

ATTACHMENT F

Special Studies

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND
NATIVE PLANT PROTECTION PLAN FOR TTM 20544, IN THE CITY OF VICTORVILLE,
SAN BERNARDINO COUNTY, CALIFORNIA**

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**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Table of Contents

SECTION 1.0 – INTRODUCTION	4
1.1 PROJECT LOCATION	4
1.2 PROJECT DESCRIPTION	4
SECTION 2.0 – METHODOLOGY	5
2.1 LITERATURE REVIEW	5
2.2 SOILS	5
2.3 BIOLOGICAL RECONNAISSANCE-LEVEL SURVEY	5
2.4 JURISDICTIONAL FEATURES	6
2.5 VEGETATION	6
2.6 WILDLIFE	6
2.7 WILDLIFE CORRIDORS AND HABITAT CONSERVATION PLAN	6
SECTION 3.0 – RESULTS	6
3.1 LITERATURE REVIEW RESULTS	6
3.1.1 SOILS	7
3.1.2 SPECIAL STATUS SPECIES	7
3.1.3 JURISDICTIONAL WATERS	10
3.1.4 DESIGNATED CRITICAL HABITAT	10
3.1.5 HYDROLOGY AND HYDROLOGIC CONNECTIVITY	10
3.1.6 SAN BERNARDINO COUNTY DEVELOPMENT CODE	10
3.2 FIELD STUDY RESULTS	12
3.2.1 HABITAT	12
3.2.2 WILDLIFE	12
3.2.3 SPECIAL STATUS SPECIES	13
3.2.4 NESTING BIRDS	18
3.2.5 JURISDICTIONAL WATERS	18
3.2.6 WETLANDS AND BLUE LINE STREAM	18
3.2.7 NATIVE PLANT PROTECTION PLAN	19
SECTION 4.0 – CONCLUSIONS AND RECOMMENDATIONS	19
4.1 JURISDICTIONAL AREAS	19
4.2 SENSITIVE SPECIES	19
4.3 NESTING BIRDS	20

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

4.4 CERTIFICATION	20
Section 5 – REFERENCES	22
Appendix A – Figures	23
Appendix B – Photos	28
Appendix C – Regulatory Framework	48
Appendix D – Tables	55

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

SECTION 1.0 – INTRODUCTION

Jennings Environmental, LLC (Jennings) was retained by Lilburn Corporation (Lilburn) to conduct a literature review and reconnaissance-level survey for the proposed Tentative Tract Map (TTM) 20544 in the City of Victorville, California (Project). The survey identified vegetation communities, the potential for the occurrence of special status species, or habitats that could support special status wildlife species, and recorded all plants and animals observed or detected within the Project boundary. This biological resources assessment is designed to address the potential effects of the proposed project on designated critical habitats and/or any species currently listed or formally proposed for listing as endangered or threatened under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) or species designated as sensitive by the California Department of Fish and Wildlife (CDFW) or the California Native Plant Society (CNPS).

Information contained in this document is in accordance with accepted scientific and technical standards that are consistent with the requirements of the United States Fish and Wildlife Service (USFWS) and (CDFW). Additionally, the site was surveyed for any drainage features that would meet the definition of the Waters of the US (WOUS), Waters of the State (WOS), or CDFW jurisdiction. Also, the project is located within the desert of San Bernardino County. As such, this report also contains the results of the Native Plant Protection Plan in accordance with San Bernardino County Development Code Section 88.01.060.

1.1 PROJECT LOCATION

The project is generally located in Section 5, Township 4 North, Range 5 West, and is depicted within the *Baldy Mesa* U.S. Geological Survey's (USGS) 7.5-minute topographic map. More specifically the project is located within APN 3071-111-01, within the City of Victorville, San Bernardino County, California. The Project site is located on the southeast corner of the intersection of Verbena Road and Bear Valley Road. The site is surrounded by vacant lands on all sides, with rural residences in the vicinity (Figures 1 and 2 in Appendix A).

1.2 PROJECT DESCRIPTION

Bear Valley 60, LLC (Project Applicant) is requesting approval of a Tentative Parcel Map (TTM No. 20544) to subdivide a 20-acre parcel, described as Assessor's Parcel Number (APN) 3071-111-01 into 61 single-family residential lots and three lettered lots. The Project Site is currently vacant and zoned single-family residential (R-1) within the Land Use Category of Low Density Residential (LDR). The Proposed Project is an allowable use within the zoning of single-family residential and is therefore consistent with the City of Victorville General Plan Land Use and Zoning Districts. The lots would range from approximately 3,781 to 15,614 square-feet (refer to Figure 1-Site Plan). Access to the Proposed Project would be from Sierra Road and from Bear Valley Road onto internal "A" Street. The Proposed Project would include three additional internal 40-foot-wide streets B, C, and D.

SECTION 2.0 – METHODOLOGY

2.1 LITERATURE REVIEW

Prior to performing the field survey, existing documentation relevant to the Project site was reviewed. The most recent records of the California Natural Diversity Database (CNDDDB) managed by CDFW (CDFW 2023), the USFWS Critical Habitat Mapper (USFWS 2023), and the California Native Plant Society's Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPS 2023) were reviewed for the following quadrangle containing and surrounding the Project site: *Baldy Mesa, Hesperia, Victorville, and Adelanto*, USGS 7.5-minute quadrangle. The *Hesperia, Victorville, and Adelanto* quads were included in the records search due to the site's proximity to their borders. These databases contain records of reported occurrences of federal- or state-listed endangered or threatened species, California Species of Concern (SSC), or otherwise special status species or habitats that may occur within or in the immediate vicinity of the Project site. These sources include:

- California Natural Diversity Database (CNDDDB) managed by CDFW (CDFW 2023)
- USFWS Critical Habitat Mapper (USFWS 2023)
- California Native Plant Society's Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPS 2023)
- U.S. Fish and Wildlife (USFWS) threatened and endangered species occurrence GIS overlay;
- USGS National Map;
- Calwater Watershed Maps
- USFWS Designated Critical Habitat Maps
- San Bernardino County Biotic Recourses Overlay
- San Bernardino County Development Code, 88.01.060 Desert Native Plant Protection
- Western Joshua Tree Conservation Act 2023

2.2 SOILS

Before conducting the surveys, soil maps for Los Angeles County were referenced online to determine the types of soil found within the Project site. Soils were determined in accordance with categories set forth by the United States Department of Agriculture (USDA) Soil Conservation Service and by referencing the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2023).

2.3 BIOLOGICAL RECONNAISSANCE-LEVEL SURVEY

Jennings biologist, Gene Jennings, conducted the general reconnaissance survey within the Project site to identify the potential for the occurrence of special status species, vegetation communities, or habitats that could support special status wildlife species. The survey was conducted on foot, throughout the Project site between 0850 and 1050 hours on October 29, 2023. Weather conditions during the survey included temperatures ranging from 53 to 64 degrees Fahrenheit, with no cloud cover, no precipitation, and 3.3 to 6.2 mile-per-hour winds. Photographs of the Project site were taken to document existing conditions (Appendix B).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

2.4 JURISDICTIONAL FEATURES

A general assessment of jurisdictional waters regulated by the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and CDFW was conducted for the proposed Project area. Pursuant to Section 404 of the Clean Water Act, USACE regulates the discharge of dredged and/or fill material into waters of the United States. The State of California (State) regulates the discharge of material into waters of the State pursuant to Section 401 of the Clean Water Act and the California Porter- Cologne Water Quality Control Act (California Water Code, Division 7, §13000 et seq.). Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, CDFW regulates all substantial diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife. The initial assessment was conducted by a desktop survey through the USGS National Hydrography Dataset for hydrological connectivity. Additional assessment findings are discussed in Sections 3.1.2 and 3.2.5. A discussion of the regulatory framework is provided in Appendix C.

2.5 VEGETATION

All plant species observed within the Project site were recorded. Vegetation communities within the Project site were identified and qualitatively described. Plant communities were determined in accordance with the *Manual of California Vegetation, Second Edition* (Sawyer et al. 2009). Plant nomenclature follows that of *The Jepson Manual, Second Edition* (Baldwin et al. 2012). A comprehensive list of the plant species observed during the survey is provided in Appendix D.

2.6 WILDLIFE

All wildlife and wildlife signs observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded. Additional survey time was spent in those habitats most likely to be utilized by wildlife (native vegetation, wildlife trails, etc.) or in habitats with the potential to support state- and/or federally listed or otherwise special-status species. Notes were made on the general habitat types, species observed, and the conditions of the Project site. A comprehensive list of the wildlife species observed during the survey is provided in Appendix D.

2.7 WILDLIFE CORRIDORS AND HABITAT CONSERVATION PLAN

According to the California Essential Habitat Connectivity Project, the Project Site is not mapped within an area for wildlife movement and is not within a habitat conservation plan. Additionally, the site is not within a wildlife linkage as mapped by Mojave Desert Land Trust. Therefore, the proposed Project will have a less than significant impact on any current wildlife corridors or habitat conservation plans.

SECTION 3.0 – RESULTS

3.1 LITERATURE REVIEW RESULTS

According to the CNDDb, CNPSEI, and other relevant literature and databases, 37 sensitive species including 10 listed species, and 3 sensitive habitats have been documented in the *Baldy Mesa, Hesperia*,

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Victorville, and *Adelanto* quads. This list of sensitive species and habitats includes any State and/or federally-listed threatened or endangered species, CDFW-designated Species of Special Concern (SSC), and otherwise Special Animals. “Special Animals” is a general term that refers to all of the taxa the CNDDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of “species at risk” or “special status species.” The CDFW considers the taxa on this list to be those of greatest conservation need.

An analysis of the likelihood of the occurrence of all CNDDDB-sensitive species documented in the *Baldy Mesa*, *Hesperia*, *Victorville*, and *Adelanto* quads is provided in Table 2, in Appendix D. This analysis takes into account species range as well as documentation within the vicinity of the project area and includes the habitat requirements for each species and the potential for their occurrence on the site, based on required habitat elements and range relative to the current site conditions. According to the databases, no USFWS-designated critical habitat occurs within or adjacent to the project site.

3.1.1 SOILS

After a review of the USDA Soil Conservation Service and by referencing the USDA NRCS Web Soil Survey (USDA 2023), it was determined that the Project site is located within the Mojave River Area, California area CA671. Based on the results of the database search, one (1) soil type was documented in the area:

Cajon sand, 0 to 2 percent slopes (112). This soil is somewhat excessively drained with a high to very high capacity to transmit water. This soil consists of alluvium derived from granite sources, typically ranges in elevation from 1,800 to 3,200 feet above mean sea level (amsl), and is considered farmland of statewide importance.

3.1.2 SPECIAL STATUS SPECIES

Desert Tortoise (*Gopherus agassizii*) (Federal/State Threatened)

The desert tortoise is a State and federally-listed threatened species. Throughout its range, it is threatened by habitat loss, domestic grazing, predation, collections, and increased mortality rates. The desert tortoise is typically found in creosote bush scrub. They are most often found on level or sloped ground where the substrate is firm but not too rocky. Tortoise burrows are typically found at the base of shrubs, in the sides of washes and hillsides. Because a single tortoise may have many burrows distributed throughout its home range, it is not possible to predict the exact numbers of individuals on a site based upon burrow numbers.

In 1992 the US Bureau of Land Management issued the *California Statewide Desert Tortoise Management Policy* which included categorizing habitat into three levels of classification. The management goal for Category I areas is to maintain stable, viable populations and to increase the population where possible. The management goal for Category II areas is to maintain stable, viable populations. The management goal for Category III areas is to limit population declines to the extent feasible. In April 1993, the BLM amended the CDCA plan to delineate these three categories of desert tortoise habitat on public lands. Although habitat categories apply only to public lands administered by the BLM, regulatory agencies typically determine habitat compensation ratios based on the nearest BLM habitat categories. With the adoption of the West Mojave Plan all lands that are outside Desert Wildlife Management Areas, including

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

the subject parcel, are characterized as Category 3 Habitat, which is the lowest priority management area for viable populations of the desert tortoise.

Burrowing Owl (Athene cunicularia) – Species of Species Concern (SSC)

The burrowing owl (BUOW) is a state and federal SSC. This owl is a mottled, brownish and sand-colored, dove-sized raptor, with large, yellow eyes, a rounded head lacking ear tufts, white eyebrows, and long legs compared to other owl species. It is a ground-dwelling owl typically found in arid prairies, fields, and open areas where vegetation is sparse and low to the ground. The BUOW is heavily dependent upon the presence of mammal burrows, with ground squirrel burrows being a common choice, in its habitat to provide shelter from predators, inclement weather, and to provide a nesting place. They are also known to make use of human-created structures, such as cement culverts and pipes, for burrows.

BUOW spends a great deal of time standing on dirt mounds at the entrance to a burrow or perched on a fence post or other low to the ground perch from which they hunt for prey. BUOW frequently hunt by hovering in place above the ground and dropping on their prey from above. They feed primarily on insects such as grasshoppers, June beetles, and moths, but will also take small rodents, birds, and reptiles. They are active during the day and night but are considered a crepuscular owl; generally observed in the early morning hours or at twilight. The breeding season for BUOW is February 1 through August 31. Up to 11, but typically 7 to 9, eggs are laid in a burrow, abandoned pipe, or other subterranean hollows where incubation is complete in 28-30 days. Young BUOW fledges in 44 days. The BUOW is considered a migratory species in portions of its range, which includes western North America from Canada to Mexico, and east to Texas and Louisiana. BUOW populations in California are considered to be sedentary or locally migratory.

Throughout its range, the BUOW is vulnerable to habitat loss, predation, vehicular collisions, and destruction of burrow sites, and the poisoning of ground squirrels. BUOW has disappeared from significant portions of their range in the last 15 years and, overall, nearly 60% of the breeding groups of owls known to have existed in California during the 1980s had disappeared by the early 1990s. The BUOW is not listed under the state or federal Endangered Species Act but is considered both a federal and state Species of Special Concern. The BUOW is a migratory bird protected by the international treaty under the Migratory Bird Treaty Act of 1918 and by State law under the California Fish and Game Code (CDFG Code #3513 & #3503.5).

Desert Kit Fox (Vulpes macrotis)

The desert kit fox is not federally- or state-listed, but is considered a species of local concern by the County of Los Angeles. It is an uncommon to rare permanent resident in arid habitats within southern California. Kit foxes are threatened by a number of human activities, including poaching, pesticide and rodenticide use, and direct poisoning, as well as heavy agricultural and urban development. Desert kit foxes occur in the desert and other arid habitats, including sagebrush flats, creosote scrub, and annual grassland habitats, and other areas with scattered brush, scrub, and shrubs. They are an important predator of small mammals, preying on black-tailed jackrabbits (*Lepus californicus*), desert cottontails (*Sylvilagus audubonii*), kangaroo rats, ground squirrels, and other rodents, insects, reptiles, birds, and bird eggs. Limited vegetation may be taken. Desert kit foxes excavate burrows in loose-textured sandy or loamy soils for shelter, pupping, and as an escape from extreme heat and cold. Open, level areas are preferred for

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

burrowing. Man-made structures and infrastructure, including culverts and pipes, also may be used for denning where suitable friable soils are not present.

American Badger (*Taxidea taxus*)

The American badger is a CDFW Species of Special Concern. Badgers are uncommon, permanent residents throughout California, and occur most commonly in open stages of shrub, woodland, and herbaceous habitats. They are tenacious diggers and occur where friable soils support denning and burrowing activities. They are active year-round, and most often nocturnal, although they may be active during the day. They prey upon fossorial rodents, especially California ground squirrels and pocket gophers; rats and mice, some reptiles, insects, eggs, birds, and carrion also may be taken. Breeding typically occurs in the summer and early fall, with pups being born the following March or April in burrows dug in relatively dry, often sandy soil. American badgers are threatened primarily by indiscriminate trapping, agricultural conversion, and the eradication of ground squirrels and other fossorial rodents that comprise the majority of their prey base.

Mohave Ground Squirrel (*Xerospermophilus mohavensis*) (State – Threatened)

The Mohave ground squirrel (MGS) is a State listed threatened species. Mohave ground squirrel is endemic to 2 million hectares in the western Mojave Desert. It typically inhabits sandy soils of alkali sink and creosote bush scrub habitat. In much of this region, the geographic range of the species is considered to lie west of the Mojave River. However, in the Victorville and Barstow areas, there are records of Mohave ground squirrel occurrence on the east side of the Mojave River. Mohave ground squirrel is listed as threatened by CDFW due to habitat loss, fragmentation, and deterioration. CDFW does not designate critical habitat for this species.

MGS is small, grayish, diurnal squirrel measuring about 9 inches from nose to tip of tail. They forage on leaves and seeds and aestivate/hibernate for long periods of the year. Plants documented as forage for MGS include: fiddleneck (*Amsinckia tessellata*), wolfberry (*Lycium andersonii*), Joshua tree (*Yucca brevifolia*), winterfat (*Krascheninnikovia lanata*), spiny hopsage (*Grayia spinosa*), allscale (*Atriplex canescens* and *A. polycarpa*), desert holly (*A. hymenelytra*), coreopsis (*Coreopsis* sp.), and the seeds of Joshua tree. It is suspected that Mohave ground squirrel forage on the plant species with the highest water content available at the time. The project site falls within the historic range of the MGS but is located outside, to the south, of the Mohave ground squirrel Conservation Area set forth in the West Mojave Plan.

Western Joshua Tree (*Yucca brevifolia*) (State Candidate for Listing)

Western Joshua trees occur throughout the Mojave Desert in Southern California and are typically found at an elevation of 400 to 1,800 meters (~1,200 to ~5,400 feet). Western Joshua trees within the western portion of the Mojave Desert typically receive more annual precipitation during "normal" years; consequently, cloning occurs more often resulting in numerous trunks sprouting from the same root system. Western Joshua tree habitats provide habitat for a variety of wildlife species including desert woodrats (*Neotoma* sp.) and night lizards (*Xantusia* sp.) both of which utilize the base of the trees. A variety of birds also utilize Western Joshua trees for nesting such as hawks, common ravens, and cactus wrens. CDFW consider Western Joshua tree woodlands as areas that support relatively high species

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

diversity and as such are considered to be a sensitive desert community. Western Joshua trees are also considered a significant resource under the California Environmental Quality Act (CEQA) and are included in the Desert Plant Protection Act, Food and Agricultural Code (80001 - 80006).

Additionally, pursuant to the provisions of Section 2074.2 of the Fish and Game Code, the California Fish and Game Commission (Commission), at its September 22, 2020, meeting, accepted for consideration the petition submitted to list the western Joshua tree (*Yucca brevifolia*) as threatened or endangered under the California Endangered Species Act. Based on that finding and the acceptance of the petition, the Commission also provided notice that the western Joshua tree is a candidate species as defined by Section 2068 of the Fish and Game Code.

3.1.3 JURISDICTIONAL WATERS

Aerial imagery of the site was examined and compared with the surrounding USGS 7.5-minute topographic quadrangle maps to identify drainage features within the survey area as indicated from topographic changes, blue-line features, or visible drainage patterns. The U.S. Fish and Wildlife Service National Wetland Inventory and Environmental Protection Agency (EPA) Water Program “My Waters” data layers were also reviewed to determine whether any hydrologic features and wetland areas had been documented within the vicinity of the site. Similarly, the Soil maps from the U.S. Department of Agriculture (USDA) - Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2023) were reviewed to identify the soil series on-site and to check if they have been identified regionally as hydric soils. Upstream and downstream connectivity of waterways (if present) was reviewed in the field, on aerial imagery, and topographic maps to determine jurisdictional status.

3.1.4 DESIGNATED CRITICAL HABITAT

The site is not located within or adjacent to any USFWS-designated Critical Habitat. No further action is required.

3.1.5 HYDROLOGY AND HYDROLOGIC CONNECTIVITY

Hydrologically, the project site is located within an undefined Hydrologic Sub-Area (HSA 628.20), as identified on the Calwater Watershed maps. This undefined area comprises a 556,821-acre drainage area within the larger Upper Fremont Wash Hydrologic Area (Hydrologic Unit Code [HUC10] 1809020805) (CalTrans, 2023). The Upper Fremont Wash watershed in Victorville is bordered to the north by the Lower Fremont Wash watershed, to the east by the Bell Mountain Wash-Mojave River watershed, to the south by the Lytle Creek watershed, and to the west by the Sheep Creek-El Mirage Lake watershed. (Figure 3 in Appendix A).

3.1.6 SAN BERNARDINO COUNTY DEVELOPMENT CODE

§ 88.01.060 Desert Native Plant Protection.

This Section provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. The provisions are intended to augment and coordinate with the Desert Native Plants Act

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

(Food and Agricultural Code §§ 80001 *et seq.*) and the efforts of the State Department of Food and Agriculture to implement and enforce the Act.

(a) *Definitions.* Terms and phrases used within this Section shall be defined in Division 10 (Definitions) and/or defined by the California Food and Agricultural Code. The California Food and Agricultural Code definition, if one exists, shall prevail over a conflicting definition in this Development Code.

(b) *Applicability.* The provisions of this Section shall apply to desert native plants specified in Subdivision (c) (Regulated Desert Native Plants) that are growing on any of the following lands, unless exempt in compliance with § 88.01.030 (Exempt Activities):

(1) Privately owned or publicly owned land in the Desert Region.

(2) Privately owned or publicly owned land in any parts of the Mountain Region in which desert native plants naturally grow in a transitional habitat.

(c) *Regulated Desert Native Plants.* The following desert native plants or any part of them, except the fruit, shall not be removed except under a Tree or Plant Removal Permit in compliance with § 88.01.050 (Tree or Plant Removal Permits). In all cases the botanical names shall govern the interpretation of this Section.

(1) The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:

(A) *Dalea spinosa* (smoketree).

(B) All species of the genus *Prosopis* (mesquites).

(2) All species of the family Agavaceae (century plants, nolin, yuccas).

(3) Creosote Rings, ten feet or greater in diameter.

(4) All Western Joshua trees.

(5) Any part of any of the following species, whether living or dead:

(A) *Olneya tesota* (desert ironwood).

(B) All species of the genus *Prosopis* (mesquites).

(C) All species of the genus *Cercidium* (palos verdes).

(d) *Compliance with Desert Native Plants Act.* Removal actions of all plants protected or regulated by the Desert Native Plants Act (Food and Agricultural Code §§ 80001 *et seq.*) shall comply with the provisions of the Act before the issuance of a development permit or approval of a land use application.

3.1.7 WESTERN JOSHUA TREE CONSERVATION ACT

The Western Joshua Tree Conservation Act (WJTCA) was passed in July 2023 to conserve the western Joshua tree and its habitat while supporting the state's renewable energy and housing priorities. The

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

WJTCA creates a streamlined permitting framework for certain development activities and collects mitigation fees for the acquisition and conservation of western Joshua tree habitat and other actions to conserve western Joshua trees. This will offset the impacts of permitted projects that negatively impact western Joshua trees and help to conserve the species on a landscape scale.

Permitting

The WJTCA authorizes the CDFW to:

- Permit the trimming and removal of hazardous or dead western Joshua trees.
- Permit the incidental take of western Joshua trees provided the permittee meets certain conditions.
- Enter into an agreement with a county or city to delegate limited authority to issue the permits mentioned above, provided certain conditions are met.

Additionally, the WJTCA directs CDFW to develop a conservation plan for western Joshua tree by the end of 2024.

Summary of Mitigation Fees

Reduced Mitigation Fees (within blue area) [See Section 1927.3 (d)]:

- Trees 5 meters or greater in height - \$1000
- Trees 1 meter or greater but less than 5 meters in height - \$200
- Trees less than 1 meter in height - \$150

Mitigation Fees (anywhere in State, outside blue area) [See Section 1927.3 (e)]:

- Trees 5 meters or greater in height - \$2,500
- Trees 1 meter or greater but less than 5 meters in height - \$500
- Trees less than 1 meter in height - \$340

3.2 FIELD STUDY RESULTS

3.2.1 HABITAT

The habitat on-site consists of sparse Creosote bush - white bursage scrub (*Larrea tridentata* - *Ambrosia dumosa* Shrubland Alliance). The site did show signs of disturbance in the form of vehicle and pedestrian traffic. Table 1 in Appendix D contains a list of all plants found on-site. Surrounding land uses include undeveloped parcels and rural residential developments.

3.2.2 WILDLIFE

Species observed or otherwise detected on or in the vicinity of the project site during the surveys included; white-crowned sparrow (*Zonotrichia leucophrys*), cactus wren (*Campylorhynchus brunneicapillus*), and house finch (*Haemorrhous mexicanus*). Table 1 in Appendix D contains a list of all wildlife observed on-site.

3.2.3 SPECIAL STATUS SPECIES

No State and/or federally listed threatened or endangered species or other sensitive species were observed on-site during surveys.

Desert Tortoise

The habitat on site is minimally suitable for desert tortoise. However, no sign of desert tortoise (i.e. burrows, tracks, or pellets) was observed during the survey. Additionally, no desert tortoise individuals were observed.

Findings: Because the site is minimally suitable, it is recommended that pre-construction surveys be completed for this species. These surveys should be conducted by a qualified biologist and at an appropriate time of day/year to observe signs of desert tortoise.

Burrowing Owl

Based on the October 2023 field survey, the site does contain minimally suitable habitat for this species. No burrowing owls were observed during the site visit. No burrows of any kind were located within the Project site. No portion of the Project site showed any evidence of past or present BUOW activity. No feathers, whitewash, or castings were found and no suitable burrow surrogate species are present on-site.

Findings: Because the site is minimally suitable, it is recommended that pre-construction surveys be completed for this species. These surveys should be conducted by a qualified biologist and at an appropriate time of day/year using the appropriate survey protocols.

Desert Kit Fox

The site is not suitable for this species. However, this species was not observed during the survey. No burrows or suitable size or shape were observed, and no evidence of this species was observed either (scat, predation remains, tracks, etc.).

Findings: This species is considered absent from the project site and no further surveys are required.

American Badger

The site is not suitable for this species. This species was not observed during the survey. No burrows or suitable size or shape were observed, and no evidence of this species were observed either (scat, predation remains, tracks, etc.).

Findings: This species is considered absent from the project site and no further surveys are required.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Mohave Ground Squirrel

The site is minimally suitable for MGS. Although on the southern edge of the known range for this species, their documented occurrences within 5 miles of the site. However, no evidence (suitable burrows, tracks, etc.) was observed during the survey.

Findings: Because the site is minimally suitable, it is recommended that protocol surveys be completed for this species. These surveys should be conducted by a permitted biologist using the approved survey protocol for this species.

Western Joshua Tree

The following represents the completion of the western Joshua tree census completed in accordance with the Western Joshua Tree Conservation Act and the City of Victorville's Development Advisory dated July 19, 2023 (Appendix E).

There are currently 31 western Joshua trees (WJT) present on-site and 2 present within the 50-foot buffer around the site. The proposed Project is to develop the parcel within the native vegetation. The proposed Project is to sub-divide the 20-acre parcel into 61 single-family lots. Each single-family lot is proposed for development and the western Joshua trees will need to be removed. As such, any impacts to western Joshua trees will require an Incidental Take Permit (ITP) from the CDFW. Table 1 below provides the results of the WJT Census as required by the Western Joshua Tree Act. Figure 4 in Appendix A shows the location of each western Joshua tree found on-site.

Tree ID	Tree Latitude	Tree Longitude	Size Class	Height of Tree (meters)	Live or Dead?	Mature Tree (branched)?	Flowering or Fruiting Stage? (flowers, fruits, or none)	Impact to Tree (removal, trim, relocation, other, or none)	Activities be within 15 meters of tree?	Relocation Site
JT01	34.469834	-117.423878	B	4.98	D	Y	N/A	Remove	Y	N/A
JT02	34.469081	-117.423706	C	5.18	L	Y	None	Remove	Y	N/A
JT03	34.468666	-117.423855	C	5.49	L	Y	None	Remove	Y	N/A
JT04	34.468721	-117.423996	C	5.79	L	Y	None	Remove	Y	N/A

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Tree ID	Tree Latitude	Tree Longitude	Size Class	Height of Tree (meters)	Live or Dead?	Mature Tree (branched)?	Flowering or Fruiting Stage? (flowers, fruits, or none)	Impact to Tree (removal, trim, relocation, other, or none)	Activities be within 15 meters of tree?	Relocation Site
JT05	34.469034	-117.423968	C	6.10	D	Y	N/A	Remove	Y	N/A
JT06	34.468884	-117.424365	B	2.74	L	N	None	Remove	Y	N/A
JT07	34.46852	-117.424461	B	4.70	L	Y	None	Remove	Y	N/A
JT08	34.46843	-117.424532	C	5.18	L	Y	None	Remove	Y	N/A
JT09	34.46895	-117.425018	B	4.06	L	Y	None	Remove	Y	N/A
JT10	34.469131	-117.425380	C	5.79	L	Y	None	Remove	Y	N/A
JT11	34.469123	-117.425621	C	5.03	L	Y	None	Remove	Y	N/A
JT12	34.468292	-117.425563	B	3.66	L	Y	None	Remove	Y	N/A
JT13	34.467513	-117.425675	B	3.30	L	Y	None	Remove	Y	N/A
JT14	34.467262	-117.425682	B	4.95	L	Y	None	Remove	Y	N/A

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Tree ID	Tree Latitude	Tree Longitude	Size Class	Height of Tree (meters)	Live or Dead?	Mature Tree (branched)?	Flowering or Fruiting Stage? (flowers, fruits, or none)	Impact to Tree (removal, trim, relocation, other, or none)	Activities be within 15 meters of tree?	Relocation Site
JT15	34.467379	-117.425018	B	3.81	L	Y	None	Remove	Y	N/A
JT16	34.467379	-117.425018	B	2.13	D	Y	N/A	Remove	Y	N/A
JT17	34.467585	-117.425006	B	2.95	D	N	N/A	Remove	Y	N/A
JT18	34.4675	-117.42453	B	4.01	L	Y	None	Remove	Y	N/A
JT19	34.467477	-117.424116	B	4.93	L	Y	None	Remove	Y	N/A
JT20	34.467899	-117.424265	C	5.18	D	Y	N/A	Remove	Y	N/A
JT21	34.46719	-117.423878	C	5.61	D	Y	N/A	Remove	Y	N/A
JT22	34.466692	-117.423544	C	6.10	L	Y	None	Remove	Y	N/A
JT23	34.466925	-117.424115	B	3.66	L	Y	None	Remove	Y	N/A
JT24	34.466967	-117.424213	B	4.88	L	Y	None	Remove	Y	N/A

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Tree ID	Tree Latitude	Tree Longitude	Size Class	Height of Tree (meters)	Live or Dead?	Mature Tree (branched)?	Flowering or Fruiting Stage? (flowers, fruits, or none)	Impact to Tree (removal, trim, relocation, other, or none)	Activities be within 15 meters of tree?	Relocation Site
JT25	34.466804	-117.424283	B	4.88	L	Y	None	Remove	Y	N/A
JT26	34.467079	-117.42439	B	3.86	D	Y	N/A	Remove	Y	N/A
JT27	34.467129	-117.424477	B	4.78	L	Y	None	Remove	Y	N/A
JT28	34.467117	-117.424685	B	4.06	L	Y	None	Remove	Y	N/A
JT29	34.466874	-117.424650	B	4.11	L	Y	None	Remove	Y	N/A
JT30	34.466723	-117.424547	B	3.28	L	Y	None	Remove	Y	N/A
JT31	34.466636	-117.425424	C	5.18	L	Y	None	Remove	Y	N/A
JT32	34.466835	-117.425303	B	4.22	L	Y	None	Remove	Y	N/A
JT33	34.46713	-117.425088	C	5.18	L	Y	None	Remove	Y	N/A

3.2.4 NESTING BIRDS

The Project site and immediate surrounding area does contain habitat suitable for nesting birds. As such the Project is subject to the following nesting bird regulations. Recommendations for avoidance and minimization are in section 4.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918. This Act implements four international conservation treaties that the U.S. entered into with Canada in 1916, Mexico in 1936, Japan in 1972, and Russia in 1976. It is intended to ensure the sustainability of populations of all protected migratory bird species. The Act has been amended with the signing of each treaty, as well as when any of the treaties were amended, such as with Mexico in 1976 and Canada in 1995. The Act prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service.

California Fish and Game Code

The Project site is also subject to Sections 3503 and 3503.5 of the Fish and Game Code. Section 3503 states, "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". And Section 3503.5 states, "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".

3.2.5 JURISDICTIONAL WATERS

Waters of the United States and Waters of the State

The USACE has the authority to permit the discharge of dredged or fill material in Waters of the U.S. (WOUS) under Section 404 CWA. While the Regional Water Quality Board has authority over the discharge of dredged or fill material in Waters of the State under Section 401 CWA as well as the Porter-Cologne Water Quality Control Act. The Project area was surveyed with 100 percent visual coverage and no drainage features were present on site that met the definition for WOUS. As such, the subject parcel does not contain any wetlands, Waters of the U.S., or Waters of the State.

Fish and Game Code Section 1602 - State Lake and/or Streambed

The CDFW asserts jurisdiction over any drainage feature that contains a definable bed and bank or associated riparian vegetation. The Project area was surveyed with 100 percent visual coverage and no definable bed or bank features exist on the project site. As such, the subject parcel does not contain any areas under CDFW jurisdiction.

3.2.6 WETLANDS AND BLUE LINE STREAM

NWI maps did not identify portions within the Project site as a Riverine/Riparian system. Additionally, none of the requirements for wetland designation (hydric vegetation, hydric soils, and/or wetland hydrology) were present on site. As such, there are no wetlands currently present on site.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

3.2.7 NATIVE PLANT PROTECTION PLAN

The Proposed Project Site does not contain any other species (other than western Joshua tree) that are protected species under San Bernardino County Development Code § 88.01.060 and the California Desert Native Plant Act. Because protections for the western Joshua tree are covered under the western Joshua tree act, the Project is considered in compliance with the San Bernardino County Development Code and the Desert Native Plant Act.

SECTION 4.0 – CONCLUSIONS AND RECOMMENDATIONS

Based on the literature review and personal observations made in the immediate vicinity, no State and/or federally-listed threatened or endangered species are documented/or expected to occur within the Project site. Additionally, no plant species with the California Rare Plant Rank (CRPR) of 1 or 2 were observed on-site or documented to occur on-site in the relevant databases. No other sensitive species were observed within the project area or buffer area.

4.1 JURISDICTIONAL AREAS

There are no streams, channels, washes, or swales that meet the definitions of Section 1600 of the State of California Fish and Game Code (FGC) under the jurisdiction of the CDFW, Section 401 (“Waters of the State”) of the Clean Water Act (CWA) under the jurisdiction of the Regional Water Quality Control Board (RWQCB), or “Waters of the United States” (WoUS) as defined by Section 404 of the CWA under the jurisdiction of the U.S. Army Corps of Engineers (Corps) within the subject parcel. Therefore, no permit from any regulatory agency will be required.

4.2 SENSITIVE SPECIES

Desert tortoise

Although desert tortoise was absent from the site during the survey, there is minimally suitable habitat within the parcel. As such, it is recommended that pre-construction surveys be completed for this species prior to any ground-disturbing activities. These surveys should be conducted by a qualified biologist and at an appropriate time of day/year to observe signs of desert tortoise. Surveys should also be conducted using the current survey protocol from the USFWS.

Burrowing Owl

Preconstruction burrowing owl surveys shall be conducted no less than 14 days prior to the start of Project-related activities and within 24 hours prior to ground disturbance, in accordance with the *Staff Report on Burrowing Owl Mitigation* (2012 or most recent version). Preconstruction surveys should be performed by a qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the preconstruction surveys confirm occupied burrowing owl habitat, Project activities shall be immediately halted. The qualified biologist shall coordinate with CDFW and prepare a Burrowing Owl Plan that shall be submitted to CDFW and USFWS for review and approval prior to commencing Project activities.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Mohave ground squirrel

Because the site is minimally suitable, it is recommended that pre-construction surveys be completed for this species. These surveys should be conducted by a qualified biologist and at an appropriate time of day/year to observe signs of desert tortoise.

western Joshua tree

The proposed Project does propose impacts on western Joshua trees within the Project boundary. Therefore, an incidental take permit (ITP) will be required from the CDFW. The ITP will need to detail all impacts on the species and what alternative mitigation measures are proposed. Additionally, the ITP will require mitigation for the loss of individual trees.

4.3 NESTING BIRDS

Nesting Birds

Since there is some habitat within the Project site and adjacent area that is suitable for nesting birds in general, the following mitigation measure should be implemented.

Nesting bird nesting season generally extends from February 1 through September 15 in southern California and specifically, March 15 through August 31 for migratory passerine birds. To avoid impacts to nesting birds (common and special status) during the nesting season, a qualified Avian Biologist will conduct pre-construction Nesting Bird Surveys (NBS) prior to Project-related disturbance to nestable vegetation to identify any active nests. If no active nests are found, no further action will be required. If an active nest is found, the biologist will set appropriate no-work buffers around the nest which will be based upon the nesting species, its sensitivity to disturbance, nesting stage, and expected types, intensity, and duration of the disturbance. The nests and buffer zones shall be field-checked weekly by a qualified biological monitor. The approved no-work buffer zone shall be clearly marked in the field, within which no disturbance activity shall commence until the qualified biologist has determined the young birds have successfully fledged and the nest is inactive.

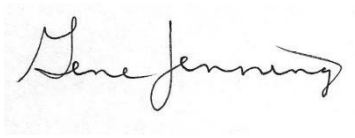
4.4 CERTIFICATION

I hereby certify that the statements furnished herein, and in the attached exhibits present data and information required for this analysis to the best of my ability, and the facts, statements, and information presented are true and correct to the best of my knowledge and belief. This report was prepared in accordance with professional requirements and standards. Fieldwork conducted for this assessment was performed by me. I certify that I have not signed a non-disclosure or consultant confidentiality agreement with the project proponent and that I have no financial interest in the project.

Please do not hesitate to contact me at 909-534-4547 should you have any questions or require further information.

Sincerely,

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

A handwritten signature in black ink that reads "Gene Jennings". The signature is written in a cursive style with a long, sweeping underline.

Gene Jennings
Principal/Regulatory Specialist

Appendices:

- Appendix A – Figures
- Appendix B – Site Photos
- Appendix C – Regulatory Framework
- Appendix D – Tables
- Appendix E – Development Advisory Dated July 19, 2023

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Section 5 – REFERENCES

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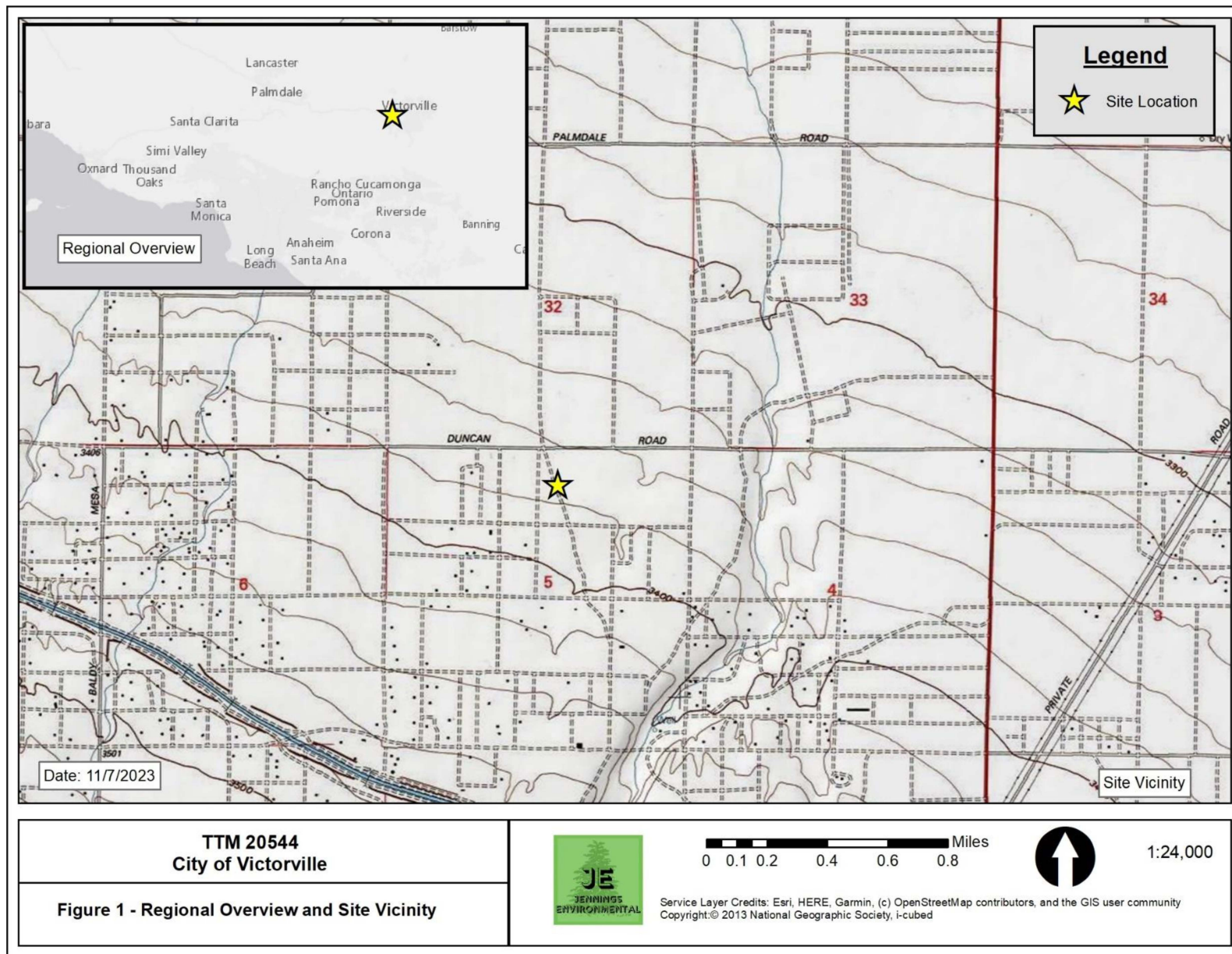
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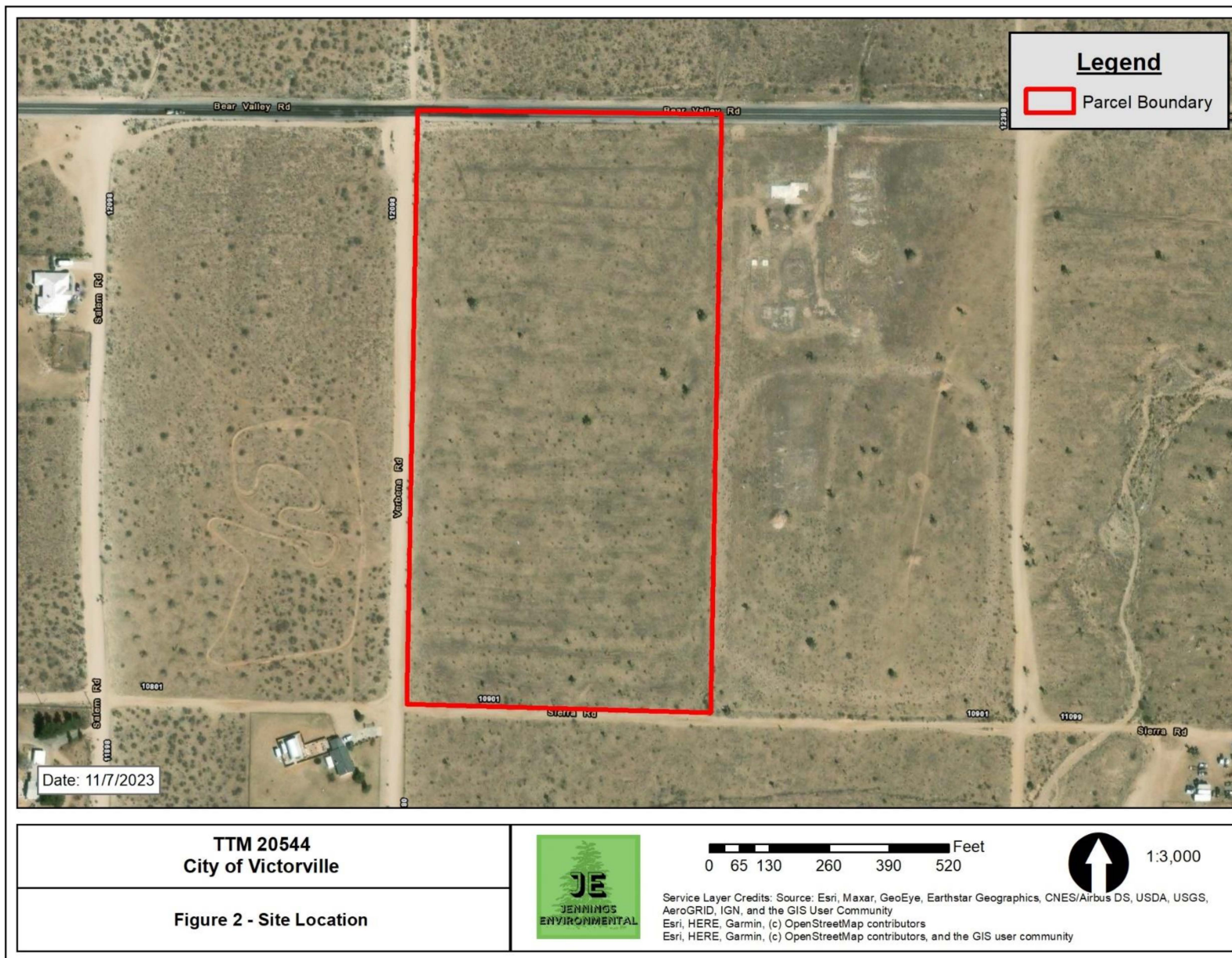
U.S. Department of Agriculture (USDA)

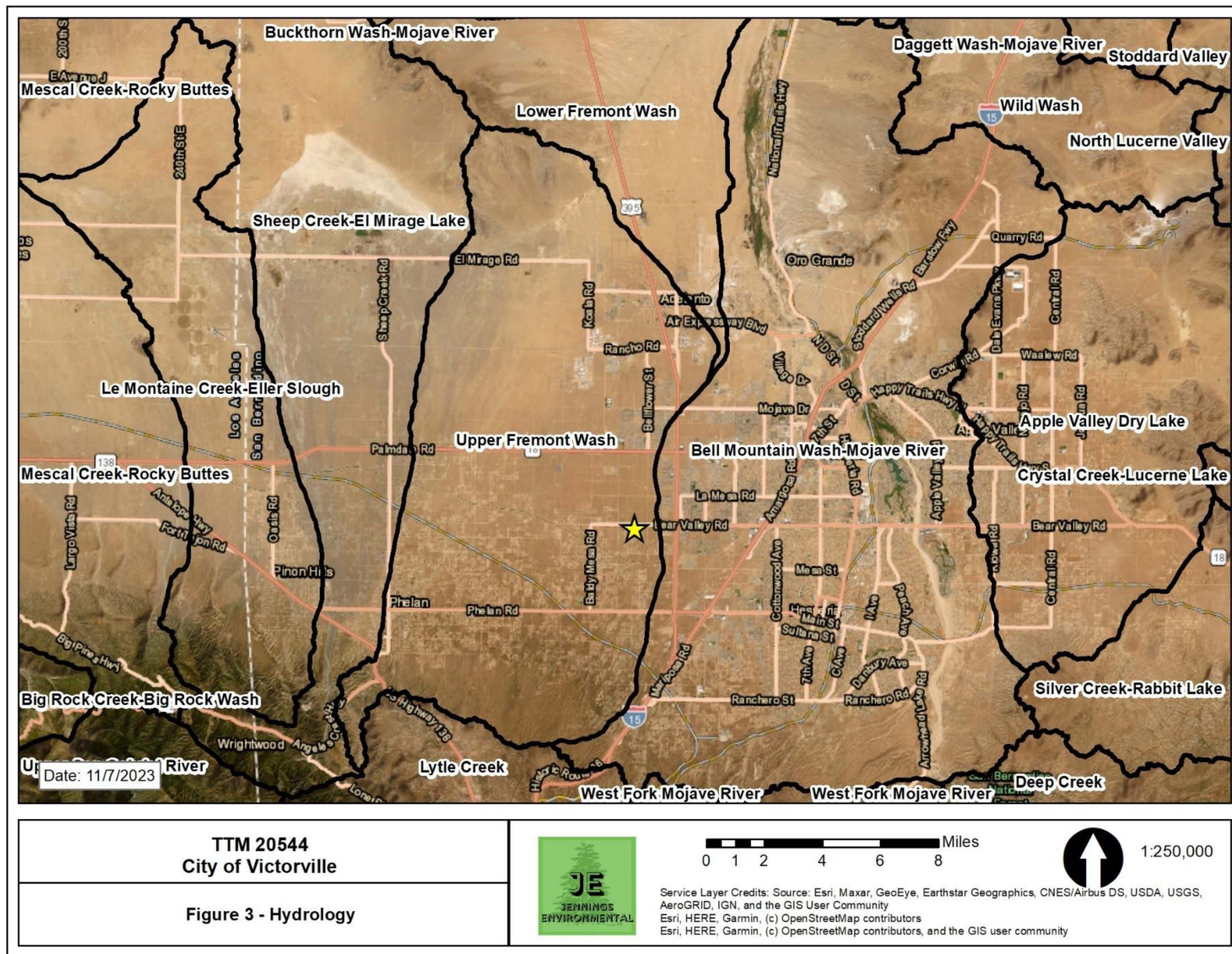
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Appendix A – Figures

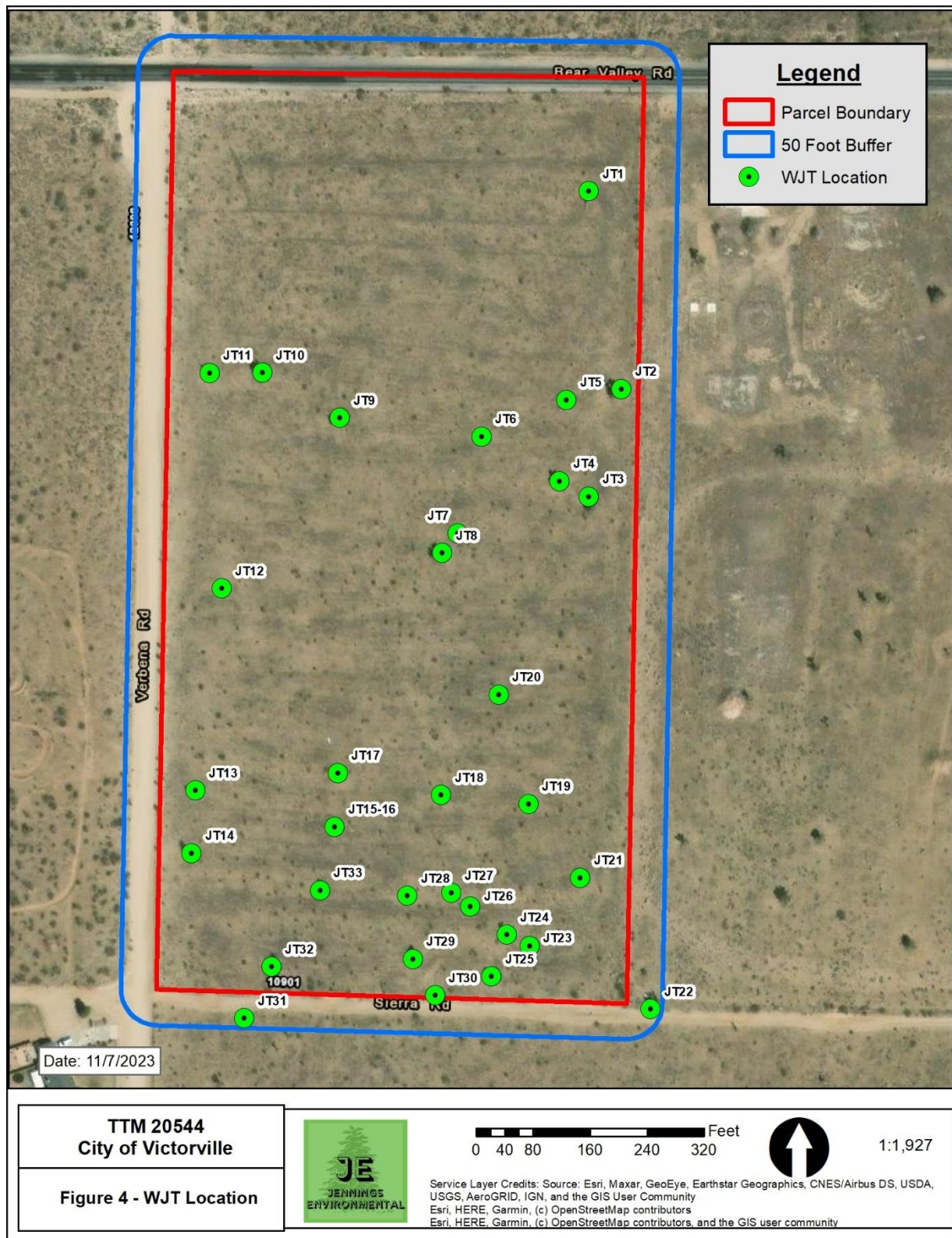
BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544









**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Appendix B – Photos

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

 <p>Photo 1 – Northwest corner of Project Site, facing east.</p>	
 <p>Photo 2 – Northwest corner of Project Site, facing south.</p>	

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

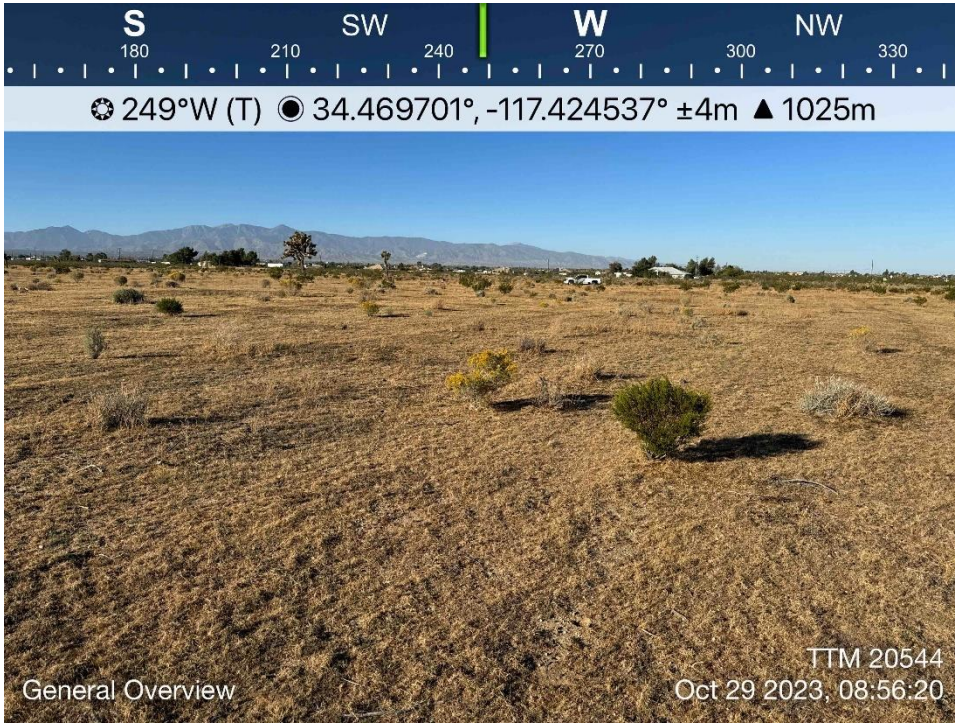
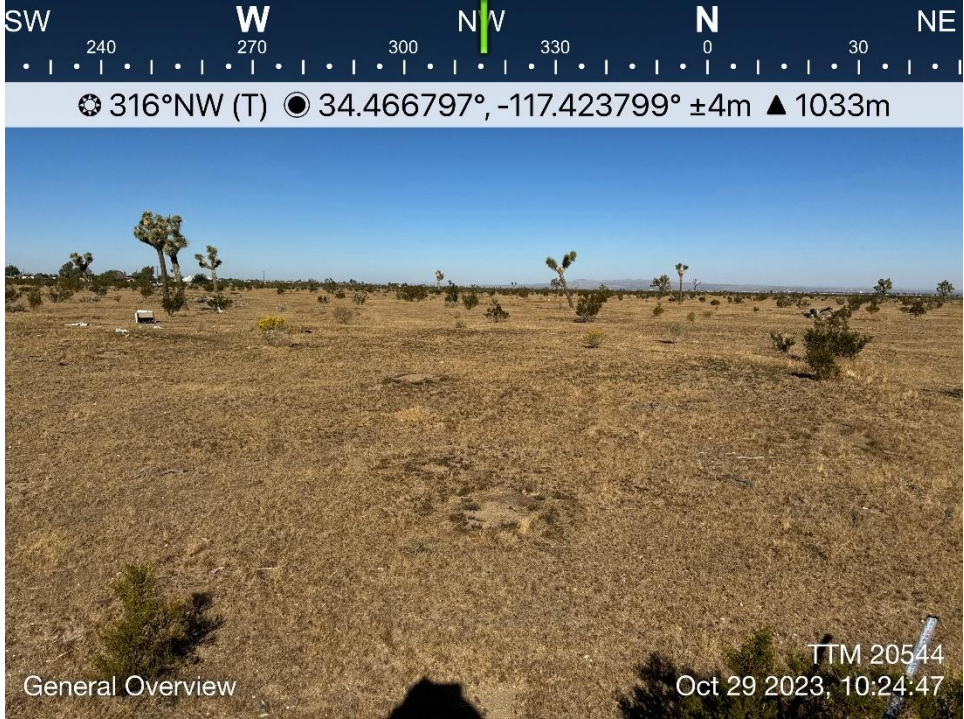



Photo 3 –
Northwest corner
of Project Site,
facing southwest.

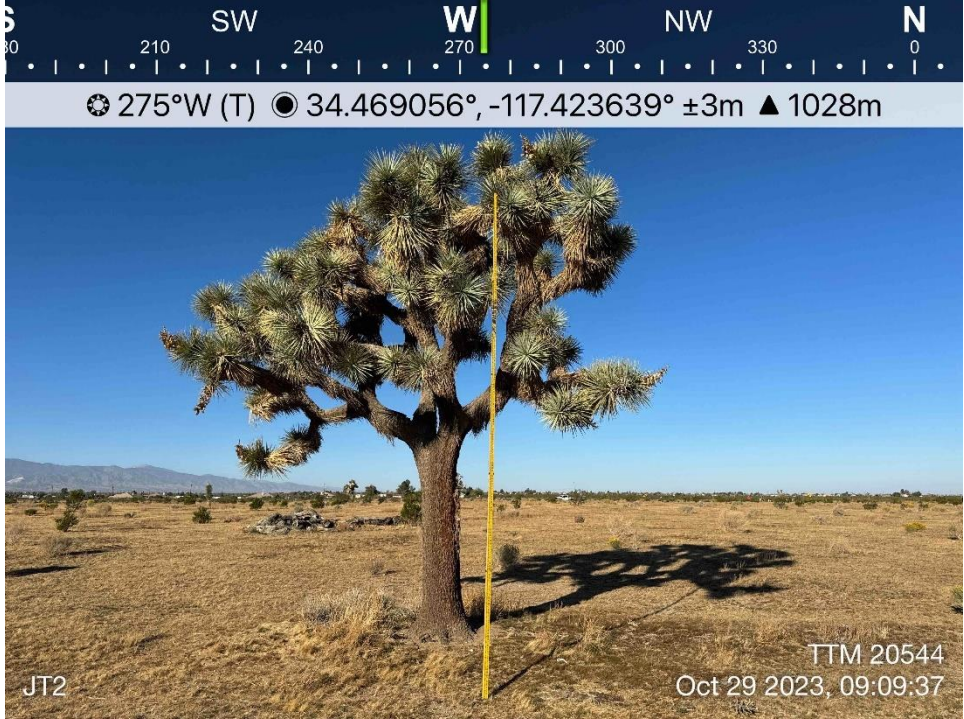
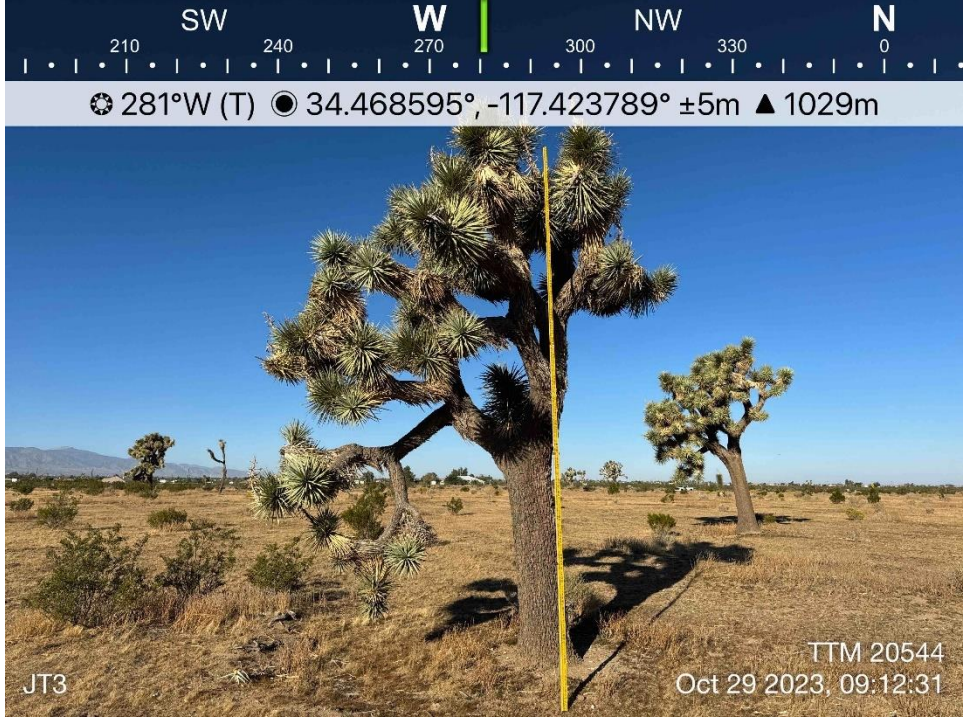


Photo 4 –
Southeast corner
of Project Site,
facing west.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

 <p>Photo 5 – Southeast corner of Project Site, facing northwest.</p>	
 <p>Photo 6 – western Joshua tree 1 (JT1).</p>	

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

 <p>Photo 7 – western Joshua tree 2 (JT2).</p>	
 <p>Photo 8 – western Joshua tree 3 (JT3).</p>	

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

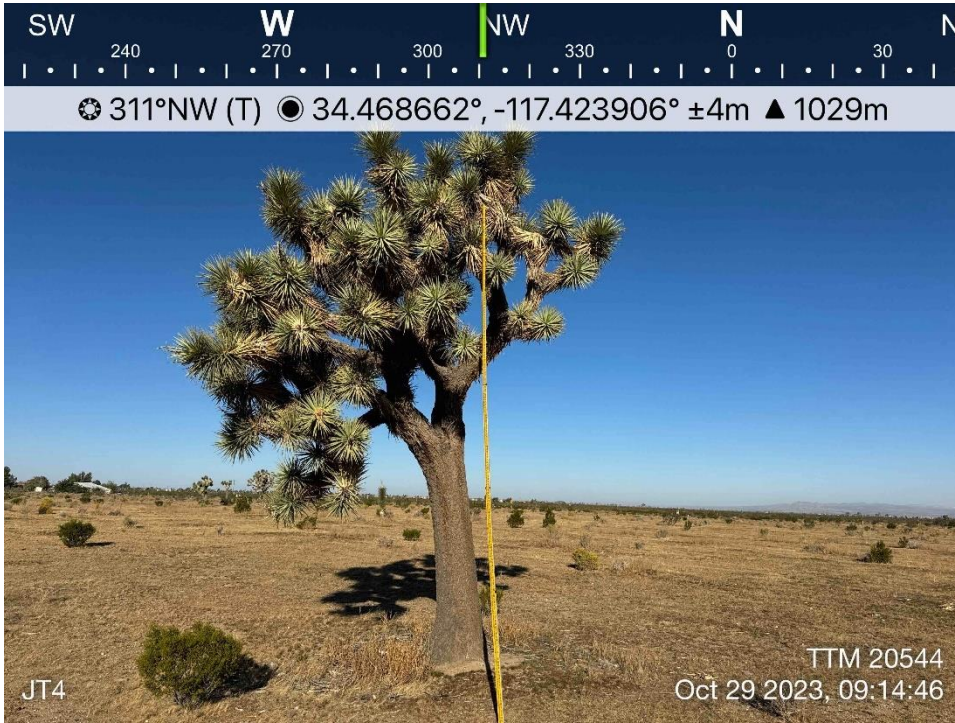


Photo 9 – western
Joshua tree 4
(JT4).

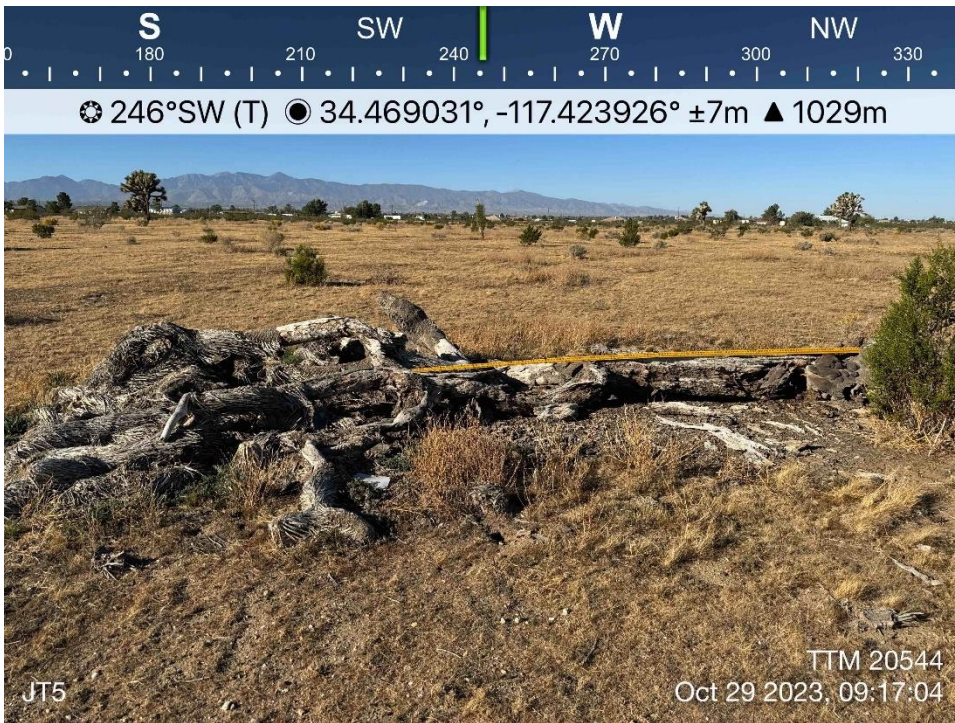


Photo 10 –
western Joshua
tree 5 (JT5).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

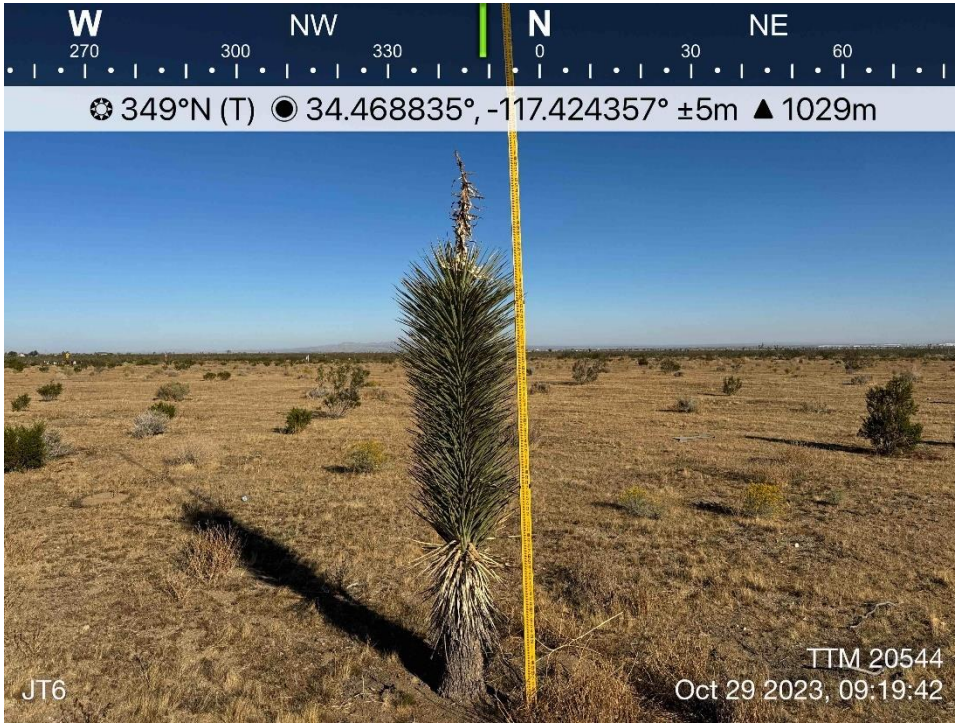


Photo 11 –
western Joshua
tree 6 (JT6).

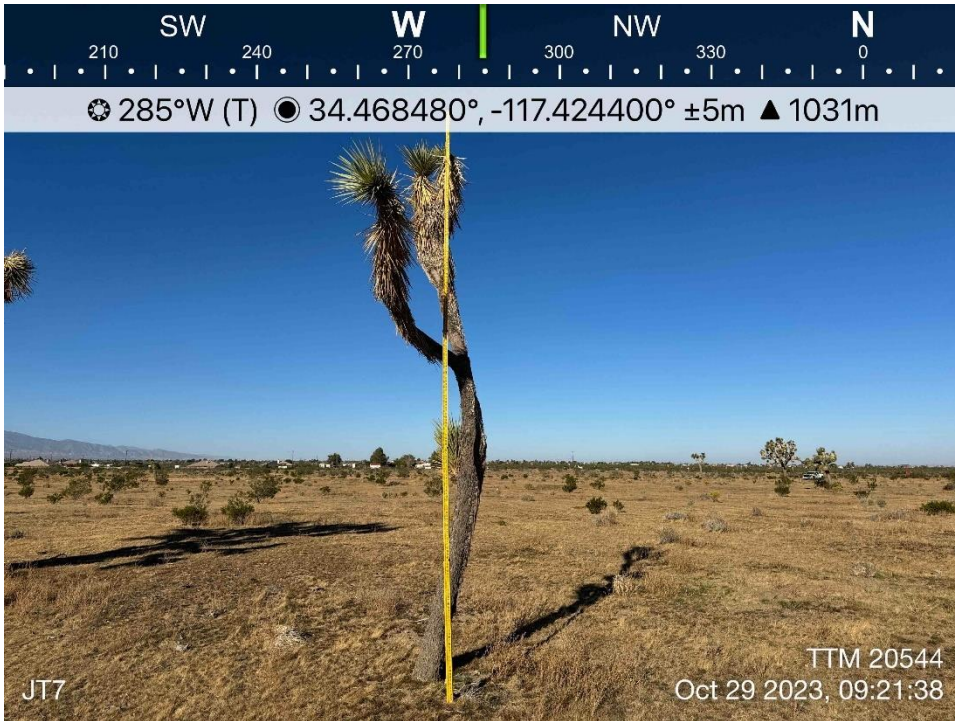


Photo 12 –
western Joshua
tree 7 (JT7).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

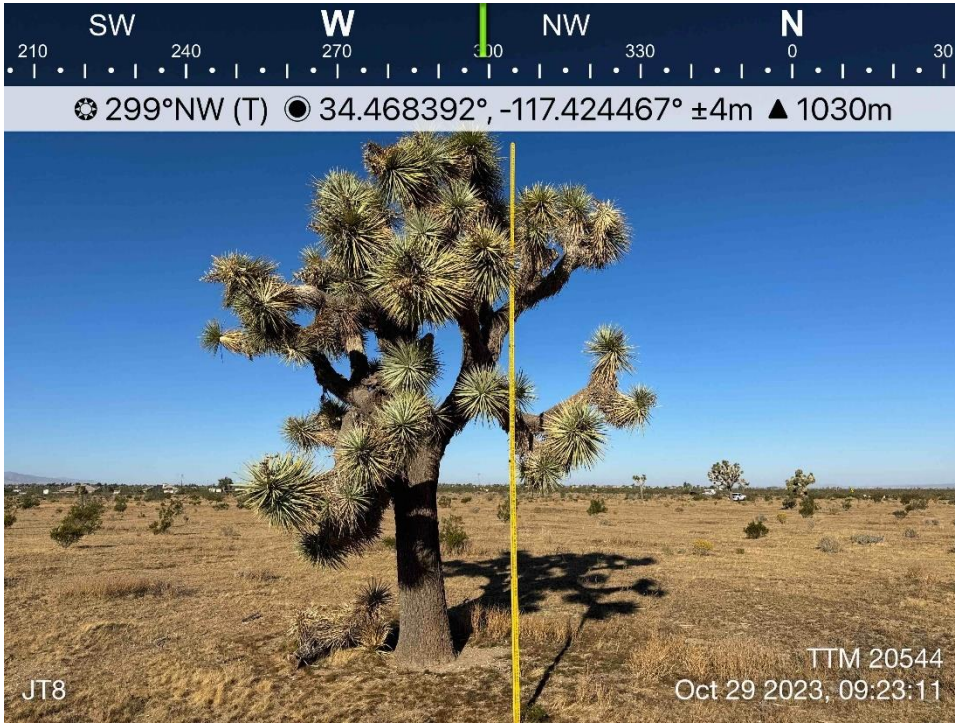


Photo 13 –
western Joshua
tree 8 (JT8).

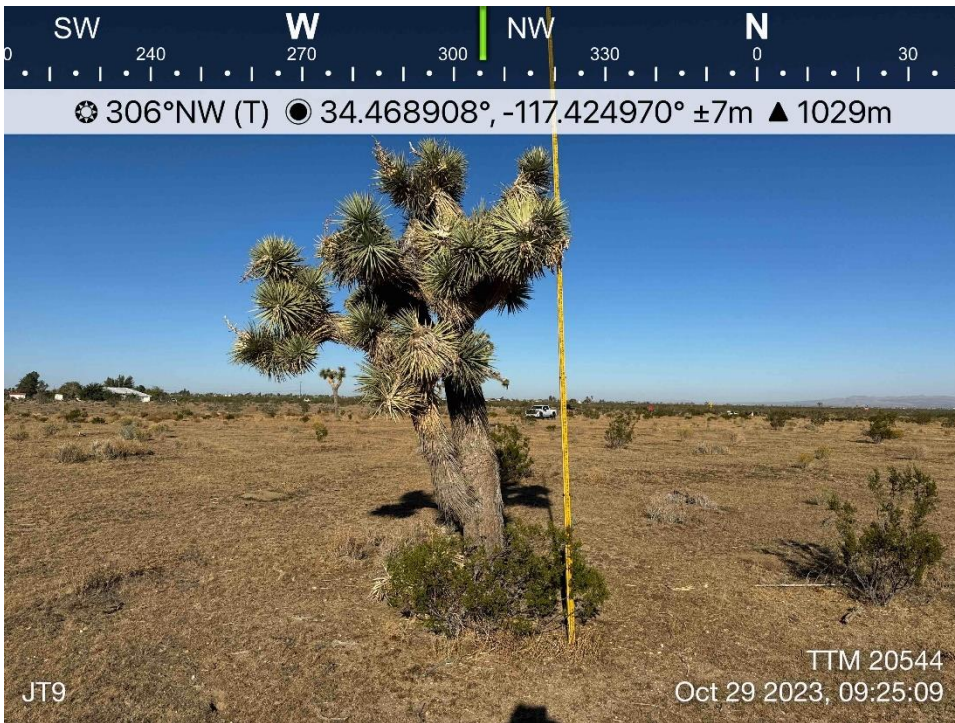


Photo 14 –
western Joshua
tree 9 (JT9).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

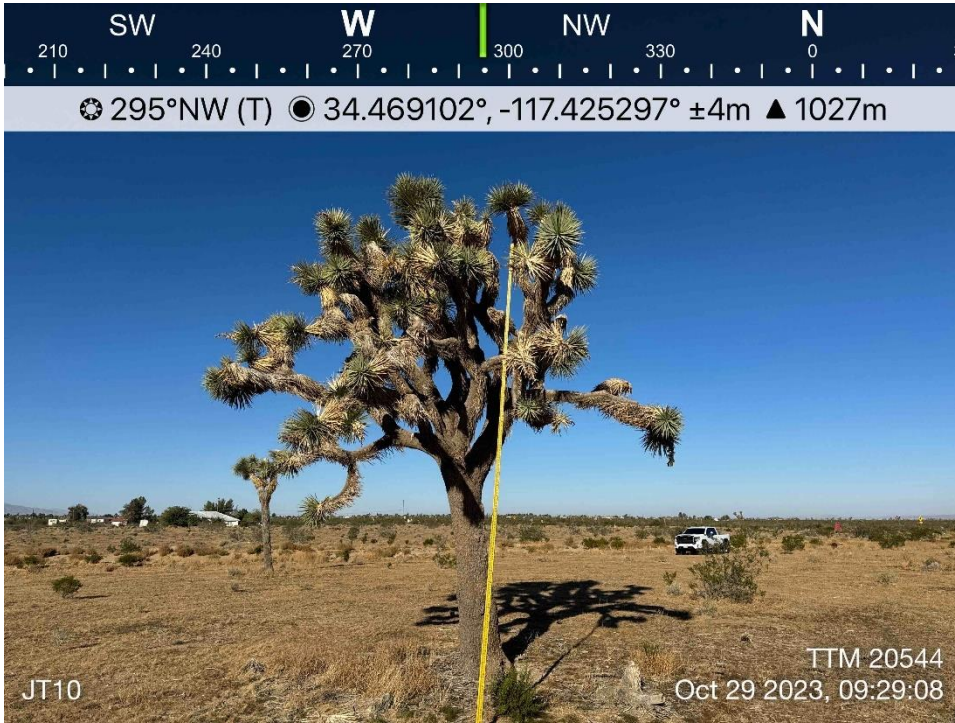


Photo 15 –
western Joshua
tree 10 (JT10).

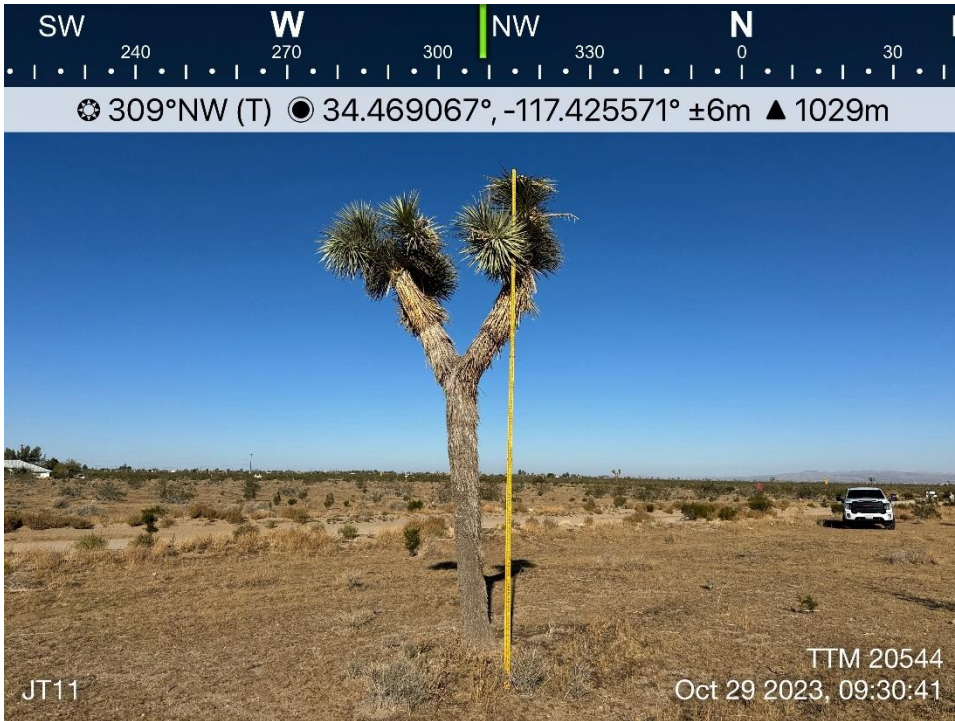


Photo 16 –
western Joshua
tree 11 (JT11).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

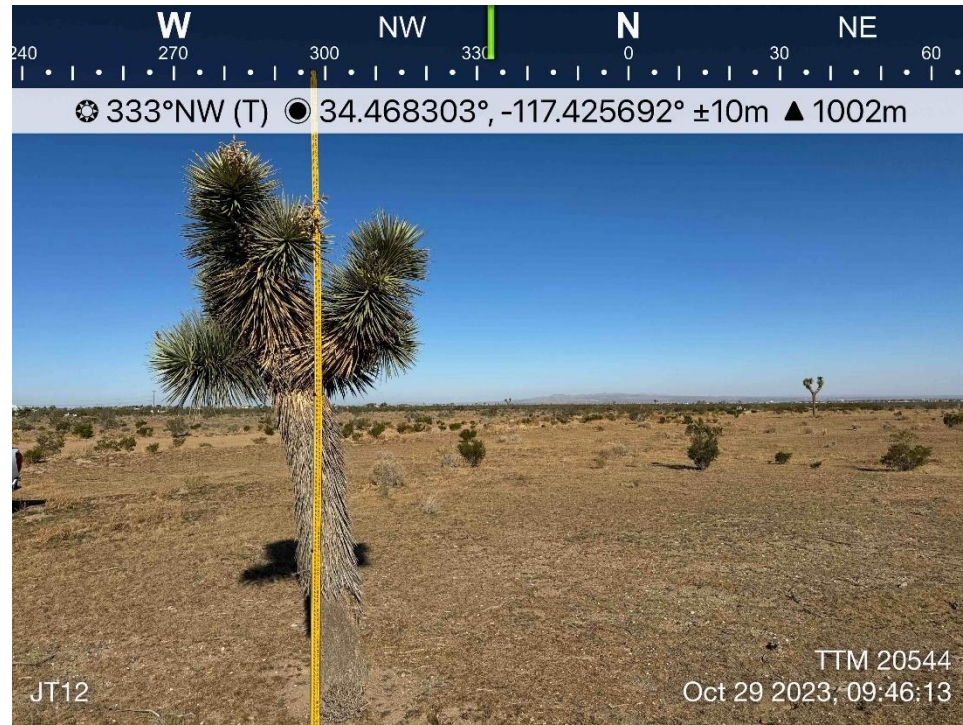


Photo 17 –
western Joshua
tree 12 (JT12).



Photo 18 –
western Joshua
tree 13 (JT13).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Photo 19 –
western Joshua
tree 14 (JT14).



Photo 20 –
western Joshua
tree 15-16 (JT15-
16).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Photo 21 –
western Joshua
tree 17 (JT17).

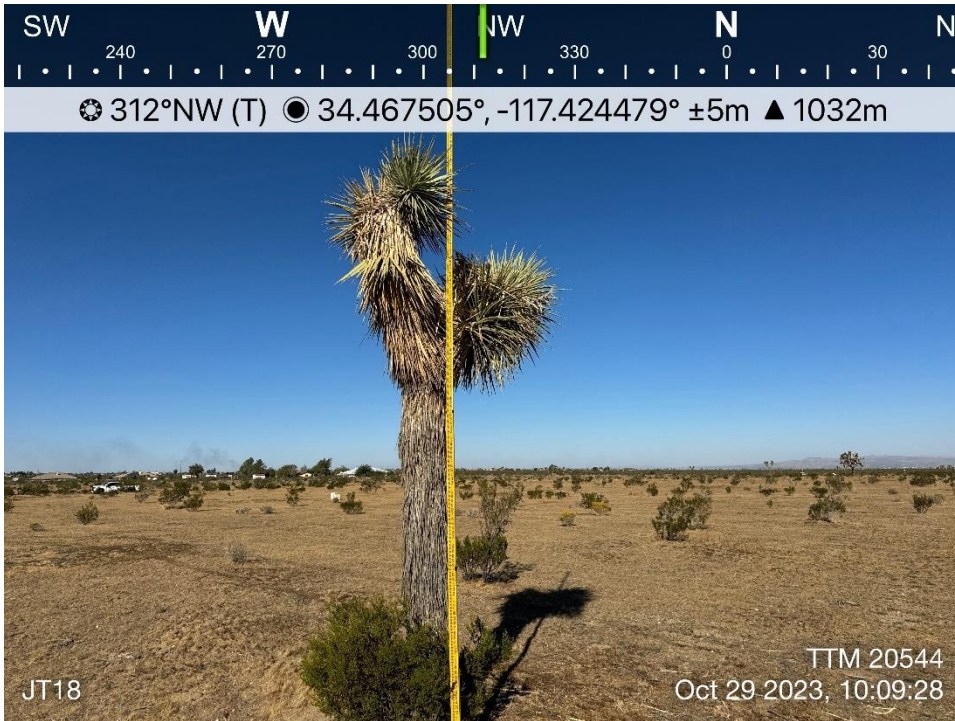


Photo 22 –
western Joshua
tree 18 (JT18).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

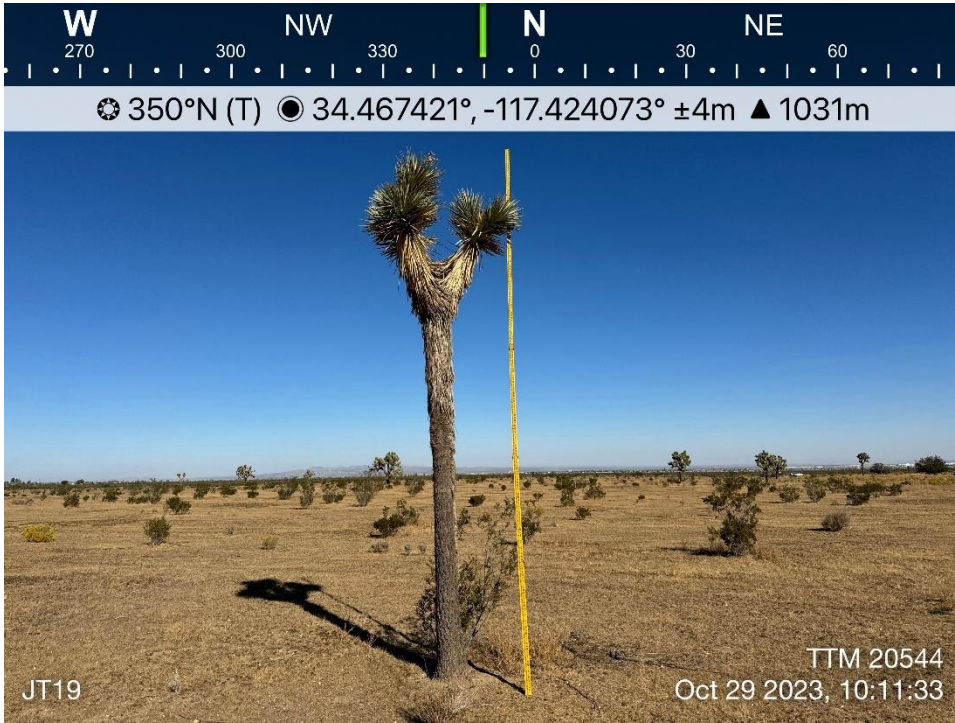


Photo 23 –
western Joshua
tree 19 (JT19).

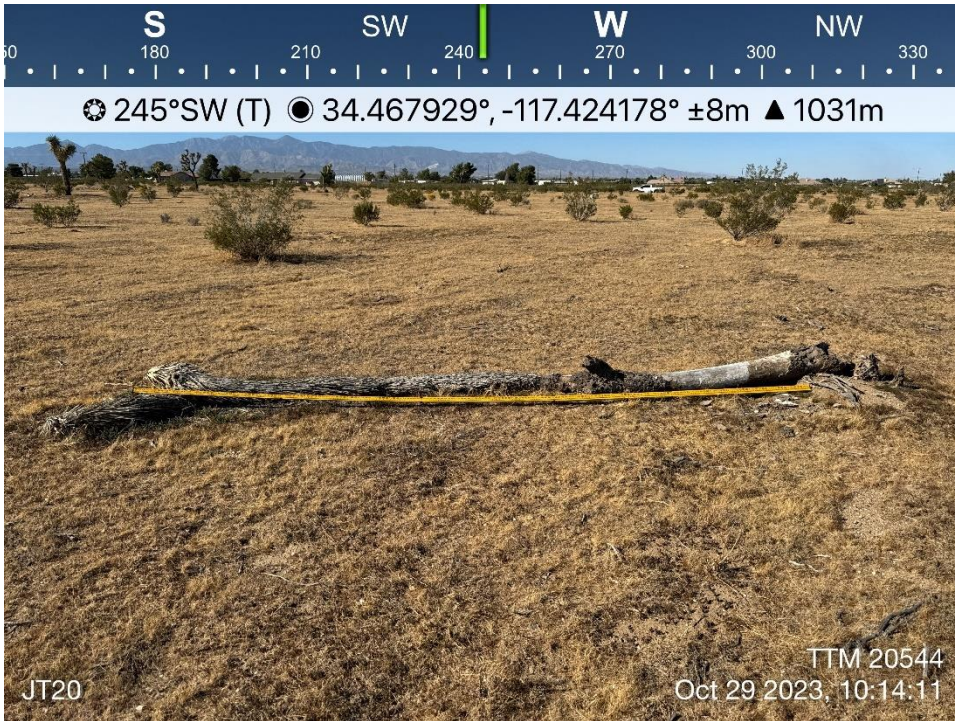


Photo 24 –
western Joshua
tree 20 (JT20).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Photo 25 –
western Joshua
tree 21 (JT21).

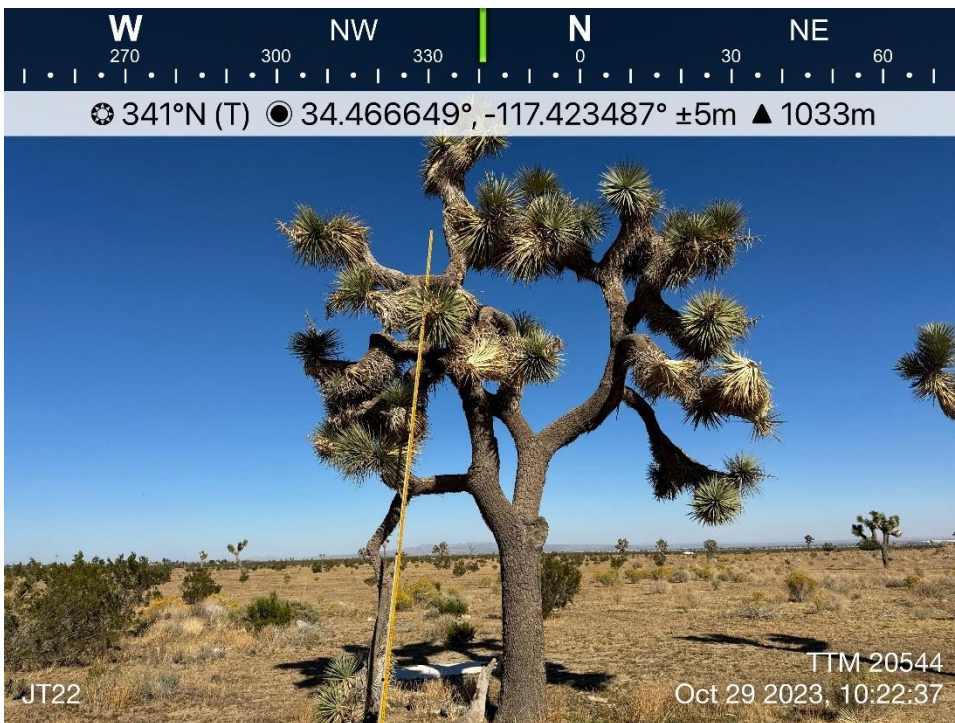


Photo 26 –
western Joshua
tree 22 (JT22).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

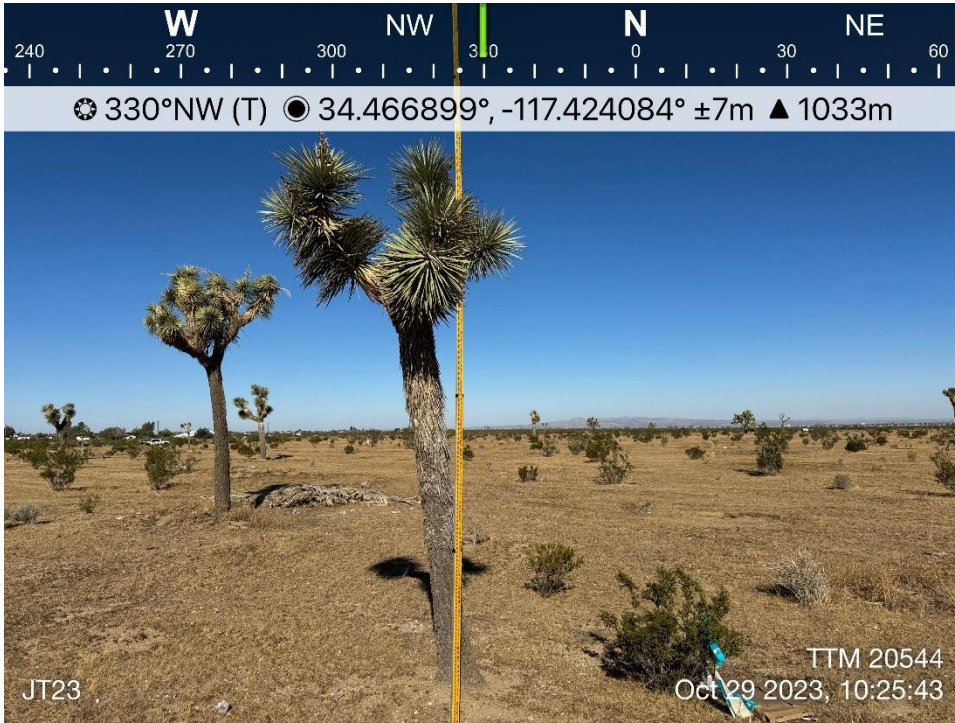


Photo 27 –
western Joshua
tree 23 (JT23).

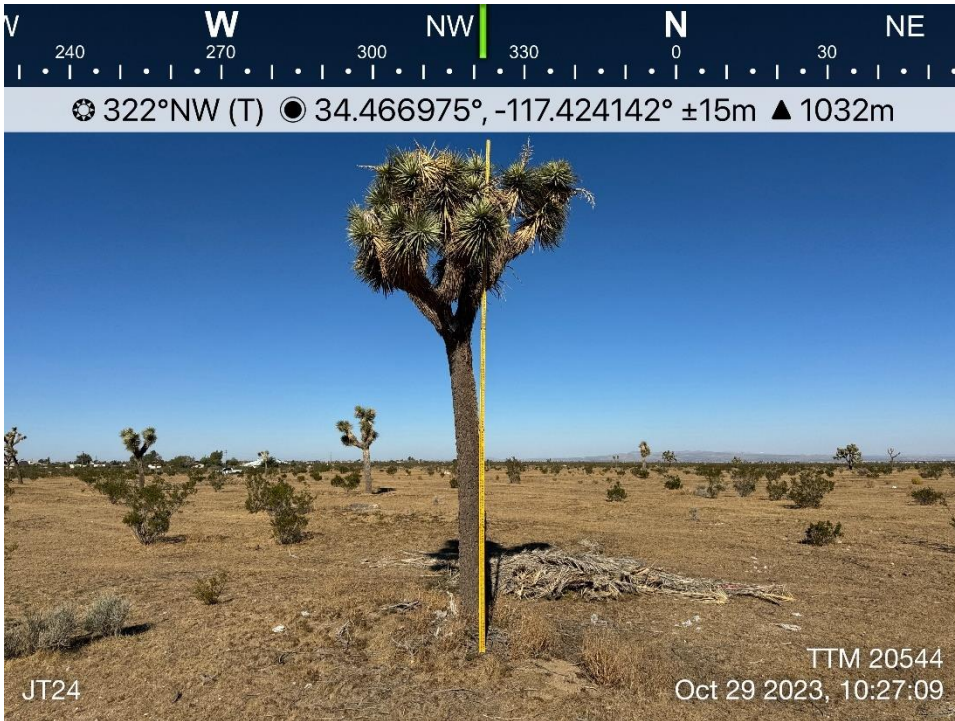


Photo 28 –
western Joshua
tree 24 (JT24).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

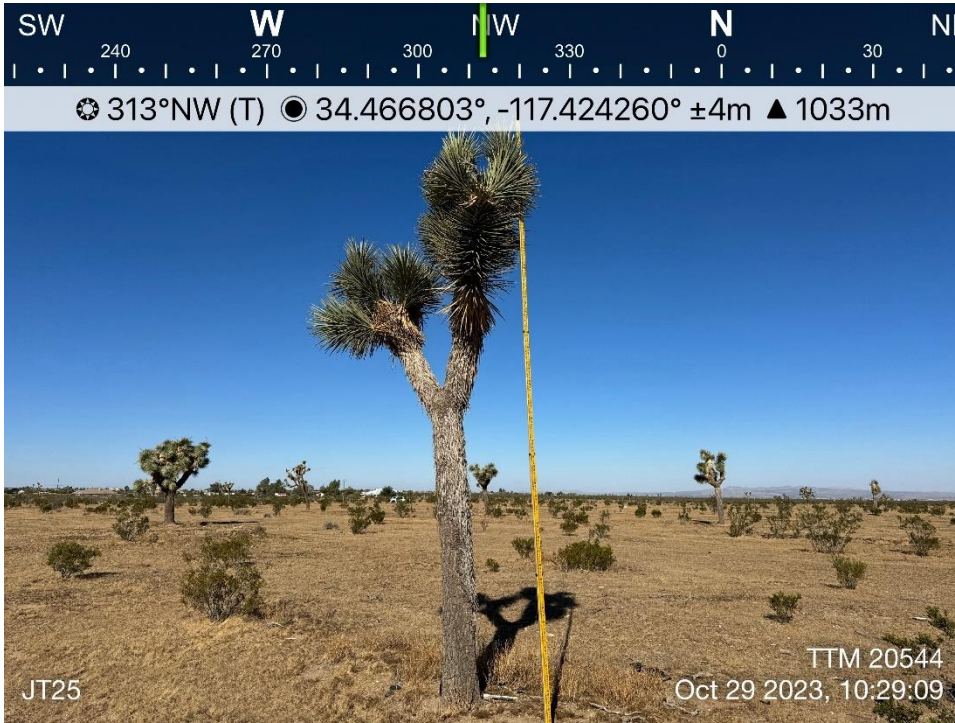


Photo 29 –
western Joshua
tree 25 (JT25).



Photo 30 –
western Joshua
tree 26 (JT26).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

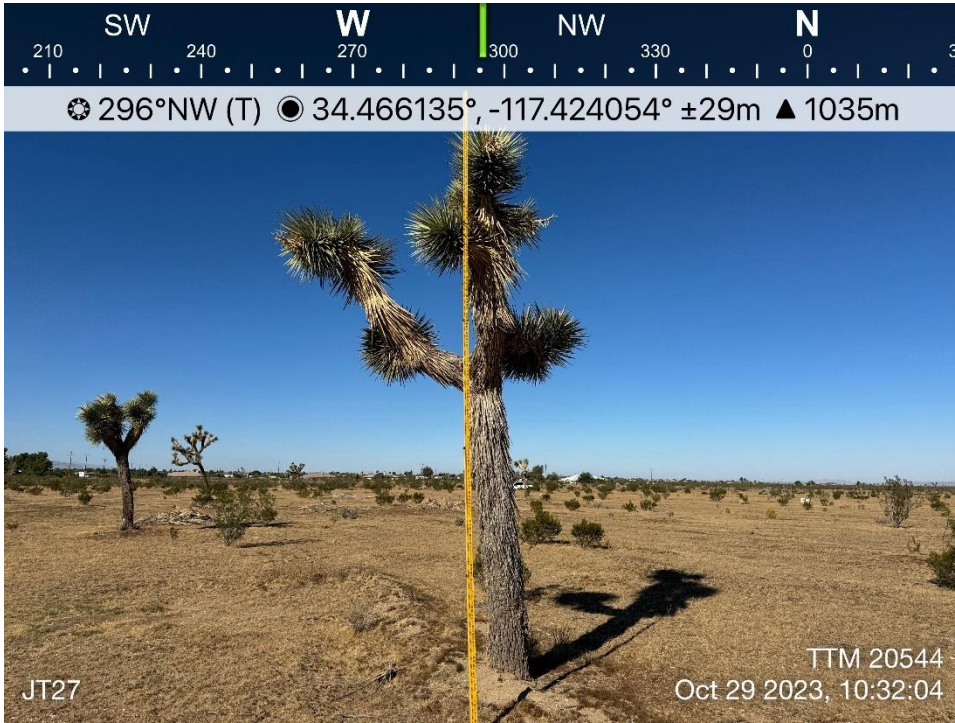


Photo 31 –
western Joshua
tree 27 (JT27).

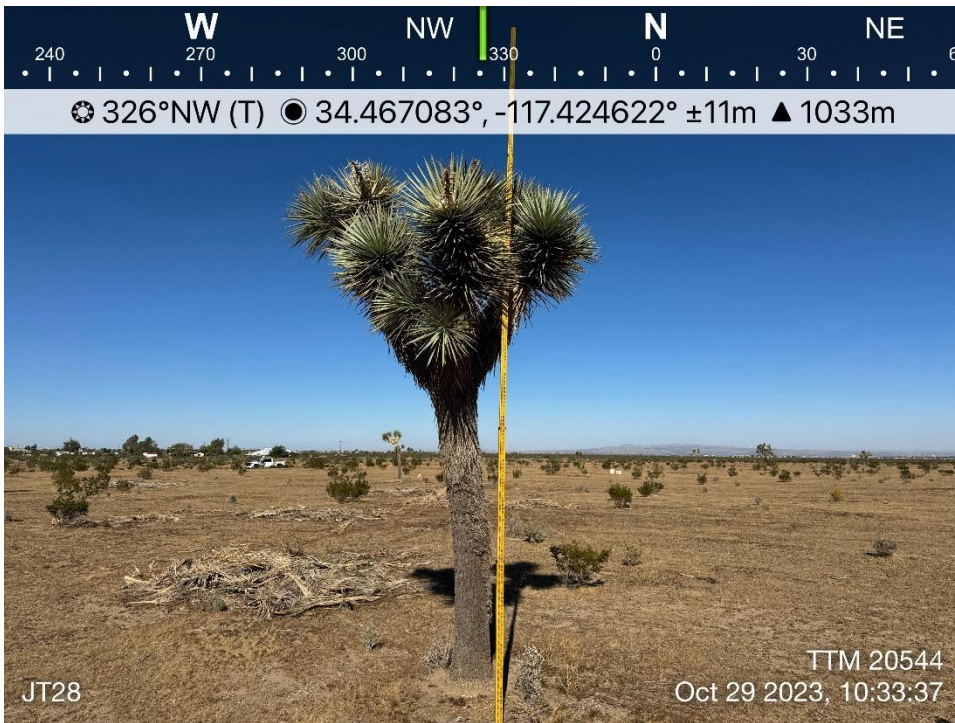
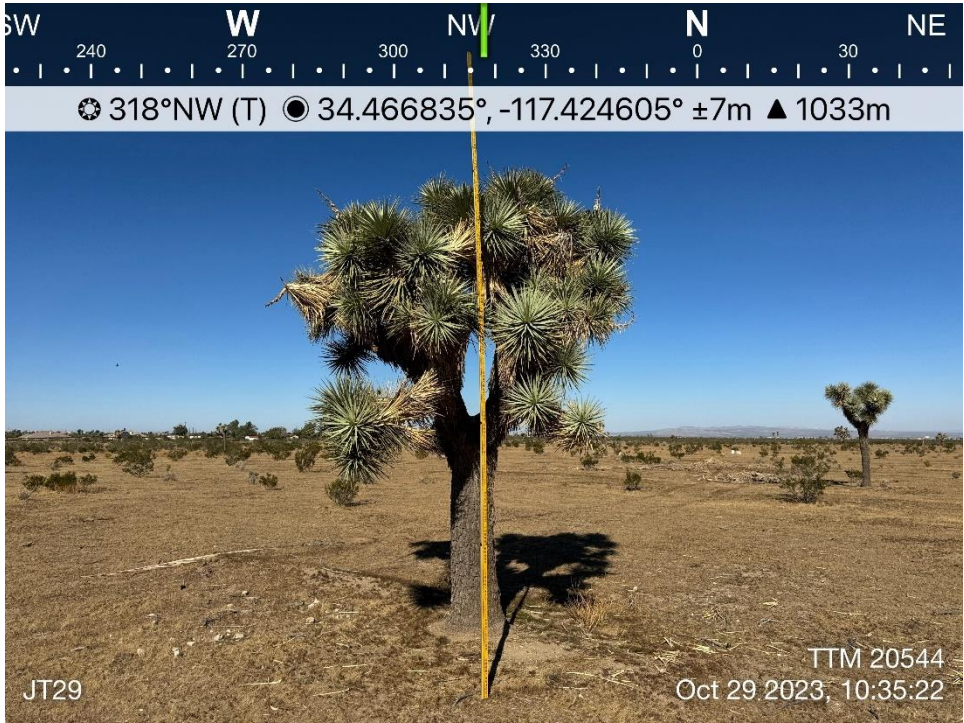
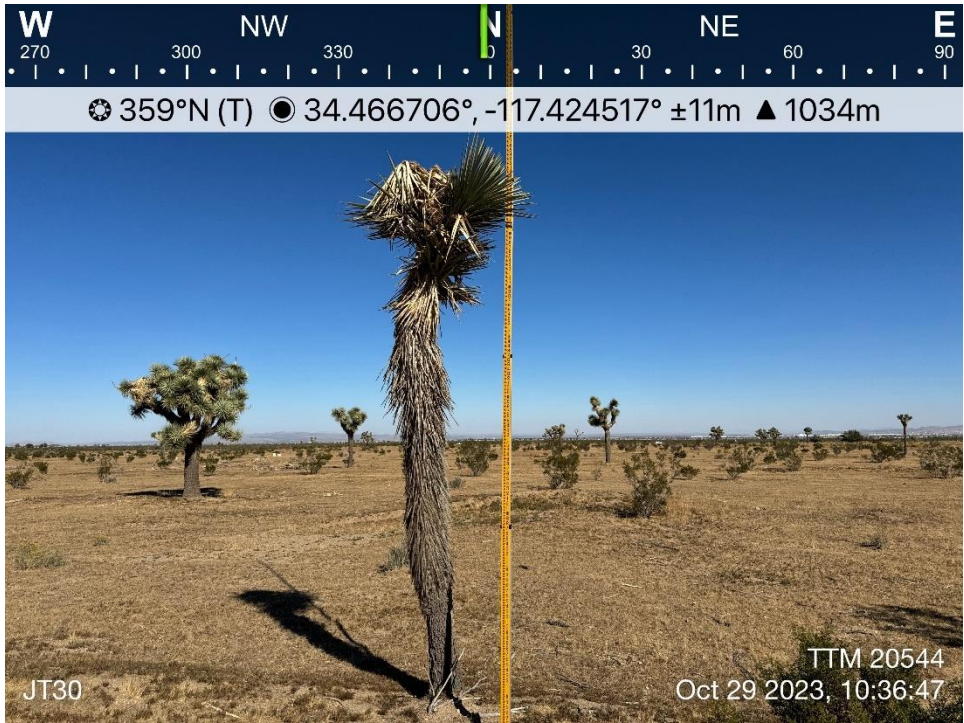


Photo 32 –
western Joshua
tree 28 (JT28).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

	<p>Photo 33 – western Joshua tree 29 (JT29).</p>
	<p>Photo 34 – western Joshua tree 30 (JT30).</p>

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Photo 35 –
western Joshua
tree 31 (JT31).

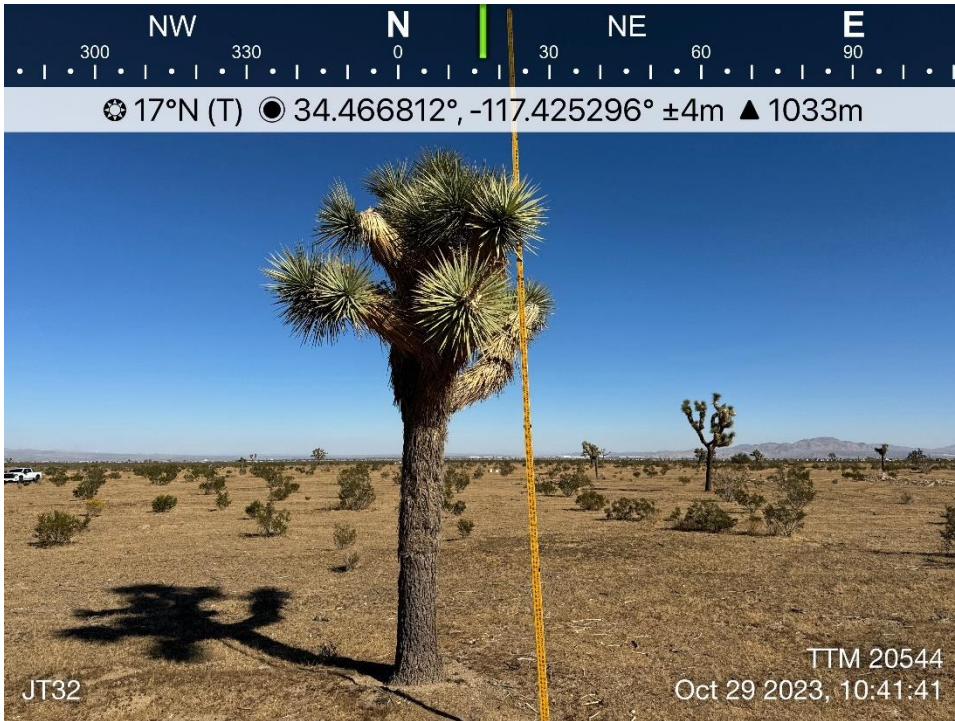
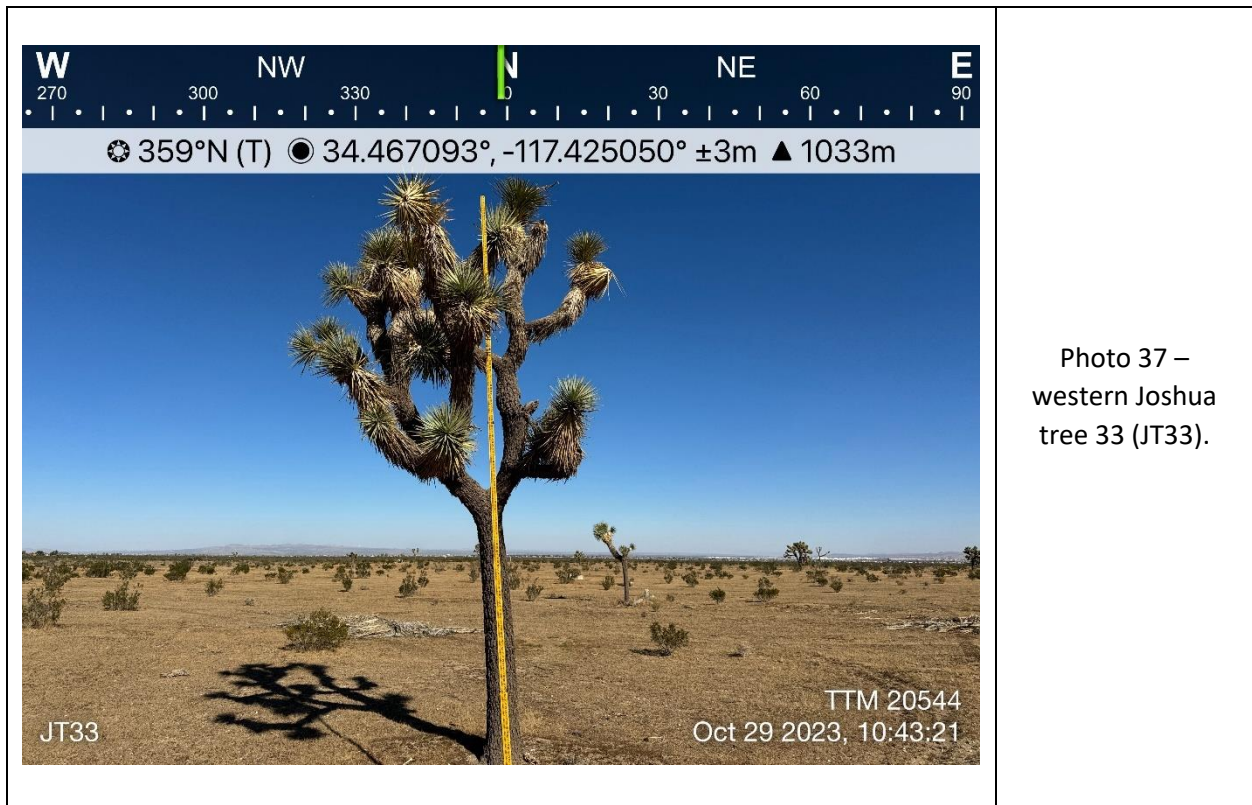


Photo 36 –
western Joshua
tree 32 (JT32).

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**



Appendix C – Regulatory Framework

1.1 FEDERAL JURISDICTION

1.1.1 United States Army Corps of Engineers

Activities within inland streams, wetlands, and riparian areas in California are regulated by agencies at the federal, state, and regional levels. At the federal level, the U.S. Army Corps of Engineers (USACE) Regulatory Program regulates activities within wetlands and waters of the US pursuant to Section 404 of the Federal Clean Water Act (CWA).

At the state level, the California Department of Fish and Wildlife (CDFW) regulates activities within the bed, bank, and associated habitat of a stream under the Fish and Game Code §§ 1600–1616. The California State Water Resources Board (SWRB) delegates authority at the regional level to Regional Water Quality Control Boards (RWQCB) that are responsible for regulating discharge into waters of the US under Section 401 of the federal CWA and waters of the State under the California Porter-Cologne Water Quality Act.

The CWA was implemented to maintain and restore the chemical, physical, and biological integrity of the Waters of the United States (33 Code of Federal Regulations [CFR] Part 328 Section 328.3). “Waters of the US” are defined as follows:

§ 328.3 Definitions.

For the purpose of this regulation these terms are defined as follows:

(a) *Waters of the United States* means:

(1) Waters which are:

- (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (ii) The territorial seas; or
- (iii) Interstate waters, including interstate wetlands;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section:

- (i) That are relatively permanent, standing or continuously flowing bodies of water; or
- (ii) That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section;

(4) Wetlands adjacent to the following waters:

- (i) Waters identified in paragraph (a)(1) of this section; or
- (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3)(i) of this section and with a continuous surface connection to those waters; or

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

- (iii) Waters identified in paragraph (a)(2) or (3) of this section when the wetlands either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section;
- (5) Intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (a)(1) through (4) of this section:
 - (i) That are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3)(i) of this section; or
 - (ii) That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section.
- (b) The following are not “waters of the United States” even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:
 - (1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;
 - (2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area’s status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;
 - (3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;
 - (4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;
 - (5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
 - (6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;
 - (7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and
 - (8) Swales and erosional features (*e.g.*, gullies, small washes) characterized by low volume, infrequent, or short duration flow.

(c) In this section, the following definitions apply:

(1) *Wetlands* means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically

adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

(2) *Adjacent* means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes, and the like are “adjacent wetlands.”

(3) *High tide line* means the line of intersection of the land with the water’s surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

(4) *Ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

(5) *Tidal waters* means those waters that rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by hydrologic, wind, or other effects.

(6) *Significantly affect* means a material influence on the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section. To determine whether waters, either alone or in combination with similarly situated waters in the region, have a material influence on the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section, the

functions identified in paragraph (c)(6)(i) of this section will be assessed and the factors identified in paragraph (c)(6)(ii) of this section will be considered:

(i) Functions to be assessed:

- (A) Contribution of flow;
- (B) Trapping, transformation, filtering, and transport of materials (including nutrients, sediment, and other pollutants);
- (C) Retention and attenuation of floodwaters and runoff;
- (D) Modulation of temperature in waters identified in paragraph (a)(1) of this section; or
- (E) Provision of habitat and food resources for aquatic species located in waters identified in paragraph (a)(1) of this section;

(ii) Factors to be considered:

- (A) The distance from a water identified in paragraph (a)(1) of this section;
- (B) Hydrologic factors, such as the frequency, duration, magnitude, timing, and rate of hydrologic connections, including shallow subsurface flow;
- (C) The size, density, or number of waters that have been determined to be similarly situated;
- (D) Landscape position and geomorphology; an
- (E) Climatological variables such as temperature, rainfall, and snowpack.

1.2 STATE JURISDICTION

The State of California (State) regulates discharge of material into waters of the State pursuant to Section 401 of the CWA as well as the California Porter-Cologne Water Quality Control Act (Porter-Cologne; California Water Code, Division 7, §13000 et seq.). Waters of the State are defined by Porter-Cologne as “any surface water or groundwater, including saline waters, within the boundaries of the state” (Water Code Section 13050(e)). Waters of the State broadly includes all waters within the State’s boundaries (public or private), including waters in both natural and artificial channels.

1.2.1 Regional Water Quality Control Board

Under Porter-Cologne, the State Water Resources Control Board (SWRCB) and the local Regional Water Quality Control Boards (RWQCB) regulate the discharge of waste into waters of the State. Discharges of waste include “fill, any material resulting from human activity, or any other ‘discharge’ that may directly or indirectly impact ‘waters of the state.’” Porter-Cologne reserves

the right for the State to regulate activities that could affect the quantity and/or quality of surface and/or groundwaters, including isolated wetlands, within the State. Wetlands were defined as waters of the State if they demonstrated both wetland hydrology and hydric soils. Waters of the State determined to be jurisdictional for these purposes require, if impacted, waste discharge requirements (WDRs).

When an activity results in fill or discharge directly below the OHWM of jurisdictional waters of the United States (federal jurisdiction), including wetlands, a CWA Section 401 Water Quality Certification is required. If a proposed project is not subject to CWA Section 401 certification but involves activities that may result in a discharge to waters of the State, the project may still be regulated under Porter-Cologne and may be subject to waste discharge requirements. In cases where waters apply to both CWA and Porter-Cologne, RWQCB may consolidate permitting requirements to one permit.

1.2.2 California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1602 of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a “stream” (including creeks and rivers) as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation” (California Code of Regulations, Title 14, Section 1.72). The jurisdiction of CDFW may include areas in or near intermittent streams, ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams that are indicated on USGS maps, watercourses that may contain subsurface flows, or within the flood plain of a water body. CDFW’s definition of “lake” includes “natural lakes or man-made reservoirs.” CDFW limits of jurisdiction typically include the maximum extents of the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

In a CDFW guidance of stream processes and forms in dryland watersheds (Vyverberg 2010), streams are identified as having one or more channels that may all be active or receive water only during some high flow event. Subordinate features, such as low flow channels, active channels, banks associated with secondary channels, floodplains, and stream-associated vegetation, may occur within the bounds of a single, larger channel. The water course is defined by the topography or elevations of land that confine a stream to a definite course when its waters rise to their highest level. A watercourse is defined as a stream with boundaries defined by the maximal extent or expression on the landscape even though flow may otherwise be intermittent or ephemeral.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Artificial waterways such as ditches (including roadside ditches), canals, aqueducts, irrigation ditches, and other artificially created water conveyance systems also may be under the jurisdiction of CDFW. CDFW may claim jurisdiction over these features based on the presence of habitat characteristics suitable to support aquatic life, riparian vegetation, and/or stream-dependent terrestrial wildlife. As with natural waterways, the limit of CDFW jurisdiction of artificial waterways includes the uppermost bank-to-bank distance and/or the outermost extent of riparian vegetation dripline, whichever measurement is greater.

CDFW does not have jurisdiction over wetlands but has jurisdiction to protect against a net loss of wetlands. CDFW supports the wetland criteria recognized by USFWS; one or more indicators of wetland conditions must exist for wetlands conditions to be considered present. The following is the USFWS accepted definition of a wetland:

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports hydrophytes, (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al. 1979).

In A Clarification of the U.S. Fish and Wildlife Service's Wetland Definition (Tiner 1989), the USFWS definition was further clarified "that in order for any area to be classified as wetland by the Service, the area must be periodically saturated or covered by shallow water, whether wetland vegetation and/or hydric soils are present or not; this hydrologic requirement is addressed in the first sentence of the definition." When considering whether an action would result in a net loss of wetlands, CDFW will extend jurisdiction to USFWS-defined wetland conditions where such conditions exist within the riparian vegetation that is associated with a stream or lake and does not depend on whether those features meet the three-parameter USACE methodology of wetland determination. If impacts to wetlands under the jurisdiction of CDFW are unavoidable, a mitigation plan will be implemented in coordination with CDFW to support the CDFW policy of "no net loss" of wetland habitat.

Appendix D – Tables

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT
PROTECTION PLAN FOR TTM 20544**

Table 1. Species Observed On-Site

Common Name	Scientific Name
<u>Plants</u>	
Common fiddleneck	<i>Amsinckia intermedia</i>
Western Joshua tree	<i>Yucca brevifolia</i>
Creosote bush	<i>Larrea tridentata</i>
White bursage	<i>Ambrosia dumosa</i>
Schismus grass	<i>Shicmus spp.</i>
Common Stork's bill	<i>Ambrosia dumosa</i>
California buckwheat	<i>Eriogonum fasciculatum</i>
Rubber rabbitbush	<i>Ericameria nauseosa</i>
Flat spine burr-ragweed	<i>Ambrosia acanthicarpa</i>
<u>Birds</u>	
White-crown sparrow	<i>Zonotrichia leucophrys</i>
Cactus wren	<i>Campylorhynchus brunneicapillus</i>
House finch	<i>Haemorhous mexicanus</i>
Common raven	<i>Corvus corax</i>
Verdin	<i>Auriparus flaviceps</i>

Table 2 – CNDDDB Potential to Occur for the *Baldt Mesa, Hesperia, Victorville, and Adelanto* Quadrangles

<u>Scientific Name</u>	<u>Common Name</u>	<u>Federal/State Status</u>	<u>Other Status</u>	<u>Habitat</u>	<u>Potential to Occur</u>
Accipiter cooperii	Cooper's hawk	None, None	G5, S4, CDFW-WL	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Agelaius tricolor	tricolored blackbird	None, Threatened	G1G2, S2, CDFW-SSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Anaxyrus californicus	arroyo toad	Endangered, None	G2G3, S2, CDFW-SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Antrozous pallidus	pallid bat	None, None	G4, S3, CDFW-SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

Aquila chrysaetos	golden eagle	None, None	G5, S3, CDFW-SSC	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Asio otus	long-eared owl	None, None	G5, S3?, CDFW-FP	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses. Require adjacent open land, productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Athene cunicularia	burrowing owl	None, None	G4, S2, CDFW-SSC	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Minimally suitable habitat exists on-site for this species. As such pre-construction surveys are recommended.
Buteo swainsoni	Swainson's hawk	None, Threatened	G5, S4	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Canbya candida	white pygmy-poppy	None, None	G3G4, S3S4, 4.2	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Gravelly, sandy, granitic places. 600-1460 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Chaetodipus fallax pallidus	pallid San Diego pocket mouse	None, None	G5T3T4, S3S4	Desert border areas of San Diego, Riverside, San Bernardino, and Los Angeles counties in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened, Endangered	G5T2T3, S1	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Corynorhinus townsendii	Townsend's big-eared bat	None, None	G4, S2, CDFW-SSC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Diplacus mohavensis	Mojave monkeyflower	None, None	G2, S2, 1B.2	Joshua tree woodland, Mojavean desert scrub. Dry sandy or rocky washes along the Mojave River. 660-1270 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Empidonax traillii extimus	southwestern willow flycatcher	Endangered, Endangered	G5T2, S3	Riparian woodlands in Southern California.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

Emys marmorata	western pond turtle	Proposed Threatened, None	G3G4, S3, CDFW-SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Eremothera boothii ssp. boothii	Booth's evening-primrose	None, None	G5T4, S3, 2B.3	Joshua tree woodland, pinyon and juniper woodland. 285-2290 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Gopherus agassizii	desert tortoise	Threatened, Threatened	G3, S2S3	Most common in desert scrub, desert wash, and Joshua tree habitats; occurs in almost every desert habitat. Require friable soil for burrow and nest construction. Creosote bush habitat with large annual wildflower blooms preferred.	Minimally suitable habitat exists on-site for this species. As such pre-construction surveys are recommended.
Helminthoglypt a mohaveana	Victorville shoulderband	None, None	G1, S1	Known only from along the Mojave River in San Bernardino County. Found among granite boulders and at the base of rocky cliffs.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Icteria virens	yellow-breasted chat	None, None	G5, S4, CDFW-SSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Lanius ludovicianus	loggerhead shrike	None, None	G4, S4, CDFW-SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Lasiurus cinereus	hoary bat	None, None	G3G4, S4	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Loevingia squarrosa var. artemisium	sagebrush loevingia	None, None	G5T3, S2, 2B.2	Great Basin scrub, Sonoran desert scrub, desert dunes. Sandy flats and dunes. Sandy areas around clay slicks w/Sarcobatus, Atriplex, Tetradymia, etc. 700-1615 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Microtus californicus mohavensis	Mohave river vole	None, None	G5T1, S1, CDFW-SSC	Occurs only in weedy herbaceous growth in wet areas along the Mojave River. May be found in some irrigated pastures. Burrows into soft soil. Feeds on leafy parts of grasses, sedges and herbs. Clips grasses to form runways from burrow.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Opuntia basilaris var. brachyclada	short-joint beavertail	None, None	G5T3, S3, 1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Sandy soil or coarse, granitic loam. 425-2015 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Pediomelum castoreum	Beaver Dam breadroot	None, None	G3, S2, 1B.2	Joshua tree woodland, Mojavean desert scrub. Sandy soils; washes and roadcuts. 605-1485 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Phrynosoma blainvillii	coast horned lizard	None, None	G4, S4, CDFW-SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Piranga rubra	summer tanager	None, None	G5, S1, CDFW-SSC	Summer resident of desert riparian along lower Colorado River, and locally elsewhere in California deserts. Requires cottonwood-willow riparian for nesting and foraging; prefers older, dense stands along streams.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Plebulina emigdonis	San Emigdio blue butterfly	None, None	G1G2, S1S2	Found in desert canyons and along riverbeds in Inyo, Kern, Los Angeles, and San Bernardino counties. Host plant is Atriplex canescens; maybe Lotus purshianus also.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Rana draytonii	California red-legged frog	Threatened, None	G2G3, S2S3, CDFW-SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	None, None	G4T3, S3, 1B.2	Chaparral, cismontane woodland, lower montane coniferous forest. In gravelly soils on streambanks or in mesic sites in oak or pine woodland. 425-2000 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Setophaga petechia	yellow warbler	None, None	G5, S3, CDFW-SSC	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Siphateles bicolor mohavensis	Mohave tui chub	Endangered, Endangered	G4T1, S1, CDFWFP	Endemic to the Mojave River basin, adapted to alkaline, mineralized waters. Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Symphyotrichum defoliatum	San Bernardino aster	None, None	G2, S2, 1B.2	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland. Vernal mesic grassland or near ditches, streams and springs; disturbed areas. 3-2045 m.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.

BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION PLAN FOR TTM 20544

Toxostoma lecontei	Le Conte's thrasher	None, None	G4, S3, CDFW-SSC	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Vireo bellii pusillus	least Bell's vireo	Endangered, Endangered	G5T2, S3	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Vireo vicinior	gray vireo	None, None	G5, S2, CDFW-SSC	Dry chaparral; west of desert, in chamise-dominated habitat; mountains of Mojave Desert, associated with juniper and Artemisia. Forage, nest, and sing in areas formed by a continuous growth of twigs, 1-5 ft above ground.	Suitable habitat for this species does not occur on site. As such, this species is considered absent from the Project site.
Xerospermophilus mohavensis	Mohave ground squirrel	None, Threatened	G3, S2	Open desert scrub, alkali scrub and Joshua tree woodland. Also feeds in annual grasslands. Restricted to Mojave Desert. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover. Nests are in burrows.	Minimally suitable habitat exists on-site for this species. As such protocol surveys are recommended.

Coding and Terms

E = Endangered T = Threatened C = Candidate FP = Fully Protected SSC = Species of Special Concern R = Rare

State Species of Special Concern: An administrative designation given to vertebrate species that appear to be vulnerable to extinction because of declining populations, limited acreages, and/or continuing threats. Raptor and owls are protected under section 3502.5 of the California Fish and Game code: "It is unlawful to take, possess or destroy any birds in the orders Falconiformes or Strigiformes or to take, possess or destroy the nest or eggs of any such bird."

State Fully Protected: The classification of Fully Protected was the State's initial effort in the 1960's to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Global Rankings (Species or Natural Community Level):

- G1 = Critically Imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
- G2 = Imperiled – At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
- G3 = Vulnerable – At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
- G4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- G5 = Secure – Common; widespread and abundant.
- ? = Uncertainty in the exact status of an element (could move up or down one direction from current rank)

Subspecies Level: Taxa which are subspecies or varieties receive a taxon rank (T-rank) attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies. For example: the Point Reyes mountain beaver, *Aplodontia rufa* ssp. *phaea* is ranked G5T2. The G-rank refers to the whole species range i.e., *Aplodontia rufa*. The T-rank refers only to the global condition of ssp. *phaea*.

State Ranking:

- S1 = Critically Imperiled – Critically imperiled in the State because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the State.
- S2 = Imperiled – Imperiled in the State because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the State.
- S3 = Vulnerable – Vulnerable in the State due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the State.
- S4 = Apparently Secure – Uncommon but not rare in the State; some cause for long-term concern due to declines or other factors.
- S5 = Secure – Common, widespread, and abundant in the State.

California Rare Plant Rankings (CNPS List):

- 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 = Plants about which more information is needed; a review list.
- 4 = Plants of limited distribution; a watch list.

Threat Ranks:

- .1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
- .2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
- .3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Appendix E – Development Advisory Dated July 19, 2023

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION
PLAN FOR TTM 20544**

CITY OF
VICTORVILLE



Community & Development Department
Planning • Building • Code Compliance
Engineering • Public Works
Recreation • Library

14343 Civic Drive
P.O. Box 5001
Victorville, CA 92395-5001

(760) 955-5135
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July 19, 2023

DEVELOPMENT ADVISORY

Western Joshua Tree

On February 8, 2023, the California Fish and Game Commission ("Commission") delayed a final determination on making the Western Joshua Tree (*Yucca brevifolia*) a Candidate Species for listing as a threatened or endangered species under the California Endangered Species Act (CESA). At the time, this delay was based upon the potential passage of the Western Joshua Tree Conservation Act by the State Legislature.

On July 10, 2023, the Governor of the State of California approved the Western Joshua Tree Conservation Act ("Act") via the approval of Senate Bill No. 122 (2023). Although the Act became effective immediately on July 10, 2023, with specific provisions regarding the take of Western Joshua Trees as discussed herein, the subject species also remains a Candidate Species for listing as a threatened or endangered species under the California Endangered Species Act (CESA) until a final determination is made by the Commission.

At this time, the Western Joshua Tree is subject to the provisions of the Act and is protected from unauthorized take under CESA Section 2085, with any authorized take subject to approval by the California Department of Fish and Wildlife (CDFW) via a Section 2081 incidental take permit or in accordance with the provisions of the Act. The first available opportunity for the Commission to make a final determination on listing the Western Joshua Tree as a threatened or endangered species under CESA would be their scheduled meeting on August 22-23; however, no agenda is available for said meeting at this time.

Please refer to the City's "Western Joshua Tree Conservation Act Fact Sheet" for additional information on the provisions of the Act, its requirements, and the applicability to projects within the City of Victorville.

Staff will continue to monitor this situation and any further action from from CDFW and/or the Commission for disbursement to the development community. Should you have any questions, please contact our Planning Division at 760-955-5135 or by email at planning@victorvilleca.gov.

A handwritten signature in blue ink that reads "Jenele Davidson".

Jenele Davidson
Deputy City Manager

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION
PLAN FOR TTM 20544**



City of Victorville

Department of Development

Planning • Building • Code Enforcement • Business License

**WESTERN JOSHUA TREE CONSERVATION ACT
FACT SHEET**

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Victorville, CA 92393-5001

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planning@victorvilleca.gov

July 19, 2023

On July 10, 2023, the Governor of the State of California approved the Western Joshua Tree Conservation Act via the approval of Senate Bill No. 122 (2023), which became effective immediately and includes specific provisions regarding the take of Western Joshua Trees. At this time, the Western Joshua Tree is also protected from unauthorized take under the California Endangered Species Act Section 2085, with any authorized take subject to approval by the California Department of Fish and Wildlife (CDFW) via a Section 2081 incidental take permit or in accordance with the provisions of the Western Joshua Tree Conservation Act discussed below. Any project utilizing the allowances provided by the Western Joshua Tree Conservation Act shall comply with the following requirements in order to receive authorization for take by the CDFW.

Projects Involving Take of Western Joshua Tree(s)

Data Requirements (CA Fish and Game § 1927.3(a)(1))

- Provide a census of all Western Joshua Trees on the project site, including size and photographs, that categorize the Western Joshua Trees according to the following size classes:
 - (A) Less than one meter in height; (B) One meter or greater but less than five meters in height; or (C) Five meters or greater in height.

Mitigation Requirements (CA Fish and Game § 1927.3(a)(2),(3), &(4))

- Avoid and minimize impacts to, and the taking of, the Western Joshua Tree to the maximum extent practicable. Minimization may include trimming, encroachment on root systems, relocation, or other actions that result in detrimental but nonlethal impacts to a Western Joshua Tree.
- Possible relocation requirements, with implementation measures to assist the survival of relocated trees such as specific orientation and timing.
- Mitigation of all impacts to, and taking of, the Western Joshua Tree that are roughly proportional in extent to the impact of the authorized taking of the species and are capable of successful implementation/funding to implement the mitigation measures. In lieu of completing the mitigation obligation on its own, a permittee may elect to satisfy this mitigation obligation by paying fees, pursuant to the fee schedule noted herein.

Fee's (CA Fish and Game § 1927.3)

- Developers of projects that are both (1) north of Palmdale Road and (2) west of Interstate 15, as well as projects that are north of D Street shall be subject to the following fee's in lieu of mitigating impacts to project on their own. (CA Fish and Game § 1927.3(d))
 - One thousand dollars (\$1,000) for each Western Joshua Tree five meters or greater in height.
 - Two hundred dollars (\$200) for each Western Joshua Tree one meter or greater but less than five meters in height.
 - One hundred fifty dollars (\$150) for each Western Joshua Tree less than one meter in height.

**BIOLOGICAL RESOURCES ASSESSMENT, JURISDICTIONAL DELINEATION, AND NATIVE PLANT PROTECTION
PLAN FOR TTM 20544**

- Developers of projects that are either south of Palmdale Road, or east of Interstate 15 and south of D Street shall be subject to the following fee's in lieu of mitigating impacts to project on their own. (CA Fish and Game § 1927.3(e))
 - Two thousand five hundred dollars (\$2,500) for each Western Joshua Tree five meters or greater in height.
 - Five hundred dollars (\$500) for each Western Joshua Tree one meter or greater but less than five meters in height.
 - Three hundred forty dollars (\$340) for each Western Joshua Tree less than one meter in height.

**Projects Involving Trimming of Live Western Joshua Tree(s)
or the Trimming/Removal of Dead Western Joshua Tree(s)
(Including detached fallen trees and limbs)**

Data Requirements (CA Fish and Game § 1927.4(a)(3))

- Submit a permit request to CDFW on a form to be provided by CDFW that includes the following information:
 - The name, telephone number, mailing address, and email address of the property owner seeking the permit.
 - The street address of the property on which the Western Joshua Trees to be removed or trimmed are located. If no street address is available, the property owner shall include the assessor's parcel number.
 - Photographs of the Western Joshua Trees that visually depict the dead trees or the trees to be trimmed and that demonstrate that the Western Joshua Tree meets one or more of the requirements of paragraph (2).
 - A signed attestation from the property owner or signed certification by a desert native plant specialist that the tree meets the definition of a dead Western Joshua Tree.

Removal Requirements (CA Fish and Game § 1927.4)

- All removals and all trimming of Western Joshua Trees authorized by permits issued pursuant to this subdivision shall be completed by a desert native plant specialist, except:
 - Removal of a detached dead Western Joshua Tree or the detached limb of a Western Joshua Tree by a property owner or their agent. (CA Fish and Game § 1927.4(a)(1))
 - Dead Western Joshua Trees or limbs that meet one of the following requirements, as approved by CDFW. (CA Fish and Game § 1927.4(a)(2))
 - Have fallen over and are within 30 feet of a structure,
 - Are leaning against an existing structure, or
 - Create an imminent threat to public health or safety.

Fees (CA Fish and Game § 1927.4)

- Administrative fee to be determined by CDFW. (CA Fish and Game § 1927.4(a)(1))
- Fees may be waived by CDFW for the removal of dead Western Joshua Trees or the limbs to be removed if in association with one of the criteria noted below. (CA Fish and Game § 1927.4(a)(2))
 - Have fallen over and are within 30 feet of a structure,
 - Are leaning against an existing structure, or
 - Create an imminent threat to public health or safety.

The information provided herein is subject to submittal, review, and approval by the CDFW and is provided for information purposes only. Should anyone have questions and/or additional feedback to provide to staff, please contact the Planning Department at planning@victorvilleca.gov or 760-955-5135.

A PHASE I CULTURAL RESOURCES STUDY FOR THE TTM 20544 PROJECT

**CITY OF VICTORVILLE,
SAN BERNARDINO COUNTY, CALIFORNIA**

APN 3071-111-01

Prepared on Behalf of:

**Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408**

Prepared for:

**City of Victorville
14343 Civic Drive
Victorville, California 92393**

Prepared by:

**BFSA Environmental Services,
a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064**

August 3, 2023



BFSA Environmental Services
A Perennial Company

Archaeological Report Summary Information

Author: Andrew J. Garrison, M.A., RPA

Prepared by: BFSA Environmental Services, a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064
(858) 484-0915

Report Date: August 3, 2023

Report Title: A Phase I Cultural Resources Study for the TTM 20544
Project, City of Victorville, San Bernardino County, California

Prepared on Behalf of: Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408

Prepared for: City of Victorville
14343 Civic Drive
Victorville, California 92393

Assessor's Parcel Numbers: 3071-111-01

USGS Quadrangle: Section 5, Township 4 North, Range 5 West of the USGS
Baldy Mesa, California (7.5-minute) Quadrangle

Study Area: Approximately 20 acres

Key Words: Archaeological survey program; City of Victorville; 20 acres;
Baldy Mesa USGS topographic quadrangle; negative no further
archaeological study recommended.

Table of Contents

<u>Section</u>	<u>Page</u>
1.0 MANAGEMENT SUMMARY/ABSTRACT	1.0–1
1.1 Purpose of Investigation	1.0–1
1.2 Major Findings	1.0–1
1.3 Recommendation Summary	1.0–2
2.0 INTRODUCTION	2.0–1
2.1 Previous Work	2.0–1
2.2 Project Setting	2.0–5
2.3 Cultural Setting	2.0–5
2.3.1 Paleo Indian Period (12,000 to 7,000 YBP)	2.0–6
2.3.2 Pinto Period (7,000 to 4,000 YBP)	2.0–6
2.3.3 Gypsum Period (4,000 to 1,500 YBP)	2.0–6
2.3.4 Saratoga Springs Period (1,500 to 800 YBP)	2.0–7
2.3.5 Ethnohistoric Period (800 YBP to the Time of European Contact)	2.0–7
2.3.6 Historic Period	2.0–8
2.4 Research Goals	2.0–9
3.0 METHODOLOGY	3.0–1
3.1 Archaeological Records Search	3.0–1
3.2 Field Methodology	3.0–1
3.3 Report Preparation and Recordation	3.0–1
3.4 Native American Consultation	3.0–1
3.5 Applicable Regulations	3.0–2
3.5.1 California Environmental Quality Act	3.0–2
4.0 RESULTS	4.0–1
4.1 Records Search Results	4.0–1
4.2 Results of the Field Survey	4.0–2
5.0 RECOMMENDATIONS	5.0–1
6.0 CERTIFICATION	6.0–1
7.0 REFERENCES	7.0–1

Appendices

Appendix A – Qualifications of Key Personnel

Appendix B – Archaeological Records Search Results*

Appendix C – NAHC Sacred Lands File Search Results*

**Deleted for public review and bound separately in the Confidential Appendix*

List of Figures

<u>Section</u>	<u>Page</u>
Figure 2.0–1 General Location Map	2.0–2
Figure 2.0–2 Project Location Map.....	2.0–3
Figure 2.0–3 Conceptual Site Plan	2.0–4

List of Plates

<u>Section</u>	<u>Page</u>
Plate 4.2–1 Overview of the project from Bear Valley Road, facing south	4.0–2
Plate 4.2–2 Overview of the project from the western edge of the property, facing east	4.0–3
Plate 4.2–3 Overview of the project from the center of the property, facing south.....	4.0–3
Plate 4.2–4 Overview of the project, facing east	4.0–4

List of Tables

<u>Section</u>	<u>Page</u>
Table 4.1–1 Cultural Resources Recorded Within One Mile of the Project.....	4.0–1

1.0 MANAGEMENT SUMMARY/ABSTRACT

The following report describes the results of the cultural resources survey conducted by BFSa Environmental Services, a Perennial Company (BFSa), for the TTM 20544 Project. The survey included approximately 20 acres (Assessor's Parcel Number [APN] 3071-111-01) located within the city of Victorville in western San Bernardino County, California. The proposed project is located east of Verbena Road and bound by Bear Valley and Sierra roads in the city of Victorville, San Bernardino County, California. The subject property is situated within the northwest quarter of Section 5, Township 4 North, Range 5 West of the U.S. Geological Survey (USGS) (7.5-minute) *Baldy Mesa, California* topographic quadrangle. As designed, the project proposes to develop a residential subdivision within the approximately 20-acre project.

BFSa conducted this assessment to locate and record any cultural resources identified within the project site in compliance with the California Environmental Quality Act (CEQA) and following City of Victorville environmental guidelines. A records search was conducted by BFSa at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton (CSU Fullerton). Based on the records search results, the subject property has not previously been studied for cultural resources and does not contain any previously recorded resources. The records search did identify nine previous studies and four recorded resources (all historic) within one mile of the subject property. In addition, a search of the Sacred Lands File (SLF) was requested from the Native American Heritage Commission (NAHC) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within the project site. The SLF search was returned with negative results for sacred sites or locations of religious or ceremonial importance within the project vicinity. All correspondence with the NAHC can be found in Appendix C.

1.1 Purpose of Investigation

The purpose of this investigation was to complete background research regarding the cultural resource sensitivity of the project, survey the project site acreage, identify any archaeological resources within the project site, and test and evaluate any cultural resources that may be impacted by the proposed development. The site plan shows the configuration of the proposed development (see Figure 2.0–3).

1.2 Major Findings

A review of historic USGS data and the aerial photographs found that no structures have ever been located within the subject property. Based on aerial imagery, the property was leveled and then cleared of all vegetation, except for sporadic Joshua Trees, around 2009. The survey confirmed the property had been previously cleared and leveled. The current study did not result in the identification of any historic or prehistoric cultural resources within the project site.

1.3 Recommendation Summary

Based upon the findings presented within this report, no further archaeological studies are necessary as part of the CEQA review process. Further, mitigation monitoring is not recommended as part of project approval since there is little to no potential to encounter any cultural sites during the development of this property. However, in the event that any historic or prehistoric cultural resources are inadvertently discovered, all construction work in the immediate vicinity of the discovery shall stop and a qualified archaeologist shall be consulted to determine if further mitigation measures are warranted. Should human remains be discovered, treatment of those remains shall follow California Public Resources Code (PRC) 5097.9. Any human remains that are determined to be Native American shall be reported to the San Bernardino County Medical Examiner and Coroner and subsequently to the NAHC. A copy of this report will be filed with the SCCIC at CSU Fullerton. All notes, photographs, and other materials related to this project will be curated at the archaeological laboratory of BFSa in Poway, California.

2.0 INTRODUCTION

BFSA was retained by the applicant to conduct a cultural resources study of the proposed TTM 20544 Project in the city of Victorville, San Bernardino County, California (Figure 2.0–1). The archaeological survey was conducted in order to comply with CEQA and City of Victorville guidelines with regard to development-generated impacts to cultural resources. The project is located in an area of low to moderate cultural resource sensitivity, as suggested by known site density and predictive modeling. Sensitivity for cultural resources in a given area is usually indicated by known settlement patterns which, in the western San Bernardino County area, are focused around environments with accessible food and water.

The proposed project is located east of Verbena Road and bound by Bear Valley and Sierra roads, in the city of Victorville, San Bernardino County, California (see Figure 2.0–1). The subject property is situated within the northwest quarter of Section 5, Township 4 North, Range 5 West of the USGS (7.5-minute) *Baldy Mesa, California* topographic quadrangle (Figure 2.0–2). As designed, the project proposes to develop a residential subdivision within the approximately 20-acre project (APN 3071-111-01) (Figure 2.0–3).

Principal Investigator Tracy A. Stropes, M.A., RPA, and Senior Project Archaeologist Jennifer Stropes, M.S., RPA, conducted the pedestrian survey in 15-meter interval transects. The survey conditions were generally good. Andrew J. Garrison, M.A., RPA, prepared the technical report. Emily T. Soong created the report graphics and Shawna M. Krystek conducted technical editing and report production. Qualifications of key personnel are provided in Appendix A.

2.1 Previous Work

An archaeological records search was conducted by BFSA at the SCCIC at CSU Fullerton. Based on the records search results, the subject property has not previously been studied for cultural resources and does not contain any previously recorded resources. The records search did identify nine previous studies and four recorded resources within one mile of the subject property.

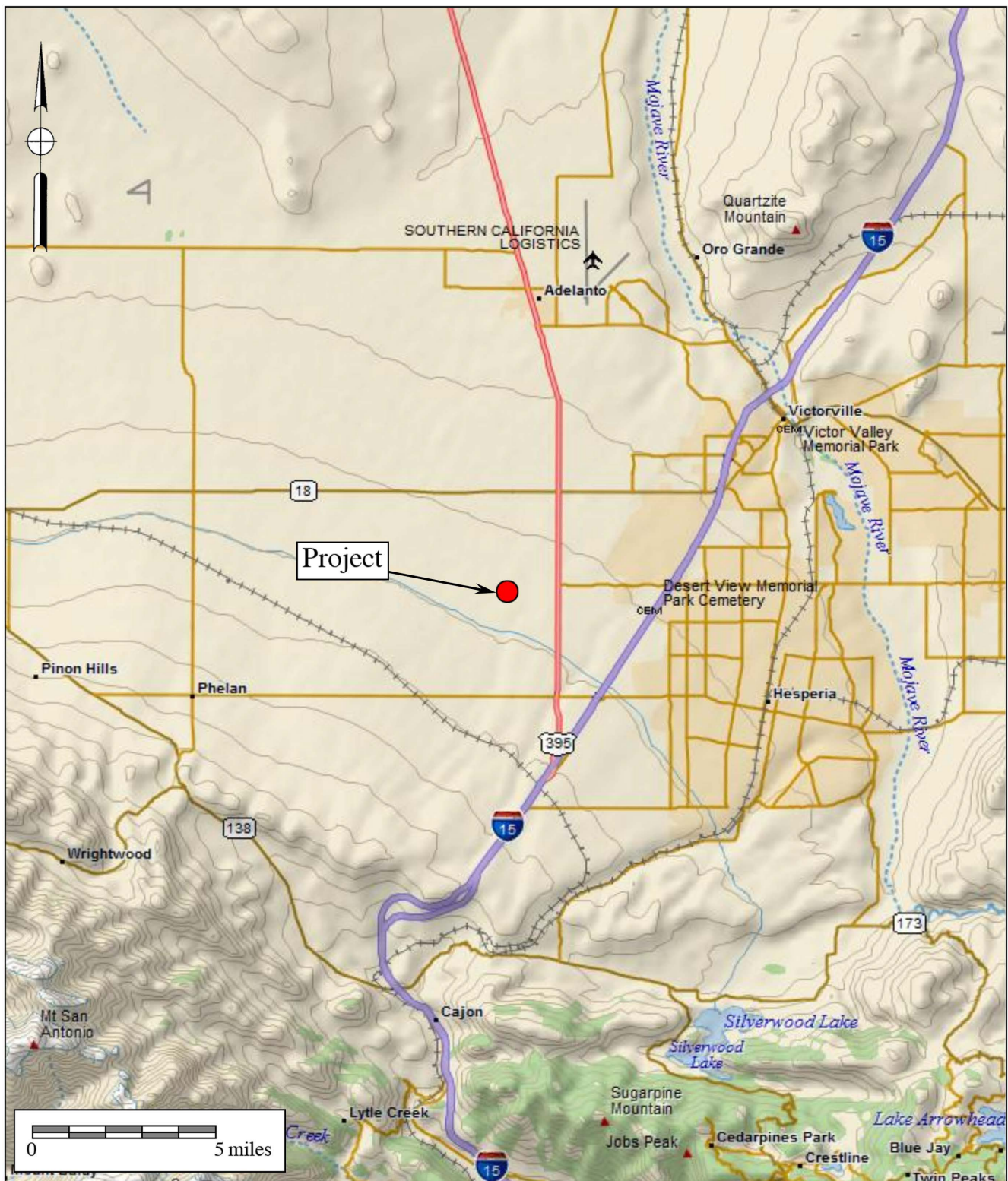
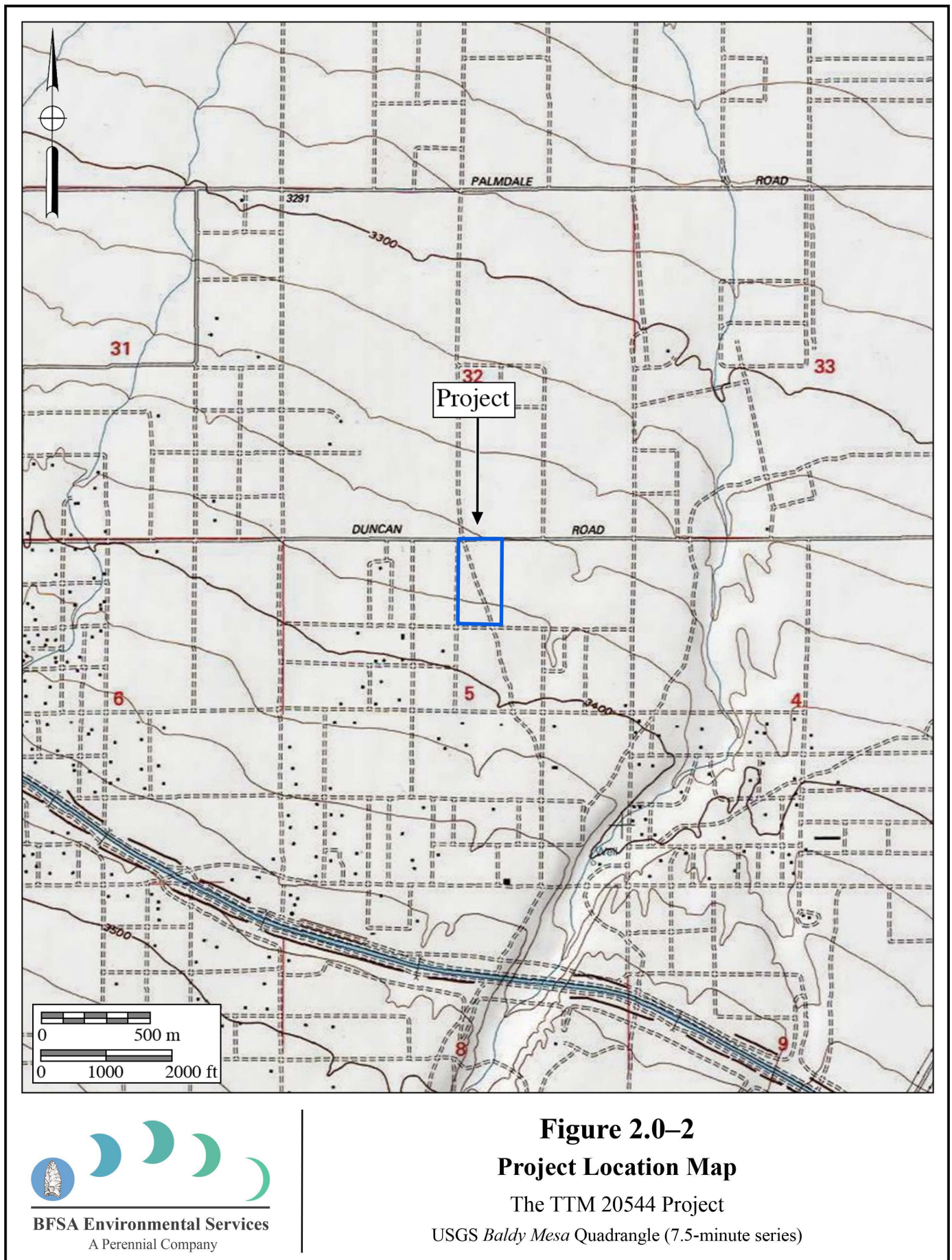
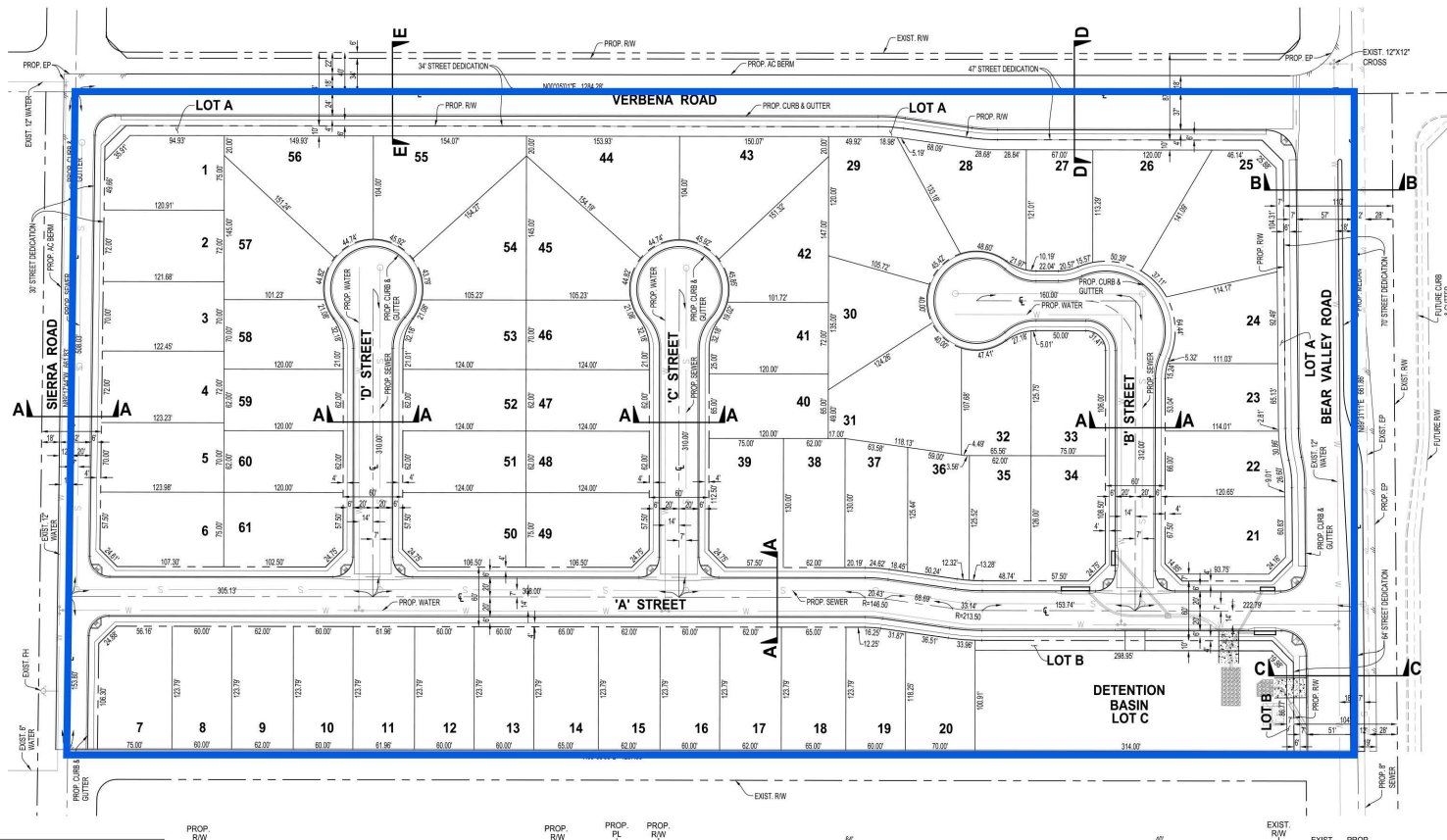


Figure 2.0-1
General Location Map
The TTM 20544 Project
DeLorme (1:250,000 series)





Legend

Project boundary



BFS Environmental Services
A Perennial Company

Figure 2.0-3
Conceptual Site Plan
The TTM 20544 Project

2.2 Project Setting

The subject property is located east of the Peninsular Ranges Geologic Province of southern California. The range, which lies in a northwest-to-southeast trend through the county, extends some 1,000 miles from the Raymond-Malibu Fault Zone in western Los Angeles County to the southern tip of Baja California. The subject property is located within the Mojave Desert, north of the San Gabriel Mountain range and the San Bernardino National Forest and south of the Ord Mountain range. The property is generally flat with elevations ranging from approximately 3,370 to 3,390 feet above mean sea level (AMSL). Currently, the vegetation on the property consists of creosote bushes, rubber rabbitbrush, and Joshua Trees.

The project is situated over the Victorville Basin, a structural depression about 40 kilometers wide and filled with sediments up to 1,300 meters thick, a succession of deposits ranging in age from middle Miocene through late Pleistocene time. The Victorville Basin is bordered by the San Gabriel and San Bernardino Mountains to the south, and along the north, local peaks and ridges of pre-Cenozoic basement rocks in the areas of Quartzite Mountain and the southeastern Shadow Mountains. These deposits record the erosional and depositional cycles of the region during episodes of crustal slip along the San Andreas Fault, along with the coeval uplift and trans-rotation of the San Bernardino and San Gabriel Mountains. A major feature of the area is the evolution of the northward-flowing ancestral Mojave River. Between the Cajon Pass and Victorville, and at the project, the main geomorphic attribute of the surface is the Victorville Fan, a broad piedmont or bajada. The fan was active between roughly one-half million years to about middle to late Pleistocene times (Cox et al. 2003). Geologically, the project site primarily overlies middle Holocene young alluvial fan deposits (Morton and Miller 2006). The specific soil type within the subject property is characterized as Cajon Sand (NRCS 2019).

2.3 Cultural Setting

The subject property straddles the traditional territory of multiple Native American groups including the Serrano and the Vanyume. Although there may be considered a range of cultural variations among these groups, they all have language derived from a base Uto-Aztecan language stock. In the same instance, although they may have held differing worldviews and maintained variations in their social structures, how they exploited the natural resources of their territories remained similar.

Although the Mojave Desert is an area believed to have had limited prehistoric subsistence resources, it has historically supported a long and occasionally dense population. Evidence of villages and camps, burials, quarries, rock features, and bedrock mortars has been documented at archaeological sites across the desert, some of which contain evidence of a lengthy prehistoric time span. Although early archaeological remains are not found frequently, when they are, they are generally located along the margins of former pluvial lakes or in areas of dune deflation. In contrast, artifacts on the desert floor may be sparse, widely scattered, and mixed with the desert pavements. For the region, archaeologists have reached a broad consensus regarding the general

cultural chronology. The identified sequence includes the Paleo Indian Period, the Pinto Period, the Gypsum Period, the Saratoga Springs Period, and the Ethnohistoric Period.

2.3.1 Paleo Indian Period (12,000 to 7,000 Years Before the Present [YBP])

The earliest documented evidence of human occupation in the Mojave Desert comes from the Paleo Indian Period, a cultural expression referred to as the Western Pluvial Lakes Tradition (WPLT). The WPLT occurred in the western Great Basin and covered an area that stretched from the now arid lands of southern California to Oregon. A cultural adaptation to pluvial conditions (e.g., lakes, marshes, and grasslands) flourished for thousands of years after approximately 9000 B.C., but disappeared in response to the warming and drying trends of the Altithermal Climatic Period (Moratto 1984). One of the most well-known expressions of the WPLT is the Lake Mojave Complex, which is thought to have covered a vast area including parts of the southwestern Great Basin and the Mojave Desert, maybe reaching as far south as the San Diego area. Artifacts indicative of the Lake Mojave Complex include foliated points and knives, Lake Mojave points, Silver Lake points, and flaked-stone crescents. Similar artifacts have been subsequently recorded along the shoreline of many other pluvial lakes in the Mojave Desert.

2.3.2 Pinto Period (7,000 to 4,000 YBP)

The Pinto Period dates to the end of the Pleistocene, when the severe and dramatic environmental change from pluvial to arid conditions began. Pinto Period sites are found mostly near ephemeral lakes and now dry streams and springs, suggesting a wetter climate than the present. Projectile points associated with the Pinto Period are characterized as larger atlatl dart points, as opposed to arrowhead points, which were introduced later. This period has been described as a highly mobile desert economy, with an emphasis on hunting that was supplemented by the use of processed seeds (Moratto 1984). Pinto Period artifacts have been interpreted as indications of temporary or seasonal occupations by small groups of people.

2.3.3 Gypsum Period (4,000 to 1,500 YBP)

The presence of Humboldt Concave Base, Gypsum Cave, Elko Eared, or Elko corner-notched points are believed to be indicative of the Gypsum Period (radiocarbon dated from 4,000 to 1,500 years ago). The Gypsum Period reflects a more intensive desert occupation. Indications of trade with coastal populations are evidenced by the shell beads in the archaeological record. An increase in milling stones and manos has been found in association with this period, which indicates an increased use of hard seeds (Moratto 1984). Several scholars associate this period with the division of the Uto-Aztecan language, approximately 3,000 to 2,500 years ago. The major language groups that emerged from this division are Numic, spoken by the Kawaiisu and Piute; Takic, spoken by the Kitanemuk, Serrano, Gabrieliño, and other southern California Shoshonean speakers; Hopic, spoken in the southwest; and Tubatulabal, spoken by the Tubatulabal in the southern Sierra Nevada Mountains. A shift in settlement patterns toward a more sedentary lifestyle

occurred during this period, characterized by the emergence of large permanent or semi-permanent village sites and associated cemeteries.

2.3.4 Saratoga Springs Period (1,500 to 800 YBP)

The Saratoga Springs Period is characterized by a transition from larger dart points to smaller arrow points. This, combined with evidence from rock art motifs, leads scholars to argue for a shift from atlatls to the use of the bow and arrow either during the end of the Gypsum Period or the beginning of the Saratoga Springs Period. This period saw an increase in trade with Arizona and other areas of the Southwest. Evidence in the archaeological record shows that Brown and Buff wares (pottery styles) characteristic of Arizona made their way to the California desert by A.D. 900. It is also believed that the Anasazi mined turquoise in the eastern California desert about this time.

2.3.5 Ethnohistoric Period (800 YPB to the Time of European Contact)

During the Ethnohistoric Period, the Vanyume and potentially the Serrano occupied the project area. The territory of the Vanyume was covered by small and relatively sparse populations focused primarily along the Mojave River, north of the Serrano and southeast of the Kawaiisu. It is believed that the southwestern extent of their territory went as far as Cajon Pass and portions of Hesperia. Bean and Smith (1978) noted that it was uncertain if the Vanyume spoke a dialect of Serrano or a separate Takic-based language. However, King and Blackburn (1978) suggest that the Vanyume and other Kitanemuk speakers once occupied most of Antelope Valley. In contrast to the Serrano, the Vanyume maintained friendly social relations with the Mohave and Chemehuevi to the east and northeast (Kroeber 1925). As with the majority of California native populations, Vanyume populations were decimated around the 1820s by placement in Spanish missions and *asistencias*. It is believed that, by 1900, the Vanyume had become extinct (Bean and Smith 1978). However, given the settlement patterns reported for the Vanyume, it is more probable that the population was dispersed rather than completely wiped out.

The Serrano and Vanyume were primarily hunters and gatherers. Individual family dwellings were likely circular, domed structures. Vegetal staples varied with locality; acorns and piñon nuts were found in the foothills, and mesquite, yucca roots, cacti fruits, and piñon nuts were found in or near the desert regions. Diets were supplemented with other roots, bulbs, shoots, and seeds (Heizer 1978). Deer, mountain sheep, antelopes, rabbits, and other small rodents were among the principal food packages. Various game birds, especially quail, were also hunted. The bow and arrow was used for large game, while smaller game and birds were killed with curved throwing sticks, traps, and snares. Occasionally, game was hunted communally, often during mourning ceremonies (Benedict 1924; Drucker 1937; Heizer 1978). In general, manufactured goods included baskets, some pottery, rabbit-skin blankets, awls, arrow straighteners, sinew-backed bows, arrows, fire drills, stone pipes, musical instruments (rattles, rasps, whistles, bull-roarers, and flutes), feathered costumes, mats, bags, storage pouches, and nets (Heizer 1978). Food acquisition and processing required the manufacture of additional items such as knives, stone or

bone scrapers, pottery trays and bowls, bone or horn spoons, and stirrers. Mortars, made of either stone or wood, and metates were also manufactured (Strong 1929; Drucker 1937; Benedict 1924).

2.3.6 Historic Period

Prior to the European presence in North America, Native American groups subsisted along the shores of the no longer extant lakes of the Great Basin region that covered the major portion of the present-day Mojave Desert. It was along these shores that Native Americans made their homes, produced their tools, and left an indelible mark upon the landscape. However, by the time the first Spanish explorers ventured into what is now southern California in 1769, the pluvial lakes had long since vanished, leaving the Mojave River to support primarily the Paiute and the Mohave tribes.

The earliest documentation of any movement through the region is from the journal of a Spanish Franciscan priest, Francisco Garcés (Kyle 1990). Garcés was in search of a passable immigration route from what is now southern Arizona to the northern Spanish missions of what is now California. This, he thought, would allow an easier route for trade between the missions located in present-day New Mexico and present-day California. It is believed that, in 1776, Garcés passed what would later become Barstow, California.

Up until the 1850s, the majority of traffic through the region took place along the “Old Spanish Trail,” which forked northward from Mojave Road, located a few miles east of present-day Barstow (Steele 1975). These early travelers were not likely organized groups and, more often than not, were raiders, mission escapees, slave traders, fur trappers, soldiers, explorers, stockmen, merchants, guides, gold prospectors, and immigrants.

By the early 1860s, many early pioneers began settling along the Mojave River, deriving their income from the road traffic that was now more common in the region. This, in turn, led to the development of way stations that held emergency supplies for travelers, with their most lucrative trade being liquor. It was around this same time that settlers also began agricultural and stock-raising ventures. Despite the early forays into gold mining that began as early as the 1850s, large-scale local developments did not begin until nearly 1881. This was likely a result of the harsh nature of the region, which forced costly freight charges and had crude mineral recovery methods, a scarcity of water, and an overall lack of local subsistence.

It was not until the discovery of silver in Calico and the construction of the Southern Pacific Railroad from Mojave to Daggett in 1882 that the region became a mining center. This gave rise to the now famous 20-mule teams. Ten teams were hitched together with two wagons and a water wagon to haul ore from Daggett to the town of Calico. It would follow that rich silver deposits gave birth to Calico Mines, Waterman Mines, and Daggett Mills (Kyle 1990). These ventures were then bolstered by the non-metallic mining industry, which still represents a significant portion of the desert’s commercial industry today.

In 1853, Congress authorized exploration and surveys to determine the most economical route for a rail line from the Mississippi River to the Pacific Ocean (Kyle 1990). Southern Pacific Railroad constructed the desert section of the rail line. The route was completed from Mojave to

Needles in 1882 to 1883. Ore was hauled on the Calico Railroad from Calico to the Oro Grande Milling Company, which was across the river from Daggett, around 1888. It was at this same time that the Santa Fe Railroad arrived in the region. In 1886, the California Southern Railroad (a subsidiary of the Atchison, Topeka, and Santa Fe Railway Company) completed the line from National City in San Diego County through the Cajon Pass, joining the transcontinental line.

That same year, the plan of the town of Victor was prepared. Named for California Southern Railroad construction superintendent Jacob Nash Victor, the town was established after the construction of the original railroad station located approximately one mile northwest of the narrows of the Mojave River. The plan for the town of Victor included a grid-patterned original subdivision map of approximately 200 acres that would encompass properties between A and G streets and First through Eleventh streets. In 1901, the name of the town was changed from Victor to Victorville, due to confusion by the United States Post Office with Victor, Colorado (City of Victorville 2015).

Due to the presence of rich soils and an abundance of water from the Mojave River, the town of Victor began to develop agriculturally soon after it was established in the 1880s. This focus was short-lived, however, as in the 1890s, limestone and granite were discovered in Victor Valley. This discovery led to the town shifting its attentions toward the cement manufacturing industry, with the Southwestern Portland Cement Company beginning operations in the town in 1916 (City of Victorville 2015).

Utilizing the existing National Old Trails Highway system, U.S. Route 66 was designated. Although the National Old Trails Highway originally cut through the town of Hesperia, the route was realigned in 1924 to pass through Victorville. The intersection of Seventh Street and D Street in downtown Victorville became a major transportation corridor after the designation (City of Victorville 2015).

As Victorville grew, the United States government became interested in utilizing the lands surrounding the town. The United States Army Corps of Engineers began construction of the Victorville Army Flight Training School in 1941, completing construction in 1942. A total of 10,000 men were stationed at the school when it opened. Following World War II, however, the airfield saw less use until the facility was reactivated in 1950 due to training needs associated with the Korean War. Upon reopening, the facility was renamed George Air Force Base after Brigadier General Harold H. George who was killed in a ground accident on a United States base in Australia in 1942. The base was closed in 1992 and has been converted for civilian use as the Southern California Logistics Airport (City of Victorville 2015).

The town of Victorville was incorporated as a general law city in 1962 with its city limits encompassing approximately 10 square miles. In 2007, the city comprised approximately 74 square miles (City of Victorville 2015).

2.4 Research Goals

The primary goal of the research design is to attempt to understand the way in which humans have used the land and resources within the project area through time, as well as to aid in

the determination of resource significance. For the current project, the study area under investigation is the western portion of San Bernardino County. The scope of work for the archaeological program conducted for the TTM 20544 Project included the survey of approximately 20 acres. Given the area involved and the narrow focus of the cultural resources study, the research design for this project was necessarily limited and general in nature. Since the main objective of the investigation was to identify the presence of, significance of, and potential impacts to cultural resources, the goal here is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues.

Although initial site evaluation investigations are limited in terms of the amount of information available, several specific research questions were developed that could be used to guide the initial investigations of any observed cultural resources. The basic research effort employed is focused upon gathering sufficient data to determine the boundaries of each resource, the depth, stratigraphy, and contents of any subsurface deposits, and the overall integrity of the site. Testing and recordation of the contents of the site would provide the basis to complete an analysis of spatial relationships of artifacts, features, and natural resources. Ultimately, this information forms the foundation to determine the cultural affiliation of the site, the period of occupation, site function, and potential to address more focused research questions. The following research questions take into account the small size and location of the project area discussed above.

Research Questions:

- Can located cultural resources be situated with a specific time period, population, or individual?
- Do the types of located cultural resources allow a site activity/function to be determined from a preliminary investigation? What are the site activities? What is the site function? What resources were exploited?
- How do the located sites compare to others reported from different surveys conducted in the area?
- How do the located sites fit existing models of settlement and subsistence for valley environments of the region?

Data Needs

At the survey level, the principal research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project area occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and archival research were undertaken with these primary research goals in mind:

- 1) To identify cultural resources occurring within the project area;
- 2) To determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified;
- 3) To place each cultural resource identified within a regional perspective; and
- 4) To provide recommendations for the treatment of each of the cultural resources identified.

3.0 METHODOLOGY

The archaeological program for the TTM 20544 Project consisted of an institutional records search, an intensive pedestrian survey of the approximately 20-acre project, and preparation of a technical study. This archaeological study conformed to professional standards in support of City of Victorville guidelines. Statutory requirements of CEQA and subsequent legislation (Section 15064.5) were followed in evaluating the significance of cultural resources. Specific definitions for archaeological resource type(s) used in this report are those established by the State Historic Preservation Office (SHPO 1995).

3.1 Archaeological Records Search

An archaeological records search for the project site and the surrounding area within a one-mile radius was conducted by BFSa at the SCCIC at CSU Fullerton. Land patent records, held by the Bureau of Land Management (BLM) and accessible through the BLM General Land Office (GLO) website, were also reviewed for pertinent project information. In addition, the BFSa research library was consulted for any relevant historical information.

3.2 Field Methodology

In accordance with CEQA review criteria and the policies of the City of Victorville, an intensive pedestrian survey of the project site was conducted that employed a series of parallel survey transects spaced at 15-meter intervals to locate archaeological sites within the project site. The archaeological survey of the project site was conducted on July 21, 2023. The entire project site was covered by the survey process and photographs were taken to document project site conditions during the survey (see Section 4.2). Ground visibility throughout the property was considered excellent.

3.3 Report Preparation and Recordation

This report contains information regarding previous studies, statutory requirements for the project, a brief description of the setting, research methods employed, and the overall results of the survey. The report includes all appropriate illustrations and tabular information needed to make a complete and comprehensive presentation of these activities, including the methodologies employed and the personnel involved. A copy of this report will be placed at the SCCIC at CSU Fullerton. Any newly recorded sites or sites requiring updated information will be recorded on the appropriate Department of Parks and Recreation site forms, which will be filed with the SCCIC.

3.4 Native American Consultation

BFSa also requested a SLF search from the NAHC to search for the presence of any recorded Native American sacred sites or locations of religious or ceremonial importance within one mile of the project site. This request is not part of any Assembly Bill 52 Native American

consultation. The results of the SLF are discussed in Section 4.1. All correspondence can be found in Appendix C.

3.5 Applicable Regulations

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality illustrating or interpreting the heritage of the city of Victorville in history, architecture, archaeology, engineering, and culture. A number of criteria are used in demonstrating resource importance. Specifically, criteria outlined in CEQA provide the guidance for making such a determination. The following sections detail the CEQA criteria that a resource must meet in order to be determined important.

3.5.1 California Environmental Quality Act

According to CEQA (§15064.5a), the term “historical resource” includes the following:

- 1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the California Register of Historical Resources (CRHR) (PRC SS5024.1, Title 14 CCR [California Code of Regulations]. Section 4850 et seq.).
- 2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the PRC, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
- 3) Any object, building, structure, site, area, place, record, or manuscript, which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency’s determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be “historically significant” if the resource meets the criteria for listing on the CRHR (PRC SS5024.1, Title 14, Section 4852) including the following:
 - a) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
 - b) Is associated with the lives of persons important in our past;
 - c) 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
 - d) Has yielded, or may be likely to yield, information important in prehistory or history.

- 4) The fact that a resource is not listed in, or determined eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1[k] of the PRC), or identified in an historical resources survey (meeting the criteria in Section 5024.1[g] of the PRC) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC Section 5020.1(j) or 5024.1.

According to CEQA (§15064.5b), a project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as:

- 1) Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired.
- 2) The significance of an historical resource is materially impaired when a project:
 - a) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or
 - b) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey, meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or,
 - c) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects on archaeological sites and contains the following additional provisions regarding archaeological sites:

- 1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource, as defined in subsection (a).
- 2) If a lead agency determines that the archaeological site is an historical resource, it shall refer to the provisions of Section 21084.1 of the PRC, Section 15126.4 of the guidelines, and the limits contained in Section 21083.2 of the PRC do not apply.

- 3) If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archaeological resource in Section 21083.2 of the PRC, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in PRC Section 21083.2 (c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
- 4) If an archaeological resource is neither a unique archaeological nor historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or Environmental Impact Report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Section 15064.5 (d) & (e) contain additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) provides:

- (d) When an initial study identifies the existence of, or the probable likelihood, of Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC as provided in PRC SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by the NAHC. Action implementing such an agreement is exempt from:
 - 1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).
 - 2) The requirement of CEQA and the Coastal Act.

4.0 **RESULTS**

4.1 **Records Search Results**

An archaeological records search for the project site and the surrounding area within a one mile radius was conducted by BFSa at the SCCIC at CSU Fullerton (Appendix B). The search results identified four cultural resource sites (all historic) within the search radius, none of which are located within the project boundaries. A brief description of the previously recorded resources is presented within Table 4.1–1.

Table 4.1–1
Cultural Resources Recorded Within One Mile of the Project

Site	Description
P-36-004180	Historic home site and trash scatter
P-36-004181	Historic cistern and trash scatter
P-36-004203	Historic Tejon Road-Palmdale Cutoff road
P- 36-033945	Historic trash scatter

The records search also identified nine previous studies within one mile of the subject property, none of which included the current project parcel.

BFSa also reviewed the following sources to help facilitate a better understanding of the historic use of the property:

- The National Register of Historic Places index
- Historic USGS data
- BLM GLO records
- Historic aerial photographs (1952 through 2023)

These sources did not indicate the presence of archaeological resources within the project. Further, based upon historic USGS data and the aerial photographs, no structures have ever been located within the subject property. Based upon aerial imagery, the property was cleared of all vegetation, except for sporadic Joshua Trees, and leveled around 2009.

BFSa also requested a SLF search from the NAHC. This request is not part of any Assembly Bill 52 Native American consultation. The SLF search was returned with negative results for sacred sites or locations of religious or ceremonial importance within the project vicinity. All correspondence is provided in Appendix C.

4.2 Results of the Field Survey

The archaeological survey of the project site was conducted by Principal Investigator Tracy A. Stropes, M.A., RPA, and Senior Project Archaeologist Jennifer R.K. Stropes, M.S., RPA, on July 21, 2023. The survey included a careful inspection of all exposed ground surfaces, including any rodent burrows and disturbed areas. The archaeological survey of the project site was an intensive reconnaissance consisting of a series of parallel survey transects spaced at approximately 15-meter intervals. The entire property was accessible with visibility characterized as excellent. Vegetation primarily consisted of creosote bushes, rubber rabbitbrush, and Joshua Trees. The survey confirmed that the project site had been previously cleared and leveled as noted in the aerial photograph review. The survey did not result in the identification of any historic or prehistoric cultural resources within the project site. Overviews of the project site are provided in Plates 4.2–1 through 4.2–4.



Plate 4.2–1: Overview of the project from Bear Valley Road, facing south.



Plate 4.2-2: Overview of the project from the western edge of the property, facing east.



Plate 4.2-3: Overview of the project from the center of the property, facing south.



Plate 4.2–4: Overview of the project, facing east.

5.0 RECOMMENDATIONS

The cultural resources survey for the TTM 20544 Project did not identify any archaeological resources within the property. Given that no archaeological sites, features, or artifacts were identified during the survey, no potential impacts to cultural resources are anticipated with the approval of the proposed development.

Based upon the findings of this study, no further archaeological studies are necessary as part of the CEQA review process. Further, mitigation monitoring is not recommended as part of project approval since there is little to no potential to encounter any cultural sites during the development of this property. However, in the event that any historic or prehistoric cultural resources are inadvertently discovered, all construction work in the immediate vicinity of the discovery shall stop, and a qualified archaeologist shall be consulted to determine if further mitigation measures are warranted. Should human remains be discovered, treatment of these remains shall follow California PRC 5097.9. Any human remains that are determined to be Native American shall be reported to the San Bernardino County Medical Examiner and Coroner and subsequently to the NAHC.

6.0 **CERTIFICATION**

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.



Andrew J. Garrison, M.A., RPA
Project Archaeologist

August 3, 2023

Date

7.0 REFERENCES

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APPENDIX A

Qualifications of Key Personnel

Andrew J. Garrison, MA, RPA

Project Archaeologist

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Education

Master of Arts, Public History, University of California, Riverside	2009
Bachelor of Science, Anthropology, University of California, Riverside	2005
Bachelor of Arts, History, University of California, Riverside	2005

Professional Memberships

Register of Professional Archaeologists	Society of Primitive Technology
Society for California Archaeology	Lithic Studies Society
Society for American Archaeology	California Preservation Foundation
California Council for the Promotion of History	Pacific Coast Archaeological Society

Experience

Project Archaeologist	June 2017–Present
BFSA Environmental Services, A Perennial Company	Poway, California

Project management of all phases of archaeological investigations for local, state, and federal agencies including National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) level projects interacting with clients, sub-consultants, and lead agencies. Supervise and perform fieldwork including archaeological survey, monitoring, site testing, comprehensive site records checks, and historic building assessments. Perform and oversee technological analysis of prehistoric lithic assemblages. Author or co-author cultural resource management reports submitted to private clients and lead agencies.

Senior Archaeologist and GIS Specialist	2009–2017
Scientific Resource Surveys, Inc.	Orange, California

Served as Project Archaeologist or Principal Investigator on multiple projects, including archaeological monitoring, cultural resource surveys, test excavations, and historic building assessments. Directed projects from start to finish, including budget and personnel hours proposals, field and laboratory direction, report writing, technical editing, Native American consultation, and final report submittal. Oversaw all GIS projects including data collection, spatial analysis, and map creation.

Preservation Researcher	2009
City of Riverside Modernism Survey	Riverside, California

Completed DPR Primary, District, and Building, Structure and Object Forms for five sites for a grant-funded project to survey designated modern architectural resources within the City of Riverside.

Information Officer
Eastern Information Center (EIC), University of California, Riverside

2005, 2008–2009
Riverside, California

Processed and catalogued restricted and unrestricted archaeological and historical site record forms. Conducted research projects and records searches for government agencies and private cultural resource firms.

Reports/Papers

- 2019 A Class III Archaeological Study for the Tuscany Valley (TM 33725) Project National Historic Preservation Act Section 106 Compliance, Lake Elsinore, Riverside County, California. Contributing author. Brian F. Smith and Associates, Inc.
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- 2019 A Phase I Cultural Resources Assessment for the 10575 Foothill Boulevard Project, Rancho Cucamonga, California. Brian F. Smith and Associates, Inc.
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- 2018 Phase I Cultural Resource Survey for the Stone Residence Project, 1525 Buckingham Drive, La Jolla, California 92037. Brian F. Smith and Associates, Inc.
- 2018 A Phase I Cultural Resources Assessment for the Seaton Commerce Center Project, Riverside County, California. Brian F. Smith and Associates, Inc.
- 2017 A Phase I Cultural Resources Assessment for the Marbella Villa Project, City of Desert Hot Springs, Riverside County, California. Brian F. Smith and Associates, Inc.
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- 2017 A Phase I Cultural Resources Assessment for the Winchester Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.
- 2016 John Wayne Airport Jet Fuel Pipeline and Tank Farm Archaeological Monitoring Plan. Scientific Resource Surveys, Inc. On file at the County of Orange, California.
- 2016 Historic Resource Assessment for 220 South Batavia Street, Orange, CA 92868 Assessor's Parcel Number 041-064-4. Scientific Resource Surveys, Inc. Submitted to the City of Orange as part of Mills Act application.

- 2015 Historic Resource Report: 807-813 Harvard Boulevard, Los Angeles. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.
- 2015 Exploring a Traditional Rock Cairn: Test Excavation at CA-SDI-13/RBLI-26: The Rincon Indian Reservation, San Diego County, California. Scientific Resource Surveys, Inc.
- 2014 Archaeological Monitoring Results: The New Los Angeles Federal Courthouse. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.
- 2012 Bolsa Chica Archaeological Project Volume 7, Technological Analysis of Stone Tools, Lithic Technology at Bolsa Chica: Reduction Maintenance and Experimentation. Scientific Resource Surveys, Inc.

Presentations

- 2017 "Repair and Replace: Lithic Production Behavior as Indicated by the Debitage Assemblage from CA-MRP-283 the Hackney Site." Presented at the Society for California Archaeology Annual Meeting, Fish Camp, California.
- 2016 "Bones, Stones, and Shell at Bolsa Chica: A Ceremonial Relationship?" Presented at the Society for California Archaeology Annual Meeting, Ontario, California.
- 2016 "Markers of Time: Exploring Transitions in the Bolsa Chica Assemblage." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.
- 2016 "Dating Duress: Understanding Prehistoric Climate Change at Bolsa Chica." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.
- 2014 "New Discoveries from an Old Collection: Comparing Recently Identified OGR Beads to Those Previously Analyzed from the Encino Village Site." Presented at the Society for California Archaeology Annual Meeting, Visalia, California.
- 2012 Bolsa Chica Archaeology: Part Seven: Culture and Chronology. Lithic demonstration of experimental manufacturing techniques at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

APPENDIX B

Archaeological Records Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX C

NAHC Sacred Lands File Results

(Deleted for Public Review; Bound Separately)



City of Victorville
Department of Development
Planning ♦ Building ♦ Code Enforcement

14343 Civic Drive
PO Box 5001
Victorville, CA 92393-5001
(760) 955-5135
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planning@victorvilleca.gov

Greenhouse Gas Emissions Screening Table Review

Note: This form is to be used only for projects which are subject to CEQA and not exempt from CEQA (i.e. Negative Declaration, Mitigated Negative Declaration or Environmental Impact Report).

GENERAL INFORMATION

Applicant: BEAR VALLEY 60, LLC Contact Name: TAYLOR SKAHILL
MADOLE & ASSOCIATES, INC.
Address: 2472 CHAMBERS ROAD, SUITE 150, (909) 560-1802
TUSTIN, CA 92780
Telephone No.: (760) 243-0200 Email Address: TSKAHILL@MADOLEINC.COM

TYPE OF PROJECT

☒ Residential (Single-Family or Multi-Family) ☐ Commercial or Industrial

PROJECT LOCATION

General Location/Address of Project: S/E CORNER OF BEAR VALLEY ROAD AND VERBANA ROAD
Name of Business (if applicable): N/A
Assessor's Parcel No(s): 3071-111-01
Existing Zoning: R1

PROJECT DESCRIPTION:

PROPOSED DEVELOPEMENT OF 61 SINGLE FAMILY LOTS ON +/-20 ACRES.
GRADING, STREET, UTILITY, AND DRAINAGE IMPROVEMENTS. DUAL USE
RECREATIONAL / DETENTION BASIN.

Instructions

1. Fill out the appropriate section below for either Residential or Commercial/Industrial.
2. Choose items which the proposed project will incorporate into the development to reach a minimum of 100 points.
3. Do not choose items which are independently required by other laws, codes or the VVMC, such as the California Building Code, the Civic Center Sustainability Plan or required infrastructure improvements.
4. For those items listed with a TBD point value, please provide specific information and background studies (i.e. traffic study) for Staff to determine an assigned point value.
5. Submit the Screening Table along with the Planning Commission Review Application.

Residential Section

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E1: Residential Energy Efficiency			
Building Envelope			
Insulation	2019 Baseline (walls R-8; roof/attic: R-30)	0 points	9
	Enhanced Insulation (walls R-13; roof/attic: R-38)	9 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic: R-38)	9 points	
	Greatly Enhanced Insulation (spray foam wall insulated walls R-15 or higher, roof/attic R-38 or higher)	11 points	
Windows	2019 Baseline Windows (0.3 U-factor, 0.23 solar heat gain coefficient (SHGC))	0 points	6
	Enhanced Window Insulation (0.28 U-Factor, 0.22 SHGC)	6 points	
	Enhanced Window Insulation (0.28 U-Factor, 0.22 SHGC)	7 points	
	Greatly Enhanced Window Insulation (0.28 or less U-Factor, 0.22 or less SHGC)	9 points	
Cool Roof	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	6 points	0
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	6 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	7 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		0
	Air barrier applied to exterior walls, caulking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	6 points	
	Blower Door HERS Verified Envelope Leakage or equivalent	5 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		0
	Modest Thermal Mass (10% of floor or 10% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	1 points	
Building Envelope Performance Standard	Enhanced Thermal Mass (20% of floor or 20% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	2 points	0
	Projects that have not been designed to a level of detail to know the specific attributes of the building envelope can use this option in committing to one of the following performance standards:		
	Modestly Enhanced Building Envelope (5% > Title 24)	12 points	
	Enhanced Building Envelope (15% > Title 24)	28 points	
	Greatly Enhanced Building Envelope (20% > Title 24)	36 points	

Feature	Description	Assigned Point Values	Project Points
Indoor Space Efficiencies Residential			
Heating/ Cooling Distribution System	Minimum Duct Insulation (R-6 required) Modest Duct insulation (R-8) Enhanced Duct Insulation (R-8) Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	0 points 5 points 5 points 7 points	5
Space Heating/ Cooling Equipment	2019 Minimum HVAC Efficiency (SEER 13/75% AFUE or 7.7 HSPF) Improved Efficiency HVAC (SEER 14/78% AFUE or 8 HSPF) High Efficiency HVAC (SEER 15/80% AFUE or 8.5 HSPF) Very High Efficiency HVAC (SEER 16/82% AFUE or 9 HSPF)	0 points 2 points 4 points 5 points	0
Water Heaters	2019 Minimum Efficiency (0.57 Energy Factor) Improved Efficiency Water Heater (0.675 Energy Factor) High Efficiency Water Heater (0.72 Energy Factor) Very High Efficiency Water Heater (0.92 Energy Factor) Solar Pre-heat System (0.2 Net Solar Fraction) Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 7 points 9 points 11 points 2 points 5 points	7
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. All peripheral rooms within the living space have at least one window (required) All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.) such that each room has at least 800 lumens of light during a sunny day All rooms daylighted	0 points 1 point 1 point	0
Artificial Lighting	2019 Minimum (required) Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) High Efficiency Lights (50% of in-unit fixtures are high efficacy) Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	0 points 5 points 6 points 7 points	5
Appliances	Energy Star Refrigerator (new) Energy Star Dish Washer (new)	1 point 1 point	

Feature	Description	Assigned Point Values	Project Points
	Energy Star Washing Machine (new)	1 point	2
Miscellaneous Building Efficiencies Residential			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	3 points	0
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	2 Points	0
Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	15 points	0
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	0
Existing Residential Retrofits	<p>The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Escondido Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project benefit low income or disadvantaged residents?</p> <p>Does the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure R2E3?</p> <p>Does the energy efficiency retrofit project provide co-benefits important to the City?</p> <p>Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.</p>	TBD	0
Reduction Measure: New Home Clean Energy			
Photovoltaic	<p>Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments:</p> <p>30 percent of the power needs of the project</p> <p>40 percent of the power needs of the project</p> <p>50 percent of the power needs of the project</p> <p>60 percent of the power needs of the project</p>	<p>9 points</p> <p>12 points</p> <p>17 points</p> <p>20 points</p>	0

Feature	Description	Assigned Point Values	Project Points
	70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 100 percent of the power needs of the project	23 points 25 points 28 points 31 points	
Wind turbines	<p>Some areas of the City lend themselves to wind turbine applications. Analysis of the area's capability to support wind turbines should be evaluated prior to choosing this feature.</p> <p>Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments:</p> 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 100 percent of the power needs of the project	9 points 12 points 17 points 20 points 23 points 25 points 28 points 31 points	0
Off-site renewable energy project	<p>The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes that will help implement R2E4. These off-site renewable energy retrofit project proposals will be determined on a case by case basis and must be accompanied by a detailed plan that documents the quantity of renewable energy the proposal will generate.</p> <p>Point values will be determined based upon the energy generated by the proposal.</p>	TBD	0
Other Renewable Energy Generation	<p>The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.</p>	TBD	0

Feature	Description	Assigned Point Values	Project Points
Reduction Measure: Water Use Reduction Initiative			
Irrigation and Landscaping			
Water Efficient Landscaping	Limit conventional turf to < 25% of each lot (required)	0 points	0
	Limit conventional turf to < 50% of each lot	2 points	
	Non-conventional turf warm season turf <50% of required landscape area and/or low-water using plants allowed)	4 points	
	Only California Native Plants that requires no irrigation or some supplemental irrigation	5 points	
Water Efficient irrigation systems	Low precipitation spray heads < .75"/hr or drip irrigation	1 point	0
	Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	2 points	
Recycled Water	Recycled connections (purple pipe) to irrigation system on site	6 points	0
Water Reuse	Gray water Reuse System collects Gray-water from clothes-washers, showers and faucets for irrigation use	12 points	0
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	0
Potable Water Residential			
Showers	Water Efficient Showerheads (2.0 gpm)	2 points	2
Toilets	Water Efficient Toilets (1.5 gpm)	2 points	2
Faucets	Water Efficient faucets (1.28 gpm)	2 points	0
Potable Water Performance Standard	Projects that have not been designed to a level of detail to know the specific attributes of the interior design of the buildings can use this option in committing to a potable water supply performance standard		
	EPA High Efficiency Water Fixtures (15% > Title 24)		
Reduction Measure: Land Use Based Trips and VMT Reduction			
Mixed Use Residential	Mixes of land uses that complement one another in a way that reduces the need for vehicle, determined based upon a Transportation Impact Analysis	TBD	0
	Increased destination accessibility other than transit.	TBD	

Feature	Description	Assigned Point Values	Project Points
	Infill location that reduces vehicle trips or VMT beyond the specified measures.	TBD	0
Residential Near Local Retail	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT)	TBD	0
Other Trip Reduction Measures	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	0
Reduction Measure: Bicycle Master Plan Development			
Bicycle Infrastructure	Provide bicycle paths within project boundaries. Provide bicycle path linkages between residential and other land uses. Provide bicycle path linkages between residential and transit.	TBD 2 points 5 points	0
Reduction Measure: Install EV Chargers			
Electric Vehicle Recharging	Level 1 110 volt AC chargers Per Charger Level 2 240 volt AC Fast Chargers Per Charger	2 points 5 points	0
Reduction Measure: Traffic Flow Management Improvements			
	Signal Synchronization Signal connected to existing ITS	1 point 3 points	0
Total Points Earned by Residential Project:			

-Residential Section Ends-

Commercial/Industrial Section

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E3: Energy Efficiency For Commercial Development			
Building Envelope			
Insulation	2019 baseline (walls R-16; roof/attic R-32)	0 points	
	Modestly Enhanced Insulation (walls R-15, roof/attic R-38)	9 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38)	11 points	
	Greatly Enhanced Insulation (spray foam insulated walls R-18 or higher, roof/attic R-38 or higher)	12 points	
Windows	2019 Baseline Windows (0.3 U-factor, 0.23 solar heat gain coefficient [SHGC])	0 points	
	Enhanced Window Insulation (0.28 U-factor, 0.22 SHGC)	4 points	
	Enhanced Window Insulation (0.28 U-factor, 0.22 SHGC)	4 points	
	Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC)	5 points	
Cool Roofs	2019 Standard (none)	0 points	
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	7 points	
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	7 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	8 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage	0 points	
	Air barrier applied to exterior walls, caulking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	7 points	
	Blower Door HERS Verified Envelope Leakage or equivalent	6 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		
	Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	2 points	
	Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	14 points	

Feature	Description	Assigned Point Values	Project Points
Building Envelope Performance Standard	<p>Projects that have not been designed to a level of detail to know the specific attributes of the building envelope can use this option in committing to one of the following performance standards</p> <p>Modestly Enhanced Building Envelope (5% > Title 24)</p> <p>Enhanced Building Envelope (15% > Title 24)</p> <p>Greatly Enhanced Building Envelope (20% > Title 24)</p>	<p>TBD</p> <p>TBD</p> <p>TBD</p>	
Indoor Space Efficiencies Commercial			
Heating/ Cooling Distribution System	<p>Minimum Duct Insulation (R-6 required)</p> <p>Enhanced Duct Insulation (R-8)</p> <p>Enhanced Duct Insulation (R-8)</p> <p>Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)</p>	<p>0 points</p> <p>5 points</p> <p>5 points</p> <p>6 points</p>	
Space Heating/ Cooling Equipment	<p>2019 Minimum HVAC Efficiency (EER 13/75% AFUE or 7.7 HSPF)</p> <p>Improved Efficiency HVAC (EER 14/78% AFUE or 8 HSPF)</p> <p>High Efficiency HVAC (EER 15/80% AFUE or 8.5 HSPF)</p> <p>Very High Efficiency HVAC (EER 16/82% AFUE or 9 HSPF)</p>	<p>0 points</p> <p>4 points</p> <p>5 points</p> <p>7 points</p>	
Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings	<p>TBD</p> <p>TBD</p>	
Water Heaters	<p>2019 Minimum Efficiency (0.57 Energy Factor)</p> <p>Improved Efficiency Water Heater (0.675 Energy Factor)</p> <p>High Efficiency Water Heater (0.72 Energy Factor)</p> <p>Very High Efficiency Water Heater (0.92 Energy Factor)</p> <p>Solar Pre-heat System (0.2 Net Solar Fraction)</p> <p>Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)</p>	<p>0 points</p> <p>8 points</p> <p>10 points</p> <p>11 points</p> <p>2 points</p> <p>5 points</p>	
Daylighting	<p>All peripheral rooms within the customer areas have at least one window</p> <p>All rooms within the customer areas have daylight (through use of windows, solar tubes, skylights, etc.) such that each room has at least 800 lumens of light during a sunny day</p> <p>All rooms daylighted</p>	<p>0 points</p> <p>1 points</p> <p>1 points</p>	

Feature	Description	Assigned Point Values	Project Points
Artificial Lighting	2019 Minimum (required)	0 points	
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	5 points	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	7 points	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	8 points	
Appliances	Energy Star Commercial Refrigerator (new)	2 points	
	Energy Star Commercial Dish Washer (new)	2 points	
	Energy Star Commercial Cloths Washing Machine (new)	2 points	
Indoor Space Performance Standard	Projects that have not been designed to a level of detail to know the specific attributes of the interior design of the buildings can use this option in committing to one of the following performance standards		
	Modestly Enhanced Interior and appliances (5% > Title 24)	TBD	
	Enhanced Interior and appliances (15% > Title 24)	TBD	
	Greatly Enhanced Interior and appliances (20% > Title 24)	TBD	
Miscellaneous Commercial/Industrial Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	4 points	
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	6 points	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table.	TBD	
	Engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.		
Existing Commercial Retrofits	<p>The applicant may wish to provide energy efficiency retrofit projects to existing Commercial dwelling units to further the point value of their project. Retrofitting existing Commercial dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Escondido Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following:</p> <p>Will the energy efficiency retrofit project benefit low income or disadvantaged residents?</p> <p>Does the energy efficiency retrofit project fit within the overall assumptions in Reduction Measure R2E3?</p>		

Feature	Description	Assigned Point Values	Project Points
	<p>Does the energy efficiency retrofit project provide co-benefits important to the City?</p> <p>Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.</p>	TBD	
Reduction Measure PS E2: New Commercial/Industrial Renewable Energy			
Photovoltaic	<p>Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments:</p> <p>30 percent of the power needs of the project</p> <p>40 percent of the power needs of the project</p> <p>50 percent of the power needs of the project</p> <p>60 percent of the power needs of the project</p> <p>70 percent of the power needs of the project</p> <p>80 percent of the power needs of the project</p> <p>90 percent of the power needs of the project</p> <p>100 percent of the power needs of the project</p>	<p>8 points</p> <p>12 points</p> <p>16 points</p> <p>19 points</p> <p>23 points</p> <p>26 points</p> <p>30 points</p> <p>34 points</p>	
Wind turbines	<p>Some areas of the City lend themselves to wind turbine applications. Analysis of the area's capability to support wind turbines should be evaluated prior to choosing this feature.</p> <p>Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments:</p> <p>30 percent of the power needs of the project</p> <p>40 percent of the power needs of the project</p> <p>50 percent of the power needs of the project</p> <p>60 percent of the power needs of the project</p> <p>70 percent of the power needs of the project</p> <p>80 percent of the power needs of the project</p> <p>90 percent of the power needs of the project</p> <p>100 percent of the power needs of the project</p>	<p>8 points</p> <p>12 points</p> <p>16 points</p> <p>19 points</p> <p>23 points</p> <p>26 points</p> <p>30 points</p> <p>34 points</p>	
Off-site renewable energy project	<p>The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing Commercial that will help implement R2 E4, or existing commercial/industrial that will help implement R2 E7. These off-site renewable energy retrofit project proposals will be determined on a case by case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate.</p> <p>Point values will be determined based upon the energy generated by the proposal.</p>	TBD	

Feature	Description	Assigned Point Values	Project Points
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure PS W2: Water Use Reduction Initiative			
Irrigation and Landscaping			
Water Efficient Landscaping	Eliminate conventional turf from landscaping Only moderate water using plants Only low water using plants Only California Native landscape that requires no or only supplemental irrigation	0 points 2 points 3 points 5 points	
Water Efficient Irrigation Systems	Low precipitation spray heads < .75"/hr. or drip irrigation Weather based irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	1 point 3 points	
Recycled Water	Recycled water connection (purple pipe) to irrigation system on site	5 points	
Trees	Increase tree planting in parking areas 50% beyond City Code requirements	TBD	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	
Potable Water Commercial			
Showers	Water Efficient Showerheads (2.0 gpm)	2 points	
Toilets	Water Efficient Toilets/Urinals (1.5gpm) Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 3 points	
Faucets	Water Efficient faucets (1.28gpm)	2 points	
Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	2 points	

Feature	Description	Assigned Point Values	Project Points
Commercial Laundry Washers	EPA Water Efficient laundry (15% water savings)	2 points	
	EPA High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	4 points	
Commercial Water Operations Program	<p>Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water.</p> <p>Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.</p>	TBD	
Potable Water Performance Standard	Projects that have not been designed to a level of detail to know the specific attributes design can use this in committing to a potable water efficiency	TBD	
Reduction Measure: Land Use Based Trips and VMT Reduction			
Mixed Use Commercial	<p>Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges:</p> <p>Mixes of land uses that complement one another in a way that reduces the need for vehicle, determined based upon a Transportation Impact Analysis (2-28 points)</p> <p>Increased destination accessibility other than transit (1-18 points)</p> <p>Increased transit accessibility (1-28 points)</p> <p>Infill location that reduces vehicle trips or VMT beyond the specified measures</p>	<p>TBD</p> <p>TBD</p> <p>TBD</p> <p>TBD</p> <p>TBD</p>	
Local Retail Near Residential (Commercial only Projects)	<p>Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled.</p> <p>The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.</p> <p>Preferential parking</p> <p>Synchronize signals</p> <p>Connect signals to existing ITS</p>	<p>TBD</p> <p>1 point</p> <p>1 point</p> <p>3 points</p>	
Reduction Measure: Bicycle Master Plan Development			
Bicycle Infrastructure	<p>Provide bicycle paths within project boundaries.</p> <p>Provide bicycle path linkages between residential and other land uses.</p> <p>Provide bicycle path linkages between residential and transit.</p>	<p>1 point</p> <p>2 points</p> <p>5 points</p>	

Feature	Description	Assigned Point Values	Project Points
Reduction Measure: Electric Vehicle Infrastructure			
Cars	Level 2 240 volt AC Fast Chargers Level 3 480 volt DC Rapid Chargers	5 points 8 points	
Trucks	Medium & Heavy Duty Electric Truck Chargers Level 1 AC Chargers for EV Medium Duty Truck Level 1 AC Chargers for EV Class 8 (Heavy Duty) Truck Level 2 AC Chargers for EV Medium Duty Truck Level 2 AC Chargers for EV Class 8 (Heavy Duty) Truck Level 3 DC Chargers for EV Class 8 (Heavy Duty) Truck	3 points 5 points 8 points 12 points 16 points	
Total Points from Commercial/Industrial Project:			

-Commercial/Industrial Section Ends-



**REPORT OF GEOTECHNICAL EXPLORATION
PROPOSED 66-LOT RESIDENTIAL DEVELOPMENT
VTTM NO. 20544, APN 3071-111-01
SOUTHEAST OF BEAR VALLEY ROAD AND VERBENA ROAD
VICTORVILLE, SAN BERNARDINO COUNTY, CALIFORNIA**

Prepared For **CHARLES F. PAINE AND JUDITH S.
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TRUST DATED 12/14/1978
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Project No. 13526.001

June 24, 2022



Leighton and Associates, Inc.

A Leighton Group Company

June 24, 2022

Project No. 13526.001

To: Charles F. Paine and Judith S. Paine, Trustees of the Pain Family Trust
dated 12/14/1978
Jack Lee Herron and Deborah L. Herron, Trustees of the Jack and
Deborah Herron Trust dated 02/01/08
2472 Chambers Road, Suite 150
Tustin, California 92780

Attention: Mr. Jack Herron

Subject: Report of Geotechnical Investigation, Proposed 66-Lot Residential
Development, VTTM No. 20544, APN 3071-111-01
Southeast of Bear Valley Road and Verbena Road
Victorville, San Bernardino County, California

In response to your request, Leighton and Associates, Inc. has conducted a preliminary geotechnical investigation for the proposed 66-Lot residential development located at Vesting Tentative Tract Map (VTTM) No. 20544, Assessor's Parcel Number (APN) 3071-111-01, in the City of Victorville California. The property is located southeast of Bear Valley Road and Verbena Road. The purpose of this investigation was to evaluate the general geotechnical conditions at the site with respect to the proposed development and to provide preliminary geotechnical recommendations for design and construction.

Based on this investigation, construction of the proposed residential development is feasible from a geotechnical standpoint. The most significant geotechnical issues with respect to the project are those related to the potential for strong seismic shaking and potentially compressible soil. Good planning and design of the project can limit the

impact of these constraints. This report presents our preliminary findings, conclusions, and geotechnical recommendations for the project.

We appreciate the opportunity to work with you on the development of this project. If you have any questions regarding this report, please call us at your convenience.

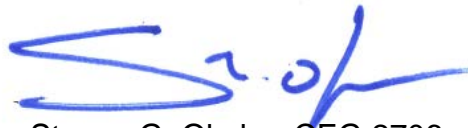
Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.




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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION.....	1
1.1 Site Location and Description.....	1
1.2 Proposed Development.....	1
1.3 Purpose of Investigation.....	2
1.4 Scope of Work.....	2
2.0 FINDINGS	5
2.1 Regional Geologic Setting.....	5
2.2 Subsurface Soil Conditions	5
2.2.1 Compressible and Collapsible Soil	6
2.2.2 Expansive Soils	6
2.2.3 Sulfate Content.....	7
2.2.4 Resistivity, Chloride and pH	7
2.3 Groundwater	7
2.4 Faulting and Seismicity	8
2.4.1 Surface Faulting	8
2.4.2 Seismic Design Parameters	8
2.5 Secondary Seismic Hazards	10
2.5.1 Liquefaction Potential	10
2.5.2 Seismically Induced Settlement.....	11
2.5.3 Seismically Induced Landslides.....	11
2.6 Infiltration Testing.....	11
3.0 CONCLUSIONS AND RECOMMENDATIONS	13
3.1 General Earthwork and Grading.....	13
3.1.1 Site Preparation.....	13
3.1.2 Overexcavation and Recomaction.....	13
3.1.3 Fill Placement and Compaction	14
3.1.4 Import Fill Soil.....	14
3.1.5 Shrinkage and Subsidence.....	15
3.1.6 Rippability and Oversized Material	15
3.2 Recommendations for Foundations	16
3.2.1 Minimum Embedment and Width.....	16
3.2.2 Allowable Bearing.....	16
3.2.3 Lateral Load Resistance.....	16
3.2.4 Settlement Estimates.....	17

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
3.3 Recommendations for Slabs-On-Grade	17
3.3.1 Slab Underlayment for Moisture Vapor Retarding	18
3.4 Seismic Design Parameters	19
3.5 Lateral Earth Pressures	19
3.6 Cement Type and Corrosion Protection	21
3.7 Pavement Design	21
3.8 Infiltration Recommendations	22
3.9 Temporary Excavations	26
3.10 Trench Backfill	27
3.11 Surface Drainage	27
3.12 Additional Geotechnical Services	28
4.0 LIMITATIONS	29

Appendices

Appendix A - References

Appendix B - Geotechnical Boring Logs and Infiltration Test Results

Appendix C - Laboratory Test Results

Appendix D - Seismic

Appendix E - General Earthwork and Grading Specifications

Figures (Rear of Text)

Figure 1 - Site Location Map

Figure 2 - Boring and Infiltration Test Location Map

Figure 3 - Regional Geology Map

Figure 4 - Regional Faults and Historical Seismicity Map

Figure 5 - Retaining Wall Backfill and Subdrain Detail

1.0 INTRODUCTION

1.1 Site Location and Description

The site is approximately 20 acres and located southeast of the intersection of Bear Valley Road and Verbena Road, in the southwestern portion of the City of Victorville, San Bernardino County, California (see Figure 1, *Site Location Map*). The site is bounded to the north by Bear Valley Road, to the west by Verbena Road, to the south by Sierra Road, and to the east by vacant land. The surrounding areas around the site are currently undeveloped, with the exception of existing single-family homes on the southwest corner of Sierra Road and Verbena Road and the previous home that was removed sometime in 2016 adjacent to the northeast corner of the site.

The site and surroundings are relatively flat and generally drain to the north, with site elevations ranging from approximately 3,385 feet above mean sea level on the south to an approximate elevation of 3,360 feet above msl on the northern end of the site.

Based on a review of available historical aerial photographs from 1952 to present, the site has been undeveloped.

1.2 Proposed Development

Our understanding of the project is based on the provided *Vesting Tentative Tract Map No. 20544* prepared by Madole and Associates, Inc., plotted March 11, 2022. The plan shows the proposed development of approximately 66 lots that will accommodate single family homes, each with a minimum 7,200-square-foot lot area. Also planned are three lots (A, B, C) planned for landscape, and one lot (D) proposed to be utilized as a park and detention basin. Additional development will include interior streets and sidewalks, and presumably landscape and buried utility improvements.

Although no grading plans were available for our review, the site has low relief, and relatively shallow cuts and fills (generally 5 feet or less) have been assumed to ultimately achieve design grades.

1.3 Purpose of Investigation

The purpose of this study has been to evaluate the general geotechnical conditions at the site with respect to the proposed development and to provide preliminary geotechnical recommendations for design and construction.

Our geotechnical exploration included hollow-stem auger soil borings, infiltration testing, laboratory testing and geotechnical analysis to evaluate existing conditions and develop the recommendations contained in this report.

1.4 Scope of Work

Our scope of work has included the following tasks:

- Background Review: We reviewed available, relevant geotechnical/ geologic maps and reports and aerial photographs available from our in-house library.
- Utility Coordination: We contacted Underground Services Alert (USA) prior to excavating borings so that utility companies could mark utilities onsite in the areas of our proposed borings.
- Field Exploration: Our field exploration included drilling of hollow-stem auger borings and infiltration testing. Logs of the geotechnical borings and infiltration testing are presented in Appendix B.

Seven (7) hollow-stem auger borings (LB-1 through LB-5 and IT-1 through IT-2) were drilled, logged, and sampled in representative locations onsite to evaluate the subsurface conditions. The borings were excavated by a subcontracted drill rig operator to depths ranging from 20 to 51.5 feet below the existing ground surface (bgs). Each boring was logged by a member of our technical staff. Relatively undisturbed soil samples were obtained at selected depth intervals within each boring using a modified California ring sampler. Standard Penetration Tests (SPT) were conducted at selected depths within the borings and samples were obtained. Bulk samples of representative soil types were also obtained from the borings.

Well permeameter tests were conducted within two of these borings (IT-1 and IT-2) to evaluate general infiltration rates of subsurface soils at the depths and locations tested based on the anticipated location of the proposed basin within Lot D located on the northeast portion of the site. Well permeameter tests were conducted based on the USBR-7300-89 method. Tests were conducted at depths of approximately 17 to 20 feet bgs to estimate the tested soil's infiltration characteristics.

Borings drilled at the site were backfilled and tamped with soil cuttings at the surface. Logs of the geotechnical borings are presented in Appendix B. Approximate boring locations are shown on the accompanying Figure 2, *Boring and Infiltration Test Location Map*.

- Geotechnical Laboratory Testing: Geotechnical laboratory tests were conducted on selected relatively undisturbed and bulk soil samples obtained during our field investigation. This laboratory testing program was designed to evaluate engineering characteristics of site soils. Laboratory tests conducted during this investigation include:
 - In situ moisture content and dry density
 - Maximum dry density, optimum moisture content
 - Grain size distribution and percent fines
 - Expansion index
 - Swell and collapse potential
 - Water-soluble sulfate concentration
 - Resistivity, chloride content and pH

The laboratory test results are presented in Appendix C.

- Engineering Analysis: Data obtained from our background review, field exploration and geotechnical laboratory testing was evaluated and analyzed to develop geotechnical conclusions and to provide preliminary recommendations presented in this report.

- Report Preparation: Results of our preliminary geotechnical investigation have been summarized in this report, presenting our findings, conclusions and preliminary geotechnical recommendations for design and construction of the proposed residential development.

2.0 FINDINGS

2.1 Regional Geologic Setting

The site is located in the western Mojave Desert, in San Bernardino County California, and is part of the Mojave Desert geomorphic province, a wide interior region of isolated mountain ranges separated by broad desert plains and deep alluvial valleys. The Mojave province is a structural block wedged in a sharp angle between the Garlock fault (southern boundary of the Sierra Nevada) and the San Andreas fault, where the San Andreas fault bends north from its northwest trend. The northern boundary of the Mojave province is separated from the prominent Basin and Range to the north by the eastern extension of the Garlock fault. The San Andreas fault, at its nearest point, is approximately 12.7 miles southwest of the project site.

The geology of the region consists of three main rock groups, crystalline rocks of Pre-Tertiary age; volcanic and sedimentary rocks of the Tertiary age; and alluvial sedimentary rocks of the Quaternary age. The Pre-Tertiary and Tertiary rocks are hard, consolidated materials forming the surrounding mountains and rocky buttes that rise from the valley floors and underlie the alluvium at depths. The valley soil profile consists of up to several thousand feet of fine to coarse-grained alluvial fill underlain by consolidated rocks. The alluvial fill consists of Pliocene to Holocene age (5 million years old to recent) fine to coarse-grained soil layers formed as a result of uplift and erosion of the surrounding mountains. Figure 3, *Regional Geologic Map* shows the site in relation to the predominate geologic material (alluvium) of the area.

Quaternary Young Alluvial Fan Deposits (Map Symbol Qyf): On a local site-specific scale, the site is mapped as being underlain by Holocene age (recent) young alluvial fan deposits (see Figure 3, *Regional Geology Map*) consisting of fine to coarse sand and gravel eroded and transported from the surrounding mountain areas.

2.2 Subsurface Soil Conditions

Based upon our review of pertinent geotechnical literature and our subsurface exploration, the site is underlain by alluvial deposits. The alluvial soil encountered within the borings generally consisted of sand and silty sands with varying

amounts of gravel within the matrix. The soil was generally moist and medium dense to dense. The in-situ moisture content within the upper approximately 10 feet generally ranged from 1 to 4 percent and was typically described as dry to moist, while the in situ dry density within the upper 10 feet generally ranged from 107 to 120 pound per cubic feet (pcf). More detailed descriptions of the subsurface soil are presented on the boring logs in Appendix B.

2.2.1 Compressible and Collapsible Soil

Soil compressibility refers to a soil's potential for settlement when subjected to increased loads as from a fill surcharge. Based on our investigation, the near surface alluvial soil encountered is generally considered moderately compressible. Partial removal and recompaction of this material under shallow foundations is recommended to reduce the potential for adverse total and differential settlement of the proposed improvements.

Collapse potential refers to the potential settlement of a soil under existing stresses upon being wetted. Based on the results of or laboratory testing, the relatively shallow onsite alluvial soil is anticipated to have a low collapse potential.

2.2.2 Expansive Soils

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Foundations constructed on these soils are subject to large uplifting forces caused by the swelling. Without proper measures taken, heaving and cracking of both building foundations and slabs-on-grade could result.

A sample of the subsurface soil was tested for expansion potential. The test result indicates an Expansion Index of 0. Based on our field sampling and laboratory test results, soils with very low expansion potential are expected onsite.

2.2.3 Sulfate Content

Water-soluble sulfates in soil can react adversely with concrete. However, concrete in contact with soil containing sulfate concentrations of less than 0.1 percent by weight is considered to have negligible sulfate exposure based on the American Concrete Institute (ACI) provisions, adopted by the 2016 CBC (CBC, 2016, Chapter 19, and ACI, 2005, Chapter 4).

A near-surface soil sample was tested during this investigation for soluble sulfate content. The results of this test indicate a sulfate content of approximately 0.015 percent by weight, indicating negligible sulfate exposure.

2.2.4 Resistivity, Chloride and pH

Soil corrosivity to ferrous metals can be estimated by the soil's electrical resistivity, chloride content, and pH level. In general, soil having a minimum resistivity less than 1,000 ohm-cm is considered severely corrosive, soil having a minimum resistivity of 1,000 to 2,000 is considered corrosive, soil having a minimum resistivity of 2,000 to 5,000 is considered moderately corrosive, and soil having a minimum resistivity of 5,000 to 10,000 is considered mildly corrosive. Soil with a chloride content of 500 ppm or greater is considered corrosive to ferrous metals.

As a screening for potentially corrosive soil, a representative soil sample was tested during this investigation to estimate minimum resistivity, chloride content, and pH. The test indicates a minimum resistivity 9,410 ohm-cm, chloride content of 40 ppm, and pH of 6.8. Based on these results, the onsite soil is considered mildly corrosive to ferrous metals.

2.3 Groundwater

Groundwater was not encountered in any of our borings to a max explored depth of 51 ½ feet below ground surface.

Based on groundwater data from a nearby well (State Well No. 05N05W22E002S) located approximately 3 miles northeast of the site with

groundwater readings from 1960 to 2006, the shallowest groundwater reading identified was measured on March 1961, which was at an elevation of 2,823 feet above mean sea level (msl). This elevation correlates to a groundwater depth of 302 feet bgs based on the lowest elevation at the project site (CDWR, 2022).

More recent groundwater readings from another nearby groundwater well (State Well No. 04N05W09R001S) managed by the Mojave Water Agency, located approximately 2.1 miles southeast of the site, from readings measured from October 2010 to March 2020 indicated the shallowest groundwater recorded was at an elevation of 2,881 feet msl on May 2015 (CDWR, 2022). This groundwater elevation correlates to a groundwater depth of approximately 589 feet bgs based on the lowest elevation at the project site.

2.4 Faulting and Seismicity

In general, the primary seismic hazards for sites in the region include surface rupture along active faults and strong ground shaking. The potential for fault rupture and seismic shaking are discussed below.

2.4.1 Surface Faulting

Our review of available in-house literature indicates that there are no known active faults traversing the site. The closest known active or potentially active fault is the Cleghorn fault, located approximately 11.1 miles south of the site. Based on our review of readily available resources, no active faults have been previously mapped through or trending towards the project site.

Based on our understanding of the current geologic framework, the potential for future surface rupture of active faults onsite is considered very low.

2.4.2 Seismic Design Parameters

The site will experience strong ground shaking after the proposed project is developed resulting from an earthquake occurring along one or more of the major active or potentially active faults in southern California.

Accordingly, the project should be designed in accordance with all applicable current codes and standards utilizing the appropriate seismic design parameters to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117a (CGS, 2008). Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential effects relating to seismic shaking can be reduced.

The following parameters should be considered for design under the 2019 CBC:

2019 CBC Parameters (CBC or ASCE 7-16 reference)	Value 2019 CBC
Site Latitude and Longitude: 34.4685, -117.4247	
Site Class Definition (1613.2.2, ASCE 7-16 Ch 20)	D**
Mapped Spectral Response Acceleration at 0.2s Period (1613.2.1), S_s	1.423 g
Mapped Spectral Response Acceleration at 1s Period (1613.2.1), S_1	0.553 g
Short Period Site Coefficient at 0.2s Period (T1613.2.3(1)), F_a	1.000
Long Period Site Coefficient at 1s Period (T1613.2.3(2)), F_v	1.747*
Adjusted Spectral Response Acceleration at 0.2s Period (1613.2.3), S_{MS}	1.423 g
Adjusted Spectral Response Acceleration at 1s Period (1613.2.3), S_{M1}	0.966* g
Design Spectral Response Acceleration at 0.2s Period (1613.2.4), S_{DS}	0.949 g
Design Spectral Response Acceleration at 1s Period (1613.2.4), S_{D1}	0.644* g
Mapped MCE_G peak ground acceleration (11.8.3.2, Fig 22-9 to 13), PGA	0.500 g
Site Coefficient for Mapped MCE_G PGA (11.8.3.2), F_{PGA}	1.100
Site-Modified Peak Ground Acceleration (1803.5.12; 11.8.3.2), PGA_M	0.550 g

* Per Table 11.4-2 of Supplement 1 of ASCE 7-16, this value of F_v may only be used to calculate T_s [that note is not included in Table 1613A.2.3(2)]; note that S_{D1} and S_{M1} are functions of F_v . In addition, per Exception 2 of 11.4.8 of ASCE 7-16, special equations for C_s are required. This is in lieu of a site-specific ground motion hazard analysis per ASCE 7-16 Chapter 21.2.

** Site Class D, and all of the resulting parameters in this table, may only be used for structures without seismic isolation or seismic damping systems.

Based on the 2019 CBC Table 1613.2.3(2) footnote c., F_v should be determined in accordance with Section 11.4.8 of ASCE 7-16, since the mapped spectral response acceleration at 1 second is greater than 0.2g for Site Class D; in

accordance with Section 11.4.8 of ASCE 7-16, a site-specific seismic analysis is required. However, the values provided in the table above may be utilized if design is performed in accordance with Exception (2) in Section 11.4.8 of ASCE 7-16, with special requirements for the seismic response coefficient (C_s), and F_v is only used for calculation of T_s . This exception does not apply (and the values in the table above would not be applicable) for proposed structures with seismic isolation or seismic damping systems. The project structural engineer should review the seismic parameters. A site-specific seismic ground motion analysis can be performed upon request.

2.5 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding, and earthquake-induced flooding. The potential for secondary seismic hazards at the site is discussed below.

2.5.1 Liquefaction Potential

Liquefaction is the loss of soil strength or stiffness due to a buildup of pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine-to-medium grained, cohesionless soils. As the shaking action of an earthquake progresses, the soil grains are rearranged, and the soil densifies within a short period of time. Rapid densification of the soil results in a buildup of pore-water pressure. When the pore-water pressure approaches the total overburden pressure, the soil reduces greatly in strength and temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, settlement, and bearing capacity failures below structural foundations.

San Bernardino County has mapped the site to not be within an area that is susceptible to liquefaction hazards based on the Land Use Plan Geologic Hazards Overlay Map EHFH C (SBC, 2010) The State of California has not prepared liquefaction hazard maps for this area.

Based on the site not having shallow groundwater historically and the relatively dense nature of the underlying soils the potential for liquefaction to occur onsite is considered very low.

2.5.2 Seismically Induced Settlement

During a strong seismic event, seismically induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking is often nonuniformly distributed, which can result in differential settlement.

We have performed analyses to estimate the potential for seismically induced settlement using the method of Tokimatsu and Seed (1987), and based on Martin and Lew (1999), considering the maximum considered earthquake (MCE) peak ground acceleration (PGA_M). The results of our analyses suggest that the onsite soils are susceptible to 1 inch or less of seismic settlement based on the MCE. Differential settlement due to seismic loading is assumed to be ½ inch or less over a horizontal distance of 40 feet based on the MCE. A summary of seismic settlement analysis is included in Appendix D.

2.5.3 Seismically Induced Landslides

The site is generally level without significant slopes. This site is not considered susceptible to static slope instability or seismically induced landslides.

2.6 Infiltration Testing

Two well permeameter tests were conducted onsite (IT-1 and IT-2) to evaluate infiltration rates of native soils. The encountered soils were generally composed of sand and silty sand in the upper 20 feet. Well permeameter tests IT-1 and IT-2 were performed within sand and silty sand material at test zone depths of about 17 to 20 feet bgs.

Well permeameter tests are useful for field measurements of soil infiltration rates, and are suited for testing when the design depth of the basin or chamber is

deeper than current existing grades. It should be noted that this is a clean-water, small-scale test, and that correction factors need to be applied. The test consisted of excavating a boring to the depth of the test. A layer of clean sand was placed in the boring bottom to support temporary perforated well casing pipe. In addition, No. 3 Monterrey Sand was poured around the outside of the well casing within the test zone to prevent the boring from caving/collapsing or eroding when water was added. Water was added into the boring to the predetermined test zone depth from a supplied water source and measured at select time intervals as a falling head test method. The test is repeated several times until a constant rate is achieved. The incremental infiltration rate as measured during intervals of the test is defined as the incremental flow rate of water infiltrated, divided by the surface area of the infiltration interface. The test was conducted based on the USBR 7300-89 test method.

Field infiltration tests indicated small scale unfactored infiltration rates of 14.9 in/hr to 35 in/hr at the depths tested. See Section 3.8 for infiltration recommendations. The results of infiltration tests are provided in Appendix B.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on this investigation, construction of the proposed 66-Lot residential development is feasible from a geotechnical standpoint. No severe geologic or soils related issues were identified that would preclude development of the site for the proposed improvements. The most significant geotechnical issues at the site are those related to the potential for strong seismic shaking, and potentially compressible near surface soils. Good planning and design of the project can limit the impact of these constraints. Remedial recommendations for these and other geotechnical issues are provided in the following sections.

3.1 General Earthwork and Grading

All grading should be performed in accordance with the General Earthwork and Grading Specifications presented in Appendix E, unless specifically revised or amended below or by future recommendations based on final development plans.

3.1.1 Site Preparation

Prior to construction, the site should be cleared of vegetation, trash and debris, which should be disposed of offsite. Any underground obstructions should be removed, as should large trees and their root systems. Resulting cavities should be properly backfilled and compacted. Efforts should be made to locate existing utility lines. Those lines should be removed or rerouted if they interfere with the proposed construction, and the resulting cavities should be properly backfilled and compacted.

3.1.2 Overexcavation and Recomaction

To reduce the potential for adverse differential settlement of the proposed improvements, the underlying subgrade soil should be prepared in such a manner that a uniform response to the applied loads is achieved. For structures with shallow foundations, we recommend that onsite alluvial soils be overexcavated and recompacted to a minimum depth of 3 feet below the bottom of the proposed footings or 4.5 feet below existing grade, whichever is deeper. Overexcavation and recompaction should

extend a minimum horizontal distance of 5 feet from perimeter edges of the proposed footings, where feasible.

Local conditions may require that deeper overexcavation be performed; such areas should be evaluated by Leighton during grading.

Areas outside these overexcavation limits planned for asphalt or concrete pavement, site walls, and areas to receive fill should be overexcavated to a minimum depth of 24 inches below the existing ground surface or 12 inches below the proposed subgrade, whichever is deeper. In addition, any undocumented artificial fill should be overexcavated.

After completion of the overexcavation, and prior to fill placement, the exposed surfaces should be scarified to a minimum depth of 6 inches, moisture conditioned to or slightly above optimum moisture content, and recompacted to a minimum 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.1.3 Fill Placement and Compaction

Onsite soil to be used for compacted structural fill should also be free of debris, organic material and oversized material (greater than 8 inches in largest dimension). Any soil to be placed as fill, whether onsite or imported material, should be reviewed and possibly tested by Leighton.

All fill soil should be placed in thin, loose lifts, moisture conditioned, as necessary, and compacted to a minimum 90 percent relative compaction. Relative compaction should be determined in accordance with ASTM Test Method D1557. Aggregate base for pavement should be compacted to a minimum of 95 percent relative compaction.

3.1.4 Import Fill Soil

Import soil to be placed as fill should be geotechnically accepted by Leighton. Preferably at least 3 working days prior to proposed import to the site, the contractor should provide Leighton pertinent information of the proposed import soil, such as location of the soil, whether stockpiled or

native in place, and pertinent geotechnical reports if available. We recommend that a Leighton representative visit the proposed import site to observe the soil conditions and obtain representative soil samples. Potential issues may include soil that is more expansive than onsite soil, soil that is too wet, soil that is too rocky or too dissimilar to onsite soils, oversize material, organics, debris, etc.

3.1.5 Shrinkage and Subsidence

The change in volume of excavated and recompact soil varies according to soil type and location. This volume change is represented as a percentage increase (bulking) or decrease (shrinkage) in volume of fill after removal and recompaction. Subsidence occurs as in-place soil (e.g., natural ground) is moisture-conditioned and densified to receive fill, such as in processing an overexcavation bottom. Subsidence is in addition to shrinkage due to recompaction of fill soil. Field and laboratory data used in our calculations included laboratory-measured maximum dry densities for soil types encountered at the subject site, the measured in-place densities of soils encountered and our experience. We preliminarily estimate the following earth volume changes will occur during grading:

Shrinkage	Approximately 15 +/- 5 percent
Subsidence (overexcavation bottom processing)	Approximately 0.20 foot

The level of fill compaction, variations in the dry density of the existing soils and other factors influence the amount of volume change. Some adjustments to earthwork volume should be anticipated during grading of the site.

3.1.6 Rippability and Oversized Material

Oversized material (rock or rock fragments greater than 8 inches in dimension) was not observed during our investigation. Oversized material should not be used within structural fill areas.

3.2 Recommendations for Foundations

Based on our study, conventional shallow foundations may be used to support the loads of the proposed single-family wood-frame structures. Overexcavation and recompaction of the footing subgrade soil should be performed as detailed in Section 3.1. The following design parameters are based on soils with a very low expansion potential. Additional testing of expansion potential should be conducted at the conclusion of site grading.

3.2.1 Minimum Embedment and Width

Footings for the proposed single-family structures should have a minimum embedment depth in accordance with California Building Code (CBC) requirements, with a minimum width of 24 and 15 inches for isolated and continuous footings, respectively.

3.2.2 Allowable Bearing

An allowable bearing pressure of 2,000 pounds-per-square-foot (psf) may be used, based on the minimum embedment depth and width above. This allowable bearing value may be increased by 250 psf per foot increase in depth or width to a maximum allowable bearing pressure of 4,000 psf. If additional allowable bearing pressure is needed, this should be evaluated on a case-by-case basis. These allowable bearing pressures are for total dead load and sustained live loads, and include a factor of safety of 3 which factor of safety does not consider excessive settlement. Footing reinforcement should be designed by the structural engineer, but as a minimum, footings should have one No. 4 rebar top and bottom.

3.2.3 Lateral Load Resistance

Soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the foundation and the subgrade soil may be computed using a coefficient of friction of 0.35. The passive resistance may be computed using an

unfactored equivalent fluid pressure of 375 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil. Friction and passive pressure may be combined without reduction, provided the footings can move laterally sufficiently to develop passive pressure (approximately $\frac{1}{4}$ inch); otherwise, friction alone should be assumed.

3.2.4 Settlement Estimates

The recommended allowable bearing pressure is generally based on a total allowable, post-construction settlement of 1 inch. Differential settlement due to static loading is estimated at $\frac{1}{2}$ inch over a horizontal distance of 40 feet. Since settlement is a function of footing sustained load, size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists.

3.3 Recommendations for Slabs-On-Grade

Slabs-on-grade should be designed by the structural engineer in accordance with the current CBC for soils with a very low expansion potential. Where conventional light floor loading conditions exist, the following minimum recommendations should be used. More stringent requirements may be required by local agencies, the structural engineer, the architect, or the CBC. Laboratory testing should be conducted at the end of rough grading to evaluate the expansion index of near-surface subgrade soils. Slabs-on-grade should have the following minimum recommended components:

- Subgrade Moisture Conditioning: The subgrade soil should be moisture conditioned to 2 percentage points above optimum moisture content to a minimum depth of 12 inches prior to placing the moisture barrier, steel or concrete.
- Concrete and Structural Design Thickness: Slabs-on-grade should be designed by the structural engineer, but should be at least 4 inches thick (this is referring to the actual minimum thickness, not the nominal thickness). Reinforcing steel should be designed by the structural engineer, but as a

minimum (for conventionally reinforced slabs) should be No. 3 rebar placed at 18 inches on center, each direction, mid-depth in the slab.

Minor cracking of the concrete as it cures, due to drying and shrinkage is normal and should be expected. However, cracking is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, aggregate that is not sufficiently clean, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. Low-slump concrete can reduce the potential for shrinkage cracking. Additionally, reinforcement in slabs and foundations can generally reduce the potential for shrinkage cracking. The structural engineer should consider these and other pertinent concrete design and construction considerations in slab design and specifications.

3.3.1 Slab Underlayment for Moisture Vapor Retarding

Because moisture vapor from the underlying soils will be transmitted through slabs-on-grade without preventive measures, slab underlayment for moisture vapor retarding should be designed by qualified professionals (such as the structural engineer and/or architect) where control of moisture vapor transmission through slabs is considered important to this project (such as where moisture-sensitive floor coverings or equipment are planned). Slab underlayment typically includes a moisture vapor retarder membrane (such as 10-mil thick or greater), underlain by a capillary break and provisions for protection of the vapor retarder during construction. The structural engineer and/or architect should specify pertinent slab and concrete design parameters, such as whether a sand blotter layer should be placed over the vapor retarder.

Moisture retarders can reduce, but not eliminate moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Institute, ASTM International, and California Building Code requirements and guidelines.

Leighton does not practice in the field of moisture vapor transmission evaluation/mitigation, since this does not fall under the geotechnical discipline. Therefore, we recommend that a qualified person, such as the flooring subcontractor, structural engineer, and/or architect, be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. That person (or persons) should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

3.4 Seismic Design Parameters

Seismic parameters presented in this report should be considered during project design. In order to reduce the effects of ground shaking produced by regional seismic events, seismic design should be performed in accordance with the most recent edition of the California Building Code (CBC). Seismic parameters based on the 2016 CBC are included in Section 2.4.2. The seismic parameters should be updated if design will be per the 2019 CBC.

3.5 Lateral Earth Pressures

We recommend that retaining walls be backfilled with very low expansive soil and constructed with a backdrain in accordance with the recommendations provided on Figure 3, *Retaining Wall Backfill and Subdrain Detail*. Using expansive soil as retaining wall backfill will result in higher lateral earth pressures exerted on the wall and are, therefore, not recommended. Based on these recommendations, the following parameters may be used for the design of conventional retaining walls:

Lateral Earth Pressures

Condition	Level Backfill
Active	38
At-Rest	59
Passive (allowable)	250 (Maximum of 4,000 psi)

The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Cantilever walls that are designed to yield at least $0.001H$, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition.

Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.35 may be used at the concrete and soil interface. The lateral passive resistance should be taken into account only if it is ensured that soil providing passive resistance, embedded against the foundation elements, will remain intact with time. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure or traffic loading, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall should be considered in the design. A third of uniform vertical surcharge-loads should be applied as a horizontal pressure on cantilever (active) retaining walls, while half of uniform vertical surcharge-loads should be applied as a horizontal pressure on braced (at-rest) retaining walls. To account for automobile parking surcharge, we suggest that a uniform horizontal pressure of 100 psf (for restrained walls) or 70 psf (for cantilever walls) be added for design, where autos are parked within a horizontal distance behind the retaining wall less than the height of the retaining wall stem.

We recommend that the wall designs for walls 6 feet tall or taller be checked seismically using an additive seismic Equivalent Fluid Pressure (EFP) of 20 pcf, which is added to the EFP. The additive seismic EFP should be applied at the retained midpoint.

Conventional retaining wall footings should have a minimum width of 24 inches and a minimum embedment of 12 inches below the lowest adjacent grade. An allowable bearing pressure of 2,000 psf may be used for retaining wall footing design, based on the minimum footing width and depth. This bearing value may be increased by 250 psf per foot increase in width or depth to a maximum allowable bearing pressure of 4,000 psf.

3.6 Cement Type and Corrosion Protection

Based on the results of laboratory testing, concrete structures in contact with onsite soil will have negligible exposure to water-soluble sulfates in the soil. Therefore, common Type II cement may be used for concrete construction. Concrete should be designed in accordance with ACI 318-14, Section 19.3 (ACI, 2014), adopted by the 2019 CBC (Section 1904.2).

Based on our laboratory testing, the onsite soil is considered mildly corrosive to ferrous metals. Corrosion information presented in this report should be provided to your underground utility contractors and consultation with a Corrosion Engineer should be considered.

3.7 Pavement Design

Based on the design procedures outlined in the current Caltrans Highway Design Manual, and using an assumed design R-value of 50, flexible pavement sections may consist of the following for the Traffic Indices indicated. Final pavement design should be based on the Traffic Index determined by the project civil engineer and R-value testing provided near the end of grading.

Table 1 - Asphalt Pavement Section Thickness

Traffic Index	Asphaltic Concrete (AC) Thickness (inches)	Class 2 Aggregate Base Thickness (inches)*
5.5 or less	3.0	8.0
6	3.5	8.0
7	4.0	8.0

* Pavement section to include a minimum 8" thick of base materials for local, collector, and arterial streets in accordance with the City of Victorville Street Design Standards drawing S-25

All pavement construction should be performed in accordance with the Standard Specifications for Public Works Construction. Field observations and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled.

Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 6 inches, moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

If the pavement is to be constructed prior to construction of the structures, we recommend that the full depth of the pavement section be placed in order to support heavy construction traffic.

3.8 Infiltration Recommendations

Infiltration Rate:

The onsite silty sandy soils and soils with a relatively low fines content encountered within approximately the upper 15 to 20 feet are anticipated to have infiltration rates of 15 inches per hour or more. We recommend an unfactored (small-scale) incremental infiltration rate of 15 inches per hour at a depth of 15 to 20 feet. Infiltration rates may vary significantly at various depths or locations across the site. It should be confirmed during infiltration facility excavation that the excavation penetrates sufficiently into very granular soils.

We recommend that a correction factor/safety factor be applied to the infiltration rate in conformance with San Bernardino County guidelines, since monitoring of actual facility performance has shown that actual infiltration rates are lower than for small-scale tests. The small-scale infiltration rate should be divided by a correction factor of at least 3, but the correction/safety factor may be higher based on project-specific aspects. If open basins are planned, we recommend that a low-flow infiltration trench with minimum depth of 10 feet be constructed in the bottom of the basin; this low-flow trench should be backfilled with clean washed concrete sand with maximum fines content (passing the No. 200 sieve) of 2 percent by weight.

The infiltration rates described herein are for a clean, unsilted infiltration surface in native, sandy alluvial soil. These values may be reduced over time as silting of the infiltration facility occurs. Furthermore, if the basin or chamber bottom is allowed to be compacted by heavy equipment, this value is expected to be significantly reduced. Infiltration of water through soil is highly dependent on such factors as grain size distribution of the soil particles, particle shape, fines content, clay content, and density. Small changes in soil conditions, including density, can cause large differences in observed infiltration rates. Infiltration is not suitable in compacted fill.

It should be noted that during periods of prolonged precipitation, the underlying soils tend to become saturated to greater and greater depths/extents. Therefore, infiltration rates tend to decrease with prolonged rainfall. It is difficult to extrapolate longer-term, full-scale infiltration rates from small-scale tests, and as such, this is a significant source of uncertainty in infiltration rates.

Additional Review and Evaluation:

Infiltration rates are anticipated to vary significantly based on the location and depth. Infiltration concepts should be discussed with Leighton as infiltration plans are being developed. Leighton should review all infiltration plans, including specific locations and depths of proposed facilities. Further testing may be needed based on the design of infiltration facilities, particularly considering their type, depth and location.

General Design Considerations:

The periodic flow of water carrying sediments into the infiltration facility, plus the introduction of wind-blown sediments and sediments from erosion of basin side

walls, can eventually cause the bottom of the facility to accumulate a layer of silt, which has the potential of significantly reducing the overall infiltration rate of the facility. Therefore, we recommend that significant amounts of silt/sediment not be allowed to flow into the facility within stormwater, especially during construction of the project and prior to achieving a mature landscape on site. We recommend that an easily maintained, robust silt/sediment removal system be installed to pretreat storm water before it enters the infiltration facility.

As infiltrating water can seep within the soil strata nearly horizontally for long distances, it is important to consider the impact that infiltration facilities can have on nearby subterranean structures, such as basement walls or open excavations, whether onsite or offsite, and whether existing or planned. We understand that some of the infiltration facilities will be located between structures and that water could be present in the system for several days, and saturating the subsurface soils. In this condition, we recommend that a 15-mil stego wrap be placed on the sides of the exaction to limit later movement horizontally and reduce saturation of soil immediately below structures. The seams of the stego wrap should be taped and care taken to limit damage during installation. Setbacks should be discussed with Leighton during the planning process.

Infiltration facilities should be constructed with spillways or other appropriate means that would cause overfilling to not be a concern to the facility or nearby improvements.

For buried chambers, control/access manhole covers should not contain holes or should be screened to prevent mosquitos from entering the chambers.

Additional Design Considerations (Particularly for Open Basins):

If open basins are planned, additional observation of the soils exposed at the bottom of the basin should be conducted, as these soils are critical to the basin's success. Soils at the bottom of buried chambers are also important, but not as critical to their success, provided the infiltration chamber cuts through sufficiently granular soils.

In general, the rate of infiltration reduces as the head of water in the infiltration facility reduces, and it also reduces with prolonged periods of infiltration. As such, water typically infiltrates much faster near the beginning of and/or

immediately after storm events than at times well after a storm when the water level in the facility has receded, since the infiltration rate is then slower due to both lower head and longer overall duration of infiltration. In open basins with compacted or silty bottoms, this could be problematic, in that, even if the basin had already infiltrated significant amounts of storm water, the lower several inches or feet of water could remain in the basin for an extended period of time, creating a prolonged open-water safety concern and potential for mosquitos. In a buried/covered infiltration chamber without direct access to the open atmosphere, these conditions would be of less concern.

For open basins and swales, vegetation within the basin bottoms and sides is expected to help reduce erosion and help maintain infiltration rates.

Estimating infiltration rates, especially based on small-scale testing, is inexact and indefinite, and often involves known and unknown soil complexities, potentially resulting in a condition where actual infiltration rates of the completed facility are significantly less than design rates. In open infiltration basins, this could create nuisance water in the basin. As such, enhancements may be needed after completion of the basin if prolonged or frequent standing water is experienced. A potential basin enhancement, if needed, might be to install additional infiltration trenches or infiltration borings in the basin bottom to capture and infiltrate low flows and to help speed infiltration during/after storms; specific recommendations, such as minimum trench/boring depth, would be developed based on conditions observed.

Construction Considerations:

We recommend that Leighton evaluate the infiltration facility excavations, to confirm that granular, undisturbed alluvium is exposed in the bottoms and sides. Additional excavation or evaluation may be required if silty or clayey soils are exposed.

It is critical to infiltration that the basin or chamber bottom not be allowed to be compacted during construction or maintenance; rubber-tired equipment and vehicles should not be allowed to operate on the bottom. We recommend that at least the bottom 3 feet of the basins or chambers be excavated with an excavator or similar.

If fill material is needed to be placed in the basin, such as due to removal of uncontrolled artificial fill, the fill material should be select and free-draining sand, and should be observed and evaluated by Leighton.

Maintenance Considerations:

The infiltration facilities should be routinely monitored, especially before and during the rainy season, and corrective measures should be implemented as/when needed. Things to check for include proper upkeep, proper infiltration, absence of accumulated silt, and that de-silting filters/features are clean and functioning. Pretreatment desilting features should be cleaned and maintained per manufacturers' recommendations. Even with measures to prevent silt from flowing into the infiltration facility, accumulated silt may need to be removed occasionally as part of maintenance.

3.9 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations and other excavations should be performed in accordance with project plans, specifications and all OSHA requirements.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structures.

Cantilever shoring should be designed based on an active equivalent fluid pressure of 40 pcf. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to $25H$, where H is equal to the depth of the excavation being shored.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA, standards to evaluate soil conditions. Close coordination between the competent person and the

geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

3.10 Trench Backfill

Utility-type trenches onsite can be backfilled with the onsite material, provided it is free of debris, significant organic material and oversized material. Prior to backfilling the trench, pipes should be bedded and shaded in a granular material that has a sand equivalent of 30 or greater. The sand should extend 12 inches above the top of the pipe. The bedding/shading sand should be densified. The native backfill should be placed in loose layers, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 90 percent relative compaction. The thickness of layers should be based on the compaction equipment used in accordance with the Standard Specifications for Public Works Construction (Greenbook).

3.11 Surface Drainage

Inadequate control of runoff water and/or poorly controlled irrigation can cause the onsite soils to expand and/or shrink, producing heaving and/or settlement of foundations, flatwork, walls, and other improvements. Maintaining adequate surface drainage, proper disposal of runoff water, and control of irrigation should help reduce the potential for future soil moisture problems.

Positive surface drainage should be designed to be directed away from foundations and toward approved drainage devices, such as gutters, paved drainage swales, or watertight area drains and collector pipes.

Surface drainage should be provided to prevent ponding of water adjacent to the structures. In general, the area around the buildings should slope away from the building. We recommend that unpaved landscaped areas adjacent to the buildings be avoided. Roof runoff should be carried to suitable drainage outlets by watertight drain pipes or over paved areas.

3.12 Additional Geotechnical Services

The preliminary geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our preliminary geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Additional geotechnical investigation and analysis may be required based on final improvement plans. Leighton should review the site and grading plans when available and comment further on the geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading operations. Our conclusions and preliminary recommendations should be reviewed and verified by Leighton during construction and revised accordingly if geotechnical conditions encountered vary from our preliminary findings and interpretations.

Geotechnical observation and testing should be provided:

- After completion of site clearing.
- During overexcavation of compressible soil.
- During compaction of all fill materials.
- After excavation of all footings and prior to placement of concrete.
- During utility trench backfilling and compaction.
- During pavement subgrade and base preparation.
- When any unusual conditions are encountered.

4.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples, and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions, and recommendations presented in this report are based on the assumption that Leighton and Associates, Inc. will provide geotechnical observation and testing during construction.

This report was prepared for the sole use of Charles F. Paine and Judith S. Paine, Trustees of the Pain Family Trust and Jack Lee Herron and Deborah L. Herron, Trustees of the Jack and Deborah Herron Trust for application to the design of the proposed 66-Lot residential development in accordance with generally accepted geotechnical engineering practices at this time in California.

See the GBA insert on the following page for important information about this geotechnical engineering report.

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled.* No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be, and, in general, if you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying it.* A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may

perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old*.

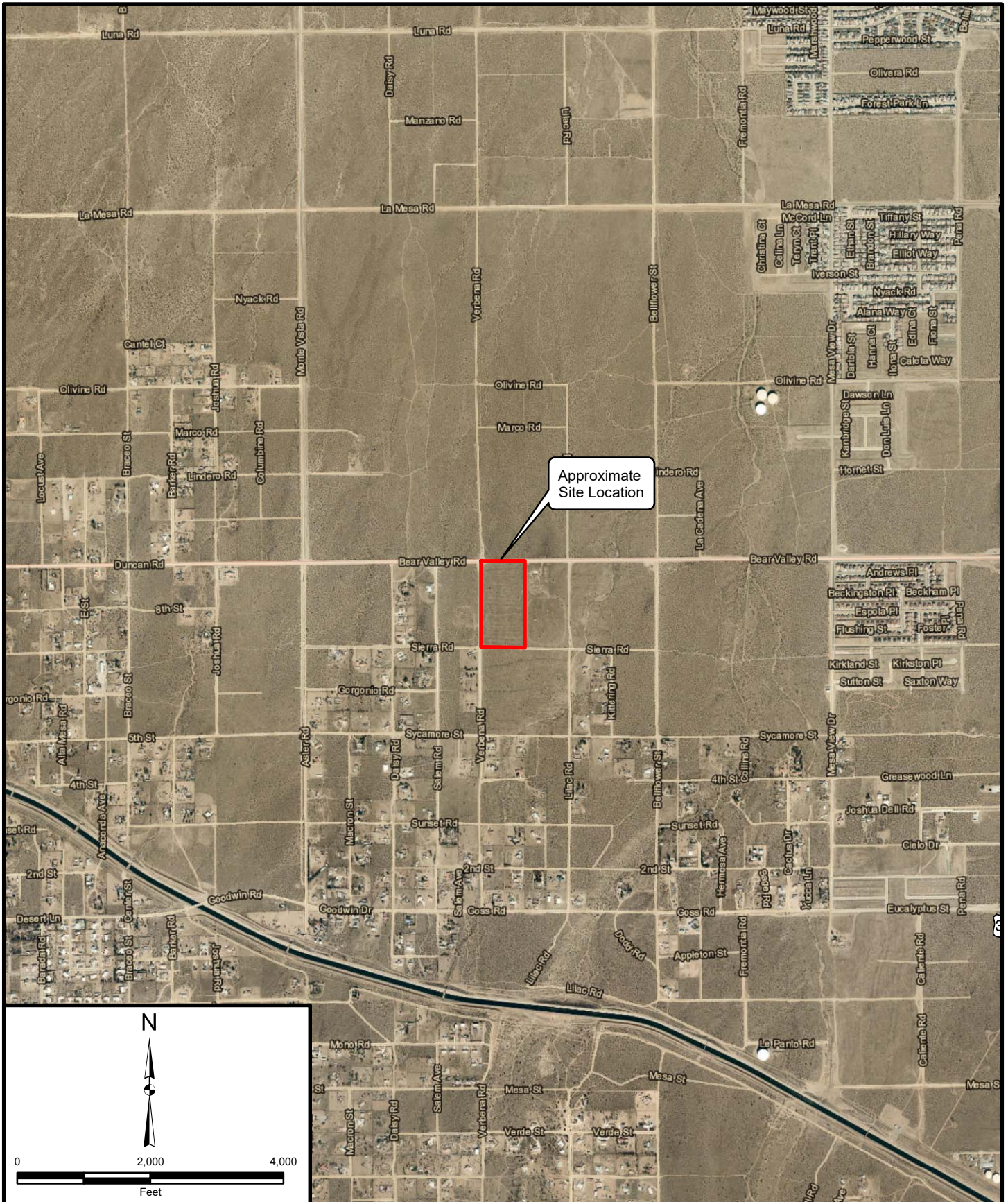
Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration*. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists*.



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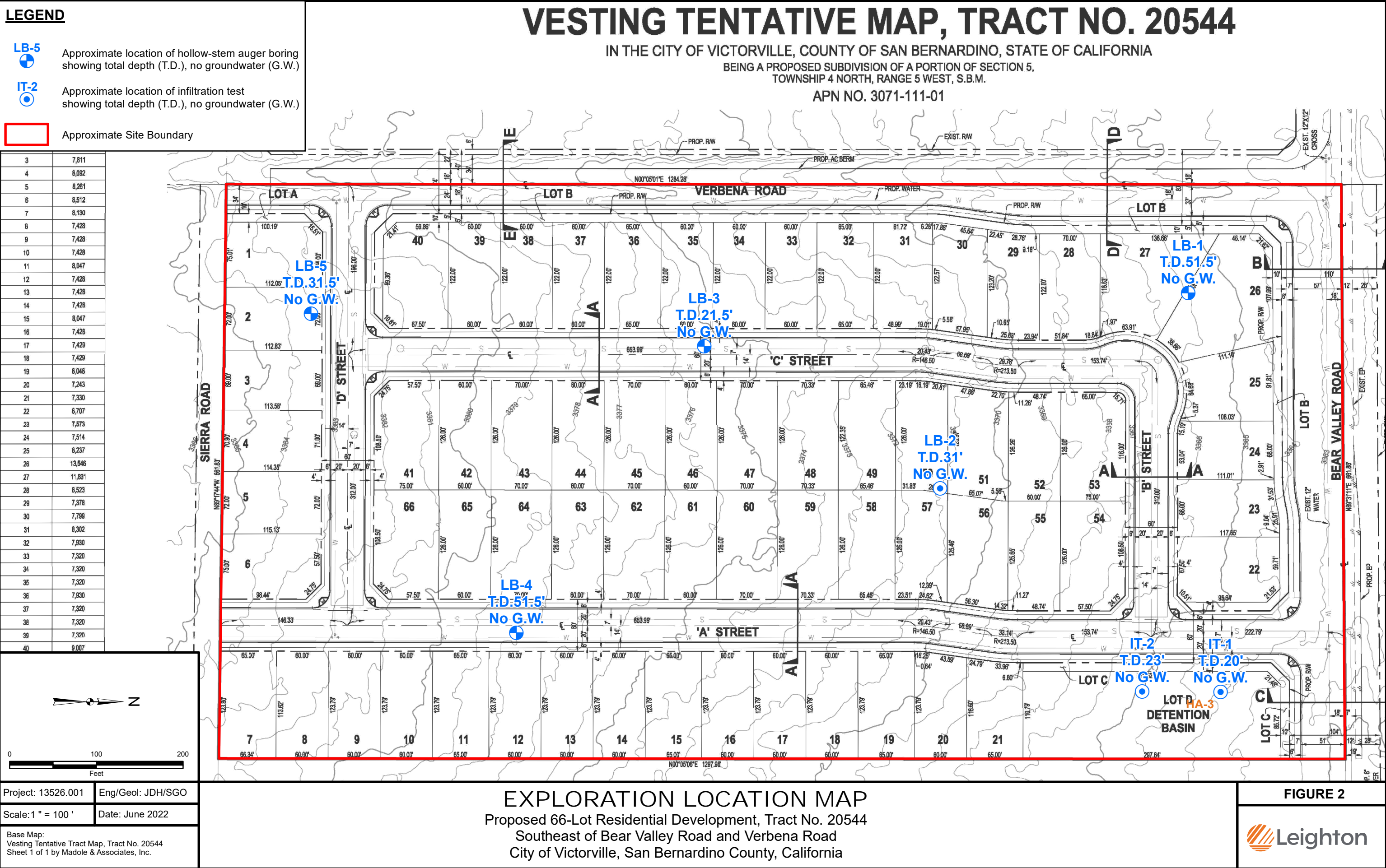
Project: 13526.001	Eng/Geol: JDH/SGO
Scale: 1" = 2,000'	Date: June 2022
Reference: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS,	

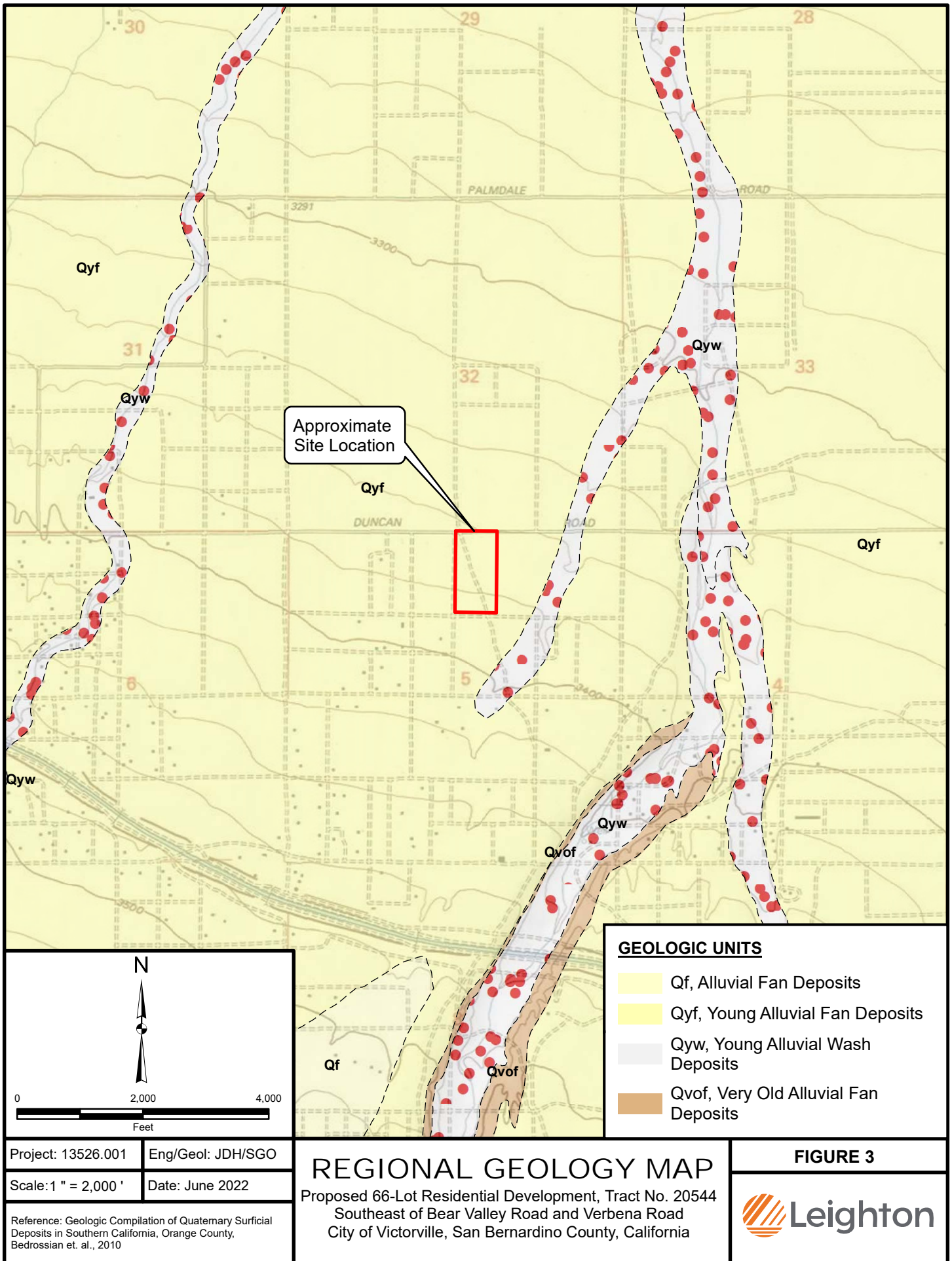
SITE LOCATION MAP

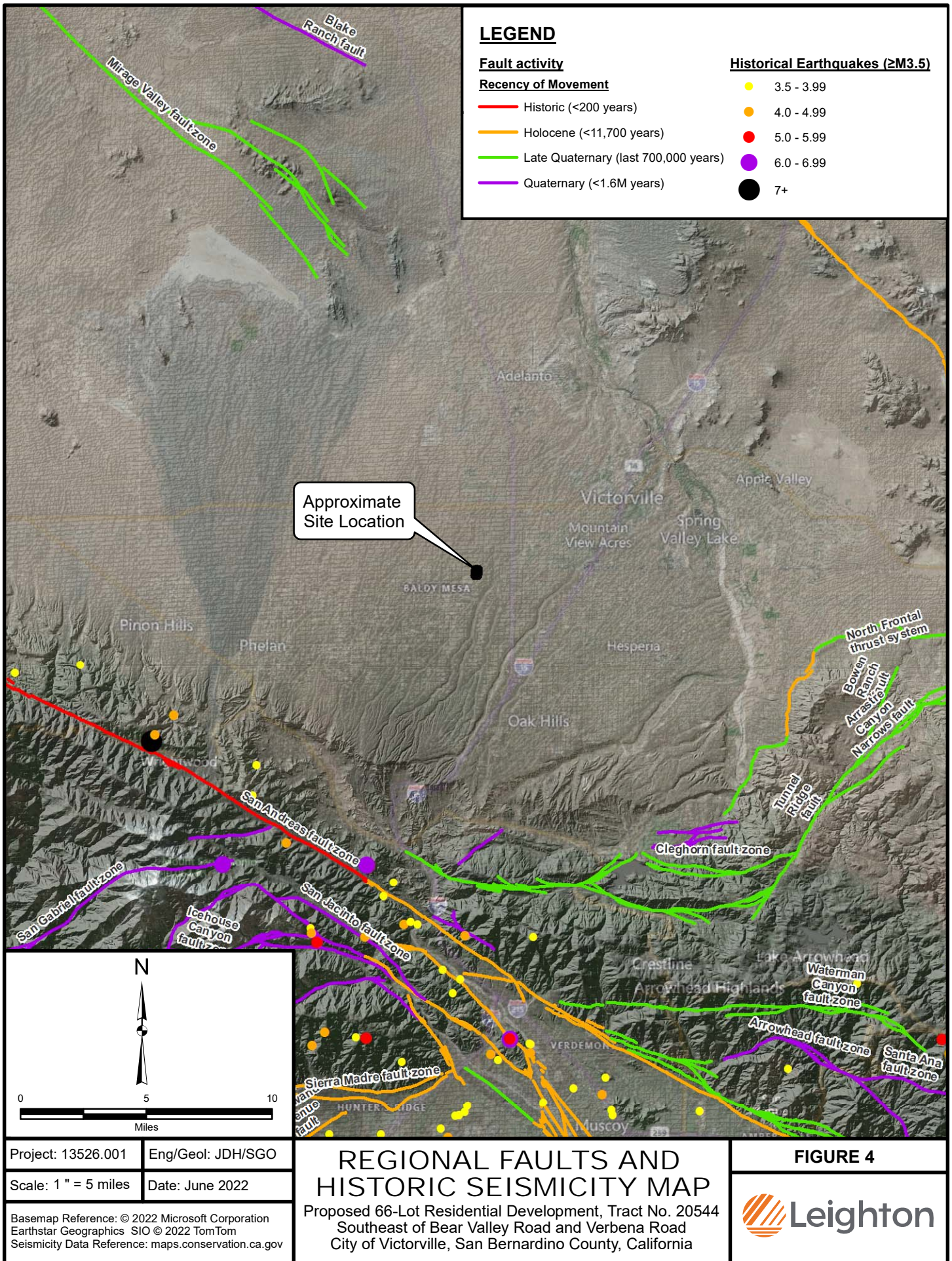
Proposed 66-Lot Residential Development, Tract No. 20544
 Southeast of Bear Valley Road and Verberna Road
 City of Victorville, San Bernardino County, California

FIGURE 1

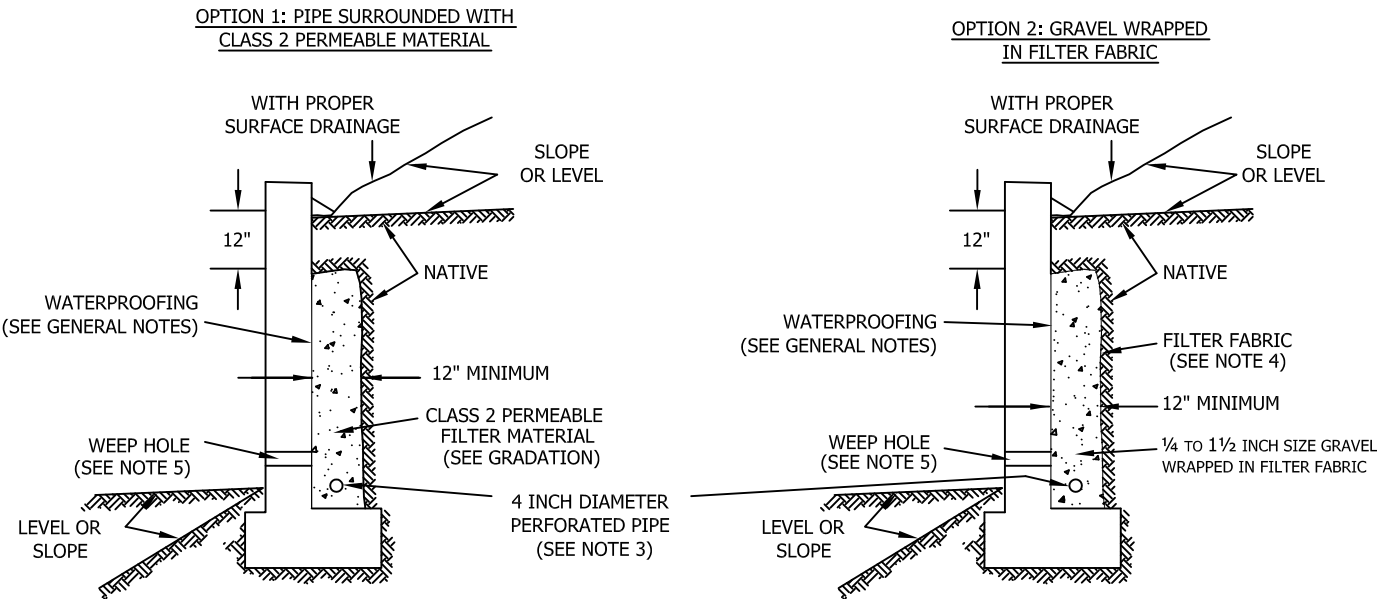

Leighton







SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤ 50



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

- * Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
- * Water proofing of the walls is not under purview of the geotechnical engineer
- * All drains should have a gradient of 1 percent minimum
- * Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
- * Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:

- 1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
- 2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
- 3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
- 4) Filter fabric should be Mirafi 140NC or approved equivalent.
- 5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
- 6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
- 7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

**RETAINING WALL BACKFILL AND SUBDRAIN DETAIL
FOR WALLS 6 FEET OR LESS IN HEIGHT
WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤ 50**



Figure 5

APPENDIX A

REFERENCES

APPENDIX A

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APPENDIX B

GEOTECHNICAL BORING LOGS
AND INFILTRATION TEST RESULTS

APPENDIX B

FIELD EXPLORATION

Encountered soils were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Relatively undisturbed soil samples were obtained at selected intervals within these borings using both a California ring-lined and Standard Penetration Test (SPT) split-spoon sampler. Standard Penetration Test (SPT) resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch outside diameter split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D 1586). In addition, 2.4-inch inside diameter brass ring samples were obtained using a Modified California sampler driven into the soil with the 140-pound hammer. Borings were backfilled with soil cuttings obtained during the exploration. Representative earth-material samples obtained from these subsurface explorations were transported to our geotechnical laboratory for evaluation and appropriate testing.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

GEOTECHNICAL BORING LOG LB-1

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-4-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3366'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
3365	0	N S		B-1				SM	@Surface: brush, over SILTY SAND (SM)	
				R-1	6 17 24	113	3	SM	@2.5': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine sand, fine to coarse gravel, micaceous, non-plastic	
3360	5			R-2	11 24 33	119	4	SM	@5': SILTY SAND (SM), dense, light brown, dry to slightly moist, fine to medium sand, fine to coarse gravel, micaceous, non-plastic	
				R-3	3 5 8	114	1	SM	@7.5': SILTY SAND (SM), loose, light brown, dry to slightly moist, fine sand, fine to coarse gravel, micaceous, non-plastic	CO
3355	10			R-4	5 11 14	109	2	SP-SM	@10': SAND with silt (SP-SM), medium dense, brown, slightly moist to moist, fine to coarse, trace coarse gravel, 10% fines (lab)	-200
3350	15			R-5	20 46 50/6"			SM	@15': SILTY SAND (SM), dense, light brown, dry to slightly moist, fine sand, fine to coarse gravel, micaceous, non-plastic	
3345	20			S-1	11 24 50/3"			SP-SM	@20': SAND with silt (SP-SM), dense, brown, slightly moist to moist, fine to coarse, trace coarse gravel	
3340	25			R-6	13 29 30			SM	@25': SILTY SAND (SM), dense, light brown, dry to slightly moist, fine to medium sand, trace fine gravel, micaceous, non-plastic	
	30									

SAMPLE TYPES:
 B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:
 -200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
EI EXPANSION INDEX
H HYDROMETER
MD MAXIMUM DENSITY
PP POCKET PENETROMETER
RV R VALUE

SA SIEVE ANALYSIS
SE SAND EQUIVALENT
SG SPECIFIC GRAVITY
UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-1

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-4-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3366'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
3335	30	N S		S-2	6 9 12			SM	@30': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine to medium sand, trace fine gravel, micaceous, non-plastic	
3330	35			R-7	6 11 16			SM	@35': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine to medium sand, trace fine gravel, micaceous, non-plastic	
3325	40			S-3	5 18 18			SM	@40': SILTY SAND (SM), dense, light brown, dry to slightly moist, fine to medium sand, trace fine gravel, micaceous, non-plastic @42.5': Spoils: light olive brown color	
3320	45			R-8	15 24 26			SP-SM	@45': SAND with silt (SP-SM), dense, light olive brown, slightly moist to moist, fine to coarse sand, trace fine gravel	
3315	50			S-4	7 8 11			SM	@50': SILTY SAND (SM), medium dense, light olive brown, slightly moist to moist, fine to medium sand, trace fine gravel	
3310	55								TOTAL DEPTH = 51.5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS TO SURFACE	
	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-2

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-4-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3371'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
3370	0	N S		B-1				SM	@Surface: brush, over SILTY SAND (SM)	CR
				R-1	7 19 20			SM	@2.5': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine sand, trace medium, trace fine gravel, micaceous, non-plastic	
3365	5			R-2	7 9 12			SP-SM	@5': SAND with silt (SP-SM), medium dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse, 12% fines (lab)	-200
				R-3	10 19 26			SM	@7.5': SILTY SAND (SM), medium dense, brown, moist, fine to medium sand, trace fine gravel, micaceous, non-plastic	
3360	10			R-4	6 10 20			SP-SM	@10': SAND with silt (SP-SM), medium dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse	
3355	15			S-1	10 18 19			SP-SM	@15': SAND with silt (SP-SM), dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse	
3350	20			R-5	5 25 50/3"			SP-SM	@20': SAND with silt (SP-SM), dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse	
3345	25			S-2	7 19 23			SP-SM	@25': SAND with silt (SP-SM), dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse	
	30									

SAMPLE TYPES:
 B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:
 -200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
EI EXPANSION INDEX
H HYDROMETER
MD MAXIMUM DENSITY
PP POCKET PENETROMETER
RV R VALUE

SA SIEVE ANALYSIS
SE SAND EQUIVALENT
SG SPECIFIC GRAVITY
UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-2

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-4-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3371'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
3340	30			R-6	28 50/6"			SP-SM	@30': SAND with silt (SP-SM), dense, brown, slightly moist to moist, fine to coarse sand, fine gravel, trace coarse	
									TOTAL DEPTH = 31 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS TO SURFACE	
3335	35									
3330	40									
3325	45									
3320	50									
3315	55									
	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-3

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-4-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3375'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
3375	0	N S		B-1				SM	@Surface: brush, over SILTY SAND (SM)	
				R-1	10 14 16	120	2	SM	@2.5': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine sand, trace medium, trace fine gravel, micaceous, non-plastic, 28% fines (lab)	MD, SA, EI
3370	5			R-2	9 16 24			SM	@5': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine sand, trace medium, trace fine gravel, micaceous, non-plastic	
				R-3	10 20 26	120	2	SM	@7.5': SILTY SAND (SM), medium dense, light brown, dry to slightly moist, fine sand, trace medium, trace fine gravel, micaceous, non-plastic	
3365	10			R-4	7 21 31			SP-SM	@10': SAND with silt (SP-SM), dense, brown, slightly to moist, fine to coarse sand, fine gravel	
3360	15			R-5	8 24 50/5"	117	3	SP-SM	@15': SAND with silt (SP-SM), dense, brown, slightly to moist, medium to coarse sand, trace fine, fine to coarse gravel	
3355	20			S-1	5 10 20			SP-SM	@20': SAND with silt (SP-SM), dense, brown, slightly to moist, medium to coarse sand, trace fine, fine to coarse gravel	
									TOTAL DEPTH = 21.5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS TO SURFACE	
3350	25									
3345	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-4

Project No.	13526.001	Date Drilled	5-5-22
Project	Herron Residential Development	Logged By	JP
Drilling Co.	BC2 Drilling	Hole Diameter	8"
Drilling Method	Autohammer - 140lb - Hollow Stem Auger - 30" Drop	Ground Elevation	3378'
Location	See Figure 2- Exploration Location Map	Sampled By	JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S		B-1				SM	@Surface: brush, over SILTY SAND (SM)	
3375				R-1	5 17 21	119	2	SM	@2.5': SILTY SAND (SM), medium dense, light brown, dry, fine to coarse gravel, ~30% fines (field estimate), trace rootlets, slightly porous, micaceous @5': SAND with silt (SP-SM), loose, brown, dry to slightly moist, fine to coarse sand, ~10% fines (field estimate), trace rootlets	
3370	5			R-2	10 20 26	119	3	SP-SM	@7.5': SAND with silt (SP-SM), medium dense, brown, dry to slightly moist, fine to coarse sand, ~10% fines (field estimate), trace rootlets	
	10			R-3	9 15 19	117	2	SP-SM	@10': SAND (SP), medium dense, brown, dry to slightly moist, fine to coarse sand, ~5% fines (field estimate), trace rootlets	
3365										
	15			S-1	25 50/6"			SP-SM	@15': SAND (SP), dense, brown, dry to slightly moist, fine to coarse sand, ~5% fines (field estimate), trace rootlets	
3360										
	20			R-4	38 50/4"	118	6	SM	@20': SILTY SAND (SM), dense, light brown, dry to moist, fine to medium sand, trace coarse gravel, ~20% fines (field estimate)	
3355										
	25			S-2	5 13 19			SM	@25': SILTY SAND (SM), dense, light brown, dry to moist, fine sand, ~35% fines (field estimate)	
3350										
	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

AL ATTERBERG LIMITS

CN CONSOLIDATION

CO COLLAPSE

CR CORROSION

CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR

EI EXPANSION INDEX

H HYDROMETER

MD MAXIMUM DENSITY

PP POCKET PENETROMETER

RV R VALUE

SA SIEVE ANALYSIS

SE SAND EQUIVALENT

SG SPECIFIC GRAVITY

UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-4

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-5-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3378'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
30		N S		R-5	16 20 31	108	2	SM	@30': SILTY SAND (SM), dense, light brown, dry to moist, fine sand, trace medium, trace fine gravel, ~35% fines (field estimate)	
3345										
35				S-3	27 50			SM	@35': SILTY SAND (SM), dense, light brown, dry to moist, fine sand, trace medium, trace fine gravel, ~30% fines (field estimate)	
3340										
40				R-6	10 12 18			SM	@40': SILTY SAND (SM), medium dense, light brown, dry to moist, fine sand, trace medium, trace fine gravel, ~45% fines (field estimate)	
3335										
45				S-4	9 12 18			SM	@45': SILTY SAND (SM), dense, light brown, dry to moist, fine sand, trace medium, trace fine gravel, ~45% fines (field estimate)	
3330										
50				R-7	13 19 24			SM	@50': SILTY SAND (SM), medium dense, light brown, dry to moist, fine sand, trace medium, trace fine gravel, ~45% fines (field estimate)	
3325									TOTAL DEPTH = 51.5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS TO SURFACE	
55										
3320										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
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 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
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 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-5

Project No.	13526.001	Date Drilled	5-5-22
Project	Herron Residential Development	Logged By	JP
Drilling Co.	BC2 Drilling	Hole Diameter	8"
Drilling Method	Autohammer - 140lb - Hollow Stem Auger - 30" Drop	Ground Elevation	3384'
Location	See Figure 2- Exploration Location Map	Sampled By	JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <small><i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i></small>	Type of Tests
	0	N S		B-1				SM	@Surface: brush, over SILTY SAND (SM)	
3380				R-1	10 9 8	114	2	SM	@2.5': SILTY SAND (SM), loose, brown, dry to slightly moist, fine sand, trace fine gravel, micaceous, non-plastic, trace rootlets, 25% fines (lab)	-200
	5			R-2	6 7 9			SM	@5': SILTY SAND (SM), loose, brown, dry to slightly moist, fine sand, trace fine gravel, micaceous, non-plastic, trace rootlets, ~20% fines (field estimate)	CO
3375				R-3	4 5 7	107	2	SM	@7.5': SILTY SAND (SM), loose, brown, dry to slightly moist, fine sand, trace fine gravel, micaceous, non-plastic, trace rootlets, ~20% fines (field estimate)	
	10			R-4	5 10 15			SP-SM	@10': SAND with silt (SP-SM), medium dense, brown, dry to slightly moist, fine to medium sand, trace fine gravel, trace coarse, ~10% fines (field estimate)	
3370										
	15			R-5	9 16 32	115	2	SP-SM	@15': SAND with silt (SP-SM), medium dense, brown, dry to slightly moist, medium to coarse sand, trace fine to coarse gravel, ~10% fines (field estimate)	
3365										
	20			S-1	7 31 39			SM	@20': SILTY SAND (SM), dense, brown, slightly moist to moist, fine sand, trace coarse, trace fine gravel, ~25% fines (field estimate)	
3360										
	25			R-6	12 50/6"			SM	@25': SILTY SAND (SM), dense, brown, slightly moist to moist, fine sand, trace coarse, trace fine gravel, ~25% fines (field estimate)	
3355										
	30									

SAMPLE TYPES:

B BULK SAMPLE

C CORE SAMPLE

G GRAB SAMPLE

R RING SAMPLE

S SPLIT SPOON SAMPLE

T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING

AL ATTERBERG LIMITS

CN CONSOLIDATION

CO COLLAPSE

CR CORROSION

CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR

EI EXPANSION INDEX

H HYDROMETER

MD MAXIMUM DENSITY

PP POCKET PENETROMETER

RV R VALUE

SA SIEVE ANALYSIS

SE SAND EQUIVALENT

SG SPECIFIC GRAVITY

UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG LB-5

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-5-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3384'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
	30			S-2	9 11 22			SM	@30': SILTY SAND (SM), dense, brown, slightly moist to moist, fine sand, trace coarse, trace fine gravel, ~25% fines (field estimate)	
									TOTAL DEPTH = 31.5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH SOIL CUTTINGS TO SURFACE	
3350	35									
3345	40									
3340	45									
3335	50									
3330	55									
3325	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG IT-1

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-5-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3363'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
	0	N S							@Surface: minor brush, over SILTY SAND (SM)	
3360	5			R-1	13 20 26			SM	@5': SILTY SAND (SM), medium dense, light brown, dry, fine sand, trace medium, trace fine gravel, trace rootlets, micaceous, ~35% fines (field estimate)	
3355	10			R-2	10 24 50/4"			SM	@12': SILTY SAND (SM), dense, light brown, dry, fine sand, trace medium, trace fine gravel, trace rootlets, micaceous, ~35% fines (field estimate)	
3350	15			R-3	18 50/5"			SM	@13.5': SILTY SAND (SM), dense, light brown, dry, fine to medium sand, trace coarse gravel, trace rootlets, micaceous, ~35% fines (field estimate)	
3345	20			R-4	12 28 45			SW-SM	@17': SAND with silt (SW-SM), dense, brown, slightly moist to moist, medium to coarse sand, trace fine, fine to coarse gravel, ~10% fines (field estimate)	
				R-5	10 14 19			SW-SM	@18.5': SAND with silt (SW-SM), medium dense, brown, slightly moist to moist, medium to coarse sand, trace fine, fine to coarse gravel, 10% fines (lab)	SA
3340	25								TOTAL DEPTH = 20 FEET NO GROUNDWATER ENCOUNTERED CONVERTED TO INFILTRATION BORING SET WELL @ 20 FT	
3335	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



GEOTECHNICAL BORING LOG IT-2

Project No. 13526.001
 Project Herron Residential Development
 Drilling Co. BC2 Drilling
 Drilling Method Autohammer - 140lb - Hollow Stem Auger - 30" Drop
 Location See Figure 2- Exploration Location Map

Date Drilled 5-5-22
 Logged By JP
 Hole Diameter 8"
 Ground Elevation 3365'
 Sampled By JP

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
3365	0	N S							@Surface: minor brush, over SILTY SAND (SM)	
3360	5									
3355	10									
3350	15			R-1	17 50/5"			SM	@15': SILTY SAND (SM), dense, brown, dry, to slightly moist, fine to medium sand, trace coarse, ~25% fines (field estimate)	
				R-2	16 30 50/5"			SP-SM	@17': SAND with silt (SP-SM), dense, brown, dry to slightly moist, medium to coarse sand, trace fine, fine gravel, ~10% fines (field estimate)	
3345	20			R-3	15 22 31			SM	@20': SILTY SAND (SM), dense, brown, dry to slightly moist, fine to medium sand, trace coarse, 16% fines (lab)	SA
				R-4	28 50/4"			SM	@21.5': SILTY SAND (SM), dense, brown, dry to slightly moist, fine to medium sand, trace coarse, 25-30% fines (field estimate)	
3340	25								TOTAL DEPTH = 23 FEET NO GROUNDWATER ENCOUNTERED CONVERTED TO INFILTRATION BORING SET WELL @ 20 FT	
3335	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
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 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH



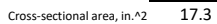
Project:

Well Prep:

all with #3

4 in. Well Radius

Tu>3h?: yes, OK



Test Type: Constant He

14.5 ft	0. in.
---------	--------

Depth of well bottom below top of casing (in): 240

Depth to top of sand from top of casing

Total Area of barrels (in.^2): 397

Calculations

Date	Time	Water Level in Supply Barrel (in.)	Depth to WL in Boring (measured from top of casing)		Water Temp (deg F)	Refilled? (or Comments)	Δt (min)	Total Elapsed Time (min)	Depth to WL in well (in.)	h, Height of Water in Well (in.)	Δh (in.)	Avg. h	Vol Change (in.^3)			Flow (in^3/ min)	q, Flow (in^3/ hr)	Average Infiltration Surface Area, (in^2)	V (Fig 9)	K20, Coef. Of Permeability at 20 deg C (in./hr)	Infiltration Rate [flow/surf area] (in./hr) (FS=1)
Start Date	Start time:												from supply	from Δh	Total						
5/6/2022	10:30		ft	in.																	
5/6/22	10:57	27.5	19.3					27	231.6	8.4											
5/6/22	10:59	27	19.4				2	29	232.8	7.2	-1.2	8	199	21	219	110	6584	246	0.9	15.09	24.64
5/6/22	11:01	26.75	19.4				2	31	232.8	7.2	0	7	99	0	99	50	2981	231	0.9	6.43	11.88
5/6/22	11:06	25.625	19.4				5	36	232.8	7.2	0	7	447	0	447	89	5365	231	0.9	11.57	21.39
5/6/22	11:11	24.375	19.5				5	41	234.0	6.0	-1.2	7	497	21	518	104	6210	216	0.9	18.02	26.49
5/6/22	11:16	23.125	19.4				5	46	232.8	7.2	1.2	7	497	-21	476	95	5712	216	0.9	11.51	24.36
5/6/22	11:21	21.875	19.26				5	51	231.1	8.9	1.68	8	497	-29	468	94	5612	252	0.9	8.65	20.50
5/6/22	11:26	20.5	19.25				5	56	231.0	9.0	0.12	9	546	-2	544	109	6532	275	0.9	10.60	21.90
5/6/22	11:31	19.125	19.25				5	61	231.0	9.0	0	9	546	0	546	109	6557	276	0.9	10.69	21.87
5/6/22	11:36	17.815	19.15				5	66	229.8	10.2	1.2	10	521	-21	500	100	5998	292	0.9	7.97	18.97
5/6/22	11:41	16.5	18				5	71	216.0	24.0	13.8	17	523	-239	284	57	3407	480	0.9	1.19	6.54
5/6/22	11:46	14.75	17.9				5	76	214.8	25.2	1.2	25	695	-21	675	135	8096	669	0.9	3.12	11.16
5/6/22	11:51	13.25	18				5	81	216.0	24.0	-1.2	25	596	21	617	123	7402	669	0.9	3.14	10.21
5/6/22	11:56	11.5	18.05				5	86	216.6	23.4	-0.6	24	695	10	706	141	8470	646	0.9	3.71	12.09
5/6/22	12:01	10	18.1				5	91	217.2	22.8	-0.6	23	596	10	606	121	7278	631	0.9	3.31	10.64
5/6/22	12:11	7.5	18.05				10	101	216.6	23.4	0.6	23	994	-10	983	98	5899	631	0.9	2.55	8.62
5/6/22	12:21	4.25	17.9				10	111	214.8	25.2	1.8	24	1292	-31	1260	126	7563	661	0.9	2.89	10.55
					Switch drums																
5/6/22	12:25	28.125	16.6					115	199.2	40.8											
5/6/22	12:27	26	16.61				2	117	199.3	40.7	-0.12	41	844	2	847	423	25397	1074	0.9	4.75	21.80
					Adjusted flow																
5/6/22	12:35	19.375	16.65					125	199.8	40.2											
5/6/22	12:40	15.625	16.7				5	130	200.4	39.6	-0.6	40	1490	10	1501	300	18008	1053	0.9	3.52	15.76
5/6/22	12:50	7	16.8				10	140	201.6	38.4	-1.2	39	3428	21	3448	345	20690	1030	0.9	4.26	18.51
	</																				

Project:

Well Prep: Drilled to 2

filled and s

Cross-sectional area, in.^2	17.3
-----------------------------	------

Test Type: **Constant Head**

240

Depth of well bottom below top of casing (in): 240

240

0

Total Area of barrels (in.^2): 397

Calculations

[illegible]

APPENDIX C

LABORATORY TEST RESULTS

APPENDIX C

GEOTECHNICAL LABORATORY TESTING

The geotechnical laboratory testing program was directed toward a quantitative and qualitative evaluation of physical and mechanical properties of soils underlying the site and to aid in soil classification.

In Situ Moisture and Density: The natural water content (ASTM D 2216) and in-situ dry density (ASTM D 2937) was determined for recovered relatively undisturbed ring-lined barrel drive samples, from our subsurface explorations. Results of these tests are shown on the logs at the appropriate sample depths, in Appendix B.

Modified Proctor Compaction Curve (MD): In accordance with ASTM Test Method D1557, a modified Proctor laboratory compaction curve was established for a shallow bulk soil sample, to determine the laboratory maximum dry density and optimum moisture content compaction curve. Results are plotted on the following “*Modified Proctor Compaction Test*” sheet in this appendix.

Collapse Potential: Collapse potential tests were performed on selected soil samples in general accordance with ASTM Standard Test Method D 4546. Test results are presented on the “*One Dimensional Swell or Settlement*” figures.

Expansion Index: Expansion Index of a representative bulk sample was determined by the ASTM D 4829 standard test method to identify expansion potential. The expansion index is presented in this appendix.

Percent Fines (Percentage Passing No. 200 Sieve, -200): Selected soil samples were wet-washed through a No. 200 U.S. Standard brass sieve in accordance with ASTM Test Methods D1140 to measure percent fines (silts and clays). This data was used to refine the Unified Soil Classification for tested soil samples. Test results are tabulated in this appendix and listed on boring logs in Appendix A.

Atterberg Limits (AL): Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) were determined for soil samples in accordance with ASTM D4318 Standard Test Method. Soil samples were air-dried and passed through a No. 40 sieve, then re-moisturized. Liquid Limit and Plastic Limit tests were performed on fraction of soil samples passing the No. 40 sieve. Results of these tests are presented on the “*Atterberg Limits*” sheet in this appendix.

Corrosivity Tests: To evaluate the corrosion potential of the subsurface soils at the site, we tested a representative bulk sample collected during our subsurface investigation for pH, resistivity and soluble sulfate and chloride content testing. Results of these tests are presented at the end of this appendix.



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: Herron Victorville

Tested By: J. Gonzalez

Date: 05/25/22

Project No.: 13526.001

Checked By: A. Santos

Date: 06/02/22

Boring No.: LB-3

Depth (ft.): 0-5

Sample No.: B-1

Soil Identification: Brown silty sand (SM)

Preparation Method:

☒

Moist

Dry

☒

Mechanical Ram

Manual Ram

Mold Volume (ft³)

0.03330

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3883	4002	3951			
Weight of Mold (g)	1826	1826	1826			
Net Weight of Soil (g)	2057	2176	2125			
Wet Weight of Soil + Cont. (g)	484.0	431.2	540.6			
Dry Weight of Soil + Cont. (g)	464.7	404.3	497.2			
Weight of Container (g)	37.3	37.8	39.2			
Moisture Content (%)	4.52	7.34	9.48			
Wet Density (pcf)	136.2	144.1	140.7			
Dry Density (pcf)	130.3	134.2	128.5			

Maximum Dry Density (pcf)

134.5

Optimum Moisture Content (%)

6.8

PROCEDURE USED



Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if + #4 is 20% or less



Procedure B

Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + #4 is >20% and + 3/8 in. is
20% or less



Procedure C

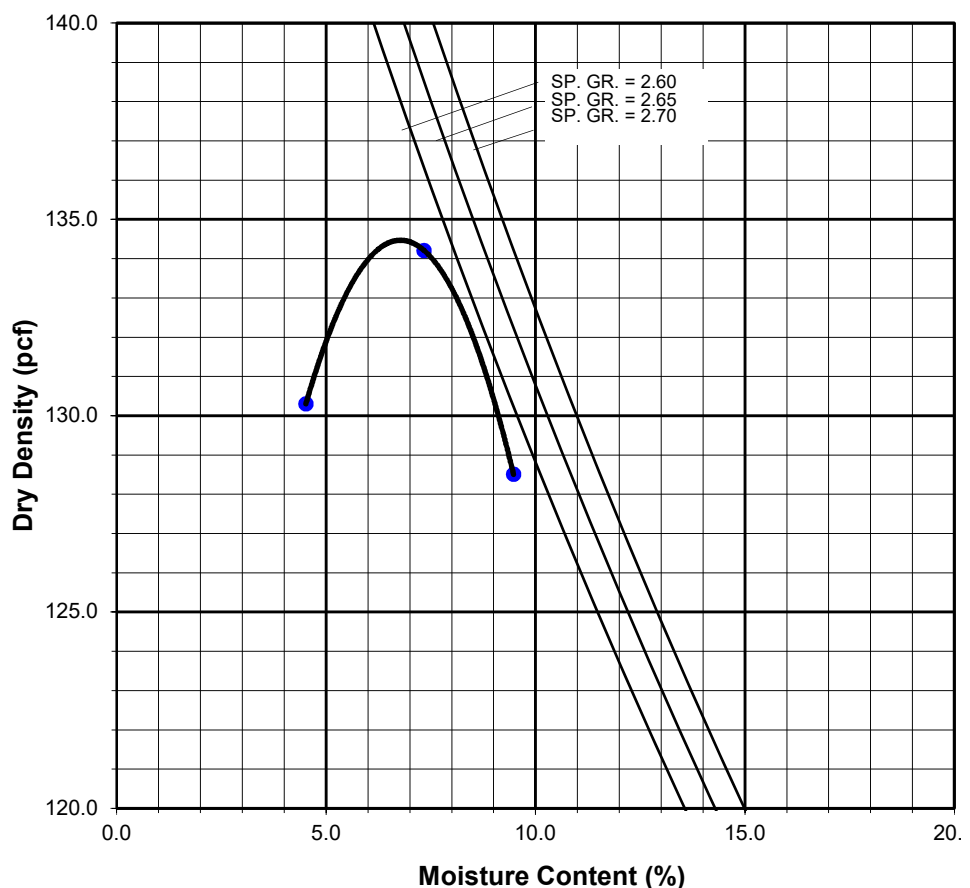
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8 in. is >20% and + 3/4 in.
is <30%


Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL, PL, PI



Boring No.	LB-1	LB-2	LB-5					
Sample No.	R-4	R-2	R-1					
Depth (ft.)	10.0	5.0	2.5					
Sample Type	Ring	Ring	Ring					
Soil Identification	Brown poorly-graded sand with silt (SP-SM)	Brown poorly-graded sand with silt and gravel (SP-SM)g	Brown silty sand (SM)					
Moisture Correction								
Wet Weight of Soil + Container (g)	0.00	0.00	0.00					
Dry Weight of Soil + Container (g)	0.00	0.00	0.00					
Weight of Container (g)	1.00	1.00	1.00					
Moisture Content (%)	0.00	0.00	0.00					
Sample Dry Weight Determination								
Weight of Sample + Container (g)	922.30	1007.70	804.70					
Weight of Container (g)	110.00	159.60	108.50					
Weight of Dry Sample (g)	812.30	848.10	696.20					
Container No.:								
After Wash								
Method (A or B)	A	A	A					
Dry Weight of Sample + Cont. (g)	844.10	908.80	629.70					
Weight of Container (g)	110.00	159.60	108.50					
Dry Weight of Sample (g)	734.10	749.20	521.20					
% Passing No. 200 Sieve	9.6	11.7	25.1					
% Retained No. 200 Sieve	90.4	88.3	74.9					
				PERCENT PASSING No. 200 SIEVE ASTM D 1140		Project Name: <u>Herron Victorville</u>		
						Project No.: <u>13526.001</u>		
						Tested By: <u>S. Felter</u> Date: <u>05/26/22</u>		



**PARTICLE-SIZE DISTRIBUTION (GRADATION)
of SOILS USING SIEVE ANALYSIS**

ASTM D 6913

Project Name: [Herron Victorville](#)

Tested By: [S. Felter](#) Date: [05/26/22](#)

Project No.: [13526.001](#)

Checked By: [A. Santos](#) Date: [06/01/22](#)

Boring No.: [IT-1](#)

Depth (feet): [18.5](#)

Sample No.: [R-5](#)

Soil Identification: [Brown well-graded sand with silt \(SW-SM\)](#)

Container No.:		Moisture Content of Total Air - Dry Soil	
		Wt. of Air-Dry Soil + Cont. (g)	
Wt. of Air-Dried Soil + Cont.(g)	9554	Wt. of Dry Soil + Cont. (g)	0.0
Wt. of Container (g)	936.2	Wt. of Container No._____ (g)	0.0
Dry Wt. of Soil (g)	107.9	Moisture Content (%)	1.0
	828.3		0.0

After Wet Sieve	Container No.	9554
	Wt. of Dry Soil + Container (g)	856.1
	Wt. of Container (g)	107.9
	Dry Wt. of Soil Retained on # 200 Sieve (g)	748.2

U. S. Sieve Size		Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
(in.)	(mm.)		
1 1/2"	37.5		
1"	25.0		
3/4"	19.0		
1/2"	12.5	0.0	100.0
3/8"	9.5	4.9	99.4
#4	4.75	28.1	96.6
#8	2.36	81.1	90.2
#16	1.18	250.2	69.8
#30	0.600	472.3	43.0
#50	0.300	619.0	25.3
#100	0.150	705.3	14.8
#200	0.075	744.7	10.1
PAN			

GRAVEL: **3 %**

SAND: **87 %**

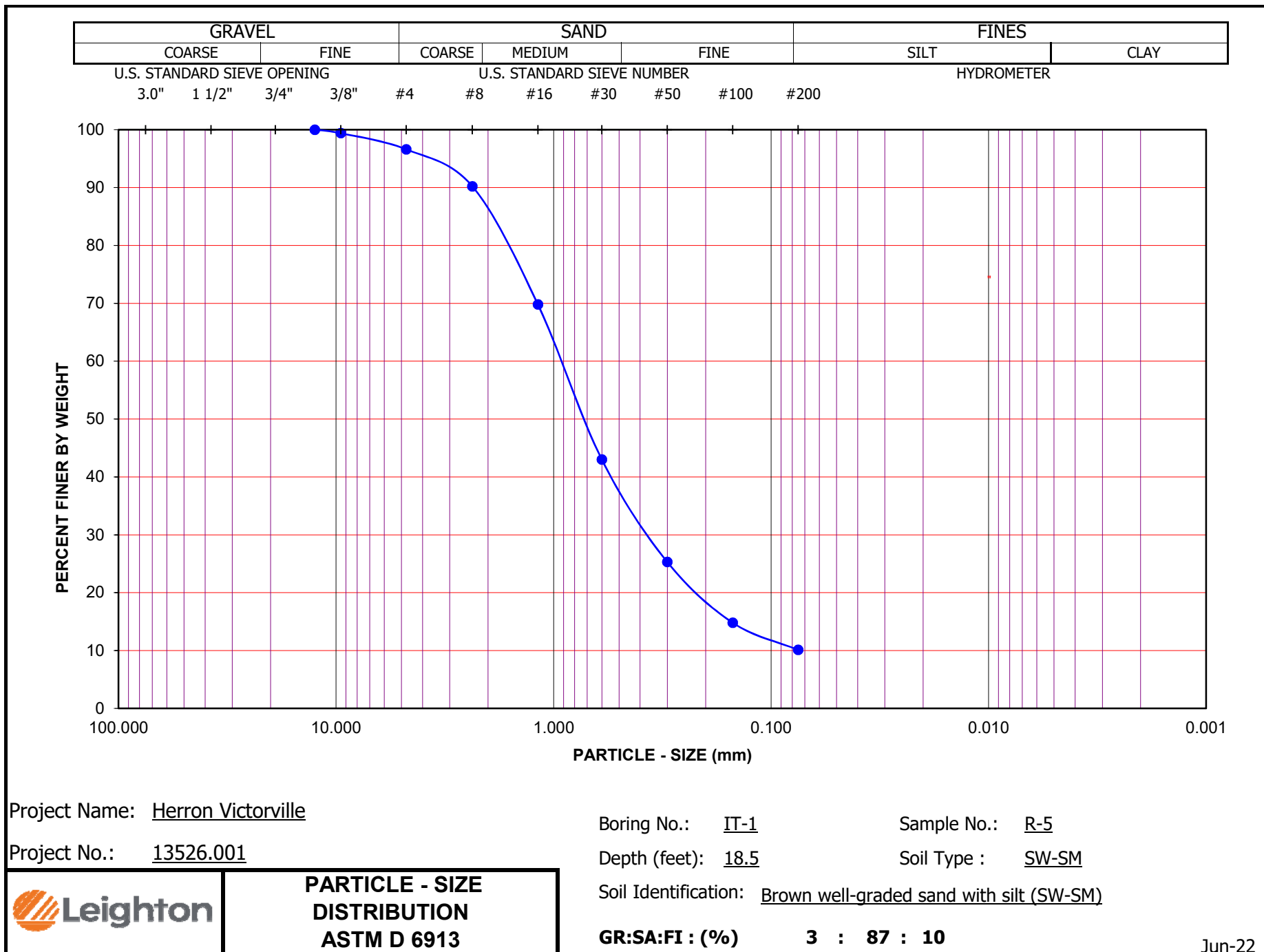
FINES: **10 %**

GROUP SYMBOL: **SW-SM**

$C_u = D_{60}/D_{10} =$ [13.14](#)

$C_c = (D_{30})^2/(D_{60}*D_{10}) =$ [2.13](#)

Remarks:





**PARTICLE-SIZE DISTRIBUTION (GRADATION)
of SOILS USING SIEVE ANALYSIS**

ASTM D 6913

Project Name: Herron Victorville

Tested By: S. Felter Date: 05/26/22

Project No.: 13526.001

Checked By: A. Santos Date: 06/01/22

Boring No.: IT-2

Depth (feet): 20.0

Sample No.: R-3

Soil Identification: Brown silty sand (SM)

Container No.:	Moisture Content of Total Air - Dry Soil		
	<u>979</u>	Wt. of Air-Dry Soil + Cont. (g)	0.0
	<u>959.2</u>	Wt. of Dry Soil + Cont. (g)	0.0
	<u>111.0</u>	Wt. of Container No. _____ (g)	1.0
	848.2	Moisture Content (%)	0.0
Wt. of Air-Dried Soil + Cont.(g)			
Wt. of Container (g)			
Dry Wt. of Soil (g)			

After Wet Sieve	Container No.	979
	Wt. of Dry Soil + Container (g)	<u>832.3</u>
	Wt. of Container (g)	111.0
	Dry Wt. of Soil Retained on # 200 Sieve (g)	721.3

U. S. Sieve Size		Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
(in.)	(mm.)		
1 1/2"	37.5		
1"	25.0	<u>0.0</u>	100.0
3/4"	19.0	<u>19.1</u>	97.7
1/2"	12.5	<u>51.3</u>	94.0
3/8"	9.5	<u>67.4</u>	92.1
#4	4.75	<u>96.0</u>	88.7
#8	2.36	<u>143.2</u>	83.1
#16	1.18	<u>219.9</u>	74.1
#30	0.600	<u>346.2</u>	59.2
#50	0.300	<u>506.7</u>	40.3
#100	0.150	<u>641.7</u>	24.3
#200	0.075	<u>716.9</u>	15.5
PAN			

GRAVEL: **11 %**

SAND: **73 %**

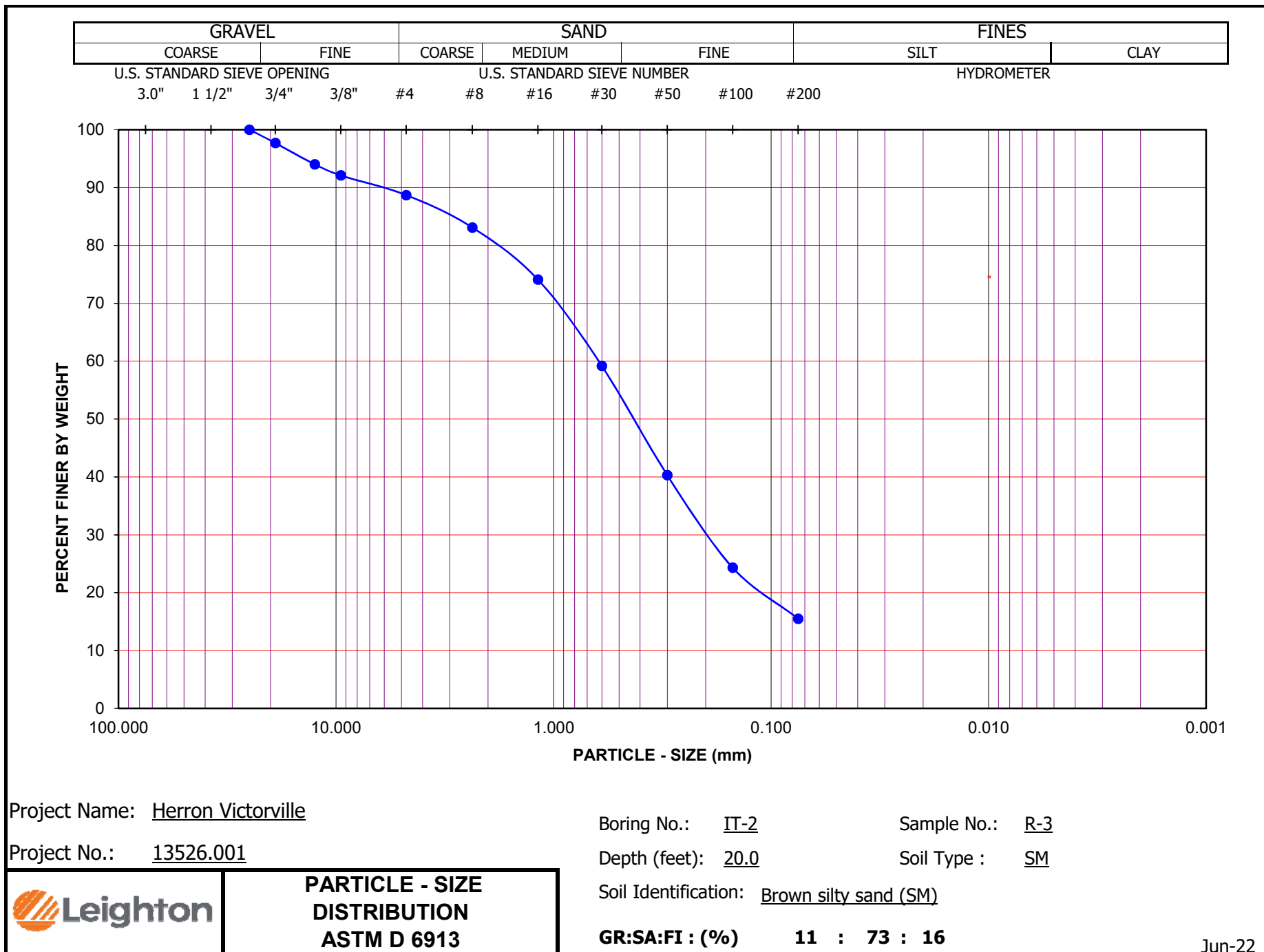
FINES: **16 %**

GROUP SYMBOL: **SM**

Cu = D60/D10 = _____

Cc = (D30)²/(D60*D10) = _____

Remarks: _____



PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 7928 & D 6913

Project Name: Herron Victorville

Tested By: J. Domingo

Date: 05/27/22

Project No.: 13526.001

Checked By: A. Santos

Date: 06/05/22

Boring No.: LB-3

Sample No.: B-1

Depth (feet): 0-5

Soil Identification: Brown silty sand (SM)

% Gravel	4	Soil Type SM	Moisture Content of Total Air-Dry Soil	Moisture Content of Air-Dry Soil Passing #10	After Hydrometer & Wet Sieve ret. in #200 Sieve
% Sand	68				
% Fines	28				
Specific Gravity (Assumed)	<u>2.70</u>	Wt. of Air-Dry Soil + Cont. (g)	<u>0.00</u>	<u>70.55</u>	
Correction for Specific Gravity	<u>0.99</u>	Dry Wt. of Soil + Cont. (g)	<u>0.00</u>	<u>70.45</u>	<u>149.69</u>
Wt. of Air-Dry Soil + Cont. (g)	<u>2519.26</u>	Wt. of Container No. ____ (g)	<u>1.00</u>	<u>1.00</u>	<u>74.74</u>
Wt. of Container	<u>226.29</u>	Moisture Content (%)	<u>0.00</u>	<u>0.14</u>	
Dry Wt. of Soil (g)	<u>2292.97</u>	Wt. of Dry Soil (g)			<u>74.95</u>

Coarse Sieve		
U.S. Sieve	Cumulative Wt. Of Dry Soil Retained (g)	% Passing
3"	<u>0.00</u>	100.0
1½"	<u>0.00</u>	100.0
¾"	<u>0.00</u>	100.0
⅜"	<u>30.62</u>	98.7
No. 4	<u>100.05</u>	95.6
No. 10	<u>272.38</u>	88.1
Pan		

Sieve after Hydrometer & Wet Sieve			
U.S. Sieve Size	Cumulative Wt. Of Dry Soil Retained (g)	% Passing	% Total Sample
No. 10	<u>0.00</u>	100.0	88.1
No. 16	<u>8.48</u>	92.1	81.2
No. 30	<u>25.97</u>	75.8	66.8
No. 50	<u>45.02</u>	58.1	51.2
No. 100	<u>59.96</u>	44.2	38.9
No. 200	<u>72.75</u>	32.3	28.4
Pan			

Hydrometer

Wt. of Air-Dry Soil (g)

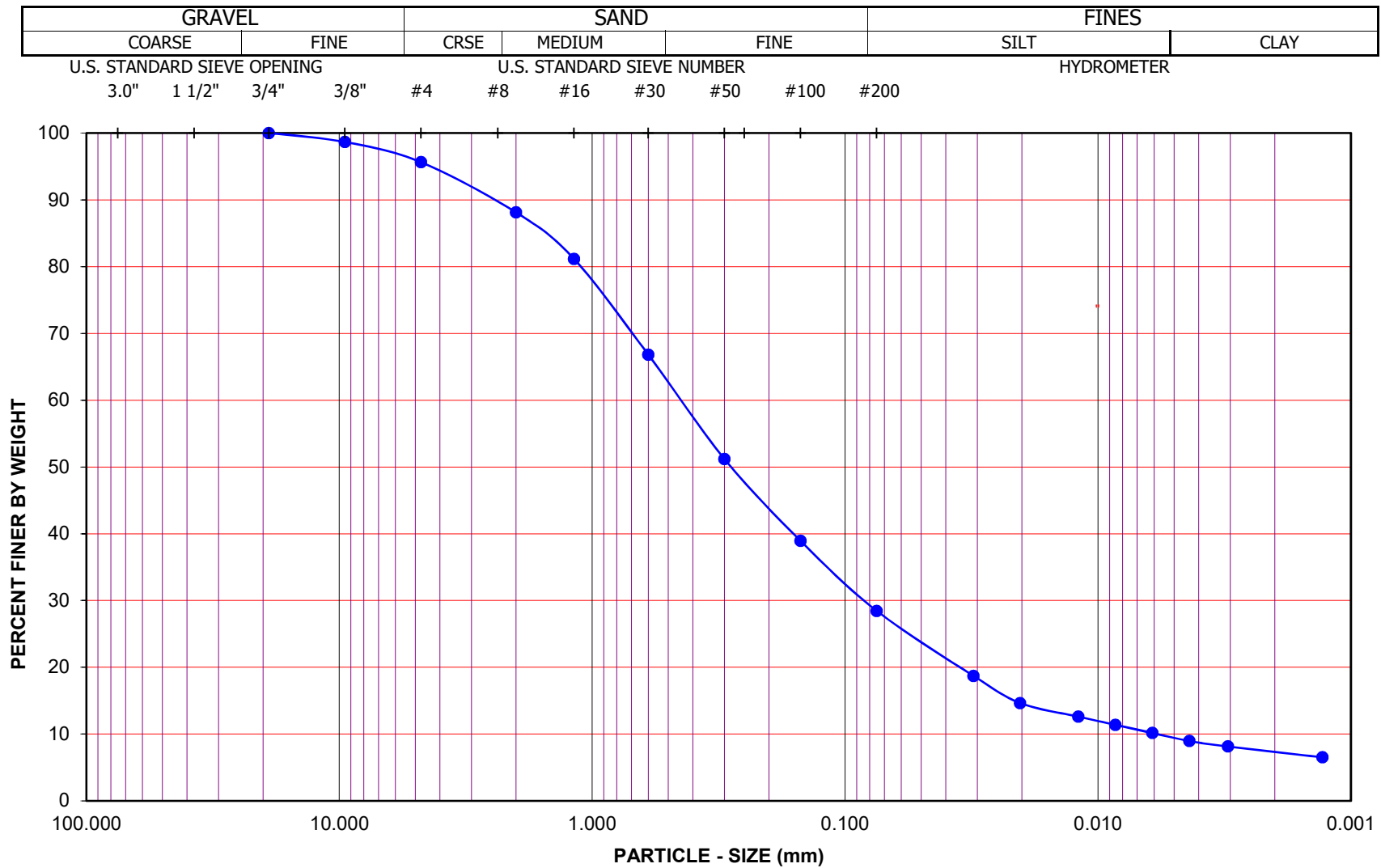
107.58

Wt. of Dry Soil (g)

107.43

Deflocculant 125 cc of 4% Solution

Date	Time	Elapsed Time (min)	Water Temperature (°C)	Composite Correction 152H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
<u>31-May-22</u>	<u>7:18</u>	<u>0</u>		<u>8.0</u>			
	<u>7:20</u>	<u>2</u>	<u>22.5</u>	<u>8.0</u>	<u>31.0</u>	<u>18.7</u>	<u>0.0311</u>
	<u>7:23</u>	<u>5</u>	<u>22.5</u>	<u>8.0</u>	<u>26.0</u>	<u>14.6</u>	<u>0.0203</u>
	<u>7:33</u>	<u>15</u>	<u>22.5</u>	<u>8.0</u>	<u>23.5</u>	<u>12.6</u>	<u>0.0120</u>
	<u>7:48</u>	<u>30</u>	<u>22.4</u>	<u>8.0</u>	<u>22.0</u>	<u>11.4</u>	<u>0.0085</u>
	<u>8:18</u>	<u>60</u>	<u>22.3</u>	<u>8.0</u>	<u>20.5</u>	<u>10.2</u>	<u>0.0061</u>
	<u>9:18</u>	<u>120</u>	<u>22.3</u>	<u>8.0</u>	<u>19.0</u>	<u>9.0</u>	<u>0.0044</u>
	<u>11:28</u>	<u>250</u>	<u>21.9</u>	<u>8.0</u>	<u>18.0</u>	<u>8.1</u>	<u>0.0031</u>
<u>01-Jun-22</u>	<u>7:18</u>	<u>1440</u>	<u>21.4</u>	<u>8.0</u>	<u>16.0</u>	<u>6.5</u>	<u>0.0013</u>



Project Name: Herron Victorville
 Project No.: 13526.001

Boring No.: LB-3 Sample No.: B-1
 Depth (feet): 0-5 Soil Type : SM
 Soil Identification: Brown silty sand (SM)

GR:SA:FI : (%) 4 : 68 : 28

**PARTICLE - SIZE
DISTRIBUTION**

ASTM D 7928 & D 6913



EXPANSION INDEX of SOILS
ASTM D 4829

Project Name: Herron Victorville Tested By: G. Berdy Date: 06/01/22
Project No.: 13526.001 Checked By: A. Santos Date: 06/05/22
Boring No.: LB-3 Depth (ft.): 0-5
Sample No.: B-1
Soil Identification: Olive brown silty sand (SM)

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	0.9995
Wt. Comp. Soil + Mold (g)	647.10	462.90
Wt. of Mold (g)	202.10	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	0	0
Wet Wt. of Soil + Cont. (g)	889.00	665.00
Dry Wt. of Soil + Cont. (g)	837.10	621.12
Wt. of Container (g)	0.00	202.10
Moisture Content (%)	6.20	10.47
Wet Density (pcf)	134.2	139.7
Dry Density (pcf)	126.4	126.5
Void Ratio	0.334	0.333
Total Porosity	0.250	0.250
Pore Volume (cc)	51.8	51.7
Degree of Saturation (%) [S meas]	50.2	84.9

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
06/01/22	14:00	1.0	0	0.5630
06/01/22	14:10	1.0	10	0.5625
Add Distilled Water to the Specimen				
06/01/22	14:30	1.0	20	0.5625
06/02/22	5:36	1.0	926	0.5625
06/02/22	8:36	1.0	1106	0.5625

Expansion Index (EI _{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	0
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**ONE-DIMENSIONAL SWELL OR SETTLEMENT
POTENTIAL OF COHESIVE SOILS
ASTM D 4546**

Project Name: Herron Victorville
Project No.: 13526.001
Boring No.: LB-1
Sample No.: R-3
Sample Description: Light olive brown silty sand (SM)

Tested By: G. Bathala Date: 05/27/22
Checked By: A. Santos Date: 06/01/22
Sample Type: Ring
Depth (ft.): 7.5

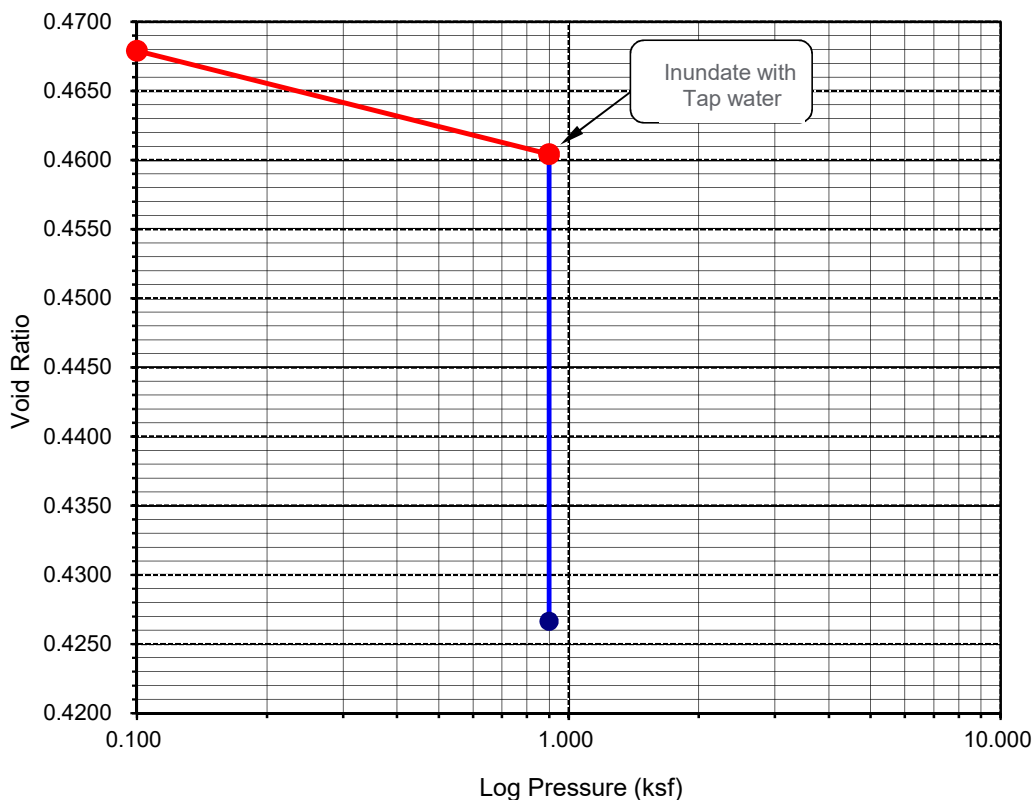
Initial Dry Density (pcf):	114.8
Initial Moisture (%):	1.46
Initial Length (in.):	1.0000
Initial Dial Reading:	0.0837
Diameter(in):	2.415

Final Dry Density (pcf):	119.1
Final Moisture (%) :	11.4
Initial Void ratio:	0.4684
Specific Gravity(assumed):	2.70
Initial Saturation (%)	8.4

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.0840	0.9997	0.00	-0.03	0.4679	-0.03
0.900	0.0930	0.9907	0.39	-0.93	0.4604	-0.54
H2O	0.1160	0.9677	0.39	-3.23	0.4267	-2.84

Percent Swell (+) / Settlement (-) After Inundation = -2.31

Void Ratio - Log Pressure Curve





**ONE-DIMENSIONAL SWELL OR SETTLEMENT
POTENTIAL OF COHESIVE SOILS
ASTM D 4546**

Project Name: Herron Victorville

Project No.: 13526.001

Boring No.: LB-5

Sample No.: R-2

Sample Description: Yellowish brown silty sand (SM)

Tested By: G. Bathala Date: 05/27/22

Checked By: A. Santos Date: 06/01/22

Sample Type: Ring

Depth (ft.): 5.0

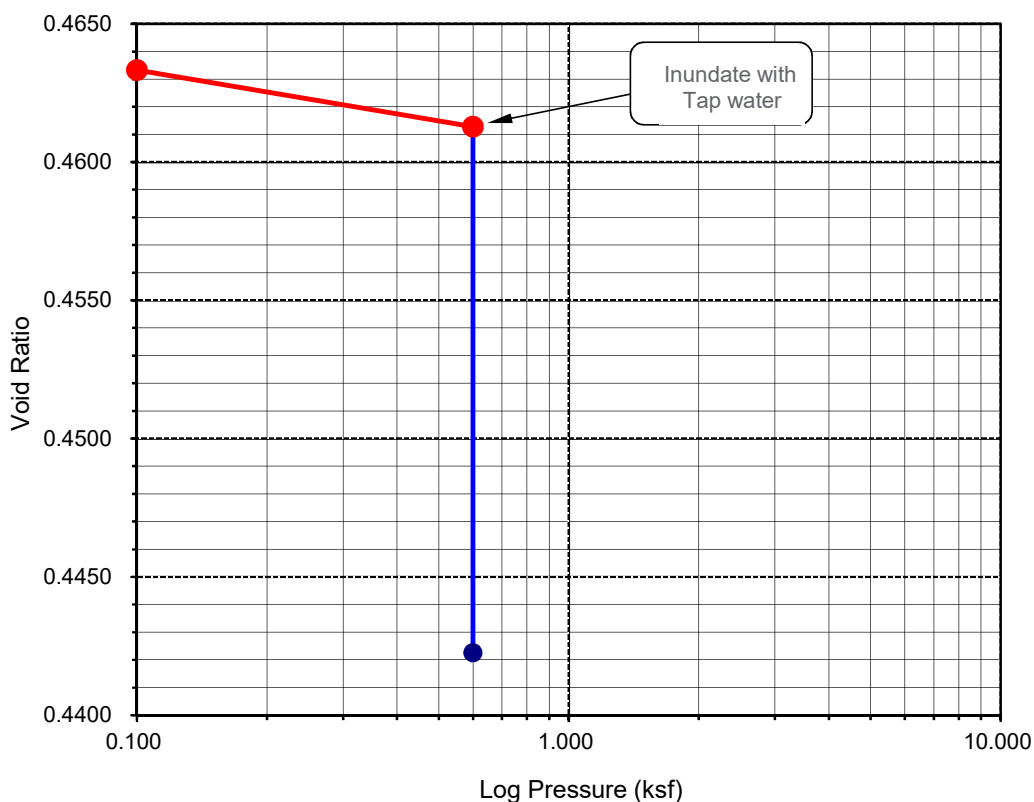
Initial Dry Density (pcf):	115.2
Initial Moisture (%):	2.21
Initial Length (in.):	1.0000
Initial Dial Reading:	0.0970
Diameter(in):	2.415

Final Dry Density (pcf):	117.3
Final Moisture (%) :	12.5
Initial Void ratio:	0.4638
Specific Gravity(assumed):	2.70
Initial Saturation (%)	12.8

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.100	0.0973	0.9997	0.00	-0.03	0.4633	-0.03
0.600	0.1003	0.9967	0.16	-0.33	0.4613	-0.17
H2O	0.1133	0.9837	0.16	-1.63	0.4423	-1.47

Percent Swell (+) / Settlement (-) After Inundation = -1.30

Void Ratio - Log Pressure Curve





**TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS**

Project Name: Herron Victorville Tested By : G. Berdy Date: 05/26/22
Project No. : 13526.001 Checked By: A. Santos Date: 06/05/22

Boring No.	LB-2			
Sample No.	B-1			
Sample Depth (ft)	0-5			
Soil Identification:	Yellowish brown (SM)			
Wet Weight of Soil + Container (g)	203.58			
Dry Weight of Soil + Container (g)	203.34			
Weight of Container (g)	62.97			
Moisture Content (%)	0.17			
Weight of Soaked Soil (g)	100.27			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	402			
Crucible No.	2			
Furnace Temperature (°C)	860			
Time In / Time Out	7:00/7:45			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	22.4966			
Wt. of Crucible (g)	22.4929			
Wt. of Residue (g) (A)	0.0037			
PPM of Sulfate (A) x 41150	152.26			
PPM of Sulfate, Dry Weight Basis	153			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15			
ml of AgNO ₃ Soln. Used in Titration (C)	0.4			
PPM of Chloride (C - 0.2) * 100 * 30 / B	40			
PPM of Chloride, Dry Wt. Basis	40			

pH TEST, DOT California Test 643

pH Value	6.78			
Temperature °C	21.2			



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: Herron Victorville

Project No. : 13526.001

Boring No.: LB-2

Sample No. : B-1

Tested By : J. Domingo Date: 06/02/22

Checked By: A. Santos Date: 06/05/22

Depth (ft.) : 0-5

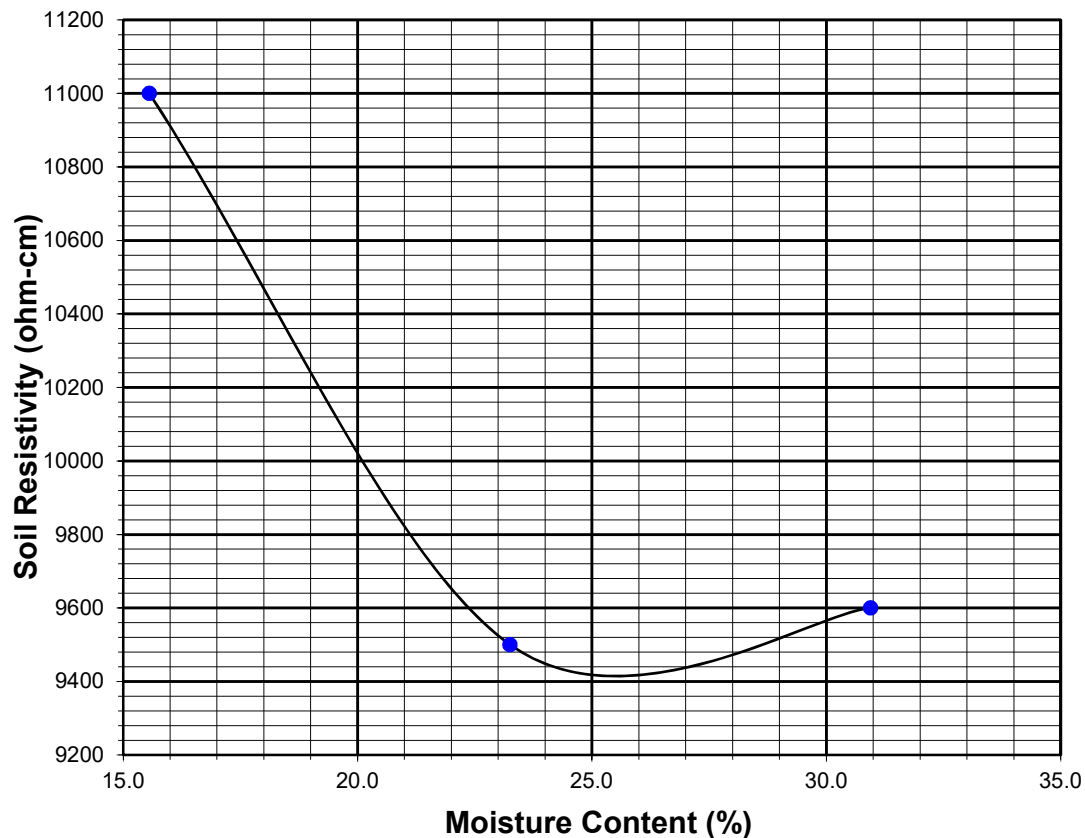
Soil Identification:* Yellowish brown (SM)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	15.56	11000	11000
2	30	23.25	9500	9500
3	40	30.95	9600	9600
4				
5				

Moisture Content (%) (Mci)	0.17
Wet Wt. of Soil + Cont. (g)	203.58
Dry Wt. of Soil + Cont. (g)	203.34
Wt. of Container (g)	62.97
Container No.	
Initial Soil Wt. (g) (Wt)	130.20
Box Constant	1.000
$MC = (((1 + Mci / 100) \times (Wa / Wt + 1)) - 1) \times 100$	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
9410	25.5	153	40	6.78	21.2



APPENDIX D

SEISMIC

Leighton

May 2022

[illegible]

$a_{\max} = 0.55g$
 $M_W = 8.1$
 MSF eq: 1
 $MSF = 0.82$
 Hammer Efficiency = 84
 $C_E = 1.40$
 $C_B = 1$
 C_s for SPT? TRUE
 Unlined, but room for liner
 Rod Stickup (feet) = 3
 Ring sample correction = 0.65

Summary of Liquefaction Susceptibility Analysis: SPT Method

Leighton

Liquefaction Method: Youd and Idriss (2001). Seismic Settlement Method: Tokimatsu and Seed (1987) and Martin and Lew (1999).

Project: Herron Victorville; Case 1; PGAm 0.55; design GW 302; No overex 0

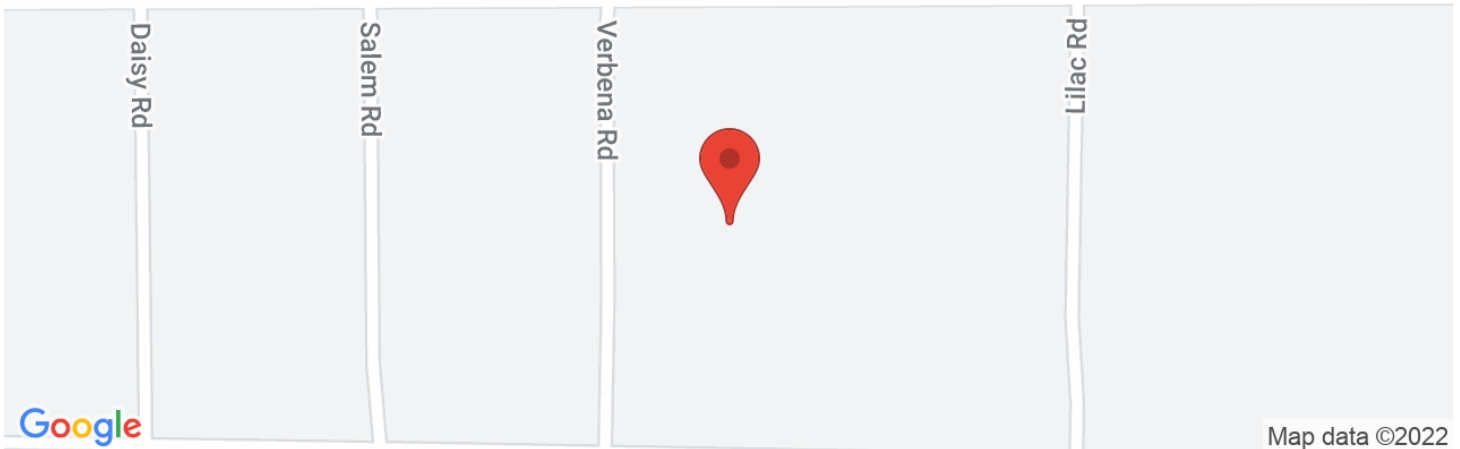
Project No.: 13526.001

Boring No.	Approx. Layer Depth (ft)	SPT Depth (ft)	Approx Layer Thickness (ft)	Plasticity ("n"=non susc. to liq.)	Estimated Fines Cont (%)	γ_t (pcf)	N_m or B (blows/ft)	Sampler Type (enter 2 if mod CA Ring)	C_s	N_m (corrected for C_s and ring->SPT) (blows/ft)	Exist σ'_{vo} (psf)	$(N_1)_{60}$	$(N_1)_{60CS}$	$CRR_{7.5}$	Design σ'_{vo} (psf)	CSR _{7.5}	CSR _M	Liquefaction Factor of Safety	$(N_1)_{60CS}$ (for Settlement) (blows/ft)	Dry Sand Strain (%) (Tok/ Seed 87)	Sat Sand Strain (%) (Tok/ Seed 87)	Seismic Sett. of Layer (in.)	Cummulative Seismic Settlement (in.)
LB-1	0 to 3.8	2.5	3.8		25	120	41	2	1	26.7	300	47.6	57.3	>Range	300	0.36	0.43	NonLiq	57.3	0.01		0.00	0.7
LB-1	3.8 to 6.3	5	2.5		25	120	57	2	1	37.1	600	66.1	78.0	>Range	600	0.35	0.43	NonLiq	78.0	0.01		0.00	0.6
LB-1	6.3 to 8.8	7.5	2.5		25	120	13	2	1	8.5	900	14.4	20.4	0.220	900	0.35	0.43	NonLiq	20.4	0.14		0.04	0.6
LB-1	8.8 to 12.5	10	3.8	<u>10</u>	120	25	2	1	1	16.3	1200	25.5	26.9	0.336	1200	0.35	0.43	NonLiq	26.9	0.16		0.07	0.6
LB-1	12.5 to 17.5	15	5.0		10	120	96	2	1	62.4	1800	80.0	82.6	>Range	1800	0.34	0.42	NonLiq	82.6	0.01		0.01	0.5
LB-1	17.5 to 22.5	20	5.0		10	120	100	1	1.3	130.0	2400	161.3	165.6	>Range	2400	0.34	0.42	NonLiq	165.6	0.01		0.01	0.5
LB-1	22.5 to 27.5	25	5.0		10	120	59	2	1	38.4	3000	42.6	44.3	>Range	3000	0.34	0.41	NonLiq	44.3	0.03		0.02	0.5
LB-1	27.5 to 32.5	30	5.0		10	120	21	1	1.29	27.0	3600	28.8	30.3	>Range	3600	0.33	0.41	NonLiq	30.3	0.08		0.05	0.5
LB-1	32.5 to 37.5	35	5.0		10	120	27	2	1	17.6	4200	17.3	18.6	0.198	4200	0.32	0.39	NonLiq	18.6	0.38		0.23	0.4
LB-1	37.5 to 42.5	40	5.0		10	120	36	1	1.3	46.8	4800	43.2	45.0	>Range	4800	0.30	0.37	NonLiq	45.0	0.02		0.01	0.2
LB-1	42.5 to 47.5	45	5.0		10	120	50	2	1	32.5	5400	28.3	29.8	0.453	5400	0.29	0.35	NonLiq	29.8	0.17		0.10	0.2
LB-1	47.5 to 52.0	50	4.5		25	120	19	1	1.19	22.5	6000	18.6	25.0	0.293	6000	0.27	0.33	NonLiq	25.0	0.20		0.11	0.1
LB-2	0 to 3.8	2.5	3.8		25	120	39	2	1	25.4	300	45.2	54.7	>Range	300	0.36	0.43	NonLiq	54.7	0.01		0.00	0.1
LB-2	3.8 to 6.3	5	2.5	<u>12</u>	120	21	2	1	1	13.7	600	24.4	26.7	0.330	600	0.35	0.43	NonLiq	26.7	0.15		0.04	0.1
LB-2	6.3 to 8.8	7.5	2.5		25	120	45	2	1	29.3	900	49.9	59.9	>Range	900	0.35	0.43	NonLiq	59.9	0.01		0.00	0.1
LB-2	8.8 to 12.5	10	3.8		10	120	30	2	1	19.5	1200	30.6	32.1	>Range	1200	0.35	0.43	NonLiq	32.1	0.08		0.03	0.1
LB-2	12.5 to 17.5	15	5.0		10	120	37	1	1.3	48.1	1800	61.6	63.9	>Range	1800	0.34	0.42	NonLiq	63.9	0.01		0.01	0.0
LB-2	17.5 to 22.5	20	5.0		10	120	100	2	1	65.0	2400	80.6	83.2	>Range	2400	0.34	0.42	NonLiq	83.2	0.01		0.01	0.0
LB-2	22.5 to 27.5	25	5.0		10	120	42	1	1.3	54.6	3000	60.6	62.8	>Range	3000	0.34	0.41	NonLiq	62.8	0.02		0.01	0.0
LB-2	27.5 to 32.0	30	4.5		10	120	100	2	1	65.0	3600	69.3	71.7	>Range	3600	0.33	0.41	NonLiq	71.7	0.02		0.01	0.0
LB-3	0 to 3.8	2.5	3.8	<u>28</u>	120	30	2	1	1	19.5	300	34.8	44.2	>Range	300	0.36	0.43	NonLiq	44.2	0.01		0.00	0.0
LB-3	3.8 to 6.3	5	2.5		28	120	40	2	1	26.0	600	46.4	57.4	>Range	600	0.35	0.43	NonLiq	57.4	0.01		0.00	0.0
LB-3	6.3 to 8.8	7.5	2.5		28	120	46	2	1	29.9	900	51.0	62.6	>Range	900	0.35	0.43	NonLiq	62.6	0.01		0.00	0.0
LB-3	8.8 to 12.5	10	3.8		10	120	52	2	1	33.8	1200	53.1	55.1	>Range	1200	0.35	0.43	NonLiq	55.1	0.02		0.01	0.0
LB-3	12.5 to 17.5	15	5.0		10	120	84	2	1	54.6	1800	70.0	72.4	>Range	1800	0.34	0.42	NonLiq	72.4	0.01		0.01	0.0
LB-3	17.5 to 22.0	20	4.5		10	120	30	1	1.3	39.0	2400	48.4	50.3	>Range	2400	0.34	0.42	NonLiq	50.3	0.02		0.01	0.0
LB-4	0 to 3.8	2.5	3.8		30	120	38	2	1	24.7	300	44.1	55.6	>Range	300	0.36	0.43	NonLiq	55.6	0.01		0.00	0.3
LB-4	3.8 to 6.3	5	2.5		10	120	17	2	1	11.1	600	19.7	21.0	0.229	600	0.35	0.43	NonLiq	21.0	0.20		0.06	0.3
LB-4	6.3 to 8.8	7.5	2.5		10	120	46	2	1	29.9	900	51.0	53.0	>Range	900	0.35	0.43	NonLiq	53.0	0.01		0.00	0.3
LB-4	8.8 to 12.5	10	3.8		5	120	34	2	1	22.1	1200	34.7	34.7	>Range	1200	0.35	0.43	NonLiq	34.7	0.07		0.03	0.3
LB-4	12.5 to 17.5	15	5.0		5	120	100	1	1.3	130.0	1800	166.6	166.6	>Range	1800	0.34	0.42	NonLiq	166.6	0.01		0.00	0.2
LB-4	17.5 to 22.5	20	5.0		20	120	100	2	1	65.0	2400	80.6	90.7	>Range	2400	0.34	0.42	NonLiq	90.7	0.01		0.01	0.2
LB-4	22.5 to 27.5	25	5.0		35	120	32	1	1.3	41.6	3000	46.2	60.4	>Range	3000	0.34	0.41	NonLiq	60.4	0.02		0.01	0.2
LB-4	27.5 to 32.5	30	5.0		35	120	51	2	1	33.2	3600	35.3	47.4	>Range	3600	0.33	0.41	NonLiq	47.4	0.02		0.01	0.2

Boring No.	Approx. Layer Depth	SPT Depth	Approx Layer Thickness	Plasticity ("n"=non susc. to liq.)	Estimated Fines Cont	γ_t	N_m or B	Sampler Type (enter 2 if mod CA Ring)	C_s	N_m (corrected for C_s and ring->SPT)	Exist σ_{vo}	$(N_1)_{60}$	$(N_1)_{60CS}$	$CRR_{7.5}$	Design σ_{vo}	$CSR_{7.5}$	CSR_M	Liquefaction Factor of Safety	$(N_1)_{60CS}$ (for Settlement)	Dry Sand Strain (%) (Tok/ Seed 87)	Sat Sand Strain (%) (Tok/ Seed 87)	Seismic Sett. of Layer	Cummulative Seismic Settlement
	(ft)	(ft)	(ft)		(%)	(pcf)	(blows/ft)			(blows/ft)	(psf)				(psf)				(blows/ft)	(%)	(%)	(in.)	(in.)
LB-4	32.5 to 37.5	35	5.0		30	120	100	1	1.3	130.0	4200	128.3	152.8	>Range	4200	0.32	0.39	NonLiq	152.8	0.01		0.01	0.2
LB-4	37.5 to 42.5	40	5.0		45	120	30	2	1	19.5	4800	18.0	26.6	0.328	4800	0.30	0.37	NonLiq	26.6	0.18		0.11	0.2
LB-4	42.5 to 47.5	45	5.0		45	120	30	1	1.3	39.0	5400	34.0	45.7	>Range	5400	0.29	0.35	NonLiq	45.7	0.02		0.01	0.1
LB-4	47.5 to 52.0	50	4.5		45	120	43	2	1	28.0	6000	23.1	32.7	>Range	6000	0.27	0.33	NonLiq	32.7	0.09		0.05	0.0
LB-5	0 to 3.8	2.5	3.8		<u>25</u>	120	17	2	1	11.1	300	19.7	26.3	0.320	300	0.36	0.43	NonLiq	26.3	0.05		0.02	0.3
LB-5	3.8 to 6.3	5	2.5		20	120	16	2	1	10.4	600	18.6	23.7	0.267	600	0.35	0.43	NonLiq	23.7	0.17		0.05	0.2
LB-5	6.3 to 8.8	7.5	2.5		20	120	12	2	1	7.8	900	13.3	18.0	0.192	900	0.35	0.43	NonLiq	18.0	0.26		0.08	0.2
LB-5	8.8 to 12.5	10	3.8		10	120	25	2	1	16.3	1200	25.5	26.9	0.336	1200	0.35	0.43	NonLiq	26.9	0.16		0.07	0.1
LB-5	12.5 to 17.5	15	5.0		10	120	48	2	1	31.2	1800	40.0	41.7	>Range	1800	0.34	0.42	NonLiq	41.7	0.02		0.01	0.0
LB-5	17.5 to 22.5	20	5.0		25	120	70	1	1.3	91.0	2400	112.9	130.2	>Range	2400	0.34	0.42	NonLiq	130.2	0.01		0.01	0.0
LB-5	22.5 to 27.5	25	5.0		25	120	100	2	1	65.0	3000	72.1	84.7	>Range	3000	0.34	0.41	NonLiq	84.7	0.02		0.01	0.0
LB-5	27.5 to 32.0	30	4.5		25	120	33	1	1.3	42.9	3600	45.7	55.3	>Range	3600	0.33	0.41	NonLiq	55.3	0.02		0.01	0.0



Latitude, Longitude: 34.4685, -117.4247



Date	5/11/2022, 4:17:52 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.423	MCE_R ground motion. (for 0.2 second period)
S_1	0.553	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.423	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.949	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.55	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
S_{sRT}	1.423	Probabilistic risk-targeted ground motion. (0.2 second)
S_{sUH}	1.533	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_{sD}	1.5	Factored deterministic acceleration value. (0.2 second)
S_{1RT}	0.553	Probabilistic risk-targeted ground motion. (1.0 second)
S_{1UH}	0.609	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S_{1D}	0.6	Factored deterministic acceleration value. (1.0 second)
$PGAd$	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.928	Mapped value of the risk coefficient at short periods
C_{R1}	0.908	Mapped value of the risk coefficient at a period of 1 s

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Unified Hazard Tool



Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

^ Input

Edition

Dynamic: Conterminous U.S. 2014 (u...

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.4685

Time Horizon

Return period in years

2475

Longitude

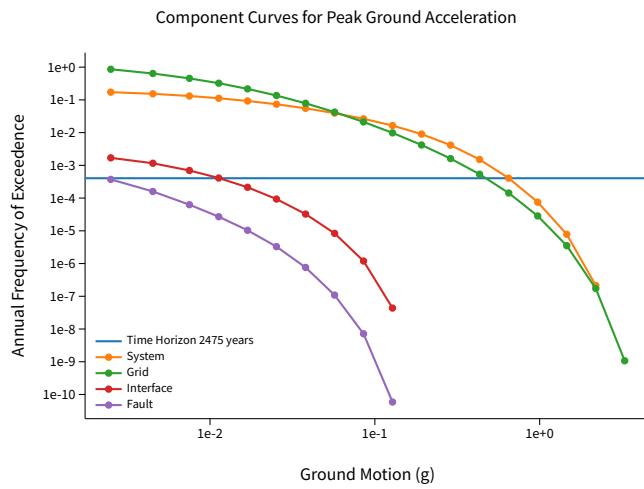
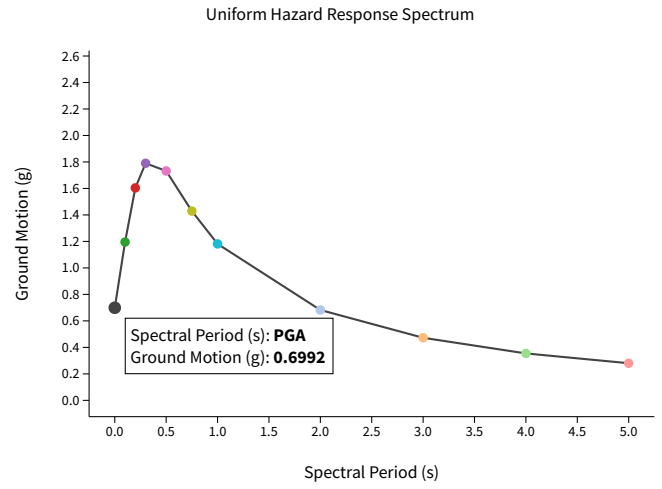
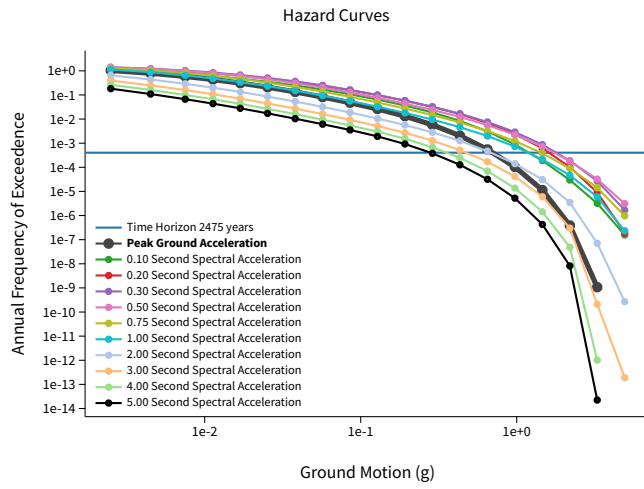
Decimal degrees, negative values for western longitudes

-117.4247

Site Class

259 m/s (Site class D)

^ Hazard Curve

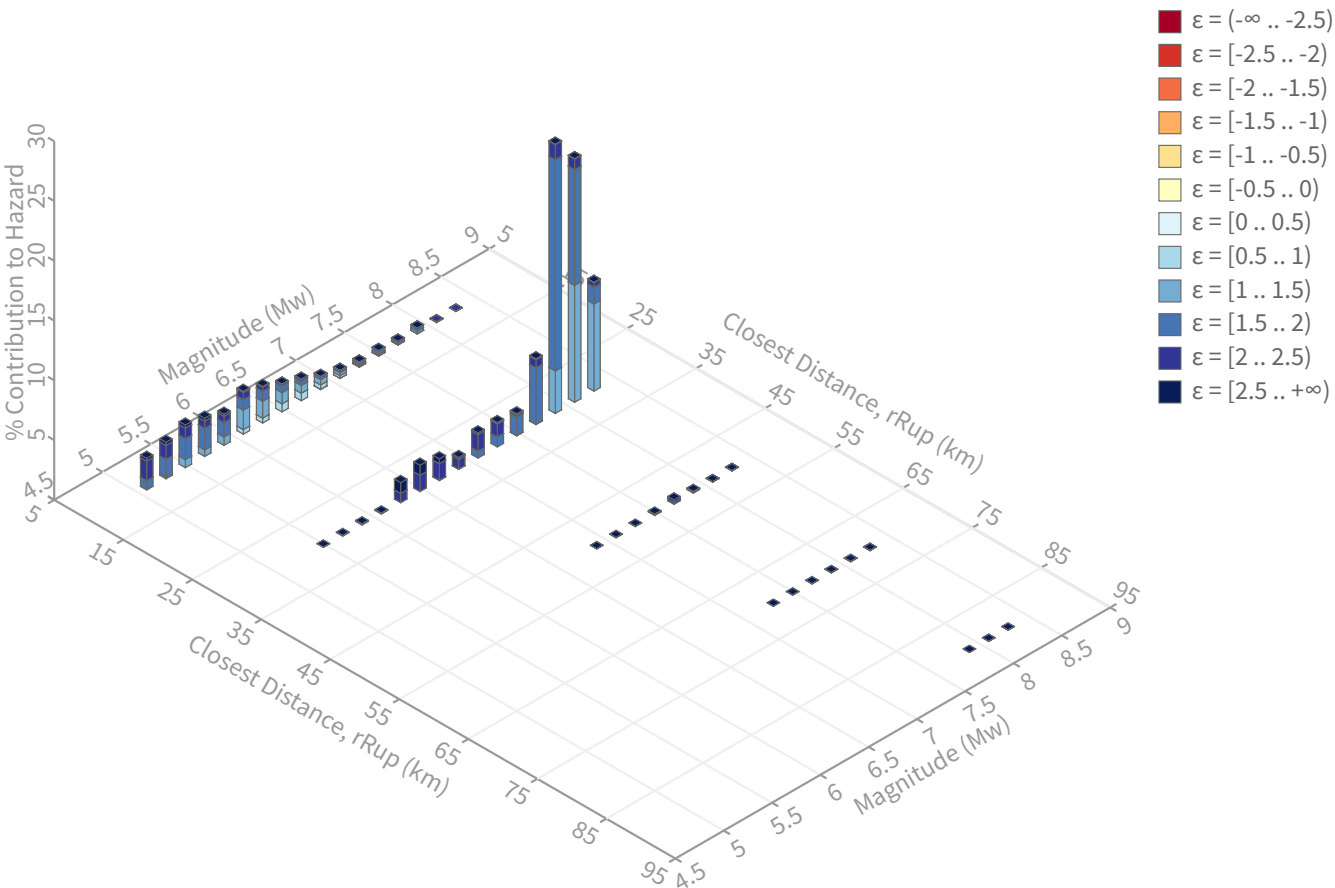


[View Raw Data](#)

^ Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr⁻¹
PGA ground motion: 0.69917613 g

Recovered targets

Return period: 3110.3139 yrs
Exceedance rate: 0.00032151095 yr⁻¹

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.08 %

Mean (over all sources)

m: 7.29
r: 17.85 km
ε₀: 1.7 σ

Mode (largest m-r bin)

m: 7.9
r: 20.99 km
ε₀: 1.66 σ
Contribution: 22.51 %

Mode (largest m-r-ε₀ bin)

m: 7.89
r: 20.86 km
ε₀: 1.65 σ
Contribution: 17.66 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

- ε0:** [-∞ .. -2.5)
- ε1:** [-2.5 .. -2.0)
- ε2:** [-2.0 .. -1.5)
- ε3:** [-1.5 .. -1.0)
- ε4:** [-1.0 .. -0.5)
- ε5:** [-0.5 .. 0.0)
- ε6:** [0.0 .. 0.5)
- ε7:** [0.5 .. 1.0)
- ε8:** [1.0 .. 1.5)
- ε9:** [1.5 .. 2.0)
- ε10:** [2.0 .. 2.5)
- ε11:** [2.5 .. +∞]

Deaggregation Contributors

Source Set	Source	Type	r	m	ϵ_0	lon	lat	az	%
UC33brAvg_FM32		System							36.11
	San Andreas (San Bernardino N) [0]		20.34	7.96	1.61	117.530°W	34.308°N	208.49	27.22
	San Andreas (Mojave S) [14]		20.41	7.11	2.10	117.549°W	34.316°N	214.01	2.14
	Cucamonga [0]		23.74	7.83	1.69	117.445°W	34.192°N	183.41	1.22
	San Andreas (Mojave S) [13]		22.14	7.11	2.18	117.612°W	34.343°N	231.00	1.14
	San Andreas (San Bernardino N) [1]		20.77	7.25	2.02	117.493°W	34.290°N	197.60	1.04
UC33brAvg_FM31		System							36.04
	San Andreas (San Bernardino N) [0]		20.34	7.96	1.61	117.530°W	34.308°N	208.49	27.10
	San Andreas (Mojave S) [14]		20.41	7.09	2.12	117.549°W	34.316°N	214.01	2.18
	San Andreas (Mojave S) [13]		22.14	7.09	2.19	117.612°W	34.343°N	231.00	1.16
	Cucamonga [0]		23.74	7.82	1.69	117.445°W	34.192°N	183.41	1.13
	San Andreas (San Bernardino N) [1]		20.77	7.25	2.01	117.493°W	34.290°N	197.60	1.08
UC33brAvg_FM31 (opt)		Grid							13.93
	PointSourceFinite: -117.425, 34.536		8.44	5.85	1.63	117.425°W	34.536°N	0.00	2.55
	PointSourceFinite: -117.425, 34.536		8.44	5.85	1.63	117.425°W	34.536°N	0.00	2.55
	PointSourceFinite: -117.425, 34.509		6.52	5.81	1.36	117.425°W	34.509°N	0.00	2.11
	PointSourceFinite: -117.425, 34.509		6.52	5.81	1.36	117.425°W	34.509°N	0.00	2.11
UC33brAvg_FM32 (opt)		Grid							13.92
	PointSourceFinite: -117.425, 34.536		8.44	5.85	1.63	117.425°W	34.536°N	0.00	2.54
	PointSourceFinite: -117.425, 34.536		8.44	5.85	1.63	117.425°W	34.536°N	0.00	2.54
	PointSourceFinite: -117.425, 34.509		6.52	5.81	1.36	117.425°W	34.509°N	0.00	2.11
	PointSourceFinite: -117.425, 34.509		6.52	5.81	1.36	117.425°W	34.509°N	0.00	2.10

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

<u>Table of Contents</u>		
<u>Section</u>		<u>Page</u>
1.0	GENERAL	1
1.1	Intent	1
1.2	The Geotechnical Consultant of Record	1
1.3	The Earthwork Contractor	2
2.0	PREPARATION OF AREAS TO BE FILLED	2
2.1	Clearing and Grubbing	2
2.2	Processing	3
2.3	Overexcavation	3
2.4	Benching	3
2.5	Evaluation/Acceptance of Fill Areas	3
3.0	FILL MATERIAL	4
3.1	General	4
3.2	Oversize	4
3.3	Import	4
4.0	FILL PLACEMENT AND COMPACTION	4
4.1	Fill Layers	4
4.2	Fill Moisture Conditioning	4
4.3	Compaction of Fill	5
4.4	Compaction of Fill Slopes	5
4.5	Compaction Testing	5
4.6	Frequency of Compaction Testing	5
4.7	Compaction Test Locations	5
5.0	SUBDRAIN INSTALLATION	6
6.0	EXCAVATION	6
7.0	TRENCH BACKFILLS	6
7.1	Safety	6
7.2	Bedding and Backfill	6
7.3	Lift Thickness	6
7.4	Observation and Testing	6

LEIGHTON AND ASSOCIATES, INC.
General Earthwork and Grading Specifications

1.0 General

- 1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).
- 1.2 The Geotechnical Consultant of Record: Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

LEIGHTON AND ASSOCIATES, INC.
General Earthwork and Grading Specifications

- 1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The

Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

- 2.1 Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

LEIGHTON AND ASSOCIATES, INC.
General Earthwork and Grading Specifications

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

- 2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.
- 2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.
- 2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.
- 2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

LEIGHTON AND ASSOCIATES, INC.
General Earthwork and Grading Specifications

3.0 Fill Material

- 3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.
- 3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.
- 3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

- 4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.
- 4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

LEIGHTON AND ASSOCIATES, INC.
General Earthwork and Grading Specifications

- 4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.
- 4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.
- 4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).
- 4.6 Frequency of Compaction Testing: Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.
- 4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety: The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill: All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.3 Lift Thickness: Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

7.4 Observation and Testing: The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

PALEONTOLOGICAL ASSESSMENT FOR THE TTM 20544 PROJECT

**CITY OF VICTORVILLE
SAN BERNARDINO COUNTY, CALIFORNIA**

APN 3071-111-01

Prepared on Behalf of:

**Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408**

Prepared for:

**City of Victorville
14343 Civic Drive
Victorville, California 92393**

Prepared by:

**BFSA Environmental Services,
a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064**

August 3, 2023



BFSA Environmental Services
A Perennial Company

Paleontological Database Information

Author: Todd A. Wirths, M.S., Senior Paleontologist, California
Professional Geologist No. 7588

Prepared by: BFSA Environmental Services, a Perennial Company
14010 Poway Road, Suite A
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Report Date: August 3, 2023

Report Title: Paleontological Assessment for the TTM 20544 Project, City of
Victorville, San Bernardino County, California

Prepared on Behalf of: Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408

Prepared for: City of Victorville
14343 Civic Drive
Victorville, California 92393

Assessor's Parcel Number: 3071-111-01

USGS Quadrangle: Section 5, Township 4 North, Range 5 West of the USGS
Baldy Mesa, California (7.5-minute) Quadrangle

Study Area: Approximately 20 acres

Key Words: Paleontological assessment; Pleistocene alluvial deposits; High
sensitivity; City of Victorville.

Table of Contents

<u>Section</u>	<u>Page</u>
I. INTRODUCTION AND LOCATION.....	1
II. REGULATORY SETTING	1
<i>State of California</i>	1
<i>City of Victorville</i>	4
III. GEOLOGY	4
IV. PALEONTOLOGICAL RESOURCES.....	5
<i>Definition</i>	5
<i>Fossil Locality Search</i>	7
<i>Field Survey</i>	7
V. PALEONTOLOGICAL SENSITIVITY.....	8
<i>Overview</i>	8
<i>Professional Standards</i>	8
<i>City of Victorville Assessment</i>	8
VI. CONCLUSIONS AND RECOMMENDATIONS	9
<i>PRIMP Elements</i>	9
VII. CERTIFICATION.....	11
VIII. REFERENCES.....	11

Appendices

Appendix A – Qualifications of Key Personnel

Appendix B – Paleontological Records Search

List of Figures

<u>Figure</u>	<u>Page</u>
Figure 1 General Location Map	2
Figure 2 Project Location Map.....	3
Figure 3 Geologic Map.....	6

I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the TTM 20544 Project, located east of Verbena Road and bounded by Bear Valley and Sierra roads in the city of Victorville, San Bernardino County, California (Figure 1). The approximately 20-acre project includes Assessor's Parcel Number (APN) 3071-111-01. On the U.S. Geological Survey (USGS) 1:24,000-scale *Baldy Mesa, California* (7.5-minute) topographic quadrangle map, the project is situated in Section 5, Township 4 North, Range 5 West (Figure 2). The project will include the construction of a residential subdivision.

As the lead agency, the City of Victorville has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area, a review of the underlying geology, and recommendations to mitigate impacts to potential paleontological resources, if necessary.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding regulation that sets the requirement for protecting California's cultural and paleontological resources. CEQA does not establish specific rules that must be followed but mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

In CEQA's Environmental Checklist Form, one of the questions to answer is, "would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources including fossils, which is paraphrased below:

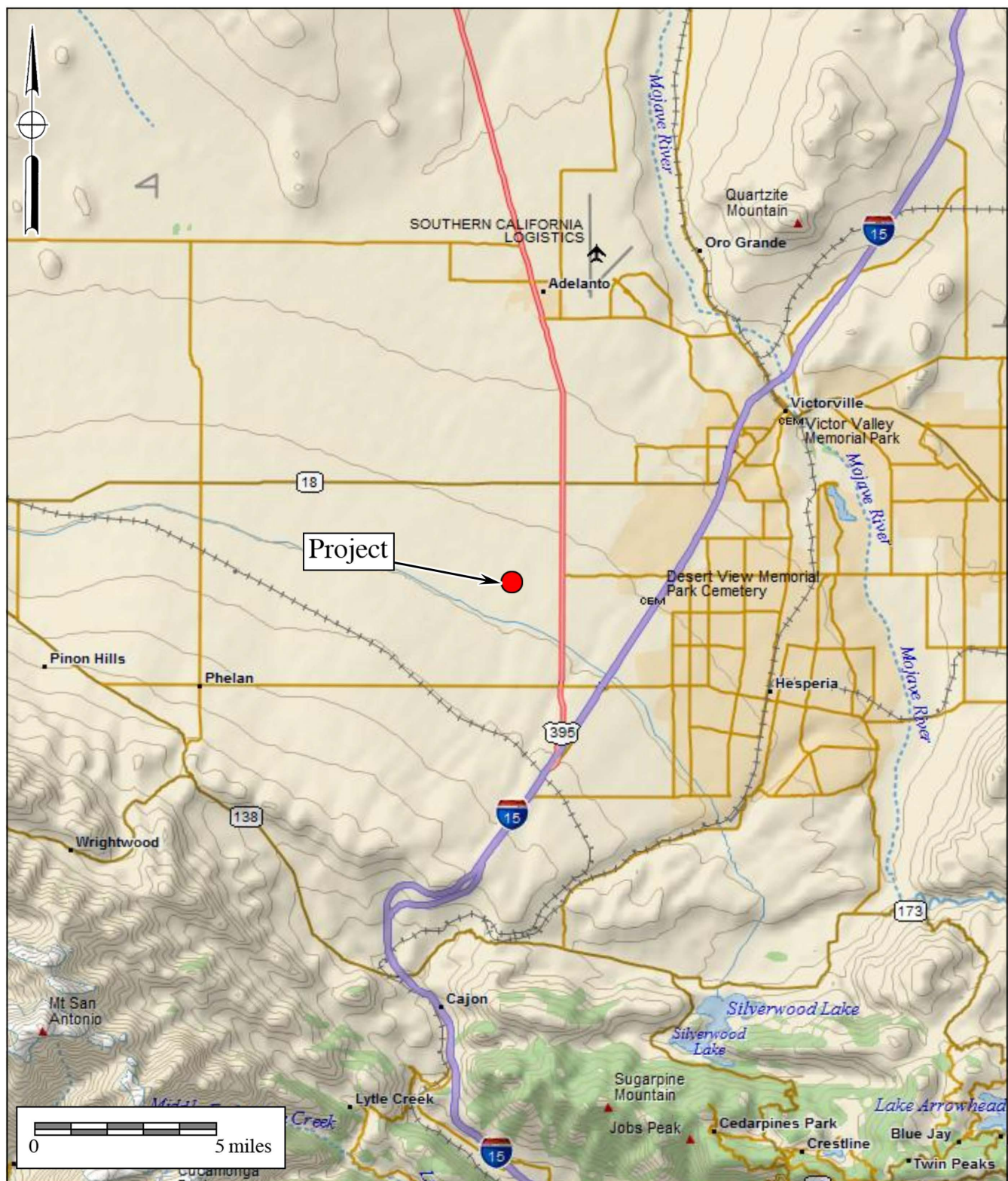


Figure 1
General Location Map
 The TTM 20544 Project
 DeLorme (1:250,000 series)

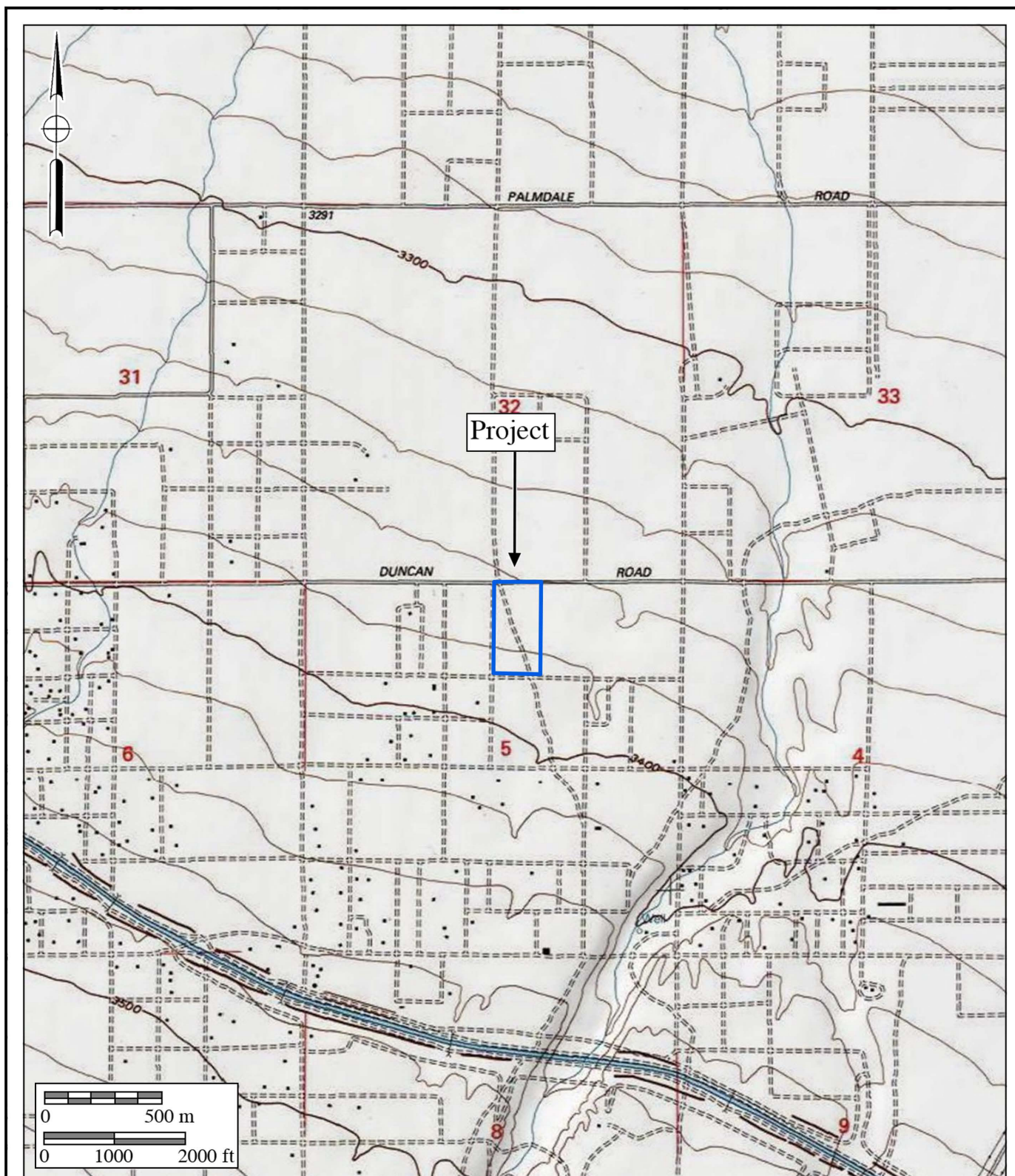


Figure 2
Project Location Map

The TTM 20544 Project

USGS Baldy Mesa Quadrangle (7.5-minute series)

- a) A person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.
- b) As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
- c) A violation of this section is a misdemeanor.

City of Victorville

In the Final Environmental Impact Report (EIR) of the City of Victorville General Plan, paleontological resource mitigation measures are specified in CUL-1. For previously undeveloped properties greater than one acre, mitigation measure CUL-1 must be implemented before construction starts (City of Victorville 2008a). The measure is as follows:

CUL-1: The applicant shall provide for an on-site paleontological/archaeological inspector to monitor all grading operations, or a letter from said licensed professional indicating that monitoring is not necessary during grading. Further, if disturbed resources are required to be collected and preserved, the applicant shall be required to participate financially up to the limits imposed by Public Resources Code Section 21083.2. The results of said monitoring shall be filed with the Development Director or his designee prior to the final approval of the development. (City of Victorville 2008a)

III. GEOLOGY

The project is situated over the Victorville Basin, a structural depression about 40 kilometers wide and filled with sediments up to 1,300 meters thick, a succession of deposits ranging in age from middle Miocene through late Pleistocene time. The Victorville Basin is bordered by the San Gabriel and San Bernardino Mountains to the south, and along the north, local peaks and ridges of pre-Cenozoic basement rocks in the areas of Quartzite Mountain and the southeastern Shadow Mountains. These deposits record the erosional and depositional cycles of the region during episodes of crustal slip along the San Andreas Fault, along with the coeval uplift and trans-rotation of the San Bernardino and San Gabriel Mountains. A major feature of the area is the evolution of the northward-flowing ancestral Mojave River. Between the Cajon Pass and Victorville, and at the project, the main geomorphic attribute of the surface is the Victorville Fan, a broad piedmont or bajada. The fan was active between roughly one-half million years to about

middle to late Pleistocene times (Cox et al. 2003).

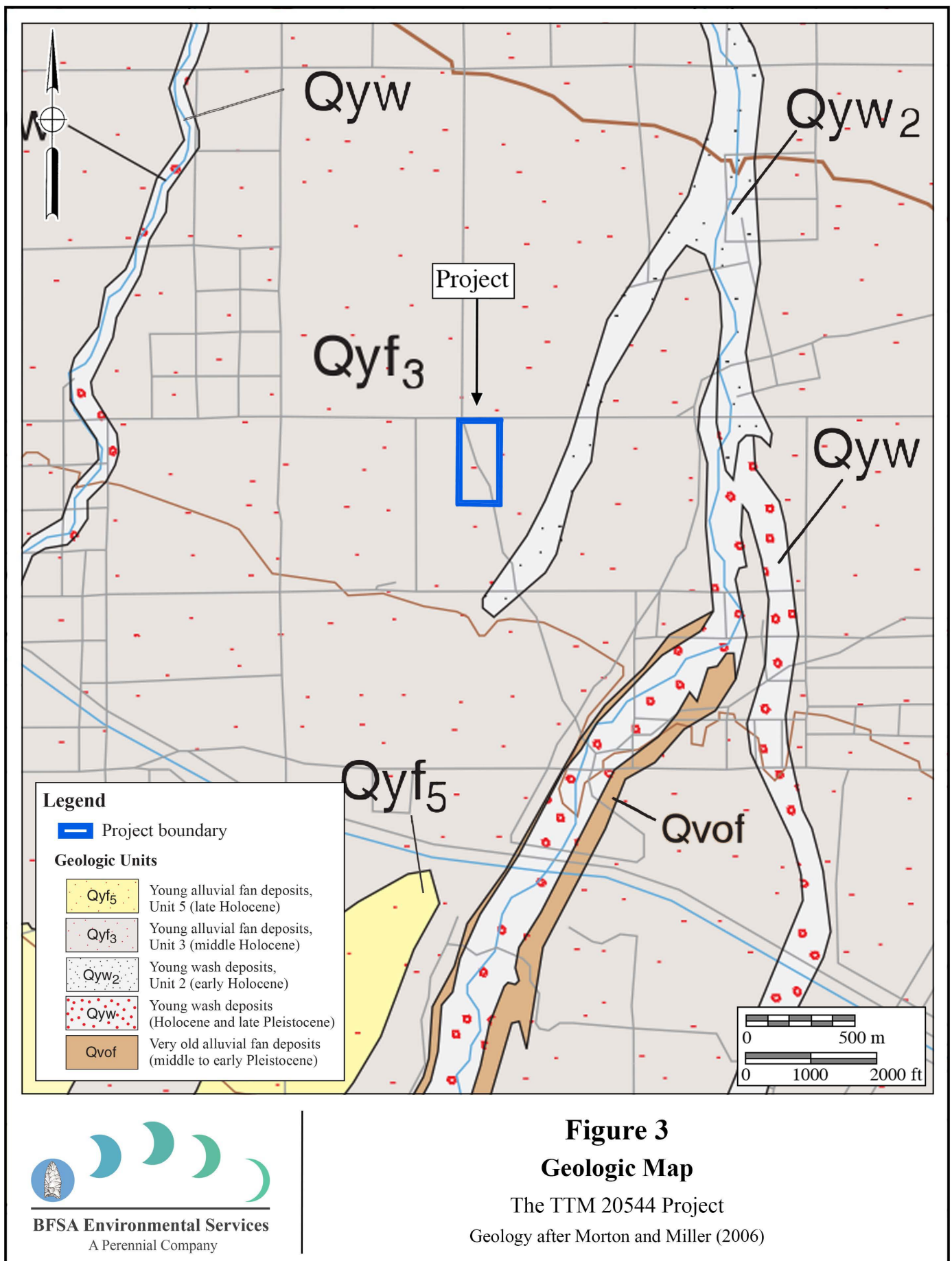
As shown on Figure 3 (after Morton and Miller 2006), the project overlies middle Holocene young alluvial fan deposits, Unit 3 (pale gray areas labeled “Qyf₃”). The fan deposits are composed of homogeneous brown silts and sands with sparse granule and pebble lenses and scattered, matrix-supported, pebble-sized clasts. The fan surfaces are slightly to moderately dissected, and locally show low amplitude, rolling surfaces with swales and ridges parallel to the axes of the fans (Morton and Miller 2006). In the attached paleontological records search for the project, the Holocene alluvial deposits are as little as three feet thick in the area and are underlain by Pleistocene-aged alluvial deposits that may contain fossils (Kottkamp 2022).

Approximately five miles east of the project are deposits of the Pleistocene and Pliocene-aged “alluvium of the ancestral Mojave River” (Hernandez et al. 2008). The current configuration of the Mojave River has developed gradually over a span of at least one million years. About 60 to 70 thousand years ago, the ancestral Mojave River began incising its modern canyon between Victorville and Barstow. The upper unit of the ancient Mojave River depositional sequence is approximately middle Pleistocene in age, based on terrestrial vertebrate fossils (Cox et al. 2003).

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology [SVP] 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (see Section II of this report).



Fossil Locality Search

A paleontological resource locality search was performed for a previous nearby project by the Division of Earth Sciences at the San Bernardino County Museum (SBCM), called the Luna and Fremontia Project (Kottkamp 2022; Appendix B). The Luna and Fremontia Project is located about one-and-a-half miles northeast of the TTM 20544 Project. The locality search indicated that there are no fossil localities within the current project. The closest locality is located approximately 1.25 miles east of the current project, consisting of Pleistocene rodent teeth and indeterminate mammalian remains (SBCM locality numbers [locs.] 1.114.209, 1.114.210, and 1.114.211). Approximately three-and-a-half miles northeast of the current project, at Silverado High School, more rodent teeth with large mammal bones, along with land/freshwater snails, were recovered during mitigation monitoring (SBCM locs. 1.114.252 to 1.114.255). Farther northeast, multiple localities, mostly of Pleistocene rodent remains, were recovered (SBCM locs. 1.115.1 to 1.115.7 and 1.115.11). Kottkamp (2022) indicated that, while depths of these fossil localities are not precisely known, the deposits that contain the fossils are buried beneath a relatively thin surficial veneer of soil and Holocene deposits.

A review of published and unpublished literature was conducted for potential paleontological resources that are known in the vicinity of the project. The sources reviewed did not indicate the presence of any known fossil localities within the project. However, in the greater Victorville area, there are many recorded Pleistocene vertebrate fossil localities (Jefferson 1986, 1991, 2009; Cox et al. 2003; Romero and Hillburn 2006; City of Victorville 2008b; Reynolds and Reynolds 1994; and several sources by R.E. Reynolds not available for review). Most of the specimens and records recovered from these localities are held by the SBCM. All the localities from these sources are derived from the alluvium of the ancestral Mojave River as mapped by Hernandez et al. (2008) and Cox et al. (2003), and are several miles east and north of the project.

Field Survey

BFSA Environmental Services, a Perennial Company (BFSA), staff, under the supervision of paleontological principal investigator Todd A. Wirths, conducted a site visit on July 21, 2023. The survey included a careful inspection of all exposed ground surfaces, including any rodent burrows and disturbed areas. The survey of the property was an intensive reconnaissance consisting of a series of parallel survey transects spaced at approximately 15-meter intervals. The entire property was accessible, with visibility characterized as excellent. Vegetation primarily consisted of creosote bushes, rubber rabbitbrush, and Joshua Trees. The survey confirmed that the project site had been previously cleared and leveled. No paleontological resources, or evidence of paleontological resources, were identified as a result of the survey.

V. **PALEONTOLOGICAL SENSITIVITY**

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.*, fossils) and is therefore typically assigned a low paleontological sensitivity. Pleistocene (greater than 11,700 years old) alluvial and alluvial fan deposits in the Inland Empire and Mojave Desert, however, often yield important Ice Age terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, and camel, saber-toothed cats, and others (Jefferson 1991). Therefore, these Pleistocene sediments are accorded a high paleontological resource sensitivity.

Professional Standards

The SVP has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as paraphrased below:

- **High Potential:** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- **Undetermined Potential:** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.
- **Low Potential:** Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that only preserve fossils in rare circumstances.
- **No Potential:** Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, based on the presence of nearby significant fossil localities and potential for buried Pleistocene deposits to underlie thin, surficial Holocene alluvial deposits at the project, the project may be considered to have a high potential to yield paleontological resources.

City of Victorville Assessment

Section 5.5.1.2 of the City of Victorville's Draft EIR for the General Plan (City of Victorville 2008b) describes the paleontologic resources within the city. Based on Pleistocene vertebrate fossils recovered from sediments deposited by the ancestral Mojave River, areas

mapped as such are assigned a “moderate to high sensitivity” for the potential to yield significant paleontological resources (City of Victorville 2008b [Sections 5.5-29, 5.5-30]).

In Section 5.5.4, “Project Impacts,” of the Draft EIR, mitigation of potentially significant impacts to significant nonrenewable resources is required if identified in program-level paleontological assessments. Implementation Measure 5.1.2.4 “Require[s] paleontologic monitoring of land alteration projects involving excavation into native geologic materials known to have a high sensitivity for the presence of paleontologic resources” (City of Victorville 2008b [Section 5.5-22]).

VI. CONCLUSIONS AND RECOMMENDATIONS

Research has confirmed the existence of potentially fossiliferous Pleistocene-aged alluvial fan deposits that are likely present in the shallow subsurface of the project. These alluvial fan deposits and the known occurrence of significant terrestrial vertebrate fossils at shallow depths from the Pleistocene deposits in the vicinity of the project support that paleontological monitoring be implemented during mass grading and excavation activities in undisturbed alluvial deposits in order to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Full-time monitoring of undisturbed alluvial deposits at the project is warranted starting at the surface.

A Paleontological Resource Impact Mitigation Program (PRIMP) report that outlines a proposed mitigation monitoring plan at the project is recommended for submittal and approval by the City of Victorville. The PRIMP should be based on the findings stated above. A PRIMP for the project is outlined below:

PRIMP Elements

1. All mitigation programs should be performed by a qualified professional (project) paleontologist, defined as an individual with an M.S. or Ph.D. in paleontology or geology who has proven experience in San Bernardino County paleontology and who is knowledgeable in professional paleontological procedures and techniques. Fieldwork may be conducted by a qualified paleontological monitor, defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor shall always work under the direction of a qualified paleontologist.
2. Monitoring of mass grading and excavation activities shall be performed by a qualified paleontologist or paleontological monitor. Full-time monitoring for paleontological resources from the surface will be conducted in areas where grading, excavation, or drilling activities occur in undisturbed alluvium of the Victorville Fan to mitigate any adverse impacts (loss or destruction) to potential nonrenewable paleontological resources. Monitoring is not warranted in disturbed soils, such as artificial fill.
3. Paleontological monitors will be equipped to salvage fossils as they are unearthed to

- avoid construction delays and to remove samples of sediment that are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment to allow for the removal of abundant or large specimens in a timely manner. The monitor shall notify the project paleontologist, who will then notify the concerned parties of the discovery. Monitoring may be reduced if the potentially fossiliferous units are not present in the subsurface or, if they are present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
4. Preparation of recovered specimens to a point of identification and permanent preservation will be conducted, including screen washing sediments to recover small vertebrates and invertebrates if indicated by the results of test sampling. Preparation of any individual vertebrate fossils is often more time-consuming than for accumulations of invertebrate fossils.
 5. All fossils must be deposited in an accredited institution (university or museum) that maintains collections of paleontological materials. The San Bernardino County Museum in Redlands, California, is the preferred institution by the County of San Bernardino. All costs of the paleontological monitoring and mitigation program, including any one-time charges by the receiving institution, are the responsibility of the developer.
 6. Preparation of a final monitoring and mitigation report of findings and significance will be completed, including lists of all fossils recovered and necessary maps and graphics to accurately record their original location(s). A letter documenting receipt and acceptance of all fossil collections by the receiving institution must be included in the final report. The report, when submitted to and accepted by the appropriate lead agency (*e.g.*, the City of Victorville), will signify satisfactory completion of the project program to mitigate impacts to any nonrenewable paleontological resources.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief and have been compiled in accordance with CEQA criteria.



August 3, 2023

Date

Todd A. Wirths

Senior Paleontologist

California Professional Geologist No. 7588

VIII. REFERENCES

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- Society of Vertebrate Paleontology. 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources; by the SVP Impact Mitigation Guidelines Revision Committee: https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines-1.pdf.

APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

Senior Paleontologist

BFSAE nvironmental Services, A P erennial Company

14010 Poway Road • Suite A •

Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: twirths@bfsa.perennialenv.com



E ducation

Master of Science, Geological Sciences, San Diego State University, California 1995

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz 1992

P rofessional C ertifications

California Professional Geologist #7588, 2003

Riverside County Approved Paleontologist

San Diego County Qualified Paleontologist

Orange County Certified Paleontologist

OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

P rofessional M emberships

Board member, San Diego Geological Society

San Diego Association of Geologists; past President (2012) and Vice President (2011)

South Coast Geological Society

Southern California Paleontological Society

E xperience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSAE nvironmental Services, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

S elected R ecent R eports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California.* Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

- 2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County.* Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County.* Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California.* Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California.* Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California.* Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Assessment for the Manitou Court Logistics Center Project, City of Jurupa Valley, Riverside County, California.* Prepared for Link Industrial. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County.* Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Assessment for the Alessandro Corporate Center Project (Planning Case PR-2020-000519), City of Riverside, Riverside County, California.* Prepared for OZI Alessandro, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.
- 2021 *Paleontological Monitoring Report for the Boardwalk Project, La Jolla, City of San Diego.* Prepared for Project Management Advisors, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

APPENDIX B

Paleontological Records Search



Museum
Division of Earth Science

Scott Kottkamp
Curator of Earth Science

27 May, 2022

Brian F. Smith & Associates, Inc.
Attn: Todd Wirths
14010 Poway Road, Suite A
Poway, CA 92064

PALEONTOLOGY RECORDS REVIEW for proposed Luna and Fremontia
(TM 20527) Project, Victorville, San Bernardino County, California

Dear Mr. Wirths,

The Division of Earth Science of the San Bernardino County Museum (SBCM) has completed a records search for the above-named project in San Bernardino County, California. The proposed project site (Luna and Fremontia, TM 20527) is in the City of Victorville, California as shown on the United States Geological Survey (USGS) 7.5 minute Baldy Mesa, California quadrangle.

Geologic mapping of that region done by Dibblee and Minch (2008a, 2008b) indicates the entire project area is located atop recent alluvial surficial deposits of Holocene age (Qa). These sediments are comprised of unconsolidated mixed sand, silt, and gravel, often covered by soil. These deposits are unlikely to be fossiliferous themselves, but directly overlie ~1.8 million to ~11,000 year old Pleistocene alluvial deposits (Qoa) that are. Where exposed at the surface east of the project site, Qoa is composed mostly of tan to light red weakly indurated sand near the banks of the Mojave River to the northeast (Dibblee and Minch, 2008b). This surficial Qoa grades to brown and gray in a vast plain, west of the river and southeast of the project site, towards Hesperia (Dibblee and Minch, 2008a). Despite these generalities, the composition, color, and depth of Qoa varies vertically and laterally, especially when found in the subsurface. Green-grey silt or clay are common, and the contact between Qa and Qoa in Victorville and Adelanto lies as little as 3 feet below the surface. Such older alluvial deposits have been found to be highly

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fossiliferous in the local area, yielding the remains of mammoth, mastodon, camels, and horses, as well as microfossils including rodents (Reynolds and Springer, 1991). Rancholabrean age fossils can be distinguished from Irvingtonian ones via both biostratigraphy and degree of diagenetic alteration – the youngest Rancholabrean specimens are subfossils and degree of diagenetic alteration generally scales with age. In the Adelanto region, Qoa in turn unconformably overlies the Miocene age Tropic Group, which is also fossiliferous (Dames and Moor, Inc., 1995). Below the Tropic Group are igneous and metamorphic units of Jurassic or older age (Dibblee and Minch, 2008b).

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontological resources have been discovered within the proposed project site. Nor have any paleontological resources been found within 1 mile of the project site's perimeter. Many fossil localities, however, are located within 5 miles and the same Qa and Qoa sediments as the project site. An abbreviated summary of these sites is provided below, to convey the highly fossiliferous nature of the area and to give a fuller understanding of the types of fossils present.

The closest fossil localities, SBCM 1.114.209, SBCM 1.114.210, and SBCM 1.114.211 are located approximately 1.5 – 1.6 miles southeast of the project site. Localities occur within Qoa units of grey-brown sand and green silt. No description of the depth at which fossils were found was provided in the records. Taxa present at these localities include *Perognathus* sp., indeterminate Mammalia, and indeterminate Chordata. *Perognathus* sp. is represented by teeth, while the indeterminate taxa are present as permineralized bone fragments.

Localities SBCM 1.114.252 – 1.114.255 were uncovered via paleontological mitigation monitoring during the construction of Silverado High School, 2.2 miles east northeast of the project site. Fossils were uncovered during construction grading and excavation of the school's foundation within Qoa. No description of the sediment or the depth at which fossils were found was provided in the records. Specimens collected from these localities include: unidentified conispiral and planispiral gastropod shells; *Thomomys bottae* LP4/; *Perognathus* sp. metapodials; enamel fragments; and bone fragments of an indeterminate large mammal. The large mammalian bone fragments appear heavily abraded and have a chalky color and texture, but the smaller rodent bones and teeth are well preserved.

SBCM localities 1.115.1 – 1.115.7 and 1.115.11 are arranged in a line running south-southeast, approximately 2.4 miles northeast to 4 miles north-northeast from the project site. These sites were uncovered during the excavation of foundations for transmission line towers. Permineralized mammal bones were discovered at these sites within the same older alluvium (Qoa) underlying the proposed project site. The contact between Qa and Qoa occurs as little as

3 feet below the surface, where Qoa takes the form of mixed green to buff colored fine sand, silt, and clay. The nature of the Qoa varies both laterally and with depth; at SBCM 1.115.11, 9 feet below the surface, Qoa was an orange-grey poorly sorted silt containing subangular gravel and caliche. Because of the excavation's nature, fossils were recovered from the spoils pile of dredged up sediments during augering. Thus, precise depths and most taphonomic data are unknown, though the deepest pit to produce fossils was 14 feet deep at the time (Reynolds and Springer, 1991). Specimens collected from these sites were either subfossils or preserved via permineralization, and include: *Crotalus* sp. vertebrae; Colubridae vertebra; Lacertilia distal tibia; bone fragments and a tarsal phalanx of small Aves; Camelidae tooth fragments (m/x, Mx/); indeterminate Artiodactyla enamel fragments; *Lepus* sp. radius and calcaneum; *Sylvilagus* sp. I1/ fragment; *Thomomys* sp. premaxillae, dentary and horizontal ramus with alveolar wall (i/1, m/x); *Perognathus* sp. R dentary fragment with i/1; *Perognathus* sp. LI1/ and RI1/; *Dipodomys* sp. LI1/, 4 indeterminate cheek teeth (p/x, Px/, m/x, or Mx/), L dentary fragment, and R proximal femur; Rodentia i/1; and a 1st phalanx, ungula phalanx, caudal vertebra, enamel fragments, and three long bone fragments from indeterminate Chordata. Another site associated with the transmission line project, SBCM 1.115.9, turned up indeterminate microfossil bone fragments within Qoa 3.4 miles northwest of the project area (Reynolds and Springer, 1991).

Finally, construction monitoring during subdivision construction within an area 3.5 – 4.5 miles northeast from the proposed project site uncovered 70 paleontological localities situated within Qoa several feet beneath the surface. Localities include SBCM 1.114.56 – 1.114.90, SBCM 1.114.93 – 1.114.97, SBCM 1.114.131 – 1.114.46, SBCM 1.114.160 – 1.114.65, SBCM 1.114.206 – 1.114.208, and SBCM 1.114.290 – 294. Localities occur in Qoa of variable composition, varying from wet dark yellow clay, to red sandy silt, to green silt with clasts of clay and caliche, to grey sand and gravel lenses dispersed within the other units. This Qoa is buried shallowly below a thin veneer of soil and Qa. The fossil assemblage consists of microfossils, bone fragments, and insect burrow traces; mode of preservation is permineralization for bone and casts for burrow traces. Taxa found at these localities include: indeterminate Plantae pollen; insect burrow traces; *Bufo* sp.; indeterminate Anura; *Coleonyx variegatus*; *Cnemidophorus* cf. *tigris*; *Callisaurus draconoides*; *Crotaphytus* sp.; *Gambelia* sp.; *Phrynosoma* sp.; *Sceloporus* sp.; *Uta stansburiana*; indeterminate Iguanidae; indeterminate Lacertilia; *Crotalus* sp.; indeterminate Colubridae; indeterminate Aves; *Lepus* sp.; *Sylvilagus* sp.; indeterminate Leporidae; *Microtus* sp.; *Neotoma* sp.; indeterminate Cricetidae; *Thomomys bottae*; *Thomomys* sp.; *Dipodomys* sp.; *Perognathus* sp.; *Ammospermophilus leucurus*; cf. *Otospermophilus variegatus*; indeterminate Sciuridae; and various indeterminate bone and enamel fragments.

This records search covers only the paleontological records of the San Bernardino County Museum. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Please do not hesitate to contact us with any further questions that you may have.

Sincerely,

A handwritten signature in black ink that reads "Scott Kottkamp". The signature is written in a cursive, slightly slanted style.

Scott Kottkamp, Curator of Earth Science
Division of Earth Science
San Bernardino County Museum

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