountains and Pleistocene to Holocene alluvium. Client: AECOM.

Crimson Energy Storage Project, Riverside County, California. Cross-Trained Field Technician (2021–2023). Completed pre-construction collection of paleontological resources and paleontological construction monitoring for construction of a battery energy storage system (BESS) and generation tie-lines for 2,500-acre fossil-rich 350 MW solar farm. Also completed onsite wet-screen processing of paleontological sediment samples and sorting/ identifying microvertebrates and other small fossils from the sediment samples in the lab. All tasks completed for federal (BLM) and state (California Department of Fish & Wildlife) compliance. Paleontologically sensitive geologic units: Alluvial deposits of the Mule Mountains and Pleistocene to Holocene alluvium. Client: AECOM.

Crossroads North Storm Drain Facilities Improvement Project, Community of Winchester, Riverside County, California. Cross-Trained Field Technician (2021). Completed paleontological construction monitoring for CEQA compliance. Paleontologically sensitive geologic units: Pleistocene alluvium. Client: Albert A. Webb Associates.