# Historical Resources Survey for the Junípero Serra Museum ADA Improvements Project (WBS #S-15034.02.02)

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RECON Number 9087.1
October 28, 2025

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## NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

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| Report Date: | October 28, 2025 |
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| Contract Number: | RECON Number 9087.1 |
| USGS Quadrangle Map: | Point Loma and La Jolla quadrangles, 1994 and 1996 editions |
| Acreage: | 1.60 acres |
| Keywords: | Historical resources survey, isolated features, Works Progress Administration |

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## ATTACHMENTS

1: Historical Resources Survey for the Junípero Serra ADA Improvements Project
2: Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements
3: Results of Excavation of CA-SDI-38: Addendum Letter to Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements
4: Native American Heritage Commission
5: Viejas Band of Mission Indians Responses

## CONFIDENTIAL ATTACHMENT (Under Separate Cover)

1: Record Search Results
2: Cultural Resources within the Area of Potential Effect

# Acronyms and Abbreviations

| | |
|---|---|
| APE | area of potential effect |
| ADA | Americans with Disabilities Act |
| CEQA | California Environmental Quality Act |
| CHL | California Historical Landmark |
| City | City of San Diego |
| cm | centimeter |
| GPR | ground penetrating radar |
| GPS | Global Positioning System |
| HRB | Historical Resources Board |
| HRR | Historic Resources Regulations |
| NAHC | Native American Heritage Commission |
| project | Junípero Serra Museum ADA Improvements Project |
| RECON | RECON Environmental, Inc. |
| WPA | Works Progress Administration |

# Summary

This report summarizes the background information, methods, and results of the historical resources survey of the 1.60-acre Junípero Serra Museum Americans with Disabilities (ADA) Improvements Project (project). The key project features include a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 28-foot-wide driveway, constructed between Presidio Drive and the new parking lot. The new parking lot would have nine total spaces, including five ADA compliant spaces and four non-ADA compliant spaces. Other project features include a green waste area for maintenance, storm water and drainage improvements, and lighting. Approximately 12 linear feet of retaining wall with a maximum height of 3 feet are proposed along portions of the ADA compliant path of travel to minimize grading. The storm water improvements would include a lined 12-foot-by-52-foot biofiltration basin at the base of the driveway near Presidio Drive that would collect and treat stormwater runoff from both the imperious surfaces (asphalt and concrete surfacing from the proposed parking lot, sidewalk, and path). The project would impact a total area of approximately 1.60 acres. Excavation would include a total of approximately 3,900 cubic yards and have maximum depths of 10 feet below ground surface for the new parking lot and 5 feet below ground surface for the new ADA compliant path. The total net new impermeable area would be approximately 24,700 square feet. The project would be completed in accordance with the Secretary of the Interior's Standards for Rehabilitation.

The records search from the South Coastal Information Center at San Diego State University identified two previously recorded cultural resources (P-37-000038/Presidio Park and P-37-038268/cobble-lined gutters) within the project area. RECON Environmental, Inc. observed the two previously recorded cultural resources with no noted change in their recorded condition and did not identify any new cultural material during the survey. No surface artifacts were encountered at P-37-000038. P-37-000038 is listed as a California Historic Landmark and listed in the National Register of Historic Places and the City of San Diego's Register of Historical Resources. The results of ground-penetrating radar, geoarchaeological borings, and archaeological excavation reveal a lack of an intact cultural deposit within the project area; this portion of the resource is recommended not significant; therefore, the project will not result in adverse effects to this resource.

P-37-038268 has been recommended eligible for listing on the California Register of Historical Resources and the City's Register for the gutters' association with the Works Progress Administration and method of construction. A portion of P-37-038268 will be impacted for the construction of the driveway to the proposed parking lot. The impacted section of the cobble gutter would be removed and replaced with a reconstructed concrete swale with hand-placed cobble to match the existing cobble gutter along Presidio Drive. The project design has reduced the impact to P-37-028268 to below a significant level; therefore, the project will not result in adverse effects to this resource. Although the potential for buried cultural features is considered low within the area of potential effect, the archaeological and historic significance of the San Diego Presidio (P-37-000038), combined with the area's importance as a tribal cultural resource for Native Americans, RECON Environmental, Inc. recommends the presence of qualified archaeological and Native American monitors during earth-moving activities.

# 1.0 Introduction

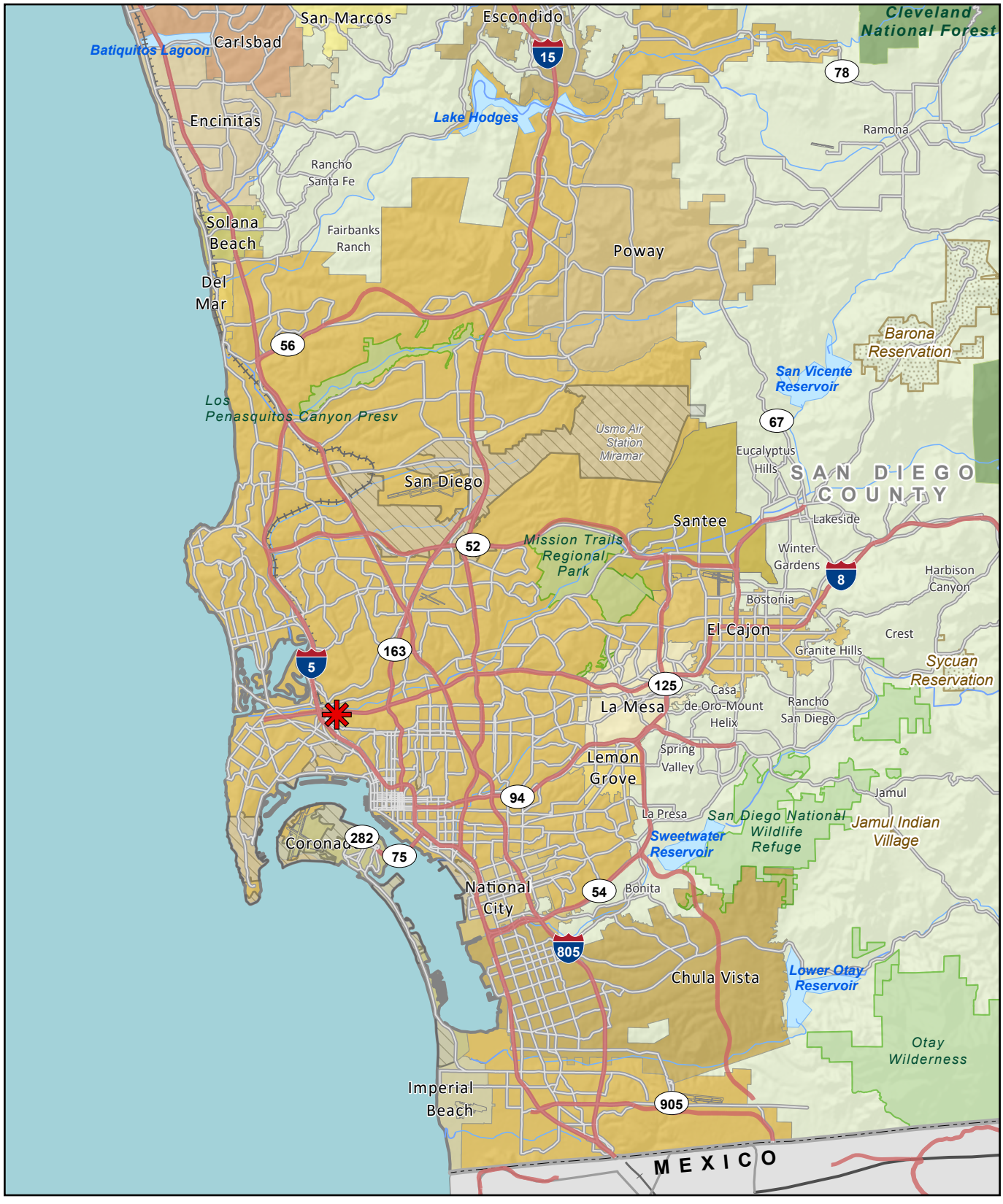
This report describes the results of the historical resource survey conducted for the Junípero Serra Museum Americans with Disabilities (ADA) Improvements Project (project). The project is located south of Interstate 8 and just south of Taylor Street, northeast of Old Town San Diego State Historic Park (Figure 1). The project area is shown on the U.S. Geological Survey 7.5-minute topographic map series, Point Loma and La Jolla quadrangles, within an unsectioned portion of the Pueblo Lands of San Diego Land Grant (Figure 2), and City of San Diego (City), Engineering and Development, City 800' scale map, Number 210-1701 (Figure 3). The project area includes a portion of the grounds south of the Junípero Serra Museum that incorporates a knoll top and extends to the south near Cosoy Way. It is bounded on the west by a north-south portion of Presidio Drive and on the east by the knoll top that overlooks the canyon bottom in the eastern portion of Presidio Park (Figure 4).

The City proposes to provide ADA improvements at the Junípero Serra Museum. Key project features include a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, a new 28-foot-wide driveway constructed between Presidio Drive a the new parking lot, lighting and signage around the parking lot, the sidewalk around the northwest side of the parking lot, and the ADA compliant path. The new parking lot would have nine total spaces, including five ADA compliant spaces and four non-ADA compliant spaces. Other project features include a green waste area for maintenance, storm water and drainage improvements, and lighting. Approximately 12 linear feet of retaining wall with a maximum height of 3 feet are proposed along portions of the ADA compliant path of travel to minimize grading. The storm water improvements would include a lined bioretention basin, approximately 600 square feet of which would discharge to an existing cobble channel located adjacent to Presidio Drive, and a self-mitigating dispersion area to the north of the project site. The project would impact a total area of approximately 1.60 acres. Excavation would include a total of approximately 3,900 cubic yards and have maximum depths of 10 feet below ground surface for the new parking lot and 5 feet below ground surface for the new ADA compliant path. The total net new impermeable area would be approximately 24,700 square feet. The project would be completed in accordance with the Secretary of the Interior's Standards for Rehabilitation.

# 2.0 Physical and Cultural Setting

## 2.1 Physical Setting

The project is located on a knoll top south of the Junípero Serra Museum and is loosely surrounded by residential and business developments with a golf course to the west. The knoll top and adjacent slopes contain both native and non-native vegetation. Within the project area are dirt walkways, picnic tables, utility alignments, maintained lawns, trees, and landscaping.



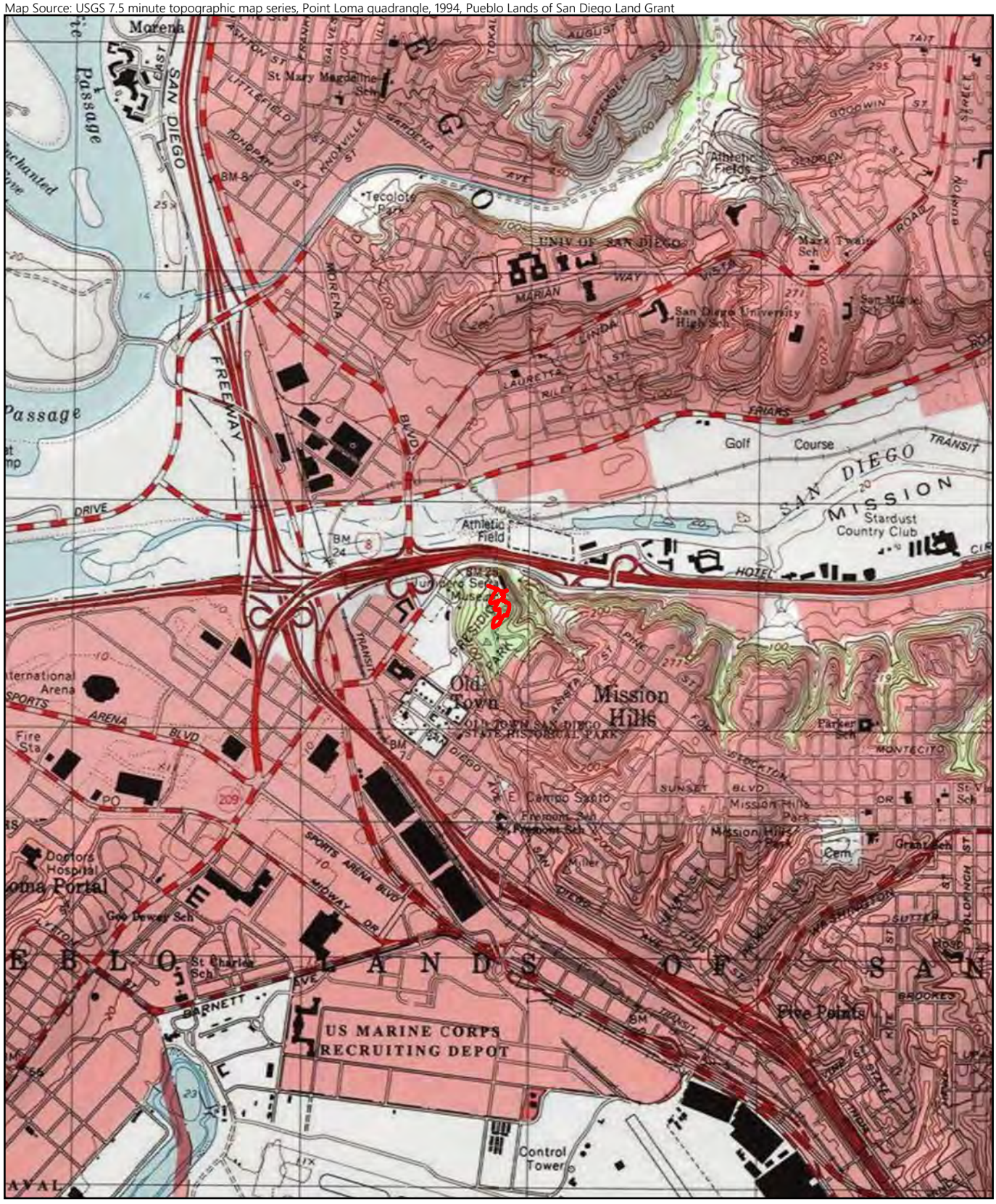

Project Location

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FIGURE 1
Regional Location

Map Source: USGS 7.5 minute topographic map series, Point Loma quadrangle, 1994, Pueblo Lands of San Diego Land Grant




Project Boundary

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FIGURE 2
Project Location on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 210-1701




Project Boundary

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FIGURE 3
Project Location on City 800' Map

Image Source: Nearmap (flown May 2025)




FIGURE 4

Project Location on Aerial Photograph

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The project elevation ranges from approximately 100 to 180 feet above mean sea level. The lowest point is the parking area west of the street crossing at Presidio Drive near the northwest project area corner and the highest point is the knoll top where the parking lot is proposed. The proposed parking lot, driveway, and access ramp occur across the entire 100 to 180 feet above mean sea level range.

The soil in the project area consists of Olivenhain-Urban land complex (OkE) with 9 to 30 percent slopes and Gaviota fine sandy loam (GaF) with 30 to 50 percent slopes. Most of the western portion of the project area is covered by Olivenhain-Urban land complex. The Olivenhain-Urban soils occur on marine terraces that have been cut, filled, and leveled for buildings. The southeastern portion of the project area is made up of Gaviota fine sandy loams which are underlain by sandstone and have a high erosion hazard (U.S. Department of Agriculture 1973).

# 2.2 Cultural Setting

## 2.2.1 Prehistoric Period

The prehistoric cultural sequence in San Diego County is generally conceived as comprising three basic periods: the Paleoindian, dated between about 11,500 and 8,500 years ago and manifested by the artifacts of the San Dieguito Complex; the Archaic, lasting from about 8,500 to 1,500 years ago (A.D. 500) and manifested by the cobble and core technology of the La Jollan Complex; and the Late Prehistoric, lasting from about 1,500 years ago to historic contact (i.e., A.D. 500 to 1769) and represented by the Cuyamaca Complex. This latest complex is marked by the appearance of ceramics, small arrow points, and cremation burial practices.

The Paleoindian Period in San Diego County is most closely associated with the San Dieguito Complex, as identified by Rogers (1938, 1939, 1945). The San Dieguito assemblage consists of well-made scraper planes, choppers, scraping tools, crescentics, elongated bifacial knives, and leaf-shaped points. The San Dieguito Complex is thought to represent an early emphasis on hunting (Warren et al. 1993:III-33).

The Archaic Period brings an apparent shift toward a more generalized economy and an increased emphasis on seed resources, small game, and shellfish. The local cultural manifestations of the Archaic Period are called the La Jollan Complex along the coast and the Pauma Complex inland. Pauma Complex sites lack the shell that dominates many La Jollan sites. Along with an economic focus on gathering plant resources, the settlement system appears to have been more sedentary. The La Jollan assemblage is dominated by rough cobble-based choppers and scrapers, and slab and basin metates. Large side-notched and Elko series projectile points appeared. Large deposits of marine shell at coastal sites argue for the importance of shellfish gathering to the coastal Archaic economy.

Near the coast and in the Peninsular Mountains beginning approximately 1,500 years ago, patterns began to emerge which suggest the ethnohistoric Kumeyaay. This period is characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversify and intensify during this period, with the continued elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive, but effective technological innovations. The late prehistoric archaeology of the San Diego coast and foothills is

characterized by the Cuyamaca Complex. It is primarily known from the work of D.L. True at Cuyamaca Rancho State Park (True 1970). The Cuyamaca Complex is characterized by the presence of steatite arrowshaft straighteners, steatite pendants, steatite comales (heating stones), Tizon Brown ware pottery, ceramic figurines reminiscent of Hohokam styles, ceramic "Yuman bow pipes," ceramic rattles, miniature pottery various cobble-based tools (e.g., scrapers, choppers, hammerstones), bone awls, manos and metates, mortars and pestles, and Desert side-notched (more common) and Cottonwood Series projectile points.

### 2.2.2 Ethnohistory

The Kumeyaay (also known as Kamia, Ipai, Tipai, and Diegueño) occupied the southern two-thirds of San Diego County. The Kumeyaay lived in semi-sedentary, politically autonomous villages or rancherias. The settlement system typically consisted of two or more seasonal villages with temporary camps radiating away from these central places (Cline 1984a and 1984b). Their economic system consisted of hunting and gathering with a focus on small game, acorns, grass seeds, and other plant resources. The most basic social and economic unit was the patrilocal extended family. A wide range of tools were made of locally available and imported materials. A simple shoulder-height bow was used for hunting. Numerous other flaked stone tools were made including scrapers, choppers, flake-based cutting tools, and biface knives. Preferred stone types were locally available metavolcanic, chert, and quartz. Obsidian was imported from the deserts to the north and east. Ground stone objects include mortars and pestles typically made of locally available, fine-grained granite. Both portable and bedrock types are known. The Kumeyaay made fine baskets. These employed either coiled or twined construction. The Kumeyaay also made pottery, using the paddle-and-anvil technique. Most were a plain brown utility ware called Tizon Brown ware, but some were decorated (Meighan 1954; May 1976, 1978).

### 2.2.3 Spanish/Mexican/American Periods

The Spanish Period (1769–1821) represents a time of European exploration and settlement. Military and naval forces along with a religious contingent founded the San Diego Presidio, the pueblo of San Diego, and the San Diego Mission in 1769 (Rolle 1998). The Presidio was home to military personnel, civilians, and Native Americans. It began as a wooden compound with a stockade, huts, chapel, and informal hospital, which was abandoned between 1770 and 1774. A large adobe complex was built and measured 300 by 300 feet. By 1779, there was an adobe quadrangle, soldiers' barracks, commander's house, a guardhouse, homes for civilians and troopers, residential area for visiting padres, storehouses for missionaries and the crown, a blacksmith shop and a carpenters' shop. By 1810, four triangular bastions at each corner of outer wall, rear yards and corrals, a new chapel, a new commander's house, a second communal barracks complex, and a gun battery had been added (Williams 2004).

During the Spanish Period, the mission system used forced Native American labor and introduced horses, cattle, other agricultural goods, and implements. Native American culture in the coastal strip of California rapidly deteriorated despite repeated attempts to revolt against the Spanish invaders (Cook 1976). One of the hallmarks of the Spanish colonial scheme was the rancho system. In an

attempt to encourage settlement and development of the colonies, large land grants were made to meritorious or well-connected individuals.

During Mexico's War for Independence (1810–1821), the Presidio went into disrepair; portions of the outer defense wall and bastions collapsed. In 1821, Mexico declared its independence from Spain. The room blocks in the northern and western sides were expanded during the Mexican Period as more people moved to the Presidio. The Presidio was an open plaza since portions of the defense wall had collapsed. During the Mexican Period (1822–1848), the mission system was secularized by the Mexican government and these lands allowed for the dramatic expansion of the rancho system. The buildings and fort wall of the Presidio were abandoned and left to crumble by 1835. Portions of the building, such as roof and floor tiles, as well as building timbers were dismantled and sold for reuse (Williams 2004). The empty rooms were used as corrals for sheep and cattle as well as for butchering on-site (Williams 1996). The southern California economy became increasingly based on cattle ranching. People moved downhill to Old Town and other nearby communities (Williams 2004).

The Mexican Period came to a close when Mexico signed the Treaty of Guadalupe Hidalgo on February 2, 1848, concluding the Mexican–American War (1846–1848; Rolle 1998). During the war, the Americans established Fort Stockton on Presidio Hill, located southeast of the ruins of the Presidio, due to its defensive location. Just prior to the signing of the Treaty of Guadalupe Hidalgo, gold was discovered in the northern California Sierra-Nevada foothills, the news was published on March 15, 1848, and the California Gold Rush began. The great influx of Americans and Europeans eliminated many remaining vestiges of Native American culture. California became a state in 1850.

The American homestead system encouraged settlement beyond the coastal plain into areas where Native Americans had retreated to avoid the worst of Spanish and Mexican influences (Carrico 1987; Cook 1976). A rural community cultural pattern existed in San Diego County from approximately 1870 to 1930. These communities were composed of an aggregate of people who lived on scattered farmsteads tied together through a common school district, church, post office, and country store (Hector and Van Wormer 1986; Pourade 1963).

Presidio Hill gained the interest of George Marston in 1907. Marston, as a supporter of park and city planning, acquired 20 acres for the future Presidio Park in 1925. Marston commissioned John Nolen, a City planner and landscape architect, to design the park landscape from the deteriorating buildings and native scrub brush to reflect a more lush and romanticized landscape with trees, grasses, curvilinear roads and paths, and a museum. In 1928, the City water reservoir located between Cosoy Way and Fort Stockton (also called the Bowl) was removed (KTU+A 2013). Marston donated 37 acres to the City in 1929 for use as a park. The adobe wall ruins were protected by mounds of dirt placed over the ruins and the planting of grass (Snell 1963). Based on an interview with Percy Broell (hired by Marston to manage plants in 1932 and later named superintendent of Presidio Park) conducted in 1978 by the San Diego Historical Society Oral History Program, alluvial soil from the middle of the San Diego River bed was brought up the hill to cover the ruins and provide a base for plantings. Removal of a portion of the hill for fill in the construction of the San Diego River dike and Mission Valley Road destroyed the remains of one row of quarters and section of outer wall. Park roads also impacted another section of the fort (Smythe 1907). No additional data could be found to identify which part of the hill was removed. Because more ruins were uncovered during surveys, grading,

landscaping, and road construction for park development by Marston, a wall was constructed to protect and delineate the remaining ruins in the late 1920s (Herrmann 2012).

Between 1928 and 1930, 20,000 plants including eucalyptus, pines, palms, acacias, California holly, rhus, sumac, and Catalina cherry were installed. The Junípero Serra Museum was built in 1929 and dedicated on the 160th anniversary of the Presidio. Post 1932, Broell had green lawns installed in open areas and other amenities such as picnic areas, restrooms, automatic sprinklers, and the Franciscan garden and fountain (KTU+A 2013). During the Great Depression the Works Progress Administration (WPA), founded in 1935, constructed the area cobble-lined ditches and graded roads.

Between the late 1960s, through to the late 1990s, archaeological excavations occurred at the Presidio. These excavation projects left adobe walls exposed. In 1998, the City began to explore the idea of site stabilization and reburial to protect the remains of the north wing ruins. The project began with removing standing water, weeds, sandbags, invasive plants, and the old sprinkler system. Mud was applied to exposed adobe walls and then covered with a geotextile barrier to hold the walls in place to prevent erosion from roots and water. Each room was mapped with a global positioning system (GPS) unit, photo-documented, and marked for future reference. Approximately 4,000 cubic yards of clean fill soil was placed in one-foot lifts up to five feet, hand-tamped, covered with topsoil, and hand-rolled. Mulch was applied as the final layer (Herrmann 2012).

# 3.0 Area of Potential Effect

The area of potential effect (APE) consists of the entire project area, equaling 1.60 acres.

# 4.0 Study Methods

The historical resources survey included both an archival search and an on-site foot survey of the APE. A records search with a half-mile radius buffer was requested from the South Coastal Information Center at San Diego State University in order to determine if previously recorded prehistoric or historic cultural resources occur within the project area. The California Historical Resources Inventory Database, which lists sites that have been designated by the City's Historical Resources Board, was also searched.

A letter was sent on March 27, 2024, to the Native American Heritage Commission (NAHC) requesting them to search their Sacred Lands File to identify spiritually significant and/or sacred sites or traditional use areas in the project vicinity. The NAHC was also asked to provide a list of local Native American tribes, bands, or individuals who may have concerns or interests in the cultural resources of the project.

The field survey was conducted on March 27, 2024, by RECON Environmental, Inc. (RECON) archaeologist Nathanial Yerka accompanied by Alisha Pico, a Native American representative from Red Tail Environmental. The spacing between the field personnel was 15 meters. The APE area was inspected for evidence of archaeological materials such as flaked and ground stone tools, ceramics,

milling features, and historic features. Photographs were taken to document the environmental setting and general conditions.

# 4.1 Previous Studies

## 4.1.1 Historical Resources Survey

The cultural resources survey included both an archival search and an on-site foot survey of the study area and was performed in September 2018. RECON's survey resulted in the recording of one new historic cultural resource (P-37-038268) consisting of three rock features built by the WPA in the 1930s as park improvements. The features include the cobble-lined gutters along both sides of Presidio Drive/Cosoy Way, the cobble-lined channel on the eastern end of the study area at the bottom of a drainage between the Presidio knoll and the mesa top of Mission Hills, and cobble steps on the southern portion of the study area (Attachment 1).

As a supplement to the on-foot survey, a ground penetrating radar (GPR) investigation was completed for 20 grids across the knoll top of the project area. Each grid was scanned by tracking along evenly spaced parallel transects using a sled or cart-mounted GPR transmitting and receiving antenna. Pulses of radar energy were sent into the ground from the surface antenna at a specific time interval. As radar energy passes through different substrates, the velocity of the radar waves changes. The energy reflected off buried objects, features, or soil strata is then measured as radar waves return to the receiving antenna. Data collected was processed with GPR Viewer 2017 amplitude slice map generation derived from MRI software. The goal of this study was to identify any potentially buried deposits or features called anomalies. Results indicated numerous water/utility lines, tree roots, a metal feature, rectangular features, soil changes, landscaping features, cobble alignment, drive tracks, wagon road, and concrete park associated features. Archaeological testing was recommended to confirm these features (see Attachment 1; Byram 2018).

## 4.1.2 Geoarchaeological Assessment

In August of 2018, in support of the project, a geoarchaeological testing program was developed to guide design plans to minimize direct impacts to significant cultural deposits and features. The testing plan consisted of twenty 2.5-inch diameter cores (Cores 1 to 20) within the study area and an alternative driveway connecting to Cosoy Way. Locations for cores were selected in spots where possible cultural features were identified by GPR results, as well as three landscape positions including summits, shoulders, and backslopes. Core depths varied depending on the depth of sandstone bedrock, or presence of cobbles or tree roots that impeded or blocked a core from being extracted. The drilling of each core was directed by a geoarchaeologist with assistance from an archaeological monitor. A Native American monitor was also present. Once at the laboratory, the core samples were analyzed for the presence of cultural remains. Various soil properties were recorded for each core in order to interpret stratigraphic integrity and buried site potential. No artifacts or cultural features were found in the core samples. Based on the buried site model presented in the report, soil within the project area has a low potential for buried or subsurface cultural deposits. The soil stratigraphy retains good integrity with minimal bioturbation with sandstone bedrock within a meter of the surface (Attachment 2).

### 4.1.3 Historical Resources Technical Report

The historical resources technical report was completed for the project by Heritage Architecture & Planning (Heritage) to determine if project impacts would be significant to the Junípero Serra Museum. The Junípero Serra Museum is listed on the City's Register of Historical Resources (Historical Resources Board [HRB] #237). The Presidio Park is listed on the City's Register of Historical Resources as HRB #240, on the National Register of Historic Places (#66000226), and on the California Historical Landmark (CHL) as CHL #59. Based on Heritage's updated existing conditions survey and significance evaluation, Junípero Serra Museum is culturally, historically, and architecturally significant. As such, efforts should be made for the continual preservation and enhancement of the site in compliance with The Secretary of the Interior's Standards for Rehabilitation. Heritage concluded the project would not result in a significant direct impact to the Junípero Serra Museum site because demolition of a small portion of the existing historic retaining wall would be minimal and reversible, and the removal of a moderately significant cork oak tree could be mitigated by planting a new cork oak tree. There would also be an indirect impact to the resource caused by the new ADA compliant walkway and lighting, which would impact some views (Marshall 2020).

### 4.1.4 Results of Excavation at CA-SDI-38: Investigation of Two Anomalies identified in Geoarchaeological Assessment

In February of 2021, RECON conducted the excavation of two 1-by-1-meter units at two locations identified during the GPR investigation (Attachment 3) as possible archaeological features or anomalies. The excavation results reveal that the GPR anomalies at the two locations are not cultural features. One anomaly was a concentration of cobbles that started at the 20-centimeter (cm) level and continued down to the 60 cm level. The other revealed decomposing granite starting at 43 cm and extending to 60 cm. A total of 5 debitage pieces, 1.68 grams of shellfish, 7 undifferentiated fish bone fragments, and 29 fragments of historic artifacts (11 of which are iron fragments, 15 are bottle glass fragments, 2 pieces of aluminum, and 1 piece of plastic) were recovered from the units. The small amount of debitage, fish bone, and shellfish remains recovered suggests that the area had light use during prehistoric and protohistoric times by Native Americans. The historic artifact fragments are likely not from the Presidio era but rather more recent. The recovered artifacts do not represent an intact cultural deposit. The unit excavation corroborates the findings of no cultural resources during analysis of the geoarchaeological coring samples (see Attachment 3).

# 5.0 Results

## 5.1 Record Search

The records search indicated that 215 cultural resource investigations have occurred within the half-mile search area; nine include the APE. One hundred and seventy-seven cultural resources occur within a half-mile radius of the project. These previously recorded cultural resources include six prehistoric resources (one of which is an isolated artifact), 156 historic resources (three of which are isolated artifacts), 10 multi-component resources (resources that contain prehistoric and historic

components), and five resources with no data recorded (Table 1; Confidential Attachment 1). The prehistoric resources consist of lithic scatters, lithic scatters with ground stone, ceramic scatters, burials, hearths, shellfish scatters, unknown resources, and habitation debris, along with an isolated mano. The historic resources consist of single-family properties, one-to-three-story commercial properties, adobe buildings, foundations, privies, dumps, trash scatters, cemeteries, women's properties, walls, fences, wells, cisterns, educational buildings, religious buildings, government buildings, theaters, a golf course, parks, trees, landscape architecture, street furniture, forts, roads, military property, dike, water conveyance system, ancillary buildings, hotels, motels, highways, bridges, industrial buildings, and WPA property. The multicomponent sites are lithic scatters, lithic scatters with ground stone, ceramic scatters, burials, hearths, foundations, privies, dumps, trash scatters, graves, cemeteries, wells, faunal remains, religious buildings, water conveyance system, and one-to-three-story commercial properties. The historic isolates consist of two glass bottles and one horseshoe. A total of 144 historic addresses have been recorded within the search radius, none of which are within the APE. Two previously recorded cultural resources occur within the APE (P-37-000038 and P-37-038268).

Table 1
Cultural Resources within a Half-Mile of the APE

| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
|---|---|---|---|---|
| **P-37-000038** | **CA-SDI-000038** | **Multi-component** | **Lithic scatter; Ceramic scatter; Burials; Hearths/pits; Foundations/structure pads; Privies/dumps/trash scatters; Graves/cemetery** | **1968 (P. Ezell)** |
| P-37-000041 | CA-SDI-000041 | Prehistoric | Unknown | N.D. (N.C. Nelson); 2011 (Garcia and Associates) |
| P-37-004611 | CA-SDI-004611 | Multi-component | Ceramic scatter; Trash scatter | 1973 (E. Germeshausen) |
| P-37-009292 | CA-SDI-009292 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 1981 (J. Woodward, D. Foster, A. Luberski, and H. Price) |
| P-37-011824 | CA-SDI-011824 | Multi-component | Foundations/structure pads; Privies/dumps/trash scatters; Well | 1990, 1996, 2019, 2021, 2022 (California Department of Parks and Recreation) |
| P-37-012131 | CA-SDI-012131 | Historic | Single-family property | 1992 (Brian F. Smith and Associates) |
| P-37-012469 | CA-SDI-012469 | Multi-component | Lithic scatter, Ground stone; Trash scatter; Faunal remains | 1991 (ERCE) |
| P-37-013663 | CA-SDI-013663 | Historic | Trash scatter | 1993 (Affinis) |
| P-37-013664 | CA-SDI-013664 | Historic | Trash scatter | 1993 (Affinis) |
| P-37-013665 | CA-SDI-013665 | Historic | Trash scatter | 1993 (Affinis); 2014 (I. Cordova and A. Cox); 2014 (E. Davidson and R. McLean); 2016 (R. McLean) |
| P-37-013666 | CA-SDI-013666 | Historic | Trash scatter | 1993 (Affinis); 2014 (I. Cordova and A. Cox) |
| P-37-013667 | CA-SDI-013667 | Historic | Trash scatter | 1994 (Affinis) |
| P-37-014247 | CA-SDI-014074 | Historic | Trash scatter | 1995 (Walter Enterprises) |
| P-37-014380 | CA-SDI-014152 | Prehistoric | Habitation debris | 1996 (Jerry Schaefer, ASM Affiliates, Inc.) |
| P-37-014688 | CA-SDI-014291 | Historic | Trash scatter | 1996 (California Department of Parks & Recreation) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-014689 | CA-SDI-014292 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 1996 (California Department of Parks & Recreation) |
| P-37-014690 | CA-SDI-014293 | Prehistoric | Lithic scatter; Marine shell | 1996 (California Department of Parks & Recreation) |
| P-37-014691 | CA-SDI-014294 | Historic | Unknown | 1996 (California Department of Parks & Recreation) |
| P-37-014692 | CA-SDI-014295 | Multi-component | Privies/dumps/trash scatters | 1996 (California Department of Parks & Recreation); 2017 (ASM Affiliates) |
| P-37-014693 | CA-SDI-014296 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 1996 (California Department of Parks & Recreation) |
| P-37-014694 | CA-SDI-014297 | Historic | Unknown; Privies/dumps/ trash scatters | 1996 (California Department of Parks & Recreation) |
| P-37-014695 | CA-SDI-014298 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 1996, 2019, 2021 (California Department of Parks & Recreation) |
| P-37-015556 | CA-SDI-014307 | Historic | Single-family property; Women's property; Adobe building/structure; Walls/ gates/fences; Foundations/ structure pads; Privies/dumps/ trash scatters; Wells/cisterns; Walls/fences | 1996 (Gallegos & Associates) |
| P-37-015809 | CA-SDI-014427 | Historic | Privies/dumps/trash scatters | 1997 (RECON) |
| P-37-015821 | CA-SDI-013712 | Historic | Privies/dumps/trash scatters | 1994 (Affinis) |
| P-37-015938 | CA-SDI-014527 | Historic | Foundations/structure pads; Privies/dumps/trash scatters; Adobe building/structure | 1997 (Gallegos) |
| P-37-018949 | -- | Historic | Single-family property | 2000 (Archaeos) |
| P-37-019194 | -- | Historic | Privies/dumps/trash scatters | 2001 (Brian F. Smith) |
| P-37-020912 | -- | Historic | Single-family property; Adobe building/structure | 2002 (No data) |
| P-37-020913 | -- | Historic | Privies/dumps/trash scatters | 1966 (No data); 2021 (California Department of Parks & Recreation) |
| P-37-020914 | CA-SDI-021062 | Historic | Single-family property; Adobe building/structure; Foundations/structure pads | 1966 (No data); 2021 (California Department of Parks & Recreation); 2013 (Laguna Mountain) |
| P-37-020915 | CA-SDI-021087 | Historic | Single-family property; Adobe building/structure; Foundations/structure pads; Privies/dumps/trash scatters | 1966 (No data); 1991, 2000 (Helmich, M. A. and R. D. Clark); 2013, 2014, 2019, 2020 (California Department of Parks & Recreation) |
| P-37-020916 | -- | -- | -- | -- |
| P-37-020917 | -- | Historic | Educational building | 1966 (No data) |
| P-37-021743 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021744 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021745 | -- | Historic | Single-family property | 1981 (Compushare); 2005 (S. Moomjian) |
| P-37-021746 | -- | Historic | Single-family property | 1981 (Compushare); 2019 (R. May) |
| P-37-021748 | -- | Historic | Single-family property | 1981 (Compushare); 1998 (A. Bevil) |
| P-37-021762 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021763 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021764 | -- | Historic | Single-family property | 1981 (Compushare) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-021765 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021766 | -- | Historic | Single-family property | 1981 (Compushare);<br>2008, 2016, 2018 (IS Architecture) |
| P-37-021767 | -- | Historic | Religious building | 1981 (Compushare) |
| P-37-021768 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021776 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021777 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021781 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021782 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021798 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021799 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021800 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021801 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021802 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021813 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021821 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021822 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021823 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021829 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021831 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021832 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021833 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021834 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021835 | -- | Historic | Single-family property | 1981 (Compushare); 2007 (Vonn Marie May & Tricia Olsen) |
| P-37-021852 | -- | Historic | Cemetery | 1981 (Compushare) |
| P-37-021853 | -- | Historic | Single-family property; Theater; 1-3 story commercial building; Government building; Privies/ dumps/trash scatters; Walls/fences | 1968 (Hoover & Rencsh);<br>2016 (AECOM) |
| P-37-021854 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021856 | -- | Historic | Religious building | 1981 (Compushare) |
| P-37-021887 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021888 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021889 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021890 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021891 | -- | Historic | Single-family property | 1982 (Compushare);<br>2005 (S. Moomjian) |
| P-37-021892 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021893 | -- | Historic | Single-family property | 1981 (Compushare) |
| P-37-021894 | -- | Historic | Single-family property | 1981 (Compushare); 2007 (Johnson & Johnson Architecture) |
| P-37-021899 | -- | Historic | Single-family property | 1982 (Compushare) |
| P-37-021900 | -- | Historic | Other – Golf course | 1981 (Compushare) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-021901 | -- | Historic | Standing structures; Other – park; Educational building; Monument/mural/gravestone; Landscape architecture; Trees/vegetation | 1981 (Compushare) |
| P-37-021902 | -- | Historic | Cemetery | 1981 (Compushare) |
| P-37-021903 | -- | Historic | Trees/vegetation | 1981 (Compushare) |
| P-37-021904 | -- | Multi-component | Privies/dumps/trash scatters; Graves/cemetery; Burials; Religious building | 1981 (Compushare) |
| P-37-021905 | -- | Historic | Educational building-museum | 1981 (Compushare) |
| P-37-021906 | -- | Historic | Other – former fort | 1981 (Compushare) |
| P-37-021907 | -- | Historic | Religious building | 1981 (Compushare) |
| P-37-021918 | -- | Historic | Street Furniture | 1982 (Compushare) |
| P-37-022004 | -- | Historic | Single-family property | N/D (SHPO) |
| P-37-023767 | -- | Historic | Single-family property | 1982 (Compushare); 1998 (A. Bevil) |
| P-37-023859 | -- | Historic | Isolate – bottle | 2000 (Brian F. Smith and Associates) |
| P-37-023919 | -- | -- | -- | 2001 (N/A) |
| P-37-023921 | -- | -- | -- | 2001 (N/A) |
| P-37-023941 | -- | Historic | Trash scatter | 2001 (Brian F. Smith and Associates) |
| P-37-023942 | -- | Historic | Landscaping/orchard | 2001 (Brian F. Smith and Associates) |
| P-37-024558 | CA-SDI-016288 | Prehistoric | Burials; Other – shell scatter | 1996 (Jo Anne D. Gilmer, Dayle M. Cheever, RECON); 2002 (N. Harris, Harris Archaeological Consultant); 2007 (No data) |
| P-37-024559 | CA-SDI-016289 | Prehistoric | Other – shell scatter | 2002 (Harris Archaeological Cons.) |
| P-37-024560 | CA-SDI-016290 | Prehistoric | Other – shell scatter | 2002 (Harris Archaeological Cons.) |
| P-37-026553 | CA-SDI-017418 | Historic | Privies/dumps/trash scatters | 1997, 2005 (Cheever, Collett, and Gilmer, RECON) |
| P-37-027055 | CA-SDI-017688 | Historic | Privies/dumps/trash scatters | 2005 (EDAW) |
| P-37-027056 | CA-SDI-017689 | Historic | Foundations/structure pads; Privies/dumps/trash scatters; Wells/cisterns | 2005 (EDAW); 2011 (C. Denardo) |
| P-37-027057 | CA-SDI-017690 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2005 (EDAW) |
| P-37-027058 | CA-SDI-017691 | Historic | Privies/dumps/trash scatters; Wells/cisterns; Fences | 2005 (EDAW) |
| P-37-027059 | CA-SDI-017692 | Historic | Foundations/structure pads; Privies/dumps/trash scatters; Wells/cisterns; Other – Underground utilities | 2005 (EDAW) |
| P-37-027060 | CA-SDI-017693 | Historic | Foundations/structure pads; Roads | 2005 (EDAW) |
| P-37-027615 | -- | Historic | Single-family property | 2005, 2006 (Vonn Marie May) |
| P-37-027671 | -- | Historic | Single-family property | 1981 (Compushare); 2005 (Vonn Marie May) |
| P-37-027729 | -- | Historic | 1-3 story commercial building | 2006 (Marie Burke Lia) |
| P-37-028238 | -- | Historic | 1-3 story commercial building; Military property | 2007 (U.S. Navy, Department of Defense); 2015 (Alice Brewster, PANGIS) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-028431 | CA-SDI-018352 | Historic | Other – former fort | 2007 (No data); 2020 (K. Ports) |
| P-37-028444 | -- | Historic | Other – Dike | No data |
| P-37-028502 | -- | Historic | Cemetery; Landscaping – garden | 2007 (No data) |
| P-37-028573 | CA-SDI-018383 | Historic | Foundations/structure pads | 2007 (ASM Affiliates, Inc.) |
| P-37-028595 | CA-SDI-021348 | Historic | Privies/dumps/trash scatters | 2007 (Historic Preservation Dept.); 2014 (Erica Pawlowski, DPR, Southern Service Center) |
| P-37-028598 | -- | Historic | Educational building – school, museum | 2007 (Historic Preservation Dept.) |
| P-37-028599 | -- | Historic | Religious building | 2007 (City of San Diego) |
| P-37-028600 | CA-SDI-018591 | Historic | Privies/dumps/trash scatters | 2007 (State of California District Preservation Officer); 2008, 2020 (California Department of Parks and Recreation) |
| P-37-028601 | -- | Historic | Single-family property; Government building – post office | 1981 (Compushare); 2007 (Frida Trup) |
| P-37-028602 | -- | Historic | Single-family property | 2007 (No data) |
| P-37-028797 | CA-SDI-018507 | Historic | Single-family property | 2007 (No data) |
| P-37-028798 | -- | Historic | Religious building | 2007 (Old Town Trolley Tours) |
| P-37-028823 | -- | Historic | Cemetery | 2007 (No data) |
| P-37-029967 | -- | -- | -- | 2008 (Scott Moomjian) |
| P-37-030930 | -- | Historic | Isolate – horseshoe | 2007 (Laguna Mountain Environmental, Inc.) |
| P-37-030935 | CA-SDI-019628 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030936 | CA-SDI-019629 | Historic | Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030937 | CA-SDI-019630 | Historic | Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030939 | CA-SDI-019632 | Historic | Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030940 | CA-SDI-019633 | Historic | Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030941 | CA-SDI-019634 | Historic | Privies/dumps/trash scatters | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030942 | CA-SDI-019635 | Historic | Foundations/structure pads | 2008 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-030945 | CA-SDI-019638 | Historic | Privies/dumps/trash scatters | 2009 (Elizabeth Davidson, Laguna Mountain Environmental, Inc.) |
| P-37-031962 | CA-SDI-020233 | Multi-component | Lithic scatter; Privies/dumps/ trash scatters; Wells/cisterns; Water conveyance system | 2011 (Jennifer Kraft, Brian F. Smith & Associates) |
| P-37-032538 | CA-SDI-020661 | Multi-component | Ceramic scatter; Foundations/ structure pads; Privies/dumps/ trash scatters | 2012 (Laguna Mountain Environmental, Inc.) |
| P-37-032899 | CA-SDI-020784 | Historic | Privies/dumps/trash scatters | 2013 (Brian F. Smith & Associates) |
| P-37-032944 | -- | Historic | Single-family property | 2013 (Legacy 106, Inc.) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-032949 | -- | Historic | Single-family property | 2013 (Scott Moomjian) |
| P-37-033135 | -- | Historic | Single-family property | 2013 (Vonn Marie May) |
| P-37-033486 | -- | Historic | Other – cinderblock and metal structure | 2013 (ECORP) |
| P-37-033489 | CA-SDI-021061 | Historic | Privies/dumps/trash scatters; Ancillary building; Hotel/ motel; 1-3 story commercial building | 2013 (Laguna Mountain) |
| P-37-033490 | CA-SDI-021063 | Historic | Privies/dumps/trash scatters; Wells/cisterns; Single-family property; 1-3 story commercial building | 2013 (Laguna Mountain) |
| P-37-033491 | CA-SDI-021064 | Historic | 1-3 story commercial building; Government building | 2013 (Laguna Mountain) |
| P-37-033537 | CA-SDI-021080 | Historic | Other – artifact scatter | 2014 (Brian F. Smith & Associates) |
| P-37-033557 | -- | Historic | Roads/trails/railroad grades; Highway/trail | 2013 (Larry Tift, ASM Affiliates, Inc.); 2015 (Kent Manchen, Matt DeCarlo, ASM Affiliates, Inc.); 2017 (Haley Chateene, PanGIS); 2017 (A. Foglia, K. Keckeisen, PanGIS, Inc.); 2018 (Sarah Stringer-Bowsher, ASM Affiliates, Inc.); 2021 (No data) |
| P-37-033808 | -- | Historic | Government building | 2014 (Caltrans) |
| P-37-033920 | CA-SDI-021307 | Historic | Privies/dumps/trash scatters | 2014 (Larry Tift, ASM Affiliates, Inc.) |
| P-37-034095 | CA-SDI-021346 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034096 | CA-SDI-021347 | Historic | Foundations/structure pads | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034097 | CA-SDI-021349 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034098 | CA-SDI-021350 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2014 (Nicole Turner, Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034099 | CA-SDI-021351 | Historic | Privies/dumps/trash scatters | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034100 | CA-SDI-021352 | Historic | Foundations/structure pads; Privies/dumps/trash scatters | 2014 (California Department of Parks and Recreation) |
| P-37-034321 | -- | Historic | Bridge | 2011 (E. Schultz, K. Harper, R. Greenlee, Garcia & Associates (GANDA)) |
| P-37-034322 | -- | Historic | 1-3 story commercial building | 2011 (E. Schultz, K. Harper, Garcia & Associates (GANDA)) |
| P-37-034323 | -- | Historic | Industrial building | 2011 (E. Schultz, K. Harper, Garcia & Associates (GANDA)) |

| Table 1<br>Cultural Resources within a Half-Mile of the APE | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Period | Site Type | Recording Events |
| P-37-034325 | -- | Historic | Industrial building | 2011 (E. Schultz, K. Harper, R. Greenlee, Garcia & Associates (GANDA)) |
| P-37-034555 | CA-SDI-021539 | Historic | Privies/dumps/trash scatters | 2014 (A. Giletti, HELIX Environmental) |
| P-37-034705 | -- | Multi-component | Lithic scatter; 1-3 story commercial building; Privies/dumps/trash scatters | 2019 (California Department of Parks and Recreation) |
| P-37-035510 | -- | Historic | Hotel/motel | 2012 (ASM Affiliates, Inc.) |
| P-37-035519 | -- | Historic | Single-family property | 2013 (J. MacAskill) |
| P-37-035592 | -- | Historic | Single-family property | 2014 (P. Dixon) |
| P-37-035610 | -- | Historic | Single-family property | 2015 (S. Moomjian) |
| P-37-036046 | -- | Historic | Trees/vegetation | 2016 (Alexander D. Bevil, California Department of Parks and Recreation) |
| P-37-036347 | -- | Prehistoric | Isolate – mano | 2017 (Andrew Pigniolo, Laguna Mountain Environmental, INC.) |
| P-37-036522 | -- | Historic | Street furniture | 2017 (Lauren Downs, AECOM) |
| P-37-036534 | -- | Historic | 1-3 story commercial building | 2017 (M. Mello, J. Hollins, AECOM) |
| P-37-036981 | -- | Historic | Single-family property | 2016 (Rebecca McManus, IS Architecture) |
| P-37-036986 | -- | Historic | Single-family property | 2016 (Ronald V. May, Kiley Wallace, Legacy 106, Inc.) |
| P-37-037723 | -- | Historic | Single-family property | 2018 (Ronald v. May and Kiley Wallace, RPA, Legacy 106 Inc.) |
| P-37-037772 | CA-SDI-022495 | Historic | Privies/dumps/trash scatters | 2018 (HDR, Inc.) |
| P-37-037773 | CA-SDI-022496 | Historic | Privies/dumps/trash scatters | 2018 (HDR, Inc.) |
| **P-37-038268** | -- | **Historic** | **WPA property; Water conveyance system** | **2018 (N. Yerka, RECON Environmental, Inc.)** |
| P-37-038587 | -- | Historic | Single-family property | 2018, 2019 (Ronald V. May) |
| P-37-038596 | -- | Historic | Hotel/motel | 2016 (K.A. Crawford, Crawford Historic Services) |
| P-37-038942 | -- | Historic | Privies/dumps/trash scatters | 2004 (Andrew Pigniolo, Laguna Mountain Environmental, INC.) |
| P-37-039148 | -- | Historic | Single-family property | 2018 (IS Architecture) |
| P-37-039948 | -- | Historic | Single-family property | 2021 (Ronald V. May) |
| P-37-039955 | -- | Historic | Single-family property | 2020 (Nexus Planning & Research) |
| P-37-040273 | CA-SDI-023352 | Multi-component | Lithic scatter; Ceramic scatter; Privies/dumps/trash scatters | 2021 (California Department of Parks and Recreation) |
| P-37-040344 | -- | Historic | Isolate – bottle | 2018 (Dudek) |
| P-37-040633 | -- | Historic | Single-family property | 2020 (Landmark Historic Preservation) |
| NOTE: **Bold** indicates resources within APE. | | | | |

### 5.1.1 P-37-000038

Site P-37-000038/CA-SDI-38 was recorded in 1968 as Presidio Park with Colonial Spanish, Mexican, Native American, and early American remains. The APE intersects with a small portion of this resource. Midden soils, lithics, ceramics, hearth features, burials, and fallen walls were noted. It was

also known as "Old Spanish Fort" (Ezell 1968). A surface collection was completed. The archaeological remains are listed as CHL #59 and are listed on the National Register of Historic Places (NRHP) as #6600226. It was added to the NRHP in 1966 as being eligible under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. The Presidio functioned as a defensive position, a fortification, and a village site. The establishment of the Presidio marks the founding of the first permanent European settlement on the Pacific Coast as well as the site of the first mission in California, founded by Father Junípero Serra. The Presidio also served as the military seat between 1769 and 1837 and as the residence of the Mexican governor between 1825 and 1829 (Snell 1963). Currently, it is within the City's Presidio Park.

A number of archaeological excavations have occurred in the Presidio. Percy Broell, hired by Marston in 1932 to manage plantings in the park, was first to conduct an informal excavation. Paul Ezell excavated in the south wing between 1965 and 1976. Diana Barbolla excavated in the west wing and adjacent gun battery. In 1987 and 1990 Brad Bartel excavated in the north wing. No comprehensive report exists for these excavations (Williams 2004).

The San Diego Presidio Archaeology project started in 1992 with the goal to facilitate effective investigation, management, conservation, and development of cultural resources of the Presidio. This project excavated 40 rooms as well as a yard in the north wing between 1994 and 1996 (Williams 1996). Artifacts recovered from the excavation include construction materials (cobbles, adobe bricks, roof tiles, roof beams, plaster). Native American and European plainware ceramics, Chinese porcelain, Majolica ceramics, prehistoric ground stone and lithic artifacts, glassware, glass jewelry, metal items (nails, hardware, spikes, cooking items, utensils, buttons, tools, munitions, watch parts), plant remains (corncobs, beans, peach and olive pits), and the remains from domesticated animals, wild animals, sea mammals, fish, and shellfish (Williams 2004).

As noted above, archaeological excavation projects from the late 1960s through the late 1990s left adobe walls exposed. After each room was mapped with a GPS unit, photo-documented, and marked for future reference, approximately 4,000 cubic yards of clean fill soil were placed in one-foot lifts up to five feet, hand-tamped, covered with topsoil, and topped with mulch (Herrmann 2012).

### 5.1.2 P-37-038268

RECON's 2018 survey resulted in the recording of one new historic cultural resource consisting of rock features built by the WPA in the 1930s as park improvements. The features include the cobble-lined gutters along both sides of Presidio Drive/Cosoy Way, the cobble-lined channel on the eastern end of the survey area at the bottom of a drainage between the Presidio knoll and the mesa top of Mission Hills, and cobble steps on the southern portion of the study area. These three features are constructed with cobbles and cement. The gutter is approximately 2 feet wide and extends past the survey area; however, only the portion within the survey area was recorded. The cobble and cement lined channel is trapezoidal in cross-section, encompassing an approximately 6-foot-wide flat bottom, with two 45-degree banks yielding a total width of approximately 8 feet. The channel starts at the south end with a cobble-lined retaining wall and ends on the north end at a culvert on Taylor Street. The cobble stairs consist of four treads. Some of the cobbles have been spray-painted, likely to help with visibility. The WPA also paved roads, cut paths, and constructed a lookout on the

west side providing a view of the ocean and mouth of the San Diego River, flagstaff, sprinkler system, much of the landscaping, and restrooms (Branton 1991; RECON 2021).

### 5.1.3 California Historical Resources Inventory Database

The results of the California Historical Resources Inventory Database search indicate that there are six sites listed within the vicinity of the APE, two of which occur within the APE. The following are descriptions of the six sites.

HRB #3 – Fort Stockton Site, also listed as CHL #54. The area was first used as a fort in 1838 during the Mexican Period. During the early American Period in 1846, the site was rebuilt as a U.S. Army fortification including a ditch around the outside and a gate with a draw bridge.

HRB #4 – Presidio Park (San Diego Presidio Park site), also listed as CHL #59 and under NRHP #6600226. This is within the project area. It is the location of the first permanent European settlement on the Pacific coast of the U.S. The Portola-Serra expedition and Fray Junípero Serra founded the mission of San Diego de Alcala in 1769. The settlement was the center of operations for exploring the interior and served as a military headquarters. The boundary of the site includes the ruins of the Presidio that were covered in 1929.

HRB #35 – Presidio Excavation Site, also listed as CHL #59 and under the NRHP #6600226. This site is where past excavation described in Section 5.1.1 above took place.

HRB #25 – Serra Palm, also listed as CHL #67. This is the site where two palm trees were planted in 1769 by Fray Junípero Serra. One tree blew down in a storm and the other was removed by the City in 1960 due to its size being a hazard.

HRB #237 – Junípero Serra Museum. This represents a fine example of Spanish Colonial Revival style architecture in the City, represents one of George White Marston's philanthropic efforts, and is the work of master architect William Templeton Johnson.

HRB #240 – Presidio Park. This designation includes HRB #3 Fort Stockton, HRB #4 Presidio of San Diego, HRB #35 Presidio Excavation site, HRB #25 Serra Palm site, HRB #237 Serra Museum, the potential archaeological sites associated with the village of Cosoy, the Franciscan Garden, La Playa Trail marker, Presidio park office, Mission Valley overlook, four statues, Serra cross, bastion and wall, arched pergola, bowl area, Palm Canyon, Inspiration Point, historic landscaping, the Mormon Battalion Petrachrome Mural, and El Jupiter cannon. This site encompasses the project area.

### 5.1.4 Sacred Lands File Search Results

A response letter from the NAHC was received on April 12, 2024, indicating the results of the search of the Sacred Lands File for the project area were positive (Attachment 4). The NAHC recommended contacting the Viejas Band of Mission Indians for more information about these sites and provided a list of Native American contacts who may have an interest in the project. Ray Teran from the Viejas Band of Mission Indians responded on April 12, 2024, requesting provision of the project plan, project description, and any anticipated ground disturbance activities. On April 24, 2024, Ray Teran indicated

that the Viejas Band reviewed the information and has determined that the project area has cultural significance or ties to Viejas. He also requested that a Kumeyaay cultural monitor be on site during ground disturbing activities and to be informed of inadvertent discoveries, cremations sites or human remains. The Band defers Kumeyaay monitoring to another Tribe who is closer to the project area if requested (Attachment 5).

## 5.2 Survey Results

RECON completed the field survey on March 27, 2024, and identified no previously unrecorded cultural resources. P-37-000038 and P-37-038268 were located with no noted change in their recorded condition (Confidential Attachment 2). No surface artifacts were located within P-37-000038. Both gutters of P-37-038268 appeared in good condition. Survey conditions consisted of clear skies, bright sunlight, and cool temperatures. The survey commenced at the current dirt proposed driveway entrance located at the south end of the APE and moved north across the knoll, proceeded downslope to the north-northwest, crossed Presidio Drive, and concluded at the parking area. The APE consists of varying terrain with an array of ornamental landscaping from open grass areas on rolling slopes, wooded areas with little to no ground cover, to densely wooded or brushy areas on steep slopes (Photographs 1 through 7). Ground disturbances in the form of the dirt path of travel for maintenance vehicles, the cleared knoll top, ornamental landscaping, a concrete drinking fountain, a concrete flagpole pedestal, utility alignments, a chain-anchored picnic table, Presidio Drive, the improved gutter system along Presidio Drive, and the improved footpath on the west side of Presidio Drive. The APE exhibited a minor amount of modern surface rubbish consisting of glass and plastic consumer beverage containers and cigarette butts (Photograph 8).

# 6.0 Evaluation and Recommendations

## 6.1 Regulatory Framework

### 6.1.1 State

According to the California Environmental Quality Act (CEQA), a significant impact is a project effect that may cause a substantial adverse change in the significance of a historical resource. Adverse changes include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings resulting in the impairment of the resource's significance (Section 15064.5.4b of the CEQA Guidelines). Mitigation measures are required for adverse effects on significant historical resources (Section 21083.2 of the CEQA Code).

State criteria are those listed in CEQA and used to determine whether a historic resource qualifies for the California Register of Historic Resources. CEQA also recognizes resources listed in a local historic register or deemed significant in a historical resource survey. Some resources that do not meet these criteria may still be historically significant for the purposes of CEQA.



PHOTOGRAPH 1
Overview of Southern Portion of APE, Looking Southwest



PHOTOGRAPH 2
Overview of Central Portion of APE, Looking West



PHOTOGRAPH 3
Overview of Northern Portion of APE, Looking Northwest



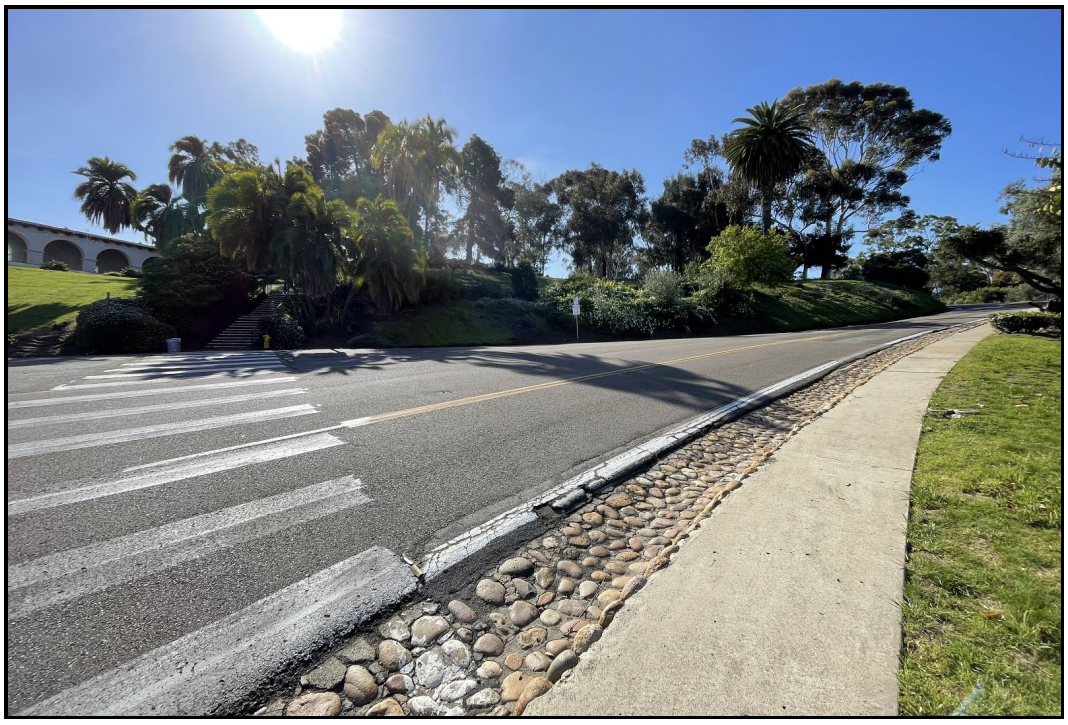
PHOTOGRAPH 4
Overview of Northern Portion of APE Near Established Walkway, Looking North



PHOTOGRAPH 5
Overview of Northern Portion of APE Near Established Walkway,
Looking Southeast



PHOTOGRAPH 6
Overview of Northern Portion of APE at Base of Grassy Slope
Near Presidio Drive, Looking Northeast



PHOTOGRAPH 7
Overview of Area Where APE Crosses Presidio Drive, Looking Southeast



PHOTOGRAPH 8
Typical Modern Surface Rubbish – Cigarette Butts

A resource may be listed in the California Register of Historic Resources if it is significant at the federal, state, or local level under one of more of the four criteria listed below.

1. Are associated with events that have made a significant contribution to the broad patterns of local or regional history and cultural heritage of California or the United States.

2. Are associated with the lives of persons important to the nation or to California's past.

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

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

Since resources that are not listed or determined eligible for the state or local registers may still be historically significant, their significance shall be determined if they are affected by a project. The significance of a historical resource under criterion 4 rests on its ability to address important research questions.

### 6.1.2 City of San Diego

The City has developed a set of guidelines that ensure compliance with state and federal guidelines for the management of historical resources. These guidelines are stated in the City's Historic Resources Regulations (HRR). The HRR have been developed to implement applicable local, state, and federal policies and mandates. Included in these are the City's Progress Guide and General Plan, CEQA, and Section 106 of the National Historic Preservation Act of 1966. The intent of the City's guidelines is to ensure consistency in the identification, evaluation, preservation/mitigation, and development of the City's historical resources. These guidelines are also reflected in Section 5.3 (Historical and Tribal Cultural Resources) of the Old Town San Diego Community Plan Update Draft Program Environmental Impact Report, San Diego, California (City of San Diego 2018).

The criteria used by the City to determine significance for historic resources reflect a more local perspective of historical, architectural, and cultural importance for inclusion on the City's HRR. The resource can meet one or more of the following criteria:

1. Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archaeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or agricultural development.

2. Is identified with persons or events significant in local, state, or national history.

3. Embodies distinctive characteristics of a style, type, period, or method of construction or is a valuable example of the use of indigenous materials or crafts.

4. Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman.

5. Is listed or has been determined eligible by National Park Service for listing on the National Register of Historic Places or is listed or has been determined eligible by the State Historical Preservation Office for listing on the State Register of Historic Resources.

6. Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest, or aesthetic value, or which represent one or more architectural periods or styles in the history and development of the city.

Unless demonstrated otherwise, archaeological sites with only a surface component are not typically considered significant. The determination of an archaeological site's significance depends on a number of factors specific to that site including size, type, integrity, presence, or absence of a subsurface deposit; soil stratigraphy, features, diagnostic artifacts, or datable material; artifact/ecofact density; assemblage complexity; cultural affiliation; association with an important person or event; and ethnic importance. Under the City's Historical Resources Guidelines, all archaeological sites are considered potentially significant (City of San Diego 2022:13).

Under City's Historical Resources Guidelines for the Land Development Code there are historical resource types which are typically considered insignificant for planning purposes. These are isolates, sparse lithic scatters, isolated bedrock milling features, shellfish processing stations, and sites and buildings less than 45 years old (City of San Diego 2022:13).

## 6.2 Evaluation of Resources

The current survey did not identify any new cultural material during the survey. The current survey observed the two previously recorded cultural resources (P-37-000038 and P-37-038268) within the APE and noted no change in their recorded condition. Despite P-37-000038 as being listed as a CHL (#59) and on the NRHP as #6600226 as being eligible under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799, the portion of P-37-000038 within the APE lacks an intact cultural deposit and is recommended not significant. The APE portion that occurs within the mapped boundary of P-37-000038 was investigated by GPR, geoarchaeological coring samples, a pedestrian survey, and subsurface testing with the conclusion that no significant cultural resources were observed (see Attachments 1 through 3). The project would not result in adverse effects to P-37-000038.

The APE portions that occur within the mapped boundary of P-37-038268 would be avoided through project design. The cobble features of P-37-038268 were in 1935 built by the WPA as part of the Presidio Park project (Branton 1991) and are listed with a web-based research group called The Living Deal, which has compiled research on WPA projects across all 50 states. Currently, 57 WPA projects, including the Presidio Park project, are listed for the city of San Diego on the Living Deals' web page (Living New Deal 2024). Therefore, P-37-038268 is recommended eligible under CRHR criterion A and the City's criterion 2 as being associated with the WPA era, which was part of President Roosevelt's New Deal that made significant contributions in brining unemployment relief to San Diego, California, and the nation after the Great Depression. The gutters also qualify under CRHR criterion C and city criterion 3 because the gutters were constructed using WPA's typical roadside aesthetically pleasing and time-intensive method of using stones and cement (Branton 1991).

Additionally, the gutters are contributing elements to the City Register-listed Junípero Serra Museum and retain good integrity. The project crosses P-37-038268 at the driveway entrance to the new parking lot. The impacted section of the cobble gutter would be removed and replaced with a reconstructed concrete swale with hand-placed cobbles to match the existing cobble gutter along Presidio Drive. The design of the proposed concrete-and-cobble swale would allow the surface runoff to continue to flow along the gutter while also maintaining durability to support vehicles on the proposed driveway. The street lighting trench at the northwest corner of the project area would be drilled under the gutter; thus, preserving the gutter in place. Therefore, the project would not result in adverse effects to the cobble gutters.

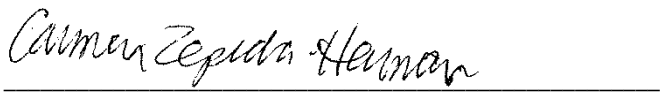
## 6.3 Recommendations

The cultural resource investigations summarized herein satisfy the study and documentation requirements identified by qualified City Planning and Development staff and are consistent with the goals and policies of the City as published in the Land Development Manual. As such, the efforts to identify and document historical resources in the APE for the project reveal that the project would have no adverse impacts on prehistoric or historic cultural resources.

The pedestrian surveys of the APE did not identify any new cultural material, and the unit excavation corroborates the findings of no cultural resources during analysis of the geoarchaeological coring samples (see Attachments 1 through 3). If the APE was heavily used in prehistory or during the occupation of the Presidio, there is no clear indication of that. Artifacts are present in sparse densities and are limited to the upper levels and may have been moved downward from the surface by animal burrowing or some other type of disturbance. Although the potential for buried cultural features is considered low within the APE, the archaeological and historic significance of the San Diego Presidio (P-37-000038), combined with its importance as a tribal cultural resource for Native Americans, RECON recommends the presence of qualified archaeological and Native American monitors during earth-moving activities.

# 7.0 Certification and Project Staff

This report was prepared in compliance with CEQA (Section 21083.2 of the Statutes and Appendix K of the Guidelines) and with policies and procedures of the City. To the best of our knowledge, the statements and information contained in this report are accurate.



Carmen Zepeda-Herman, Principal Investigator

Resumes for key personnel are on file with the City. The following individuals participated in the field tasks or preparation of this report.

| | |
|---|---|
| Carmen Zepeda-Herman | Principal Investigator |
| Nathanial Yerka | Field Archaeologist/Author |
| Alisha Pico | Native American Monitor |
| Frank McDermott | GIS Analyst |
| Jennifer Gutierrez | Production Specialist |

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# ATTACHMENTS

# ATTACHMENT 1

## Historical Resources Survey for the Junípero Serra ADA Improvements Project (WBS #S-15034.02.02)

# Historical Resources Survey for the Junípero Serra ADA Improvements Project (WBS #S-15034.02.02)

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November 13, 2020



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Project Archaeologist

## ARCHAEOLOGICAL RESOURCE REPORT FORM

## I. PROJECT DESCRIPTION AND LOCATION

The City of San Diego (City) proposes to provide Americans with Disabilities (ADA) improvements at the Junípero Serra Museum (project). The project area occurs within the City-owned Presidio Park, which includes the Junípero Serra Museum. It lies south of Interstate 8 and just south of Taylor Street, northeast of Old Town San Diego State Historic Park (Figure 1). The proposed project area is shown on the U.S. Geological Survey (USGS) 7.5-minute topographic map series, Point Loma and La Jolla quadrangles, within an unsectioned portion of the Pueblo Lands of San Diego Land Grant (Figure 2; USGS 1994 and 1996). The proposed project area includes the Junípero Serra Museum and extends south to Cosoy Way. It is bounded on the west by a north-south portion of Presidio Drive and on the east by the canyon bottom in the eastern portion of Presidio Park (Figure 3).

The project will provide a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 24-foot-wide driveway constructed between Presidio Drive and the new parking lot. The new parking lot would have 9 total spaces, including 5 ADA spaces and 4 non-ADA spaces. Other project features include a green waste area for maintenance, storm water and drainage improvements, and lighting. The storm water improvements would include a lined bio-retention basin, approximately 600 square feet of which would discharge to an existing rock swale located adjacent to Presidio Drive. The proposed project would impact a total area of approximately 1.37acres. Excavation would include a total of approximately 4,000 cubic yards of soil and have maximum depths of 10 feet for the new parking lot and 5 feet for the new ADA compliant path. The total net new impermeable area would be approximately 23,000 square feet (Figure 4). An alternative driveway connecting to Cosoy Way was also examined (Figure 5).

The survey area is larger than the project footprint and alternative driveway, and equals 10.45 acres. The proposed project will be completed in accordance with *The Secretary of the Interior's Standards for Rehabilitation*. This letter analyzes potential impacts to archaeological resources. A Historical Resources Technical Report was completed by Heritage Architecture & Planning to analyze the built environment.

## II. SETTING

### Natural Environment (Past and Present)

The proposed project is located on a knoll top south of the Junípero Serra Museum and surrounded by residential and business developments with a golf course to the west. The knoll top and adjacent slopes contain both native and non-native vegetation. Within the survey area are dirt walkways, concrete pads for picnic tables, maintained lawns, trees, and landscaping. A channelized drainage runs south to north along the eastern portion of the survey area and empties into a storm drain to the north on Taylor Street.

The project elevation ranges from approximately 40 to 180 feet above mean sea level (AMSL). The lowest point is along the canyon bottom on the eastern end and the highest point is the knoll top where the parking lot is proposed. The proposed parking lot, driveway, and access ramp occur from 100 to 180 feet AMSL.

The soil in the project area consists of Olivenhain-Urban land complex (OkE) with 9 to 30 percent slopes, Gaviota fine sandy loam (GaF) with 30 to 50 percent slopes, and Tujunga sand (TuB) with 0 to 5 percent slopes. The majority of the survey area is covered by the first two soils types. Tujunga sand occurs in the northeastern corner of the survey area. The Olivenhain-Urban soils occur on marine terraces that have been cut, filled, and leveled for buildings. Gaviota fine sandy loams are underlain

by sandstone and have a high erosion hazard. Tujunga sands occur on alluvial fans and flood plains (U.S. Department of Agriculture 1973).

**Ethnography/History**

The prehistoric cultural sequence in San Diego County is generally conceived as comprising three basic periods: the Paleoindian, dated between about 11,500 and 8,500 years ago and manifested by the artifacts of the San Dieguito Complex; the Archaic, lasting from about 8,500 to 1,500 years ago (A.D. 500) and manifested by the cobble and core technology of the La Jollan Complex; and the Late Prehistoric, lasting from about 1,500 years ago to historic contact (i.e., A.D. 500 to 1769) and represented by the Cuyamaca Complex. This latest complex is marked by the appearance of ceramics, small arrow points, and cremation burial practices.

The Paleoindian Period in San Diego County is most closely associated with the San Dieguito Complex, as identified by Rogers (1938, 1939, 1945). The San Dieguito assemblage consists of well-made scraper planes, choppers, scraping tools, crescentics, elongated bifacial knives, and leaf-shaped points. The San Dieguito Complex is thought to represent an early emphasis on hunting (Warren et al. 1993:III-33).

The Archaic Period in coastal San Diego County is represented by the La Jolla Complex, a local manifestation of the widespread Millingstone Horizon. This period brings an apparent shift toward a more generalized economy and an increased emphasis on seed resources, small game, and shellfish. The local cultural manifestations of the Archaic Period are called the La Jolla Complex along the coast and the Pauma Complex inland. Pauma Complex sites lack the shell that dominates many La Jollan sites. Along with an economic focus on gathering plant resources, the settlement system appears to have been more sedentary. The La Jollan assemblage is dominated by rough, cobble-based choppers and scrapers, and slab and basin metates. Elko series projectile points appeared by about 3,500 years ago. Large deposits of marine shell at coastal sites argue for the importance of shellfish gathering to the coastal Archaic economy.

Near the coast and in the Peninsular Mountains beginning approximately 1,500 years ago, patterns began to emerge that suggest the ethnohistoric Kumeyaay. The Late Prehistoric Period is characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversify and intensify during this period, with the continued elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive but effective technological innovations. The late prehistoric archaeology of the San Diego coast and foothills is characterized by the Cuyamaca Complex. It is primarily known from the work of D. L. True at Cuyamaca Rancho State Park (True 1970). The Cuyamaca Complex is characterized by the presence of steatite arrowshaft straighteners, steatite pendants, steatite comales (heating stones), Tizon Brown ware pottery, ceramic figurines reminiscent of Hohokam styles, ceramic "Yuman bow pipes," ceramic rattles, miniature pottery, various cobble-based tools (e.g., scrapers, choppers, hammerstones), bone awls, manos and metates, mortars and pestles, and Desert Side-notched (more common) and Cottonwood Series projectile points.

*Ethnohistory*

The Kumeyaay (also known as Kamia, Ipai, Tipai, and Diegueño) occupied the southern two-thirds of San Diego County. The Kumeyaay lived in semi-sedentary, politically autonomous villages or rancherias. The village of *Cosoy* was at the foot of Presidio Hill (Mogilner 2016). Settlement system typically consisted of two or more seasonal villages with temporary camps radiating away from these central places (Cline 1984a and 1984b). Their economic system consisted of hunting and gathering, with a focus on small game, acorns, grass seeds, and other plant resources. The most basic social and economic unit was the patrilocal extended family. A wide range of tools was made of locally available and imported materials. A simple shoulder-height bow was utilized for hunting. Numerous other

flaked stone tools were made including scrapers, choppers, flake-based cutting tools, and biface knives. Preferred stone types were locally available metavolcanics, cherts, and quartz. Obsidian was imported from the deserts to the north and east. Ground stone objects include mortars, manos, metates, and pestles typically made of locally available, fine-grained granite. Both portable and bedrock types are known. The Kumeyaay made fine baskets using either coiled or twined construction. The Kumeyaay also made pottery, utilizing the paddle-and-anvil technique. Most were a plain brown utility ware called Tizon Brown ware, but some were decorated (Meighan 1954; May 1976, 1978).

*Spanish/Mexican/American Periods*

The Spanish Period (1769–1821) represents a time of European exploration and settlement. Military and naval forces along with a religious contingent founded the San Diego Presidio, the pueblo of San Diego, and the San Diego Mission in 1769 (Rolle 1998). The Presidio was home to military personnel, civilians, and Native Americans. It began as a wooden compound with a stockade, huts, chapel, and informal hospital, which was abandoned between 1770 and 1774. A large adobe complex was built and measured 300 by 300 feet. By 1779, there was an adobe quadrangle, soldiers' barracks, commander's house, a guardhouse, homes for civilians and troopers, residential area for visiting padres, storehouses for missionaries and the crown, a blacksmith shop and a carpenters' shop. By 1810, four triangular bastions at each corner of outer wall, rear yards and corrals, a new chapel, a new commander's house, a second communal barracks complex, and a gun battery had been added (Williams 2004).

During the Spanish Period, the mission system used forced Native American labor and introduced horses, cattle, other agricultural goods, and implements. Native American culture in the coastal strip of California rapidly deteriorated despite repeated attempts to revolt against the Spanish invaders (Cook 1976). One of the hallmarks of the Spanish colonial scheme was the rancho system. In an attempt to encourage settlement and development of the colonies, large land grants were made to meritorious or well-connected individuals.

During Mexico's War for Independence (1810–1821), the Presidio went into disrepair; portions of the outer defense wall and bastions collapsed. In 1821, Mexico declared its independence from Spain. The room blocks in the northern and western sides were expanded during the Mexican Period as more people moved to the Presidio. The Presidio was an open plaza since portions of the defense wall had collapsed. During the Mexican Period (1822–1848), the mission system was secularized by the Mexican government and these lands allowed for the dramatic expansion of the rancho system. The buildings and fort wall of the Presidio were abandoned and left to crumble by 1835. Portions of the building, such as roof and floor tiles, as well as building timbers were dismantled and sold for reuse (Williams 2004). The empty rooms were used as corrals for sheep and cattle as well as for butchering on-site (Williams 1996). The southern California economy became increasingly based on cattle ranching. People moved downhill to Old Town and other nearby communities (Williams 2004).

The Mexican Period came to a close when Mexico signed the Treaty of Guadalupe Hidalgo on February 2, 1848, concluding the Mexican–American War (1846–1848; Rolle 1998). During the war, the Americans established Fort Stockton on Presidio Hill, located southeast of the ruins of the Presidio, due to its defensive location. Just prior to the signing of the Treaty of Guadalupe Hidalgo, gold was discovered in the northern California Sierra-Nevada foothills, the news was published on March 15, 1848, and the California Gold Rush began. The great influx of Americans and Europeans eliminated many remaining vestiges of Native American culture. California became a state in 1850.

The American homestead system encouraged settlement beyond the coastal plain into areas where Indians had retreated to avoid the worst of Spanish and Mexican influences (Carrico 1987; Cook 1976). A rural community cultural pattern existed in San Diego County from approximately 1870 to 1930. These communities were composed of an aggregate of people who lived on scattered farmsteads tied together through a common school district, church, post office, and country store (Hector and Van Wormer 1986; Pourade 1963).

Presidio Hill gained the interest of George Marston in 1907. Marston, as a supporter of park and city planning, acquired 20 acres for the future Presidio Park in 1925. Marston commissioned John Nolen, a City planner and landscape architect, to design the park landscape from the deteriorating buildings and native scrub brush to reflect a more lush and romanticized landscape with trees, grasses, curvilinear roads and paths, and a museum. In 1928 the City water reservoir located between Cosoy Way and Fort Stockton (also called the Bowl) was removed (KTU+A 2013). Marston donated 37 acres to the City in 1929 for use as a park. The adobe wall ruins were protected by mounds of dirt placed over the ruins and the planting of grass (Snell 1963). Based on an interview with Percy Broell (hired by Marston to manage plants in 1932 and later named superintendent of Presidio Park) conducted in 1978 by the San Diego Historical Society Oral History Program, alluvial soil from the middle of the San Diego River bed was brought up the hill to cover the ruins and provide base for plantings. Removal of a portion of the hill for fill in the construction of the San Diego River dike and Mission Valley Road destroyed the remains of one row of quarters and section of outer wall. Park roads also impacted another section of the fort (Smythe 1907). No additional data could be found to identify which part of the hill was removed. Because more ruins were uncovered during surveys, grading, landscaping, and road construction for park development by Marston, a wall was constructed to protect and delineate the remaining ruins in the late 1920s (Herrmann 2012).

Between 1928 and 1930, 20,000 plants including eucalyptus, pines, palms, acacias, California holly, rhus, sumac, and Catalina cherry were installed. The Junípero Serra Museum was built in 1929 and dedicated on the 160th anniversary of the Presidio. Post 1932, Broell had green lawns installed in open areas and other amenities such as picnic areas, restrooms, automatic sprinklers, and the Franciscan garden and fountain (KTU+A 2013). During the Great Depression the Works Progress Administration (WPA), founded in 1935, constructed the area cobble-lined ditches and graded roads.

Between the late 1960s, through to the late 1990s, archaeological excavations occurred at the Presidio. These excavation projects left adobe walls exposed. In 1998, the City began to explore the idea of site stabilization and reburial to protect the remains of the north wing ruins. The project began with removing standing water, weeds, sandbags, invasive plants, and the old sprinkler system. Mud was applied to exposed adobe walls and then covered with a geotextile barrier to hold the walls in place to prevent erosion from roots and water. Each room was mapped with a global positioning system (GPS) unit, photo-documented, and marked for future reference. Approximately 4,000 cubic yards of clean fill soil was placed in one-foot lifts up to five feet, hand-tamped, covered with topsoil and hand-rolled. Mulch was applied as the final layer (Herrmann 2012).

## III. AREA OF POTENTIAL EFFECT (APE)

The survey APE encompasses 10.45 acres as shown in Figures 2 and 3. The survey APE is larger than the project footprint, includes both direct and indirect project impacts to historical resources, and allowed for project design changes such as modifying the project to incorporate the alternative driveway.

## IV. STUDY METHODS

The cultural resources survey included both an archival search and an on-site foot survey of the APE. A records search with a 0.25-mile radius buffer was requested from the South Coastal Information Center (SCIC) at San Diego State University in order to determine if previously recorded prehistoric or historic cultural resources occur within the project area (Confidential Attachment 1). The California Historical Resources Inventory Database (CHRID), which list sites that have been designated by the City's Historical Resources Board, was also searched.

A letter was sent to the Native American Heritage Commission (NAHC) requesting them to search their files to identify spiritually significant and/or sacred sites or traditional use areas in the proposed

project vicinity. The NAHC was also asked to provide a list of local Native American tribes, bands, or individuals who may have concerns or interests in the cultural resources of the proposed project (see the attached correspondence).

The field survey was conducted on September 12, 2018, by RECON archaeologist Nathanial Yerka accompanied by Dennis "Bobo" Linton, a Native American representative from Red Tail Environmental. The spacing between the field personnel was 15 meters. The survey area was inspected for evidence of archaeological materials such as flaked and ground stone tools, ceramics, milling features, and historic features. The locations of the features and the artifacts within new site areas were recorded using a sub-meter-accurate GPS. Each site was assigned a primary GPS datum. Sketch maps were made by means of GPS data and aerial photographs of the site location. Photographs were taken to document the environmental setting and general conditions. California Department of Parks and Recreation site forms and maps will be submitted to the SCIC (Confidential Attachment 2).

RECON archaeologists Richard Shultz and Carmen Zepeda-Herman assisted Scott Byram of Byram Archaeological Consulting in setting up 20 grids to survey both proposed alternatives using Ground Penetrating Radar (GPR) technology (grids 6 and 7 were combined into grid 6). The survey grids varied in size from 9 to 23 feet wide and 15 to 26 feet long. The four corners of each survey grid were recorded using a GPS. Each survey grid was scanned by tracking along evenly spaced parallel transects using a sled or cart-mounted GPR transmitting and receiving antenna. Pulses of radar energy were sent into the ground from a surface antenna at a specific time interval. As radar energy passes through different substrates, the velocity of the radar waves change. The energy reflected off of buried objects, features, or soil strata is then measured as radar waves return to the receiving antenna. Data collected was processed with GPR Viewer 2017 amplitude slice map generation derived from MRI software. The goal of this study was to identify any potentially buried deposits or features. For more details on GPR methodology, see the attached GPR results report ("Ground-Penetrating Radar for the Presidio Hill Park ADA Project at the Serra Museum" prepared October 2018 by Byram Archaeological Consulting).

## V. RESULTS OF STUDY

The record search indicated that there have been 81 cultural resource investigations along with 47 recorded cultural resources (42 historic-era; 1 historic-era isolated artifact; 2 prehistoric; and 2 multi-component (prehistoric and historic) within a 0.25-mile radius of the survey area (Table 1; Confidential Attachment 1). The historic-era resources consist of Fort Stockton, Presidio Park, single-family houses, adobe houses, a cemetery, a dike, and trash scatters. Prehistoric resources consist of a shell scatter and a burial. The multi-component resources consist of a foundation, a trash scatter, a water conveyance system, and prehistoric ceramic and lithic scatters. One previously recorded cultural resource, P-37-000038/CA-SDI-38, is present within the survey area (see Confidential Attachment 1). A total of 41 historic addresses have been recorded within the search radius, none of which are within the proposed project area.

**Table 1**
**Cultural Resources within 0.25-mile of Survey Area**

| Primary Number | Trinomial Number | Site Type | Age | Date Recorded |
|---|---|---|---|---|
| P-37-000038 | CA-SDI-000038 | Habitation debris; foundations; ceramic scatter; burials; trash scatter; hearths; structure remains | Historic | 1968 (P. Ezell) |
| P-37-013664 | CA-SDI-013664 | Trash scatter | Historic | 1993 (Affinis) |
| P-37-013665 | CA-SDI-013665 | Trash scatter | Historic | 1993 (Affinis); 2016 (LSA Associates) |
| P-37-013666 | CA-SDI-013666 | Trash scatter | Historic | 1993 (Affinis); 2014 (PanGIS) |

| Table 1<br>Cultural Resources within 0.25-mile of Survey Area | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Site Type | Age | Date Recorded |
| P-37-013667 | CA-SDI-013667 | Trash scatter | Historic | 1994 (Affinis) |
| P-37-014247 | CA-SDI-014074 | Trash scatter | Historic | 1995 (Walter Enterprises) |
| P-37-019194 | | Trash scatter | Historic | 2001 (Brian F. Smith) |
| P-37-021834 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021835 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021894 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021900 | | Adobe | Historic | 2002 (Compushare) |
| P-37-021901 | | Park | Historic | 2002 (Compushare) |
| P-37-021902 | | Cemetery | Historic | 2002 (Compushare) |
| P-37-021903 | | Monument | Historic | 2002 (Compushare) |
| P-37-021906 | | Monument | Historic | 2002 (Compushare) |
| P-37-021907 | | Religious Building | Historic | 2002 (Compushare) |
| P-37-023767 | | Single Family Property | Historic | 2001; 1998 (Alexandar D. Bevil) |
| P-37-023919 | | Missing site form | | |
| P-37-023921 | | Missing site form | | |
| P-37-023941 | | Trash scatter | Historic | 2001 (Brian F. Smith and Associates) |
| P-37-023942 | | Wall | Historic | 2001 (Brian F. Smith and Associates) |
| P-37-024558 | CA-SDI-016288 | Burial | Prehistoric | 2007; 1996 (RECON) |
| P-37-024559 | CA-SDI-016289 | Shell scatter | Prehistoric | 2002 (Harris Archaeological Cons.) |
| P-37-027055 | CA-SDI-017688 | Trash scatter | Historic | 2005 (EDAW) |
| P-37-027058 | CA-SDI-017691 | Trash scatter; Wells; Fences | Historic | 2005 (EDAW) |
| P-37-028431 | CA-SDI-018352 | Fort | Historic | 2007 (N/A) |
| P-37-028444 | | Dike | Historic | 2007 (N/A) |
| P-37-028502 | | Cemetery | Historic | 2007 (N/A) |
| P-37-028600 | CA-SDI-018591 | Adobe | Historic | 2007 (State of California District Preservation Officer); 2008 (Department of Parks and Recreation) |
| P-37-029967 | | Single Family Property | Historic | |
| P-37-030930 | | Isolate | Historic | 2008 (Laguna Mountain Environmental, Inc.) |
| P-37-030937 | CA-SDI-019630 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030939 | CA-SDI-019632 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030940 | CA-SDI-019633 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030941 | CA-SDI-019634 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030942 | CA-SDI-019635 | Wall | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-031962 | CA-SDI-020233 | Lithic scatter; Trash scatter; Well; Water Conveyance system | Prehistoric, Historic | 2011 (Brian F. Smith & Associates) |
| P-37-032538 | CA-SDI-020661 | Foundations/structure pads; trash scatters; Ceramic scatter | Prehistoric, Historic | 2012 (Laguna Mountain Environmental, Inc.) |
| P-37-032899 | CA-SDI-020784 | Trash scatter | Historic | 2013 (Brian F. Smith & Associates) |
| P-37-032949 | | Single family property | Historic | 2013 (Scott Moomjian) |
| P-37-033537 | CA-SDI-021080 | Artifact scatter | Historic | 2014 (Brian F. Smith & Associates) |

| Table 1<br>Cultural Resources within 0.25-mile of Survey Area | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Site Type | Age | Date Recorded |
| P-37-033920 | CA-SDI-021307 | Trash scatter | Historic | 2014 (Larry Tift, ASM Affiliates, Inc.) |
| P-37-034095 | CA-SDI-021346 | Foundations; trash scatter | Historic | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034096 | CA-SDI-021347 | Foundation | Historic | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034098 | CA-SDI-021350 | Foundation; trash scatter | Historic | 2014 (Nicole Turner, Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034100 | CA-SDI-021352 | Foundations; Trash scatter | Historic | 2014 |
| P-37-034555 | CA-SDI-021539 | Trash scatter | Historic | 2014 (Helix) |
| P-37-035592 | | Single Family Property | Historic | 2014 (Peter Dixon |
| P-37-036522 | | Street furniture | Historic | 2017 (Lauren Downs, AECOM) |

The results of the CHRID search indicate that there are six sites listed within the vicinity of the project area. Portions of two are within the project area. Following are descriptions of the six sites.

HRB #3 – Fort Stockton Site, also listed as California Historical Landmark (CHL) #54. The area was first used as a fort in 1838 during the Mexican Period. During the early American Period in 1846 the site was rebuilt as a U.S. Army fortification including a ditch around the outside and a gate with a draw bridge. This is located outside the project area.

HRB #4 – Presidio Park (San Diego Presidio Park site), also listed as CHL #59 and under the National Register of Historic Places #6600226. This is within the project area. It is the location of the first permanent European settlement on the Pacific coast of the U.S. The Portola-Serra expedition and Fray Junípero Serra founded the mission of San Diego de Alcala in 1769. The settlement was the center of operations for exploring the interior and served as a military headquarters. The boundary of the site includes the ruins of the Presidio that were covered in 1929. These ruins are outside the project area.

HRB #35 – Presidio Excavation Site, also listed as CHL #59 and under the National Register of Historic Places #6600226. This is where past excavation described below took place. This area is outside the project area.

HRB #25 – Serra Palm, also listed as CHL #67. This is the site where two palm trees were planted in 1769 by Fray Junípero Serra. One tree blew down in a storm and the other was removed by the City in 1960 due to its size being a hazard. This is located outside the project area.

HRB #237 – Junípero Serra Museum. This represents a fine example of Spanish Colonial Revival style architecture in the City, represents one of George White Marston's philanthropic efforts, and is the work of master architect William Templeton Johnson. A portion of this is within the project area.

HRB #240 – Presidio Park. This designation includes HRB#3 Fort Stockton, #4 Presidio of San Diego, #35 Presidio Excavation site, #25 Serra Palm site, #237 Serra Museum, the potential archaeological sites associated with the village of Cosoy, the Franciscan Garden, La Playa Trail marker, Presidio

park office, Mission Valley overlook, four statues, Serra cross, bastion and wall, arched pergola, bowl area, Palm Canyon, Inspiration Point, historic landscaping, the Mormon Battalion Petrachrome Mural, and El Jupiter cannon. Of these, a portion of the Serra Museum is the only one within the project area.

The NAHC files indicated that Native American cultural sites have been located within the survey area. The NAHC recommended contacting the Viejas Band of Mission Indians and the Ipay Nation of Santa Ysabel for more information about these sites (see the attached correspondence).

Site P-37-000038/CA-SDI-38 was recorded in 1968 as Presidio Park with Colonial Spanish, Mexican, Native American, and early American remains. Midden soils, lithics, ceramics, hearth features, burials, and fallen walls were noted. It was also known as "Old Spanish Fort" (Ezell 1968). A surface collection was completed. The archaeological remains are listed as California Historical Landmark #59 and are listed on the National Register of Historic Places (NRHP) as #66000226. It was added to the NRHP in 1966 as being eligible under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. The Presidio functioned as a defensive position, a fortification, and a village site. The establishment of the Presidio marks the founding of the first permanent European settlement on the Pacific Coast as well as the site of the first mission in California, founded by Father Junípero Serra. The Presidio also served as the military seat between 1769 and 1837 and as the residence of the Mexican governor between 1825 and 1829 (Snell 1963). Currently, it is within the City's Presidio Park.

A number of archaeological excavations have occurred in the Presidio. Percy Broell, hired by Marston in 1932 to manage plantings in the park, was first to conduct an informal excavation. Paul Ezell excavated in the south wing between 1965 and 1976. Diana Barbolla excavated in the west wing and adjacent gun battery. In 1987 and 1990 Brad Bartel excavated in the north wing. No comprehensive report exists for these excavations (Williams 2004).

The San Diego Presidio Archaeology project started in 1992 with the goal to facilitate effective investigation, management, conservation, and development of cultural resources of the Presidio. This project excavated 40 rooms as well as a yard in the north wing between 1994 and 1996 (Williams 1996). Artifacts recovered from the excavation include construction materials (cobbles, adobe bricks, roof tiles, roof beams, plaster). Native American and European plainware ceramics, Chinese porcelain, Majolica ceramics, prehistoric ground stone and lithic artifacts, glassware, glass jewelry, metal items (nails, hardware, spikes, cooking items, utensils, buttons, tools, munitions, watch parts), plant remains (corncobs, beans, peach and olive pits), and the remains from domesticated animals, wild animals, sea mammals, fish, and shellfish (Williams 2004). No excavations have taken place within the survey area.

RECON's survey resulted in the recording of one new historic cultural resource (P-37-038268; see Confidential Attachment 2). The resource consists of rock features built by the WPA in the 1930s as park improvements. The features include the cobble-lined gutters along both sides of Presidio Drive/Cosoy Way, the cobble-lined channel on the eastern end of the survey area at the bottom of a drainage between the Presidio knoll and the mesa top of Mission Hills, and cobble steps on the southern portion of the survey area (Photographs 1 and 2). These three features are constructed with cobbles and cement. The gutter is approximately 2 feet wide and extends past the survey area; however, only the portion within the survey area was recorded. The cobble and cement lined channel is trapezoidal in cross-section, encompassing an approximately 6-foot-wide flat bottom, with two 45-degree banks yielding a total width of approximately 8 feet. The channel starts at the south end with a cobble-lined retaining wall and ends on the north end at a culvert on Taylor Street. The cobble stairs consist of four treads. Some of the cobbles have been spray-painted, likely to help with visibility. The WPA also paved roads, cut paths, and constructed a lookout on the west side providing a view of the

ocean and mouth of the San Diego River, flagstaff, sprinkler system, much of the landscaping, and restrooms (Branton 1991).

Marine shellfish remains were also noted in two different areas at the top of the knoll. The remains comprised 25-plus shell fragments of California hornsnail (*Cerithidea californica*), Wavy Chione (*Chione undatella*), and oysters (*Ostrea* spp.). The shell fragments are not considered a cultural resource since their locations are within disturbed areas in which the shell was likely imported within fill soils. No artifacts were associated with the shell fragments.

Survey conditions consisted of clear skies, bright sunlight, and a slight breeze with a temperature of approximately 75 degrees Fahrenheit. The survey area consists of varying terrain with an array of ornamental landscaping from open grass areas on rolling slopes, wooded areas with thick duff ground cover, to densely wooded or brushy areas on steep slopes (Photograph 3). Ground disturbances in the form of the Junípero Serra Museum, landscaping, roads, reinforced footpaths, drainages, utility trenches, irrigation, and imported fill were noted. The north/south canyon along the eastern project boundary exhibited a considerable amount of modern rubbish and discarded construction rubble. Ground visibility averaged 20 percent due to thick ground cover composed of needles and leaves or ornamental grass. Portions of the survey area were not surveyed due to slopes in excess of 25 degrees.

The GPR survey was conducted on August 8, 9, 28, 29, and 30, 2018. Results indicate numerous water/utility lines, tree roots, a metal feature, rectangular features, soil changes, landscaping features, cobble alignment, drive tracks, wagon road, and concrete park associated features. The results are presented in amplitude slice maps including shallow, middle, and deep GPR slice map composites; 9 grids were divided into 10–35 centimeter (cm), 35–60 cm and 60–85 cm slices and 11 grids were divided into 10–22 cm, 22–44 cm, 44–64 cm, and 64–90 cm slices. For details on findings, see the attached GPR results report. Table 2 summarizes the results by grid. The features identified in the table are conjecture based on GPR signal interpretation of high-amplitude reflections. Archaeological testing is required to confirm these features. The results can be used to create a map of locations for test excavations.

| Table 2<br>Results of GPR by Grid | | |
|---|---|---|
| Grid | Findings | Number of Slice Maps* |
| 1 | water or utility lines | 3 |
| 2 | cobbles, bricks, or tiles; water lines | 4 |
| 3 | drive tracks; utility lines | 3 |
| 4 | wagon road or bordered path | 3 |
| 5 | tree roots | 4 |
| 6 | utility, fence, or cobble lines; metal object (bars, rails, or pipes), tree roots | 4 |
| 7 | this was combined with Grid 6 | |
| 8 | concrete picnic features, utility lines, tree roots, | 4 |
| 9 | utility pipe, tree roots | 3 |
| 10 | concrete fountain pad, tree roots | 3 |
| 11 | irrigations lines, stockpiling or seasonal burning or old road | 3 |
| 12 | buried soil horizon (soil change); post (flagpole) | 4 |
| 13 | tree roots | 4 |
| 14 | tree roots, water lines | 4 |
| 15 | tree roots, water lines | 3 |
| 16 | rectilinear structure, water lines | 3 |
| 17 | irrigation lines, water supply line | 3 |
| 18 | planar feature, cobble alignment | 4 |
| 19 | stratigraphic change (landscaping or brick layer) | 4 |
| 20 | tree roots, lawn soil/root mass | 4 |
| 21 | rectilinear planar feature (concrete or brick) | 4 |
| * 3 = 10–35 cm, 35–60 cm, 60–85 cm<br>4 = 10–22 cm, 22–44 cm, 44–64 cm, 64–90 cm | | |

## VI. RECOMMENDATIONS

The cultural resource investigations summarized herein satisfy the study and documentation requirements identified by qualified City Planning and Development staff and are consistent with the goals and policies of the City as published in the Land Development Manual. As such, the efforts to identify and document historical resources in the APE for the proposed project reveal that the proposed project will have no impact on prehistoric cultural resources.

The possibility of significant historical resources being present within the proposed project is considered moderate due to the close proximity of significant cultural resources. RECON recommends a testing program utilizing geoarchaeological corings be developed based upon the mapped data set generated by the GPR.

## VII. SOURCES CONSULTED DATE

| | |
|---|---|
| National Register of Historic Places ☑ | Month and Year: September 2018 |
| California Register of Historical Resources ☑ | Month and Year: September 2018 |
| City of San Diego Historical Resources Register ☑ | Month and Year: September 2018 |
| Archaeological/Historical Site Records:<br>South Coastal Information Center ☑ | Month and Year: August 2018 |
| Other Sources Consulted: | |

## VIII. CERTIFICATION

| Preparer: Carmen Zepeda-Herman, M.A. | Title: Principal Investigator |
|---|---|
| Signature: Carmen Zepeda-Herman | Date: November 13, 2020 |

## IX. ATTACHMENTS

Bibliography
Attached

National Archaeological Data Base Information
Attached

Maps (include all of the following maps.)

Figure 1: Regional Location
Figure 2: Project Location on USGS Map
Figure 3: Project Location on City 800' Map
Figure 4: Project Location on Aerial Photograph
Figure 5: Alternative Driveway on Aerial Photograph

Photographs

Photograph 1: Gutter along Presidio Drive, Looking North
Photograph 2: Cobble-lined Channel, Looking South
Photograph 3: General Survey Conditions with Lawns, Leaf Duff, Trees, and Slopes

Personnel Qualifications (Include resumes if not already on file with the City.)
Resumes are already on file with the City.

Native American Heritage Commission Correspondence
Attached

Ground-Penetrating Radar Results
Attached

## X. CONFIDENTIAL ATTACHMENTS (Bound separately)

1. Record search results
Records search results from South Coastal Information Center.

2. New or updated historical resource records
Presidio water conveyance site

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# NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION

| | |
|---|---|
| Authors: | Carmen Zepeda-Herman, RPA |
| Consulting Firm: | RECON Environmental<br>3111 Camino del Rio North, Suite 600<br>San Diego, CA 92108-5726 |
| Report Date: | November 13, 2020 |
| Report Title: | Historical Resources Survey for the Junípero Serra ADA Improvements Project, San Diego, California |
| Prepared for: | Gretchen Eichar<br>City of San Diego, Public Works<br>525 B Street, Suite 750, MS908A<br>San Diego, California 92101 |
| Contract Number: | RECON 9087 |
| USGS Quadrangle Map: | La Jolla Quadrangle |
| Keywords: | San Diego Presidio, WPA water conveyance system, gutters, concrete and cobble channel, stairs, CA-SDI-00038, P-37-038268 |


## ABSTRACT

A pedestrian archaeological survey and a subsurface survey using ground-penetrating radar (GPR) were conducted for the Junípero Serra ADA Improvements Project (project) within Presidio Park in the City of San Diego. The survey included a records search at the South Coastal Information Center and a sacred lands search from the Native American Heritage Commission. Forty-two historic-era cultural resources, one historic-era isolated artifact, two prehistoric cultural resources, two multi-component cultural resources, and 41 historic addresses have been recorded within a 0.25-mile radius of the project. One previously recorded cultural resource, P-37-000038/CA-SDI-38, is present within the survey area The Native American Heritage Commission files indicated that Native American cultural sites have been located within the survey area.

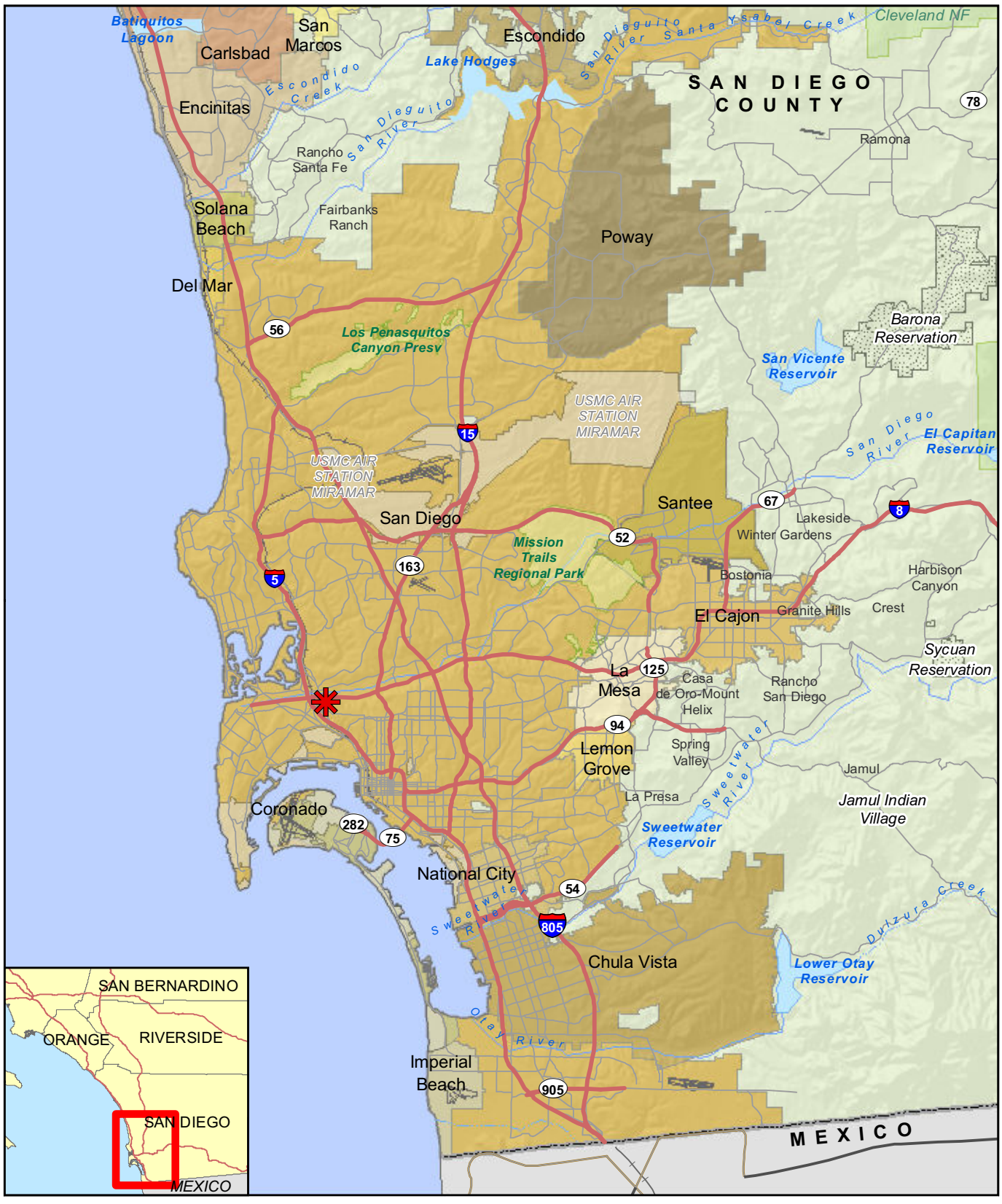
Site P-37-000038/CA-SDI-38 was recorded in 1968 as Presidio Park with Colonial Spanish, Mexican, Native American, and early American remains. Midden soils, lithics, ceramics, hearth features, burials, and fallen walls were noted. It was also known as "Old Spanish Fort" (Ezell 1968). A surface collection was completed. The archaeological remains are listed as California Historical Landmark #59 and on the National Register of Historic Places (NRHP) as #66000226. It was added to the NRHP in 1966 as being eligible under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. The Presidio functioned as a defensive position, a fortification, and a village site. The establishment of the Presidio marks the founding of the first permanent European settlement on the Pacific Coast as well as the site of the first mission in California, founded by Father Junípero Serra. It was the military seat between 1769 and 1837 and the residence of the Mexican governor between 1825 and 1829 (Snell 1963). Currently, it is within the city of San Diego's Presidio Park.

A RECON archaeologist and a Native American monitor from Red Tail Environmental completed the pedestrian survey on September 12, 2018 and recorded one previously unrecorded historic cultural resource. This consisted of rock features built by the WPA in the 1930s as park improvements. The features include the cobble-lined gutters along both sides of Presidio Drive/Cosoy Way, the cobble-

lined channel on the eastern end of the survey area at the bottom of a drainage between the Presidio knoll and the mesa top of Mission Hills, and cobble steps on the southern portion of the survey area.

Byram Archaeological Consulting completed the subsurface survey using Ground Penetrating Radar (GPR) on August 8, 9, 28, 29, and 30. RECON archaeologists Richard Shultz and Carmen Zepeda-Herman assisted Scott Byram of Byram Archaeological Consulting in setting up 20 grids to survey both proposed alternatives using GPR technology. Results indicate numerous water/utility lines, tree roots, a metal feature, rectangular features, soil changes, landscaping features, cobble alignment, drive tracks, wagon road, and concrete park associated features. These features are conjecture based on GPR signal interpretation of high-amplitude reflections. Archaeological testing is required to confirm these features. The results can be used to create a map of locations for test excavations.

The possibility of significant historical resources being present within the proposed project is considered moderate due to the close proximity of significant cultural resources. RECON recommends a testing program utilizing geoarchaeological corings be developed based upon the mapped data set generated by the GPR.



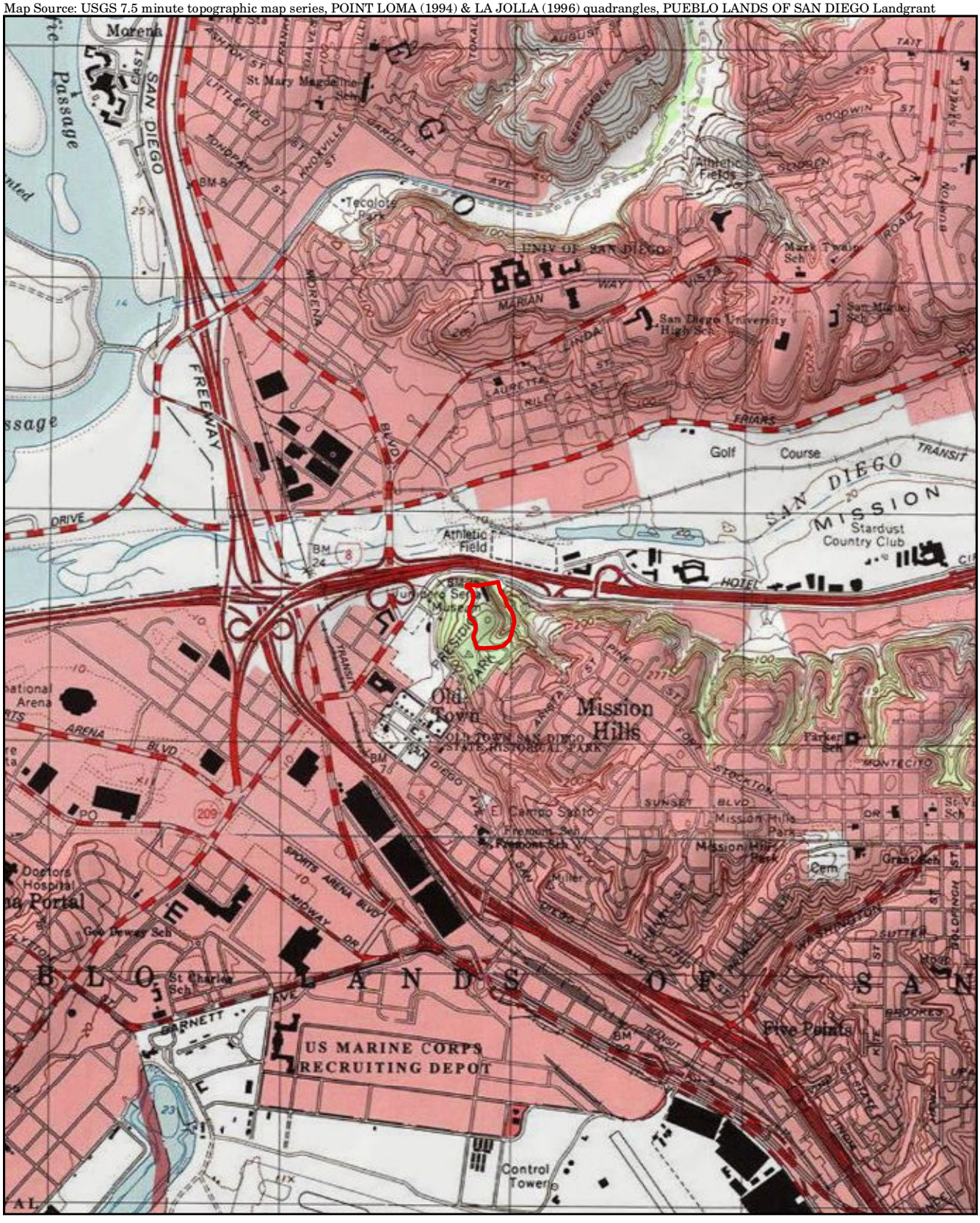

Project Location

# FIGURE 1
## Regional Location

RECON

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Map Source: USGS 7.5 minute topographic map series, POINT LOMA (1994) & LA JOLLA (1996) quadrangles, PUEBLO LANDS OF SAN DIEGO Landgrant




Survey Area

RECON

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# FIGURE 2

## Project Location on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 210-1701




FIGURE 3

Project Location on City 800' Map

RECON

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Image Source: Nearmap (flown February 2019)




RECON

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FIGURE 4

Project Location on Aerial Photograph

Image Source: Nearmap (flown February 2019)




FIGURE 5

Driveway Alternative on Aerial Photograph

RECON

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PHOTOGRAPH 1
Gutter along Presidio Drive, Looking North



PHOTOGRAPH 2
Cobble-lined Channel, Looking South



PHOTOGRAPH 3
General Survey Conditions with Lawns, Leaf Duff, Trees, and Slopes

**NATIVE AMERICAN HERITAGE COMMISSION**
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**(916) 373-3710**
**Fax (916) 373-5471**

August 2, 2018

Carmen Zepeda-Herman
RECON Environmental

Sent by Email: czepeda@reconenvironmental.com

Re : Junipero Serra Museum ADA Project, San Diego County

Dear Ms. Zepeda-Herman,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results indicate Native American cultural sites are present. Please contact the Viejas Band of Mission Indians and Ipay Nation of Santa Ysabel. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

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

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

**Native American Heritage Commission**
**Native American Contacts**
**August 2, 2018**

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**This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.**

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**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed**
**Junipero Serra Museum ADA Project, San Diego County**

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**August 2, 2018**

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**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed Junipero Serra Museum ADA Project, San Diego County**

# Ground-Penetrating Radar for the Presidio Hill Park ADA Project at the Serra Museum

Scott Byram, October, 2018

Prepared for RECON Environmental, Inc.



*Photo of GPR equipment at west edge of Grid 8, facing north towards the northwestern grids with Junipero Serra Museum in the distance.*

Archaeological ground-penetrating radar (GPR) investigations were conducted in August, 2018 at Presidio Hill Park for the City of San Diego's Junipero Serra Museum ADA expansion. This is southeast of Presidio San Diego, dating to the 18th and 19th centuries, as well as other fortifications on the ridge to the southwest. The focus of the project is to identify and delineate possible buried adobe foundations, cairns, pits, ditches or other structural archaeological features relating to mission era, precontact, or U.S. period (e.g. Fort Stockton) occupation. In an effort to identify and map potential historic features

and any precontact Native American features that may be present, 21 GPR grids consisting of 530 transects were surveyed and analyzed. These data are suitable for amplitude slice map generation and identification of potential archaeological features and cultural strata. The results of this survey are presented in this report, following context and methodology discussion. Fieldwork, including site mapping and project planning, was performed in collaboration with RECON archaeologists Carmen Zepeda-Herman and Richard Shultz, in consultation with City of San Diego planner Myra Herrmann.

Because of extensive buried rocks as well as tree growth and utility line placement (primarily park irrigation), indications of features are sometimes difficult to discern in the data set. Additionally, geological strata include cobble concentrations in some cases, so distinguishing stone architecture, earth ovens, buried cairns etc. from natural deposits may be challenging without excavation to identify smaller diagnostic artifacts. The GPR data are most useful for delineating larger features and tracing buried strata.

## GPR Methods

GPR survey involves scanning along evenly-spaced parallel transects within rectangular grids using a sled or cart-mounted GPR transmitting and receiving antenna. GPR data are generated by sending pulses of radar energy into the ground from a surface antenna at a specific time interval (Conyers 2004, 2012). The energy reflected off of buried objects, features, or strata is measured as the waves return to the receiving antenna as it is moved along the transect, with traces collected at intervals tallied with a calibrated survey wheel. The data are sampled and processed by a control unit designed for this purpose (GSSI SIR 4000 controller), attached by cable to the GPR antenna (either 350 or 900 MHz for this project).

As radar energy passes through different subsurface materials the velocity of the waves changes depending on the physical and chemical properties of the material (Conyers 2004). The larger the contrast in electromagnetic properties (measured as RDP, or relative dielectric permittivity) between two materials at an interface, the stronger the reflected signal. This determines the amplitude of the radar wave at a specific depth. Radar variation depends on sediment mineralogy, ground moisture, survey depth (radar time window) and site topography. Electrically conductive or highly magnetic materials including salt and some clays will attenuate the radar energy, resulting in little or no reflection in profile and less depth of data profiles. Dry sediments are generally more reflective than saturated sediments, resulting in deeper penetration and more detailed reflections when traces are combined to form a transect profile.

Data processing was done with GPR Viewer 2017, developed by Lawrence Conyers of Denver University, and amplitude slice map generation derived from MRI software (GPR Process 2010), and reflection amplitude topographic plots generated with GPR Process and Surfer 7.0. Amplitude slice maps are generated from multiple adjacent transects collected in a grid at fixed intervals. These maps represent varying depths, or segments of the time window for radar travel.

Analysis of transect profiles is central to archaeological interpretation of GPR data (Sunseri and Byram 2017; Conyers 2004, 2012). There are several steps to processing radar data for interpretation. For an individual transect profile, signal gains may be adjusted to compensate for diminishing signal return with depth. Continuous, horizontal background waves may be uniformly removed, though care must be taken to avoid removal of horizontal patterns that are not due to ambient radar energy. Filtering of high and low frequency radar energy may be adjusted. Determining depth through assessment of RDP value and hyperbola fitting may be useful, RDP in one part of a site may be different from another, particularly when stratum constituents vary across the site. In this report, an approximate depth scale appears at the left axis of GPR transect profile images. Often radar return time in nanoseconds is displayed instead of depth.

## Project-Specific Methodology

A total of 602 GPR transect profiles were collected for the Serra Museum project, including 530 transects from the 21 grids. The relative locations of the GPR grids are shown in the three composite maps (pp. 25-27) In addition to the GPR slice maps, select transect profiles are also presented as figures throughout the report. These transect profiles are the elements of grids, which are sets of parallel transects that can be analyzed together to produce horizontal slice maps. The RDP value for the project area ranges from 7 to 17, with most grids at the lower end of this range, allowing good depth for radar signal returns. These assessments were based on hyperbola fitting in real time with the SIR4000. The typical depth range for the 350HS antenna at the site is 170 cm, with occasional deeper returns.

GPR grids were surveyed at 0.5 meter transect intervals. Each grid consists of parallel transects that are positioned adjacent to one another for transect data processing in GPR slicing software (Table 1). Data from individual transects are shown as transect profiles, and data from grids are presented as amplitude slice maps, each representing a specified depth range (or time interval for radar travel). Depth estimates are approximate due to soil variation and surface conditions, but in general the GSSI SIR4000 and 350HS provided reflective information through the full range of known site deposits.

All data files are archived and may be viewed and adjusted in open access software such as GPR Viewer 2017. To locate a numbered transect within a given GPR grid, refer to the amplitude slice map and the grid/transect inventory table (Table 1). Each grid has a 0/0 point. The first transect is an odd numbered file beginning in the lower left of the plotted slice maps and heading towards the upper left. The second transect is even numbered and heads back to the lower left, one half meter in from the first transect. This sequence repeats through the grid, with odd numbered transects in one direction and even numbered transects in the opposite. The perimeter of the grid is in meters on the slice maps in this report. Since there are four transects per meter in each grid, locating the line of a given transect on the slice map requires counting intervals at 0.25 meters from the 0/0 starting point. All transects are run on the Y axis of the grid, so the 0/0 point is in the lower left, and counting transect intervals goes from left to right.

Subsequent to test excavations, project survey maps were modified with shallow, middle and deep GPR slice map composites as background (see pages 25-27). For Grids 1 through 18, the dry, rocky sediments allowed high quality radar returns to a depth of roughly 1.2 meters. Wetter park landscaping sediments in Grids 19-21 yielded data at lesser depth limits.

The RDP (dielectric) is set at 7.5 for Grids 1-18, yielding data to a depth of 1.7 meters. The RDP changes to 17 in Grid 19, and 12 in Grids 20, 21. The higher dielectric relates to the drying, rocky nature of the soils on the upper terrace.

| Grid Number | Direction from 0/0 corner | Starting file No. | End file No. | Grid Width m | Transect Length m |
|---|---|---|---|---|---|
| **1** | N from SW | 27 | 54 | 14 | 24 |
| **2** | N from SW | 57 | 78 | 11 | 26 |
| **3** | N from SW | 79 | 100 | 11 | 20 |
| **4** | N from SW | 101 | 122 | 11 | 20 |
| **5** | N from SW | 123 | 146 | 12 | 19 |
| **6** | N from SW | 147 | 178 | 16 | 22 |
| **8** | E from NW | 191 | 215 | 12.5 | 22 |
| **9** | N from SW | 217 | 262 | 23 | 20 |
| **10** | N from SW | 265 | 300 | 18 | 18 |
| **11** | N from SW | 303 | 348 | 23 | 21 |
| **12** | N from SW | 349 | 366 | 9 | 21 |
| **13** | N from SW | 367 | 384 | 9 | 20 |
| **14** | N from SW | 391 | 413 | 11.5 | 20 |
| **15** | SW from NE | 415 | 438 | 12 | 24 |
| **16** | SW from NE | 439 | 466 | 14 | 15 |
| **17** | SW from NE | 467 | 488 | 11 | 19 |
| **18** | SW from NE | 489 | 506 | 9 | 24 |
| **19** | N from SW | 507 | 534 | 14 | 25 |
| **20** | N from SW | 535 | 564 | 15 | 26 |
| **21** | S from NE | 565 | 582 | 9 | 17 |

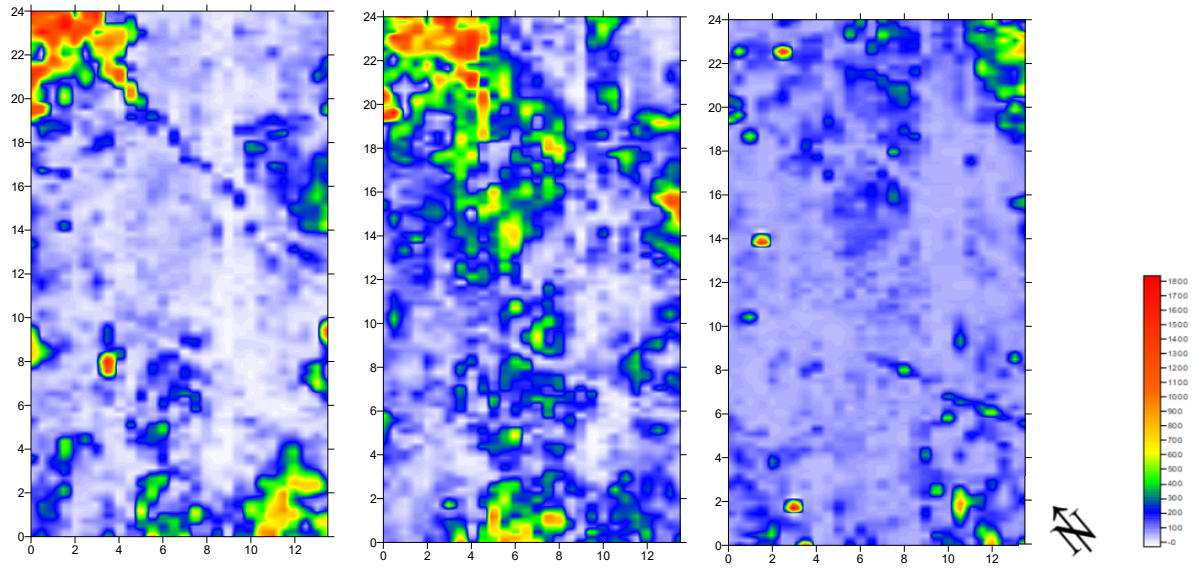
*Table 1: GPR Grid and Transect Inventory*

The discussion of findings for each grid follows the numbered sequence, beginning with Grid 1 and ending with Grid 21 (See composite maps inset for grid locations, pages 25-27). Each grid is discussed separately below, presented with a set of sequential slice maps, from shallow to deep (left to right), representing the range of relevant GPR data. This is generally the upper 1.2 meters, but in grids where there is no useful data below 80 cm, only the upper three slices are shown. North arrows shown with

the slice maps apply to all slices for the respective grid. Amplitude scale is the same across all grids, with Red at this high amplitude end and blue and white at the low amplitude end. Features may show up as either high amplitude or low amplitude relative to surrounding grid data, though in this project area features are more often of comparatively high amplitude. Utility trenches sometimes show as low amplitude gaps in higher amplitude data, as rendered on a slice map.

## Grid 1

The first grid surveyed for the Serra Museum ADA project is located along the park area entry drive at the point where the terrace widens northward toward the ridgetop. The northwest corner of the grid is an area of recent utility excavation and apparent replacement. The high amplitude reflections in the upper two slices likely relate to this excavation. Linear features running across the grid from northwest to southeast are likely water lines or trenches related to water lines and drainage.



10-35 cm 35-60 cm 60-85 cm

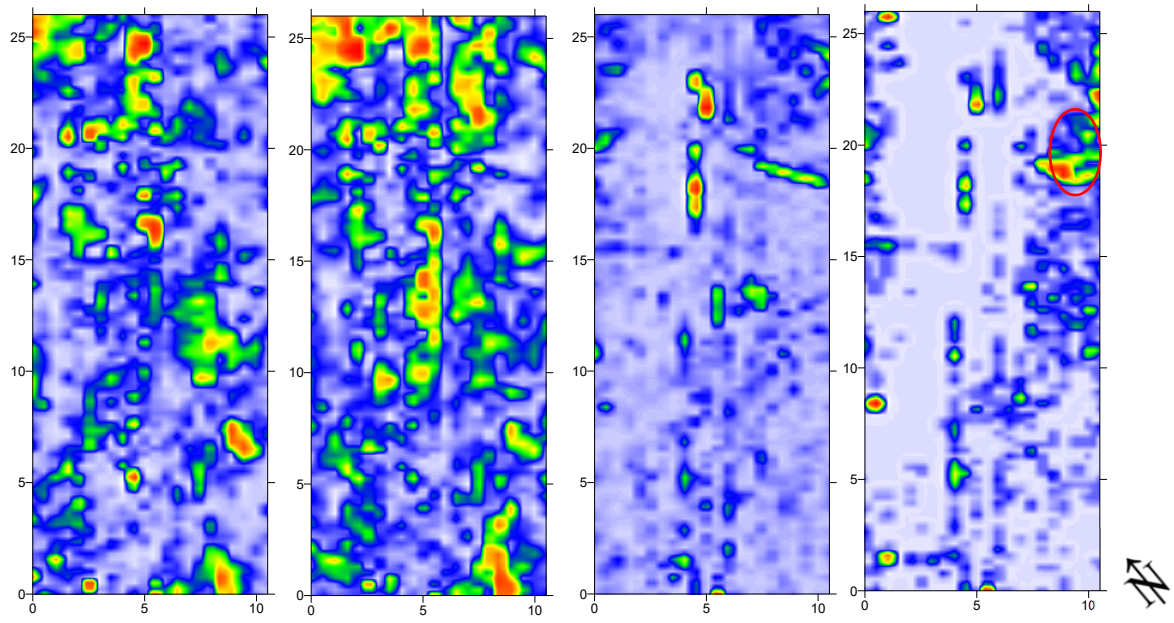
*Above: Grid 1 slice maps 1 through 3, from shallowest at left to deepest at right, representing 10-90 cm depth.*

## Grid 2

A feature appears to be present in the center east to northeast portion of Grid 2, 7 meters south of the north wall. It is 6-7 meters long, consisting of reflection nodes that may represent cobbles, bricks or tiles. Inspection of the slope to the east showed an exposure of cobbles that likely relates to this

reflection feature. The cobbles may be part of a marine terrace deposit, as seen elsewhere in the project area.

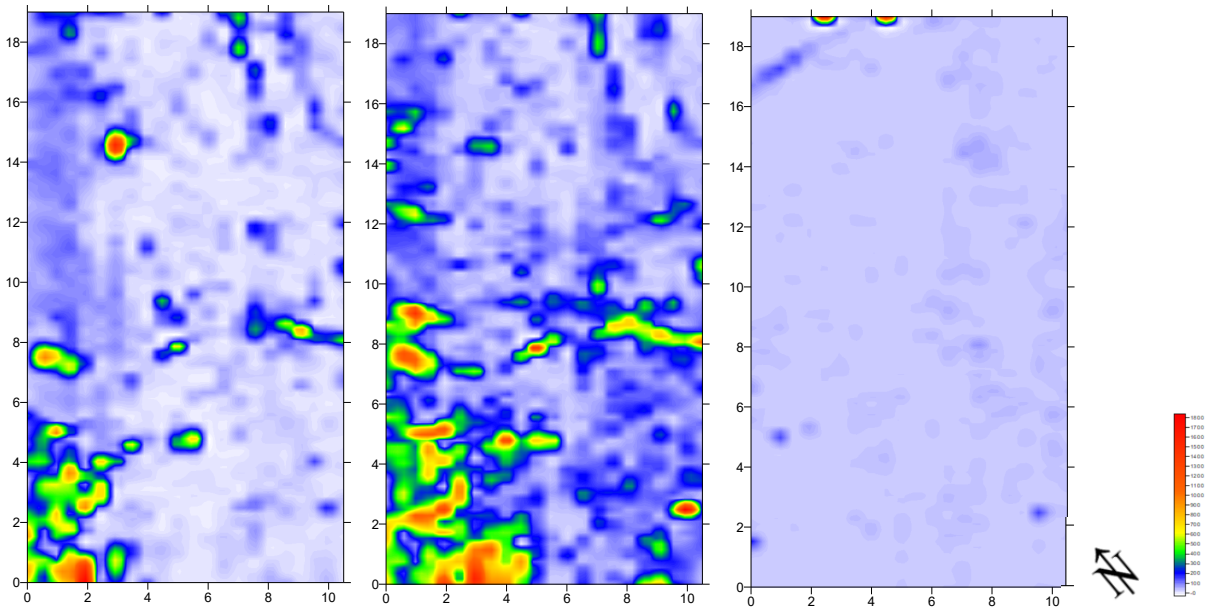
Grid 2 includes the entry driveway for this upper portion of the park, and some of the high amplitude reflections (especially north-south in Slice 2) in the center of the grid likely relate to this. Given current park irrigation maps for the project, some linear feature in Grid 2 likely represent buried water lines.




*Above: Grid 2, slices 1-4. Feature of interest circled in slice 4. Compacted drive likely accounts for high amplitude reflections in the center of the grid, running north to south.*

## Grid 3

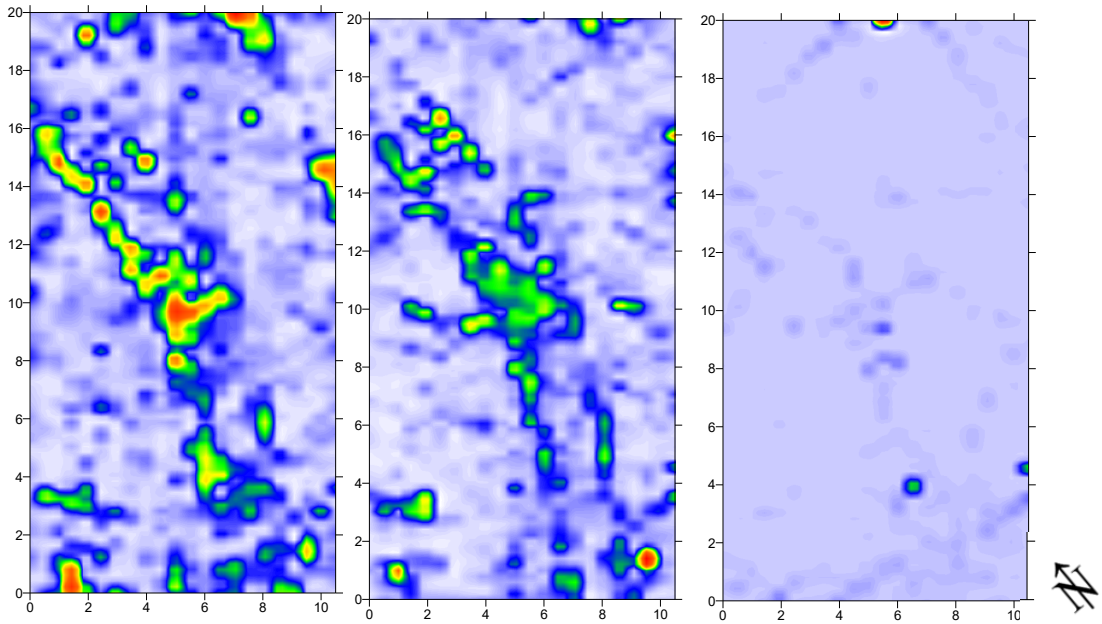
This central grid is located adjacent to an area of active brush piling in the east, and a picnic area to the west. Drive or track related features clearly expressed in Grid 4 likely account for the two parallel lines in the northeast portion of this grid, though these are not especially high amplitude features. Expansive high amplitude reflections in the southwest corner of Grid 3 likely relate to the exposed utility excavation at the shared corner of grids 5, 8, 1 and 3.




*Above: Grid 3, Slices 1-3, from 10-85 cm approximate depth. The amplitude color scale at right applies to slice maps for all grids.*

## Grid 4

Trees are present in and around this grid, as are water lines, most evident in the deepest of the three slices. The most distinctive feature is a curved, 3 meter wide high amplitude reflection that may be a wagon road, bordered path, or other feature, possibly relating to the early landscaping of the museum. It is not expressed on the surface.

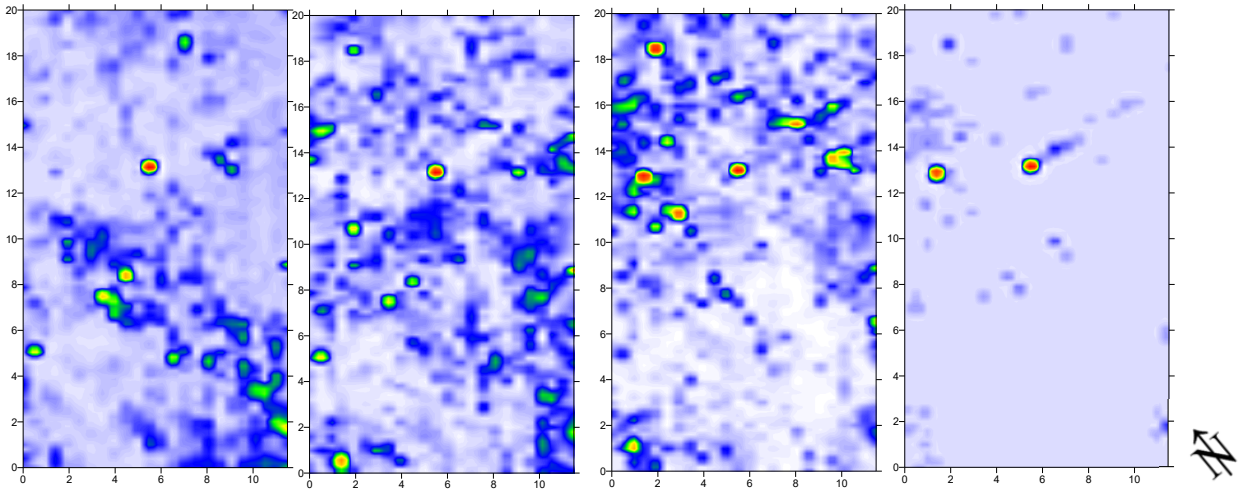


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 4, slices 1-3.*

## Grid 5

Red gum trees are numerous in this portion of the project area. A surface staircase descends from the southwest corner of the grid to the paved street below. Tree roots at 13-14 meters. Roots should be through much of unit with five large trees present.



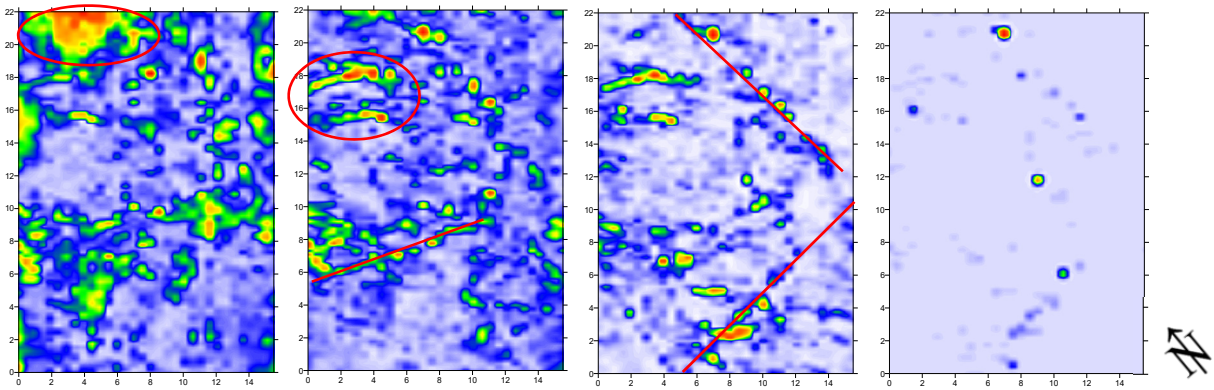
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slice maps 1-4 for Grid 5. Tree roots likely account for most of the variability in this grid.*

## Grid 6

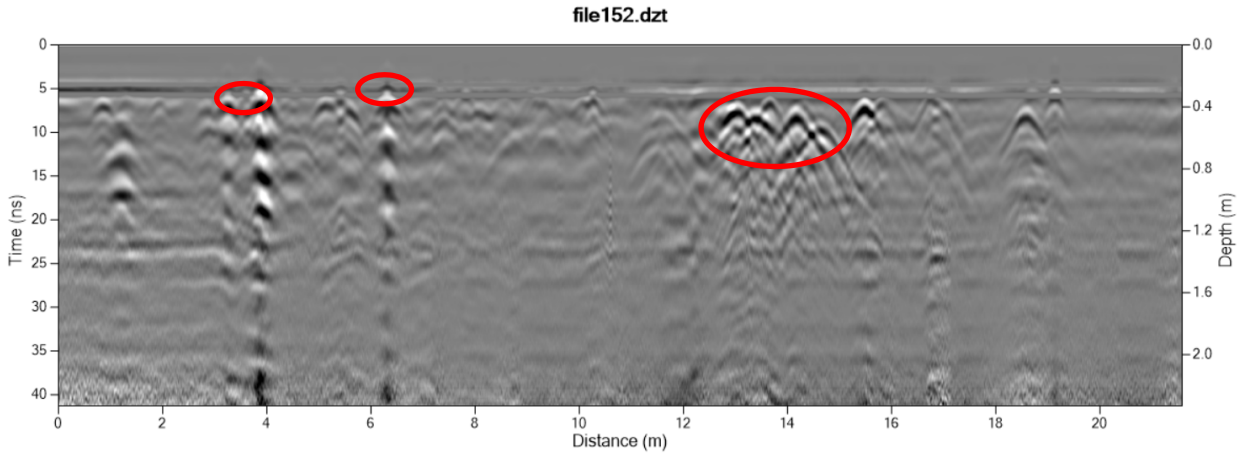
Trees and stumps are present in this grid, as well as a thick blanket of red gum needles, which obscures the ground surface. Transect length varies somewhat due to slippage on sloping areas with needle duff.

Both metal and non-metal node clusters were identified in Grid 6. Linear reflection features may be from utilities or fence lines, possibly large roots. Metal objects in the northwest suggest tracks or rails, and a near-surface planar reflection in the northwest corner is unexplained.



10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Grid 6, slices 1-4. A shallow planar feature is evident in slice 1 (red oval), adjacent to two roughly parallel metal bars, rails or pipes (circled in Slice 2). Some of the high amplitude reflections across the grid at 8-10 meters north may be roots, but deeper linear features in Slice 3 could be from a line of fence posts or cobble alignment, fainter but partly evident in Slice 4 as well.*



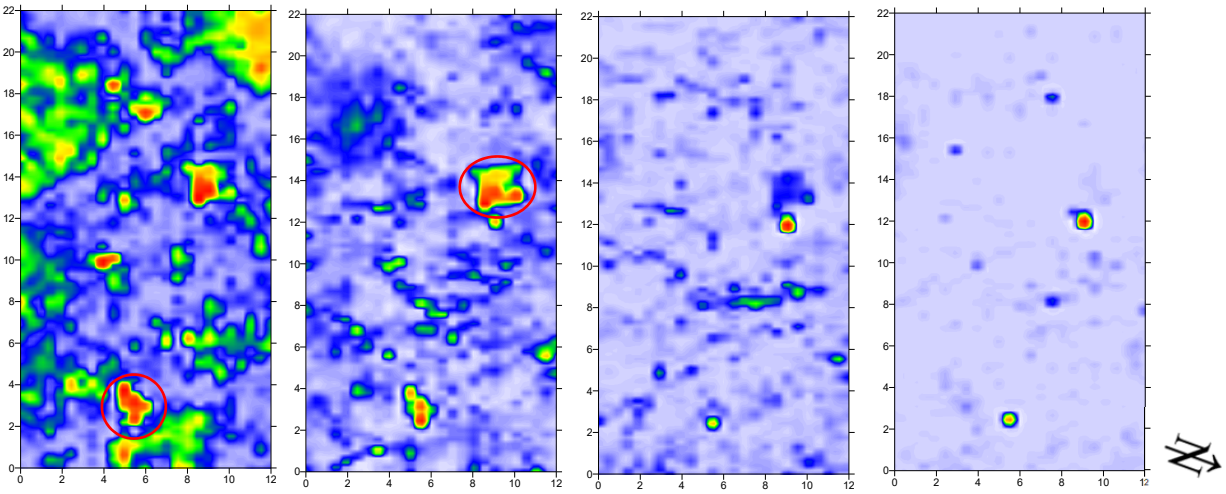

*Above: File 152 in the western portion of Grid 6, facing east. The tall, narrow reflections at the left are likely metal near the surface. The cluster of nodes at 14 meters between 40 and 60*

*cm depth are likely tree roots, given the distribution of red gum trees in this grid, though this may be part of a large filled trench running east-west between 8-10 meters north of the south wall of the grid.*

Note that there is no Grid 7. Transects initially recorded as Grid 7 were later combined with Grid 6.

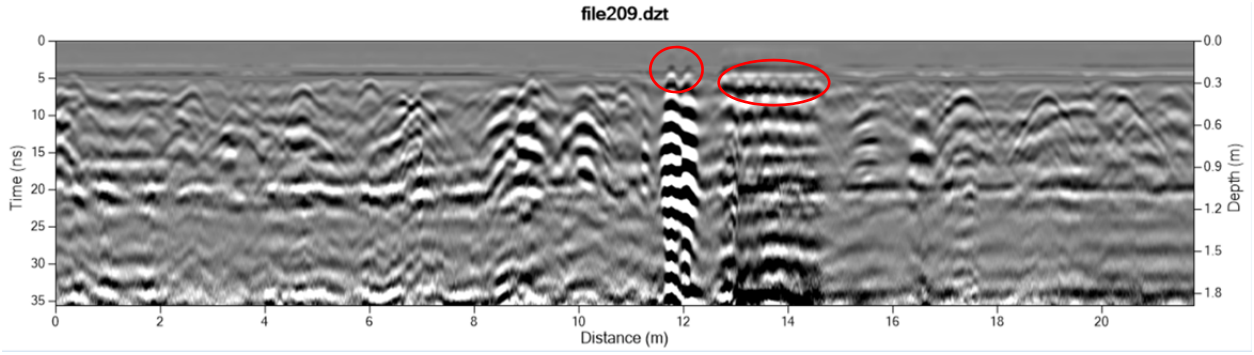
## Grid 8

This grid is located in a picnic area, with features of concrete and active utility lines present. Woodchips are present on the surface in the south, and these may obscure some radar data.



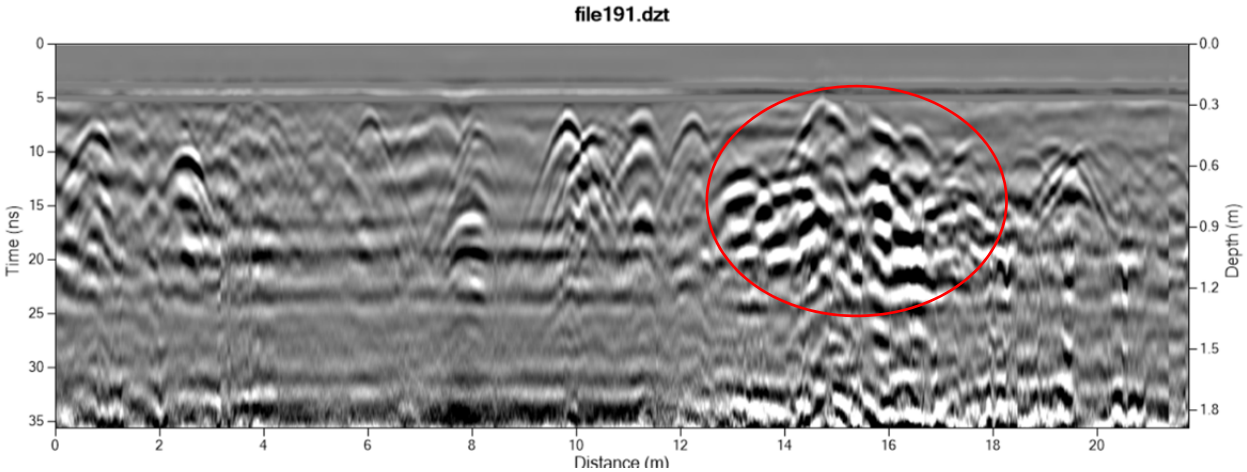
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 from Grid 8, showing surface concrete features (red circles) in an area developed for park picnicking.*




*Above: File 209 in Grid 8, south half, showing rebar and concrete at 13 to 14.5 meters (oval to right). Facing north. A metal object is located at 12 meters on this transect profile (circle to left). The metal from this object as well as the evenly spaced rebar produced multiple*

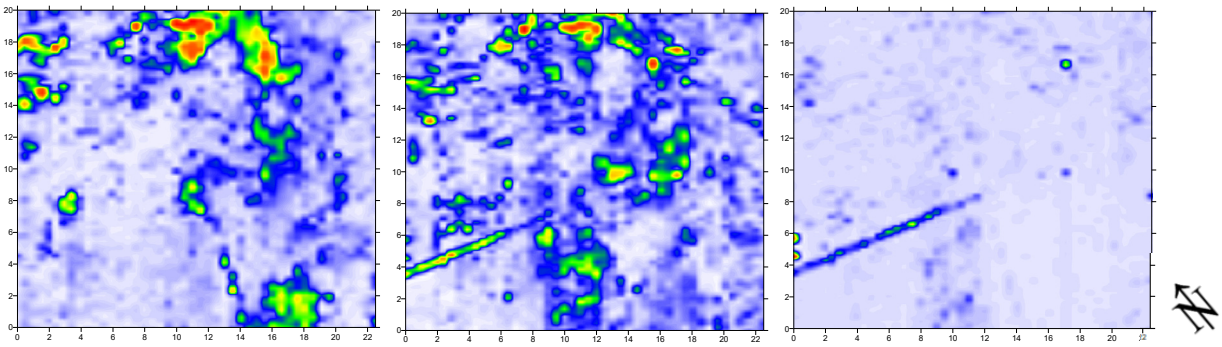
*reflections as the radar energy reverberates off of the buried metal through the open time window as the antenna moves across the surface.*




*Above: A large root system is likely the explanation for a large cluster of nodes at 13-17 meters (circled in red) in file 191 in Grid 8. This portion of the transect ran adjacent to a large tree trunk.*

## Grid 9

This grid is located in the center of the main proposed parking lot area, near the ridge crest. Grid 9 shows extensive root expansion, as well as at least one linear utility pipe. Standing trees are present within the grid, including a large one in the north-center.

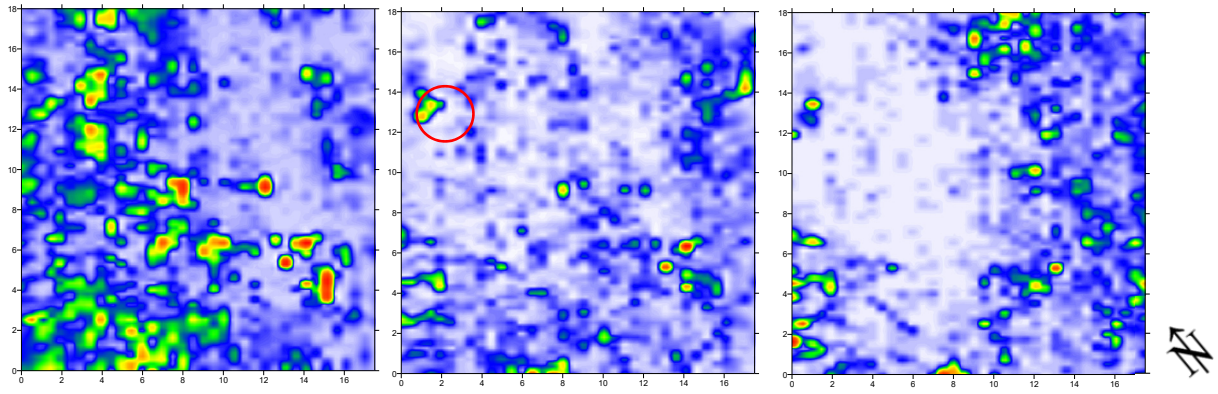


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 9, slices 1-3. The distinct linear feature in the south half is likely a water line. Planar features in the north center and the eastern half of the southeast wall are likely roots of trees.*

## Grid 10

This grid is located on the ridge crest, and an abandoned concrete water fountain is located in the northwest corner. There is a large tree in the southwest quadrant, accounting for some of the high amplitude variation here. No other cultural features were noted. This area appears deflated.

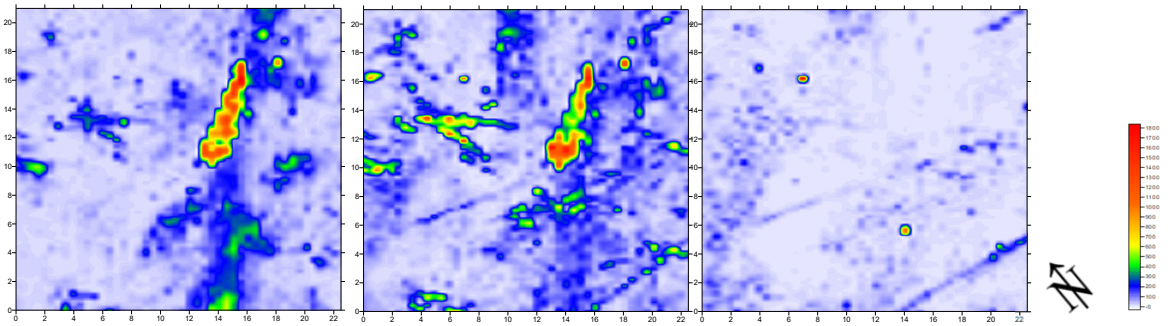


10-35 cm 35-60 cm 60-85 cm

*Above: Slices 1 through 3 for Grid 10. The location of the concrete pad for a water fountain is circled in red.*

## Grid 11

Grid 11 is relatively level in the western third, and slopes up to the north-south trending ridge top ridge in center of the east half. The ridge crest corresponds to a diffuse area of higher amplitude reflection in the grid slice maps . Grid 11 is forested but trees are fewer in the northeast. Eucalyptus predominates. Much of the grid surface is compacted from use as a refuse storage area. There is a small overlap with Grid 1 in the southwest corner.

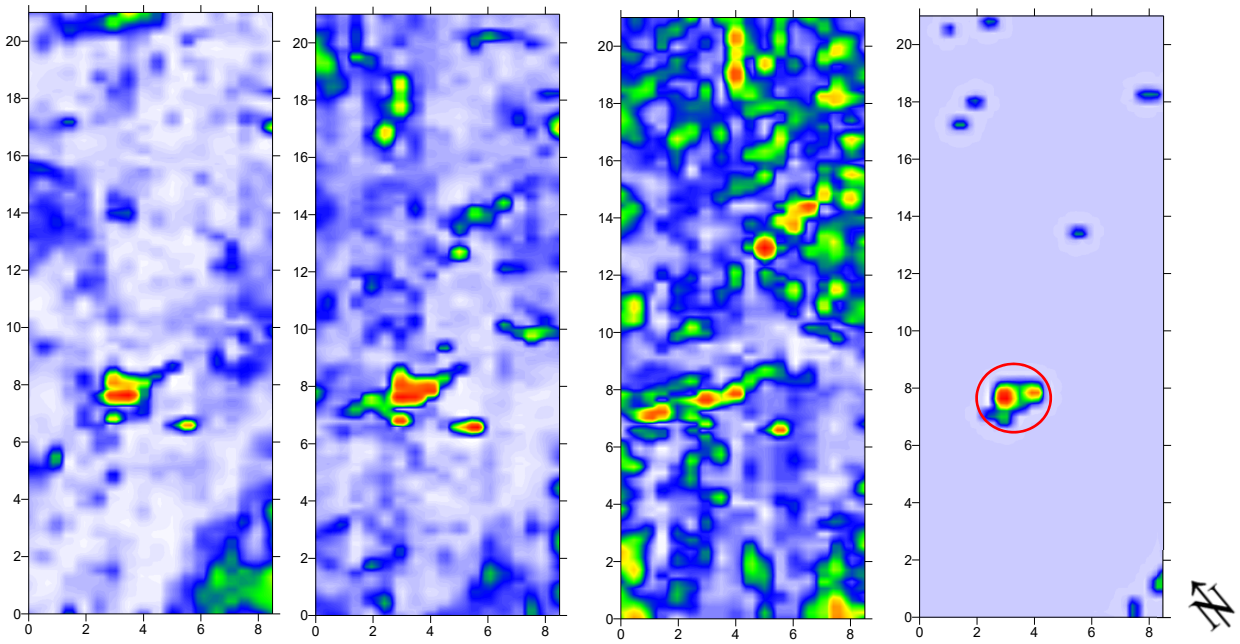


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 11 includes linear features that are likely from one or more networks of irrigation lines. A more diffuse north-south trending feature at 14-18meters east crosses the grid, with very high amplitude from 11-17 meters north. This diffuse feature may be related to the stockpiling and possibly seasonal burning of organic debris such as branches and leaves, or it may represent former use of the ridge top as a road.*

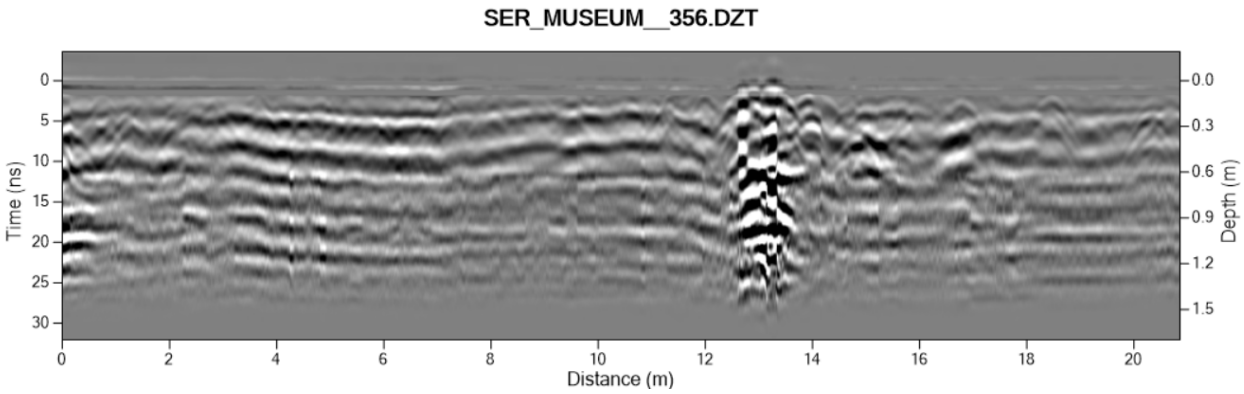
## Grid 12

Grid 12 is the most northeasterly of the grids. The slope descend to the north and east, and rises to the ridge crest in the west. In Slice map 3 (44-64 cm depth) there is a buried horizon that likely represents a stratigraphic change. At 8 meters north, 3-4 meters east there is a vertical feature that may be a pit or post (flagpole or utility pole?).



10-22 cm 22-44 m 44-64cm 64-90cm

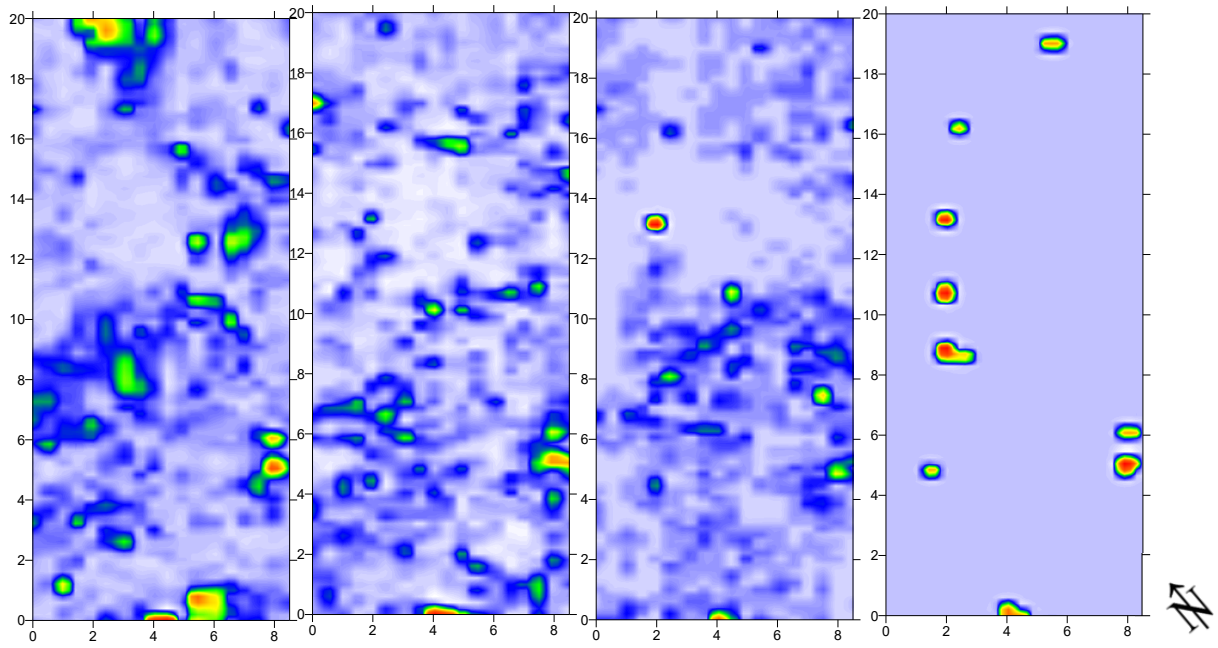
*Above: Slice maps 1-4 in Grid 12. Note the possible pit feature (circled in red in Slice 4) at 8 meters north, 3-4 meters east.*




*Above: Profile 356 in Grid 12, showing a vertical feature at 13 meters. This feature appears to contain metal, and may be a post base or flagstaff, given its location.*

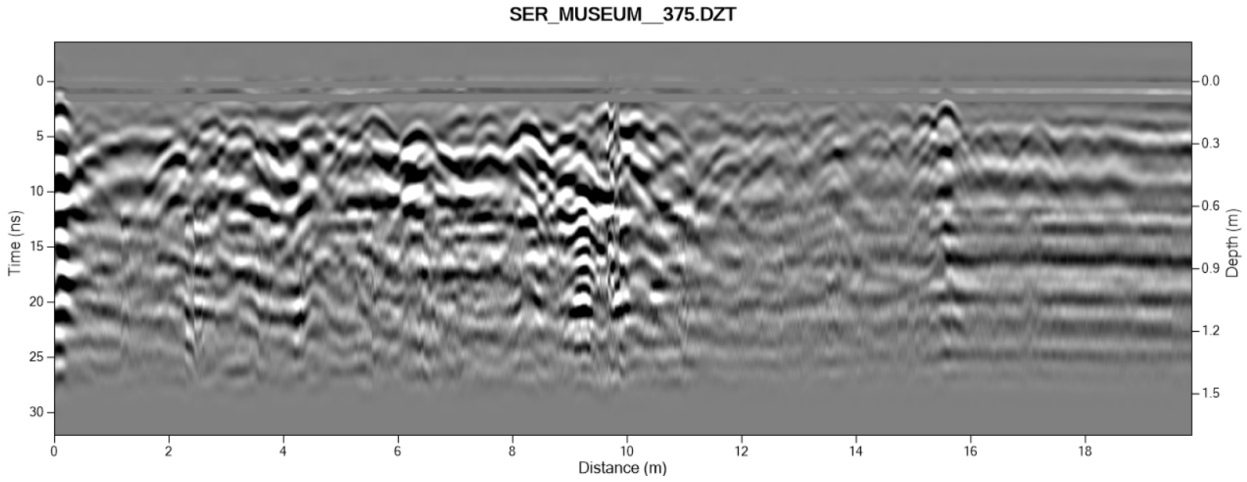
## Grid 13

The slope descends to the east of Grid 13. A wood chip pile in south has been spread, but may affect readings. No distinct features were observed in this grid. Tree roots likely account for more linear patterns.

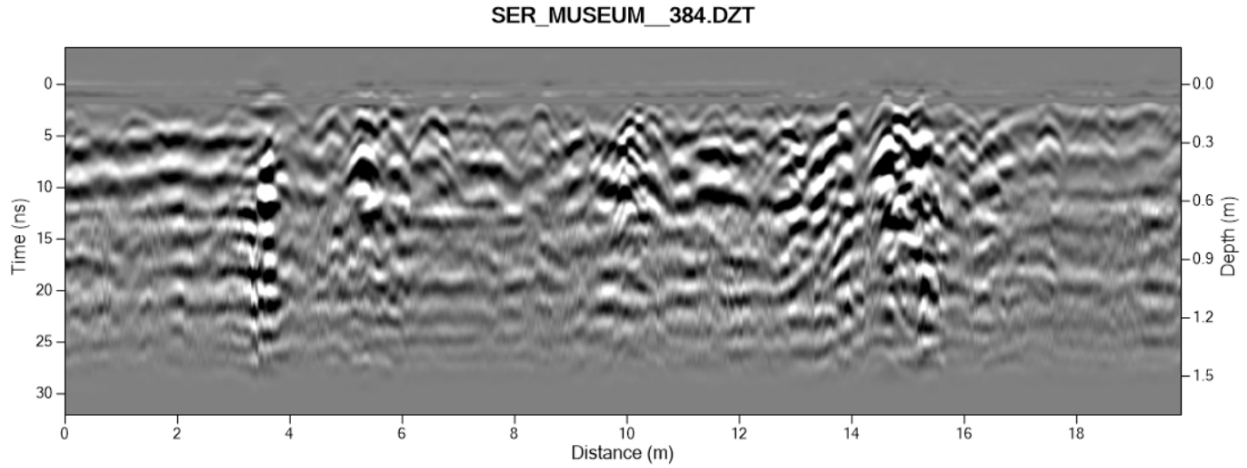


10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slice maps 1 through 4 for Grid 13*



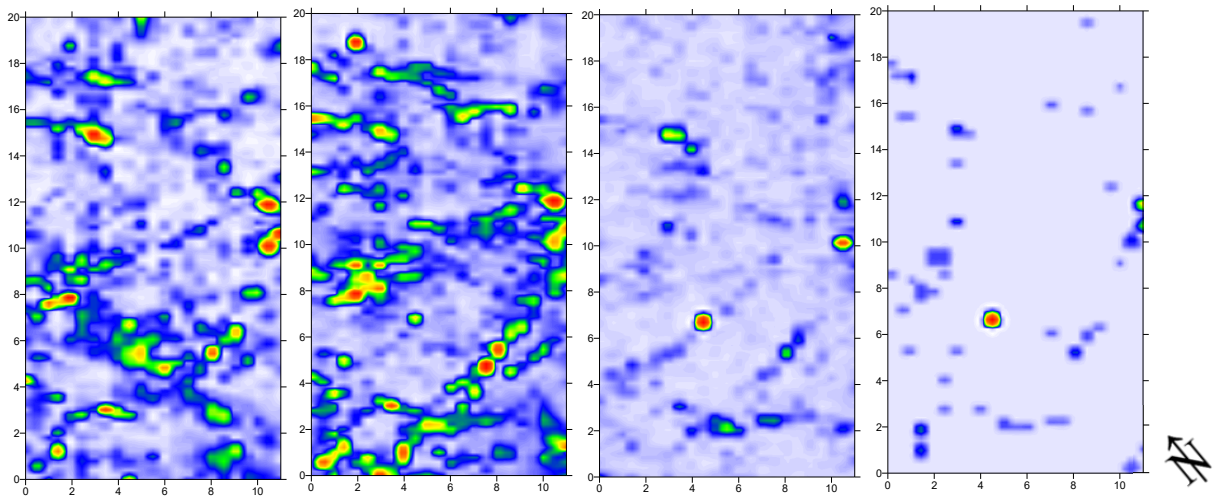

*Above: File 375 in Grid 13. Note the distinction between the south half and the north half of this profile. The abundant nodes in the south half may be tree roots.*




*Above: File 384 in Grid 13, showing pockets of roots.*

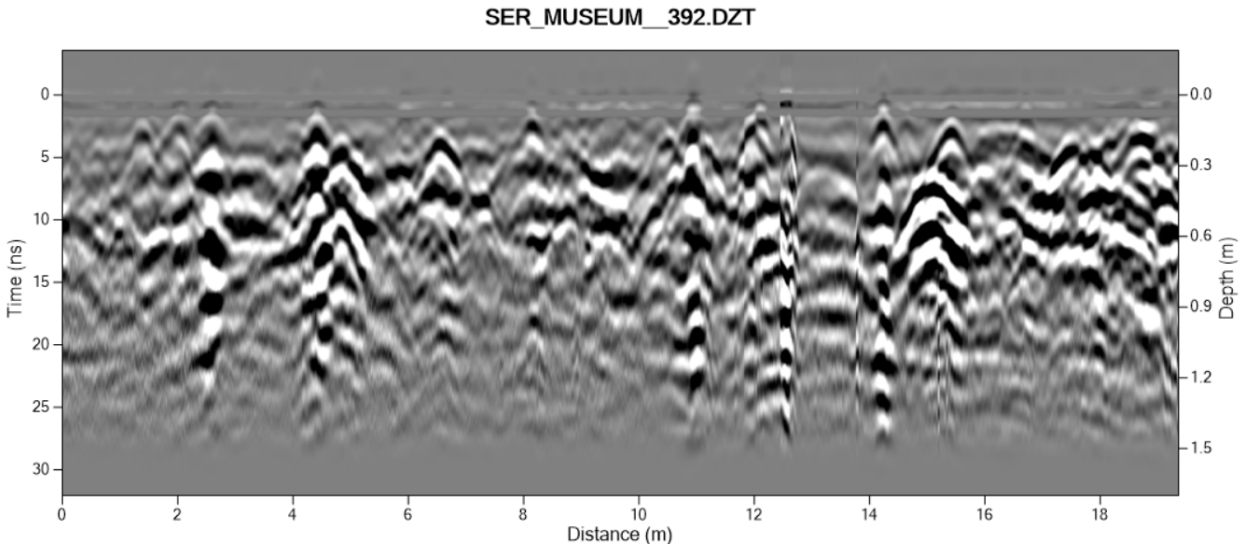
## Grid 14

This grid is located west of Grid 8 and at the slope break descending toward the paved road that borders the project area on the west. Grid 14 is an area of numerous large surface tree roots, which likely account for the large, curvilinear reflection features in the slice maps. Layering in the upper 60 cm is more distinct in this grid than in most other parts of the project area.

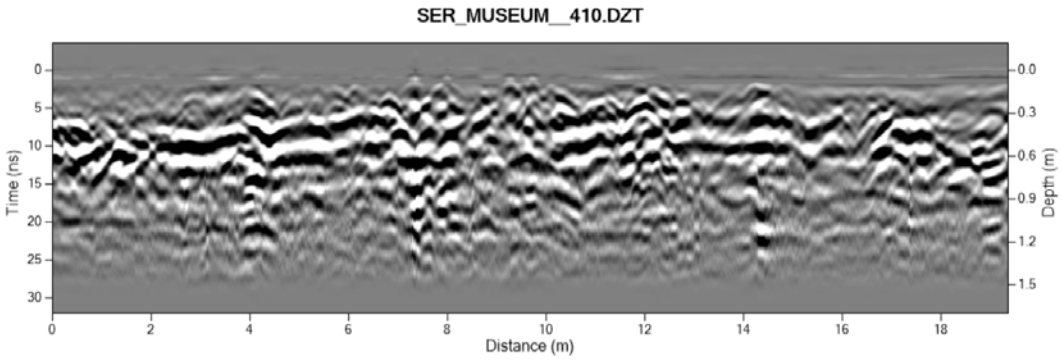


10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Grid 14 slice maps, showing numerous large roots that are also emergent. Buried water lines may account for some of these features as well.*



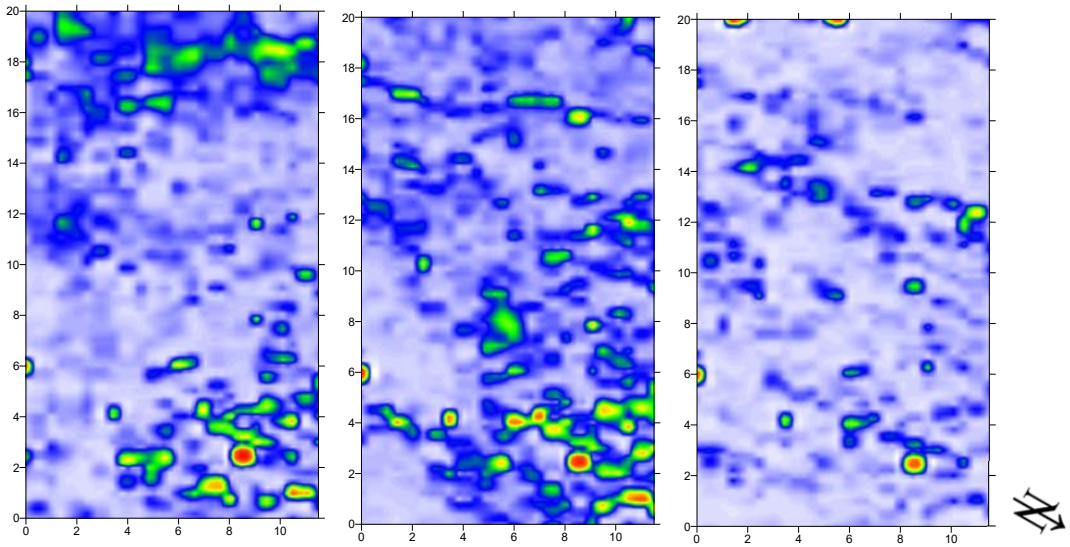

*Above: File number 392 from Grid 14, showing numerous high amplitude reflections of varying depths. Several may be roots, but metal may account for some of the taller stacked "multiple" reflections.*




*Above: File 410 from Grid 14, showing inclined laminated strata. Facing east. These laminated strata are more distinct than in other parts of the project area, and they could represent multiple stable surfaces. However no artifacts were noted on the surface to suggest this as a possible site deposit. Colluvial layers may be present, but these layers slope up to the south.*

## Grid 15

This grid is located in the center of the northwest slope within the project area. Transects were run from the east corner toward the southwest because of the slope. Large roots from a tree that is now a stump were present in the southwest corner but radiated out through much of the grid. Other linear features trending in a northward direction are likely drainage related, and some may be water lines.

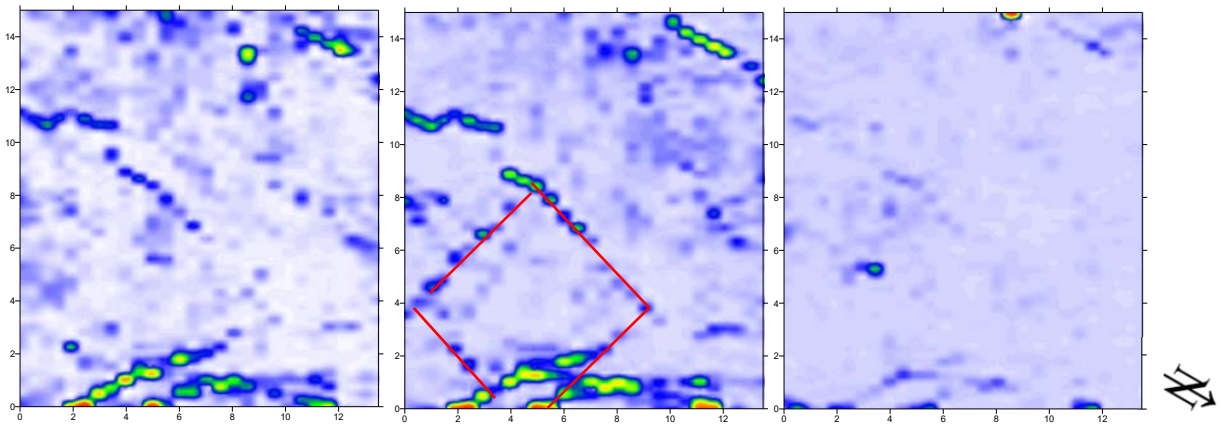


10-35 cm 35-60 cm 60-85 cm

*Above: Slice maps 1-3 for Grid 15. Both roots and water lines appear to account for the linear features visible in slice maps on this northwest slope within the project area.*

## Grid 16

This grid holds numerous narrow linear features. While most are likely irrigation related water lines, one set forms a trapezoid that could have been a rectilinear structure. Surface artifacts including shell and glass were noted in places on this northwest slope, and the possibility of a post-constructed structure should be considered.

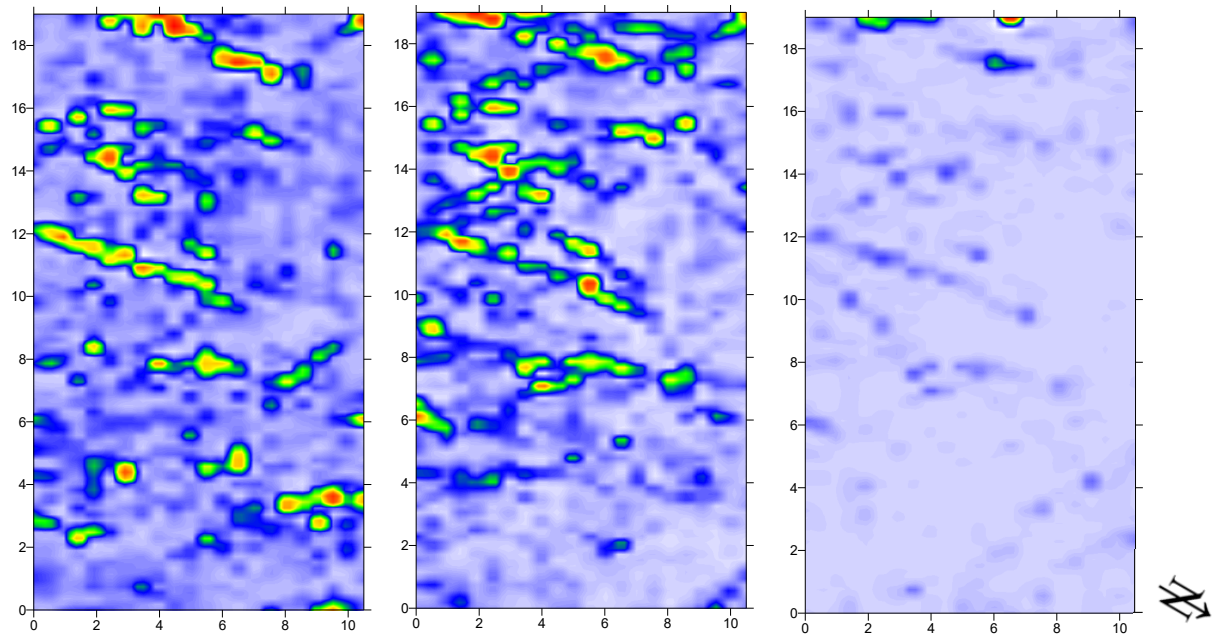


10-35 cm 35-60 cm 60-85 cm

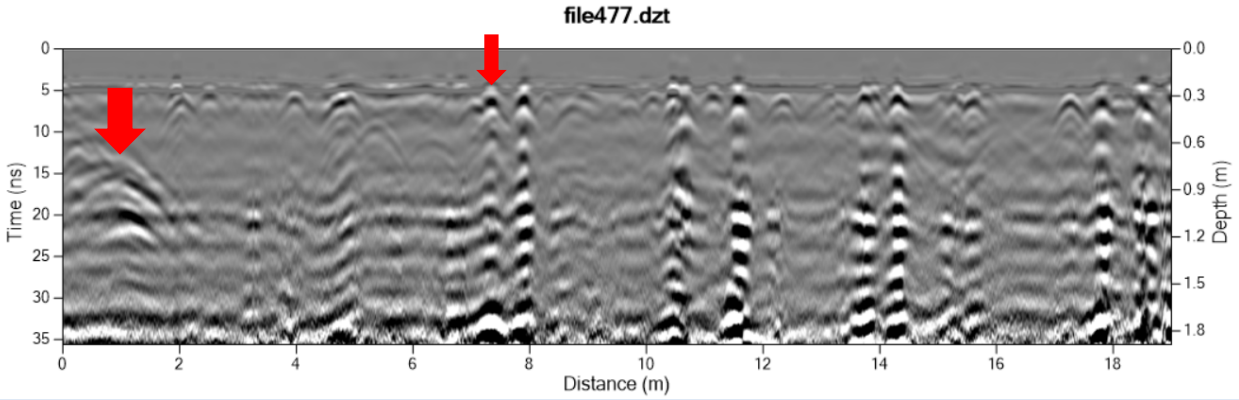
*Above: Slices 1 through 3 for Grid 16. Red lines outline the rectilinear feature, which may be intersecting pipes or the foundation of a post-constructed structure.*

## Grid 17

Located on the lower portion of the broad, open slope southeast of the museum grounds, this grid shows signs of park landscaping. Several north-south trending linear features are evident, especially at a depth of 30 cm. These are likely irrigation-related features. The surface of the grid holds plants indicative of greater moisture, possible seasonal flower beds are present or were in the past. One deeper linear feature is present in the east, and appears to be a large water line connected to the main water station northeast of the grid.



*Above: Slices 1 through 3 for Grid 17*

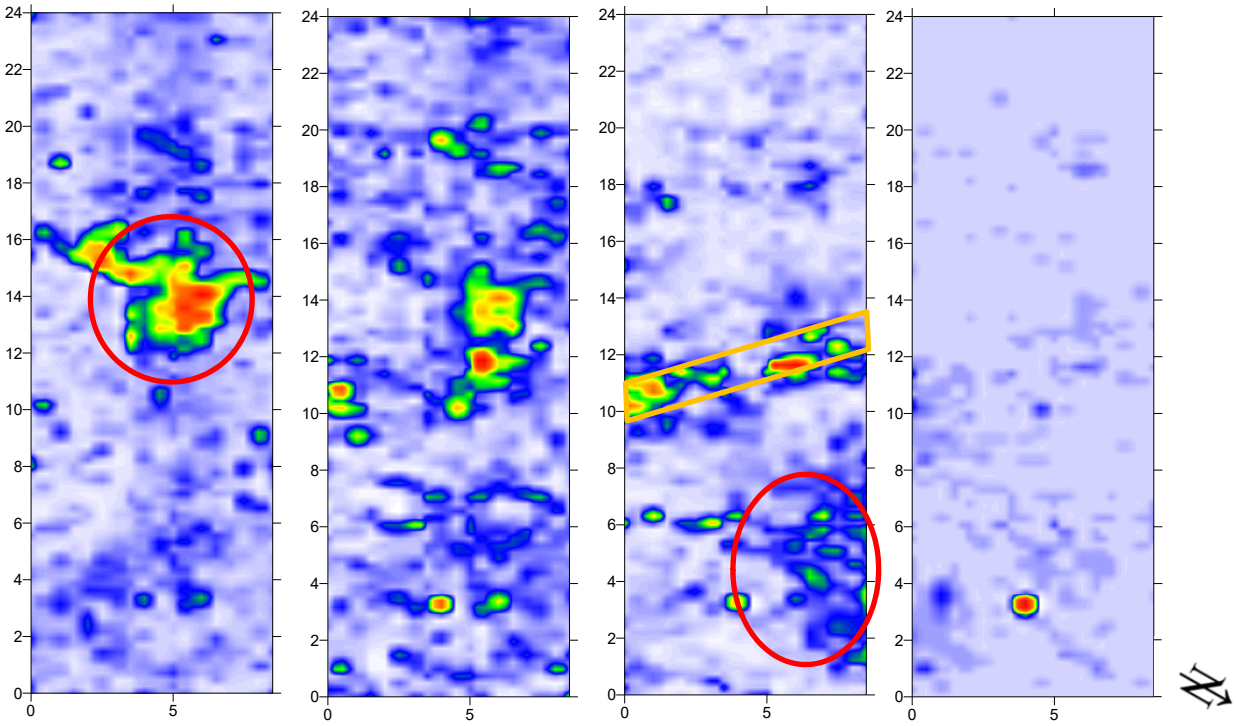



*Above: Transect 477 in Grid 17, facing south. The large feature at 60 cm depth at left, marked by the larger red arrow, appears to be a large water supply line. The smaller arrow marks potential linear feature such as a near surface pipe or root. Several shallow linear features such as this are present in Grid 17.*

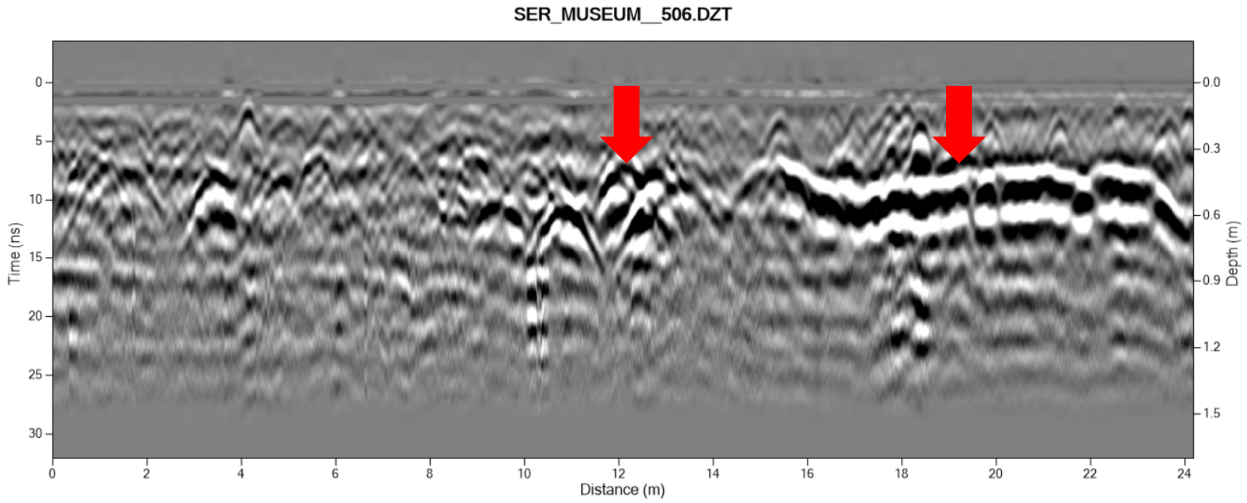
## Grid 18

This is the last grid that was surveyed on the northern slope area, and closest to the Serra Museum and historic Presidio San Diego. Grid 18 is narrow, with long transects, a shape chose to follow the planned path construction in this area. It ends a few meters southwest of a water line access point where multiple large pipes come together. This nexus for the water pipe system was exposed at the time of survey.

Planar features (red outline)) of potential archaeological interest are evident in Grid 18, though these may be of later origin, relating to landscaping horticulture. The planar feature in the center of the grid is most evident in the slice maps, and the one in the northeastern part of the grid is more evident in transect profiles such as file 506, shown below. A trench feature (orange outline) possibly filled with cobbles or other large clasts crossed the grid from north to south. These features could be related to historic structures, though no related artifacts were noted on the surface. It is worth noting that mineral soil is visible on this surface, and the features are not deep.




*Above: Grid 18 slice maps showing planar (red) and linear (orange) features.*

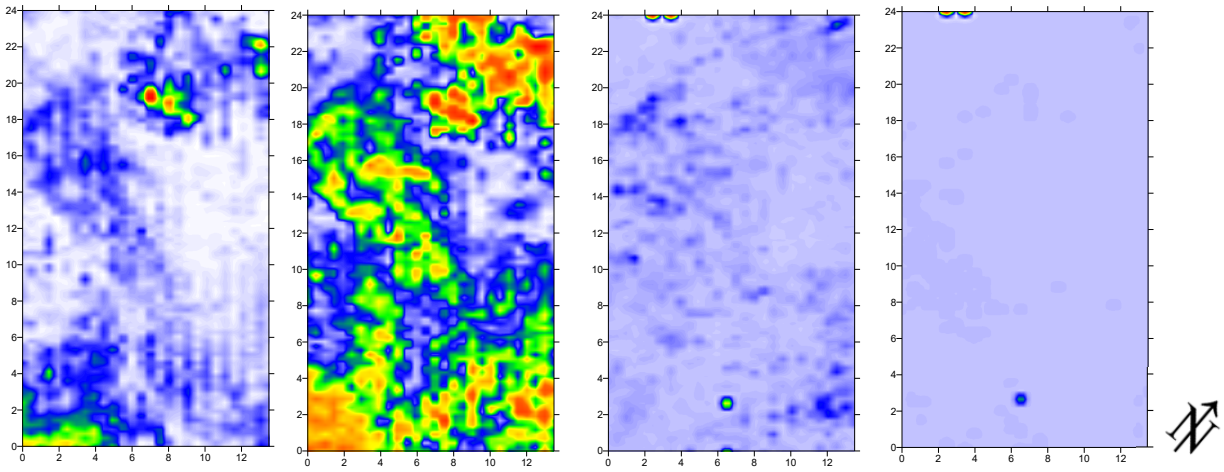


*Above: File 506 in Grid 18 shows possible cobble fill in a linear trench-like feature (marked by left arrow), and a distinct planar surface not seen in most grids (marked by arrow at right)*

## Grid 19

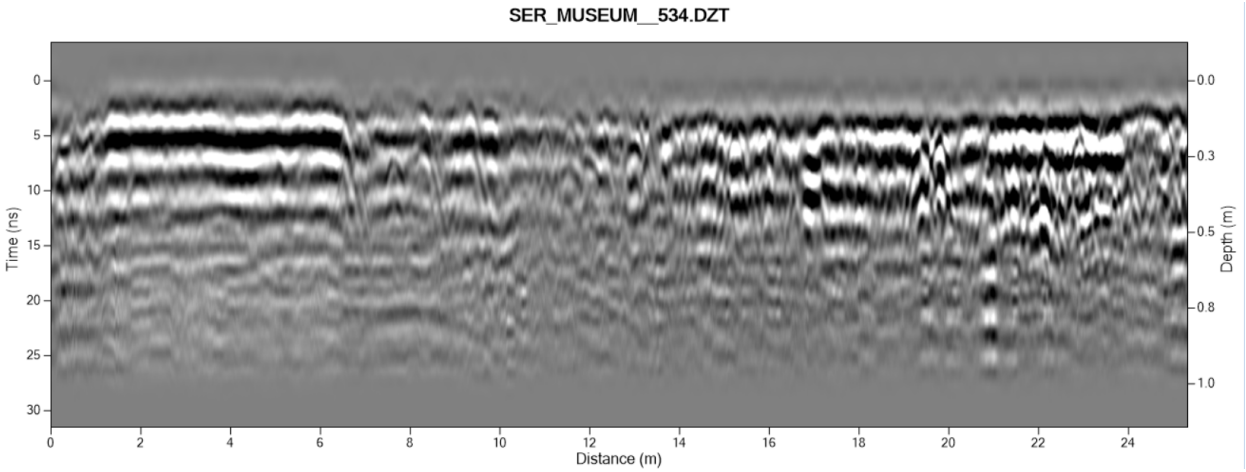
For grids 19-21 the dielectric is changed to 17.

Grid 19 shows a distinct stratigraphic change at roughly 25cm depth. This may be a more compact, buried surface, or the base of the root mass of grass. Given the groomed landscape of this portion of the park, it could be a distinction between prepared lawn soil and a subsoil. Pine needles are abundant in the southern portion of this grid.



10-22 cm | 22-44 m | 44-64cm | 64-90cm

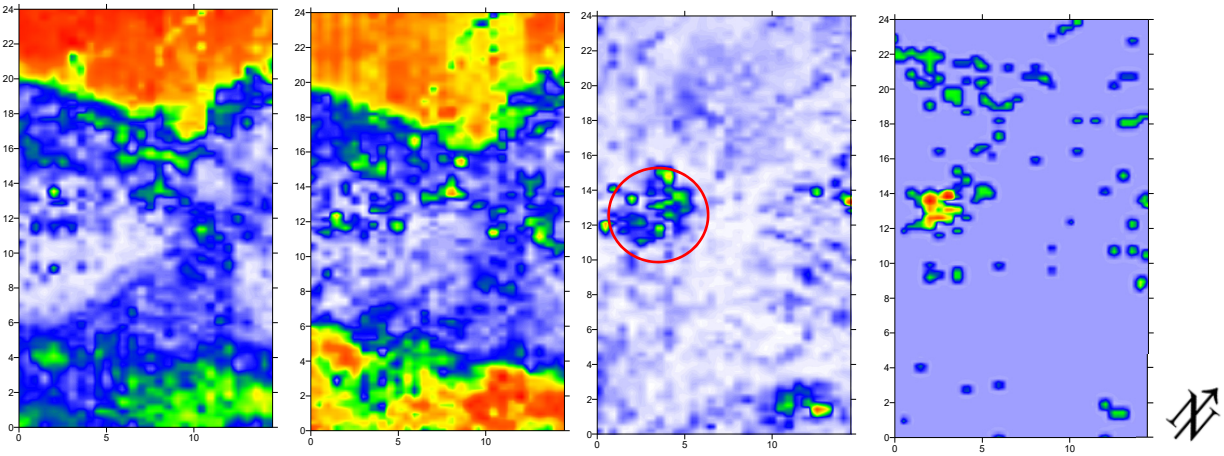
*Above: Slice maps for Grid 19. Slice 2 shows the varying extent of the planar phenomena in slice 2 that correspond to the stratigraphic change scene in transect profiles, at roughly 25-30 cm depth. Linear borders in these patterns suggest a cultural origin, but park landscaping may account for this.*




*Above: Profile 534 in Grid 19, facing east. The distinct stratigraphic transition appears at 15-20 cm, and may consist of a pavement of like sized objects such as bricks (especially in the south half of the grid). Note that pine needles are on the surface in this southern part of the grid, and the effects of this material on radar data are not known for this setting. The stratum transition a the left (north) is more continuous, from 1-7 meters in this profile.*

## Grid 20

Dielectric changed to 12, as this grid is more uphill than grid 19, so only partially in the watered lawn area. A tree accounts for the cluster of high amplitude reflections at 14 meters in the western (left) side of the grid, most evident in slices 3 and 4.



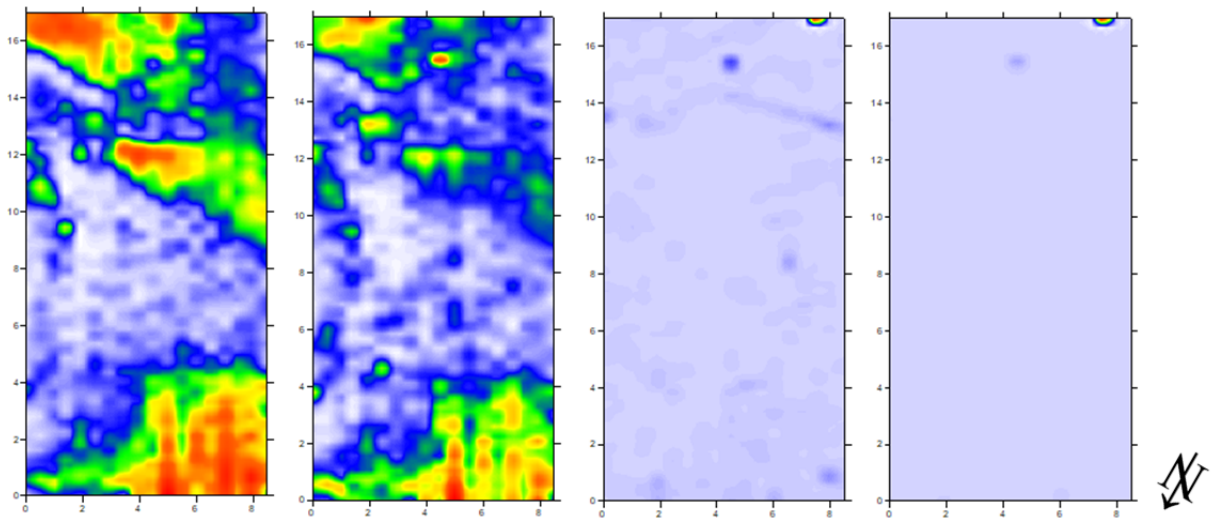
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 for Grid 20. Roots of large tree circled in red. The high amplitude stratum change in the north likely relates to the transition to dryer, rocky soil on the slope in this area,*

*while the higher amplitude stratum in the south likely relates to the base of the lawn soil, root mass and irrigation.*

## Grid 21

Rectilinear planar feature in the southeast corner appears to be reinforced concrete or brick pavement, or other regularly patterned, planar feature. Approximately 30 cm in depth, and based on slice maps it is at least 4 meters square, extending to the margins of the grid in the east and south. The planar features in the northern half of the grid are at an oblique angle, and may consist of material more smooth in texture, such as compacted gravel, as they appear in slice 1. If any of these features is part of a building, there are no indications of deeper perimeter foundations. They may be slabs, gravel pads, or paving of some kind. They may simply be different types of horizontally spread fill, though the southeastern feature appears to hold patterned elements.



10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 (representing 2-22 nanoseconds or 0-90 cm depth) for Grid 21. Scale in meters*

## Non-Grid Transects

The area between Grid 11 and Grid 20 was not surveyed with grids because its southern half is brush covered and slopes steeply, while its northern half is in the vicinity of a large and active bee hive. Individual transects were run across this area, and nothing of potential significance was noted in these.

Transects were also run north of Grid 6 and east of Grid 17, where the existing groomed path leads to the museum. A single feature was observed on the surface in this path, consisting of a gravel concentration that appears to have depth. This may be a filled drain field of some kind, and the standard gravel on the surface suggests a modern quarry origin, in contrast with the mixed sized gravel and cobbles common through much of the project area.

## Summary of Findings

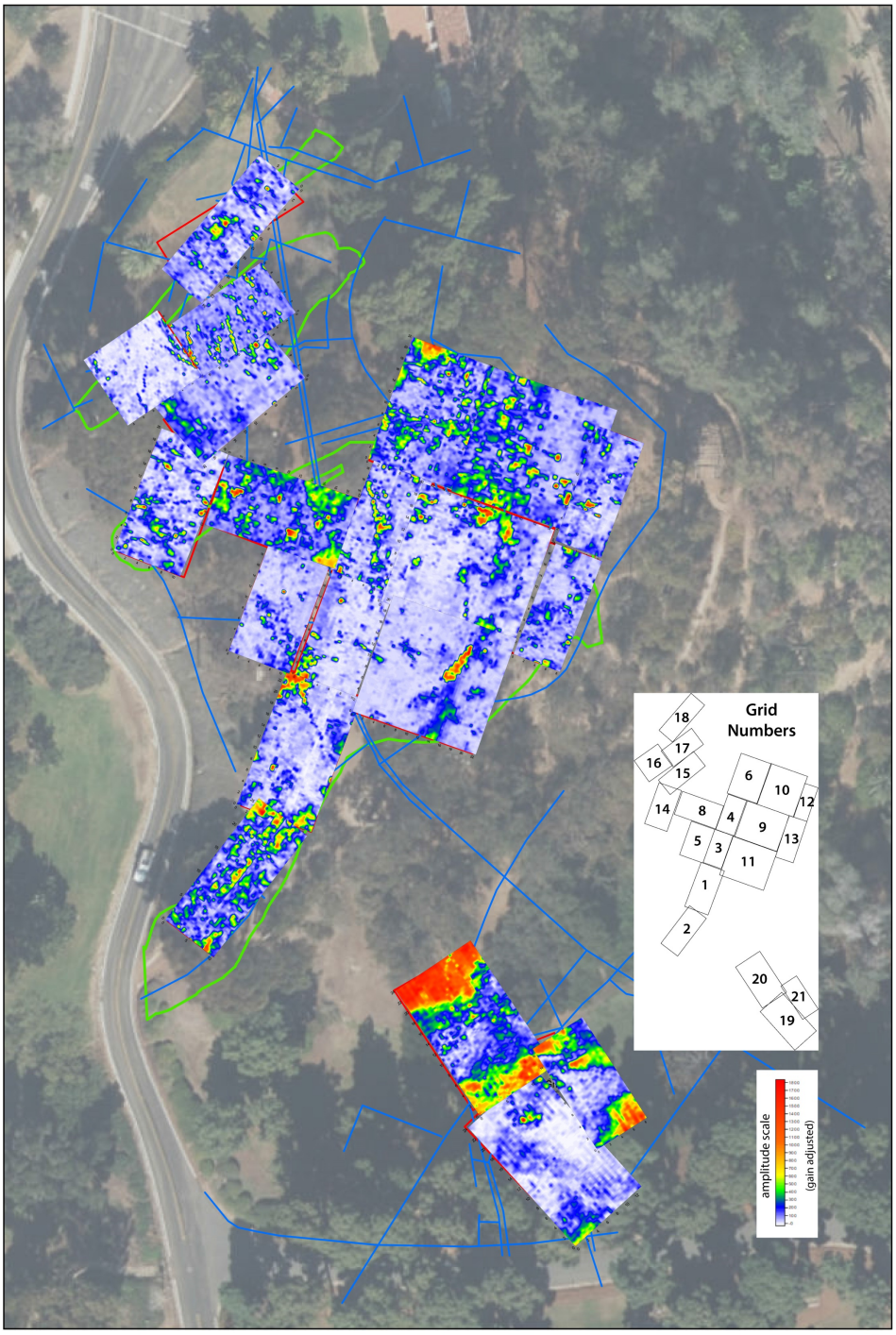
Most linear features appear to be utility pipes or related trenches. Curvilinear parallel lines in Grid 4 may be a bordered path or ruts from a vehicle or wagon track. Ditch-like pathways or channelization were noted in Grid 1 and possibly Grid 11. Planar features primarily in Grids 19-21 may relate to park landscaping. The planar feature in the northeast portion of Grid 18 is not explained, but its proximity to irrigation facilities suggest it may be garden related. Concrete on the surface relates to patterns in portions of Grid 8 and Grid 10, and is not treated further in this discussion due to its modern origin. Clusters of high amplitude nodes are often associated with tree roots. Concentrations of metal artifacts appear to be present in Grid 6.

## References Cited

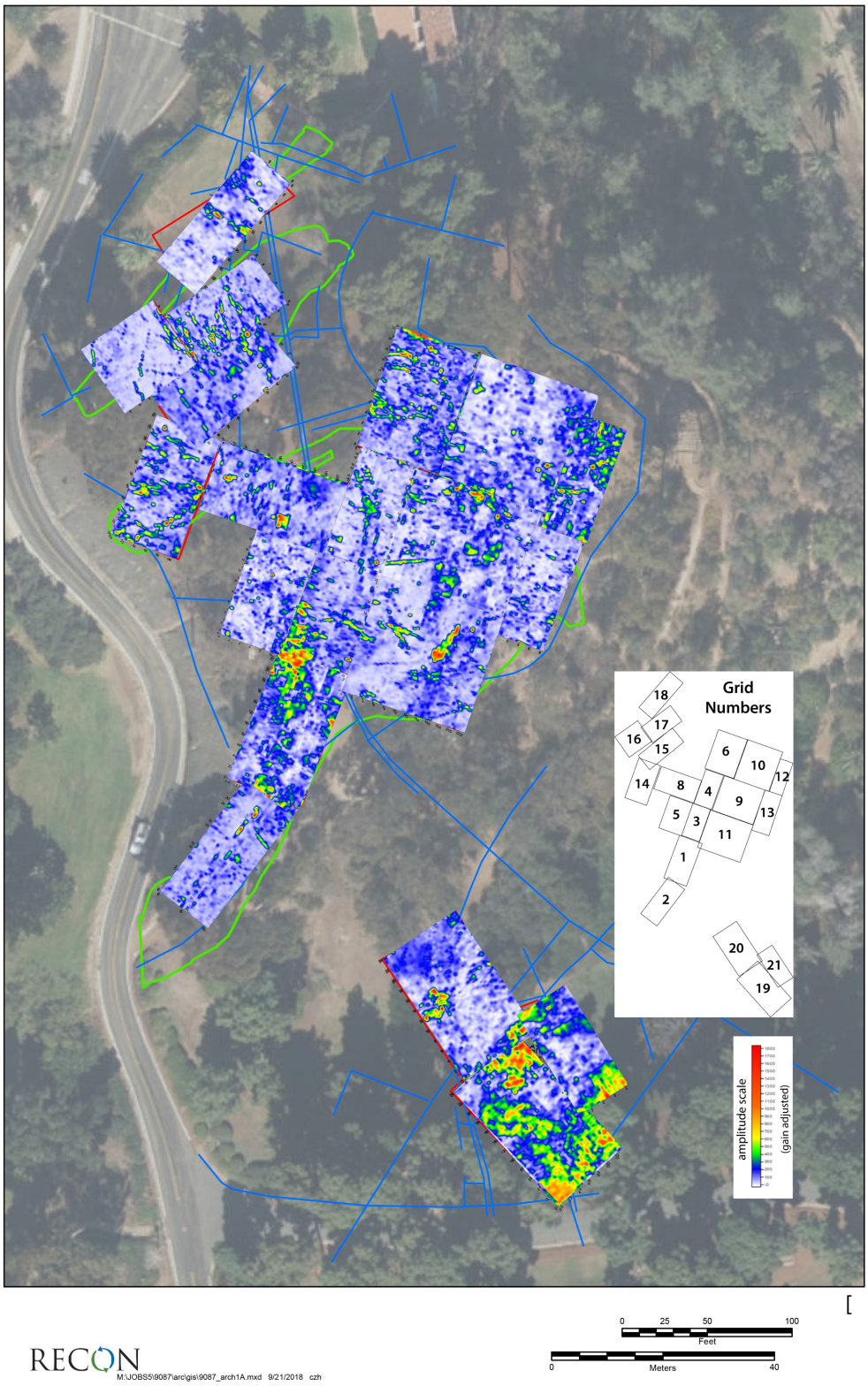
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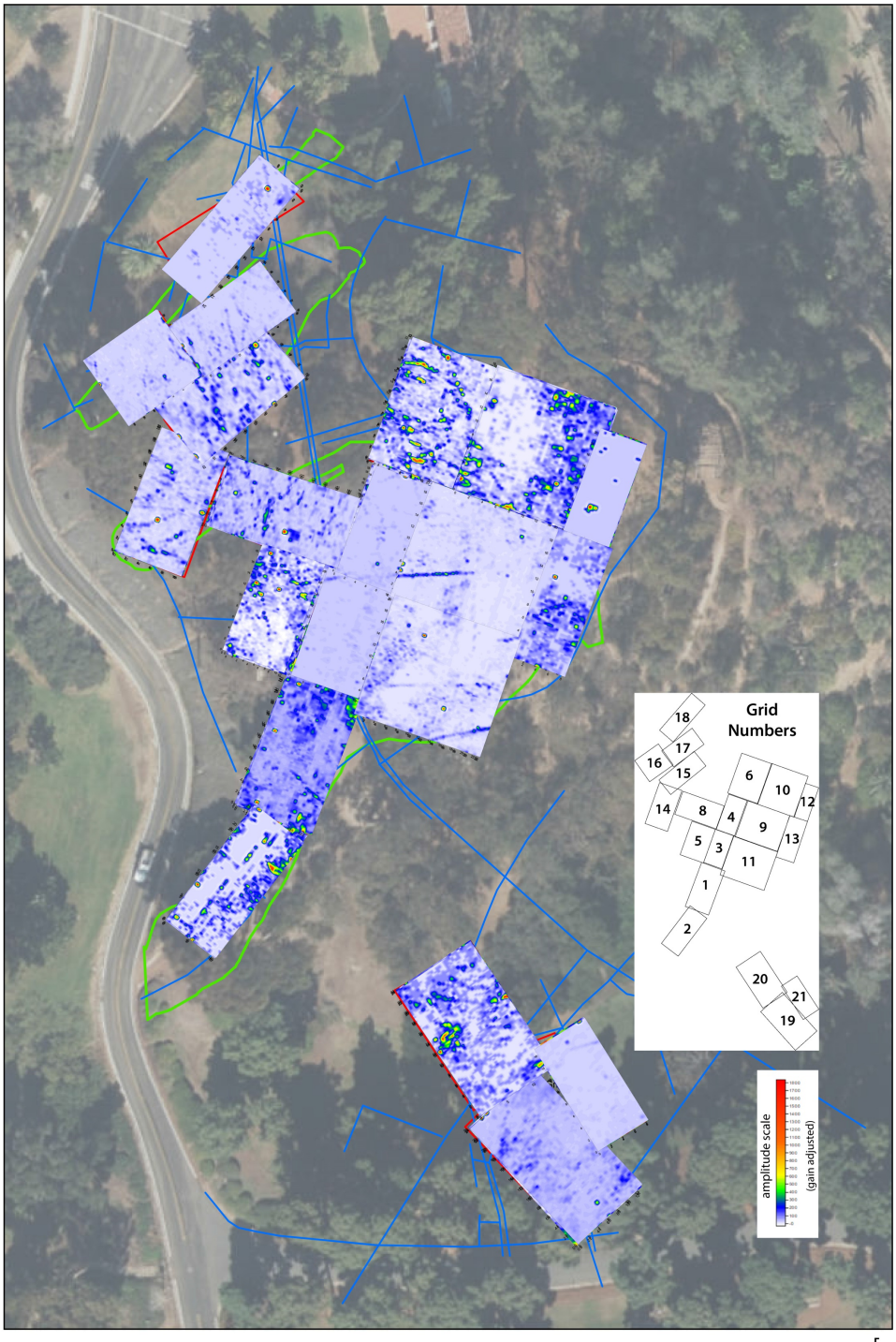
Sunseri, Kojun, and Scott Byram
2017 Site Interiography and Geophysical Scanning: Interpreting the Texture and Form of Archaeological Deposits with Ground-Penetrating Radar. *Journal of Archaeological Method and Theory*. 24(4):1400–1424, 2017. On line at http://rdcu.be/pwM5




*Above: Composite of shallow slice maps for all 21 grids.*




*Above: Composite of middle-depth slice maps for all 21 grids.*




*Above: Composite of deep slice maps for all 21 grids.*

# ATTACHMENT 2

## Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements

# Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements San Diego, California

**(WBS#2-150434.02.02)**

*Prepared for*
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Engineering & Capital Projects
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RECON Number 9087
November 13, 2020

Jeffrey A. Homburg, Ph.D., Geoarchaeologist

Carmen Zepeda-Herman, Principal Investigator

**NATIONAL ARCHAEOLOGICAL DATA BASE INFORMATION**

| | |
|---|---|
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| Consulting Firm: | RECON Environmental, Inc.<br>3111 Camino del Rio North, Suite 600<br>San Diego, CA 92108-5726 |
| Report Date: | November 13, 2020 |
| Report Title: | Geoarchaeological Assessment for the Junípero Serra Museum ADA Improvements, San Diego, California |
| Submitted to: | Gretchen Eichar<br>City of San Diego<br>Engineering & Capital Projects<br>525 B Street, Suite 750, MS 980A<br>San Diego, CA 92101 |
| USGS Quadrangle Map: | 7.5 minute, La Jolla 1967 (1975) |
| Keywords: | Geoarchaeological assessment, soil cores, GPR anomalies, P-37-000038/CA-SDI-38, Presidio |

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2: Correspondence from Native American Heritage Commission
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## CONFIDENTIAL ATTACHMENTS

1: Record Search Results
2: Site Form

# Acronyms

| | |
|---|---|
| ADA | Americans with Disabilities Act |
| AMSL | above mean sea level |
| APE | area of potential effect |
| CCR | California Code of Regulations |
| CEQA | California Environmental Quality Act |
| City | City of San Diego |
| cm | centimeter |
| CRHR | California Register of Historical Resources |
| GPR | ground-penetrating radar |
| GPS | global positioning system |
| I-8 | Interstate 8 |
| MMRP | mitigation, monitoring, and reporting program |
| NAHC | Native American Heritage Commission |
| NRHP | National Register of Historic Places |
| SCIC | South Coast Information Center |
| USDA | U.S. Department of Agriculture |
| USGS | United States Geological Survey |
| WPA | Works Progress Administration |

# 1.0 Management Summary

This report presents the results of geoarchaeological testing for the Junípero Serra Museum Americans with Disabilities Act (ADA) Improvements project (project). The City of San Diego (City) proposes to provide a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 24-foot-wide driveway constructed between Presidio Drive and the new parking lot.

The project is located within Presidio Park (P-37-000038/CA-SDI-38), an area with both prehistoric and historic uses. The archaeological remains are listed as California Historical Landmark and on the National Register of Historic Places under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. Because of this significant resource, a testing program was developed to guide design plans to minimize direct impacts to significant cultural deposits and features. The testing plan consisted of twenty 2.5-inch diameter cores (Cores 1 to 20) with the project area and an alternative driveway connecting to Cosoy Way. Their locations were chosen based on the results of ground-penetrating radar that was conducted during the survey phase of the project.

The goal was to investigate the project area and the alternative driveway. Locations for cores were selected in spots where possible cultural features were identified by the ground-penetrating radar (GPR) results, as well as three landscape positions including summits, shoulders, and backslopes. Core depths varied depending on the depth of sandstone bedrock, or presence of cobbles or tree roots that impeded or blocked a core from being extracted. The drilling of each core was directed by a geoarchaeologist with assistance from an archaeological monitor. A Native American monitor was also present. Once at the laboratory, the core samples were analyzed for the presence of cultural remains. Various soil properties were recorded for each core in order to interpret stratigraphic integrity and buried site potential.

No artifacts or cultural features were found in the core samples. The soil stratigraphy retains good integrity with minimal bioturbation. Based on a buried site model described below, soils within the area of potential effect (APE) have a low potential for buried or subsurface cultural deposits. The soil stratigraphy on the knoll indicates that sandstone bedrock is usually within a meter of the surface. If the APE was used in prehistory or during the occupation of the Presidio, there is no clear indication of that. If artifacts are present in sparse densities, they would have to be limited to the surface, unless moved downward by animal burrowing or some other type of disturbance. Isolated artifacts would not be considered significant cultural resources. Therefore, the proposed project will not result in a significant impact to known cultural resources.

As noted above, cultural features were not identified with the core samples. If features are present as suggested by the GPR survey, they could represent significant cultural resources that may yield information about past prehistoric or historic uses. Because of the potential

of unknown cultural features and the archaeological and historic significance of the San Diego Presidio and its proximity to the APE, combined with its importance as a tribal cultural resource for Native Americans, the proposed project has the potential to impact unknown (buried) significant cultural resources. Therefore, RECON recommends the presence of qualified archaeological and Native American monitors during earth-moving activities, particularly near cores #7, 11, and 14.

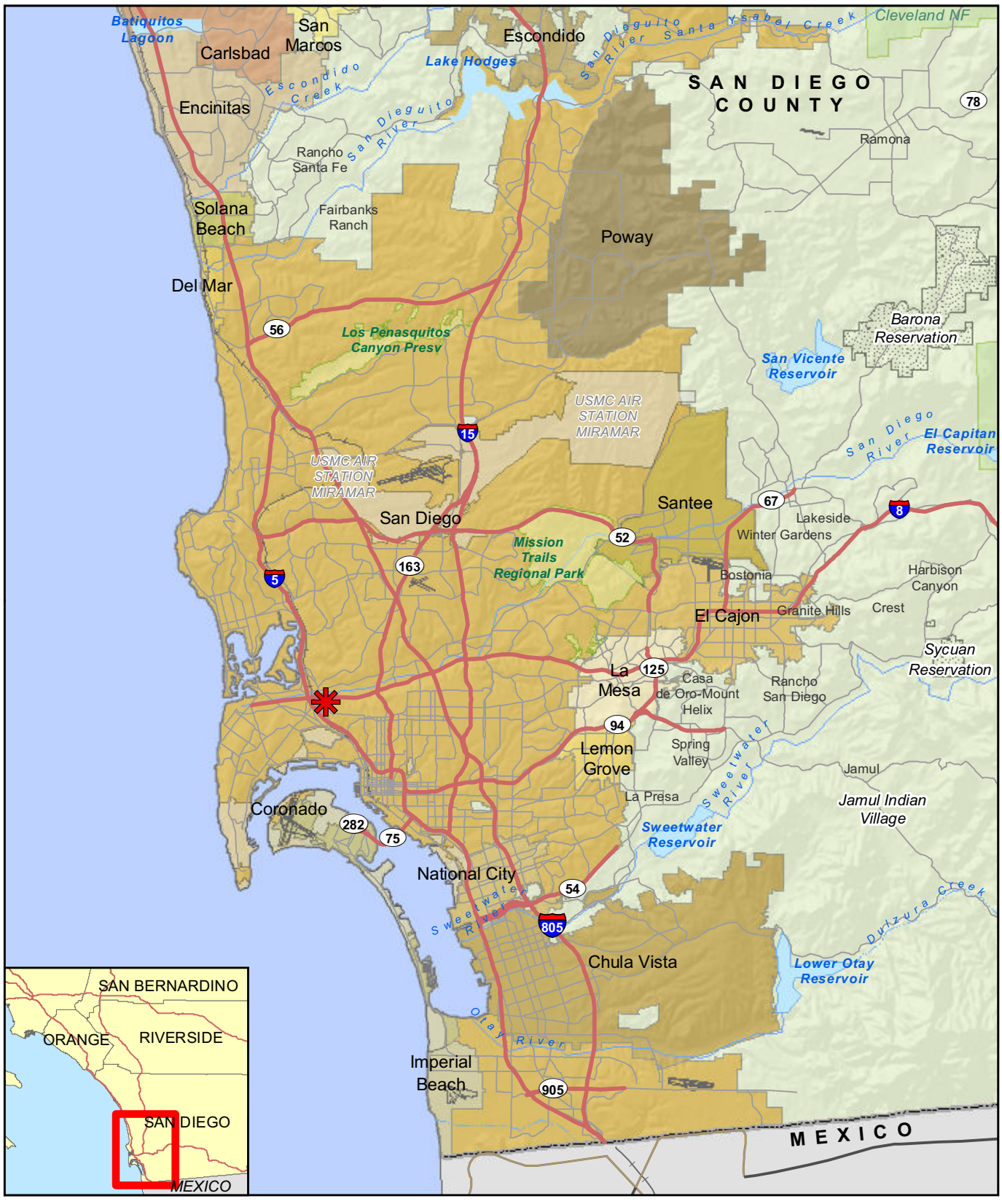
Research files and documents associated with this study are on file at the RECON offices under Job Number 9087.

# 2.0 Introduction

## 2.1 Project Description

This report presents the results of geoarchaeological testing for the Junípero Serra Museum Americans with Disabilities Act (ADA) Improvements project. The City of San Diego (City) proposes to provide ADA improvements at the Junípero Serra Museum (project). The project area occurs within the City-owned Presidio Park, which includes the Junípero Serra Museum. It lies south of Interstate 8 (I-8) and just south of Taylor Street, northeast of Old Town San Diego State Historic Park (Figure 1). The project area is shown on the U.S. Geological Survey (USGS) 7.5-minute topographic map series, Point Loma and La Jolla quadrangles, within an unsectioned portion of the Pueblo Lands of San Diego Land Grant (Figure 2; USGS 1994 and 1996). The proposed project area includes the Junípero Serra Museum and extends south to Cosoy Way. It is bounded on the west by a north-south portion of Presidio Drive and on the east by Palm Canyon in the eastern part of Presidio Park (Figure 3).

The key project features include a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 24-foot-wide driveway, constructed between Presidio Drive and the new parking lot. The new parking lot would have 9 total spaces, including 5 ADA spaces and 4 non-ADA spaces. Other project features include a green waste area for maintenance, storm water and drainage improvements, and lighting. The storm water improvements would include a lined bioretention basin approximately 600 square feet of which would discharge to an existing rock swale located adjacent to Presidio Drive. The proposed project would impact a total area of approximately 1.37 acres. Excavation would include a total of approximately 4,000 cubic yards and have maximum depths of 10 feet for the new parking lot and 5 feet for the new ADA compliant path. The total net new impermeable area would be approximately 23,000 square feet (Figure 4). The project will be completed in accordance with the Secretary of the Interior's Standards for Rehabilitation.



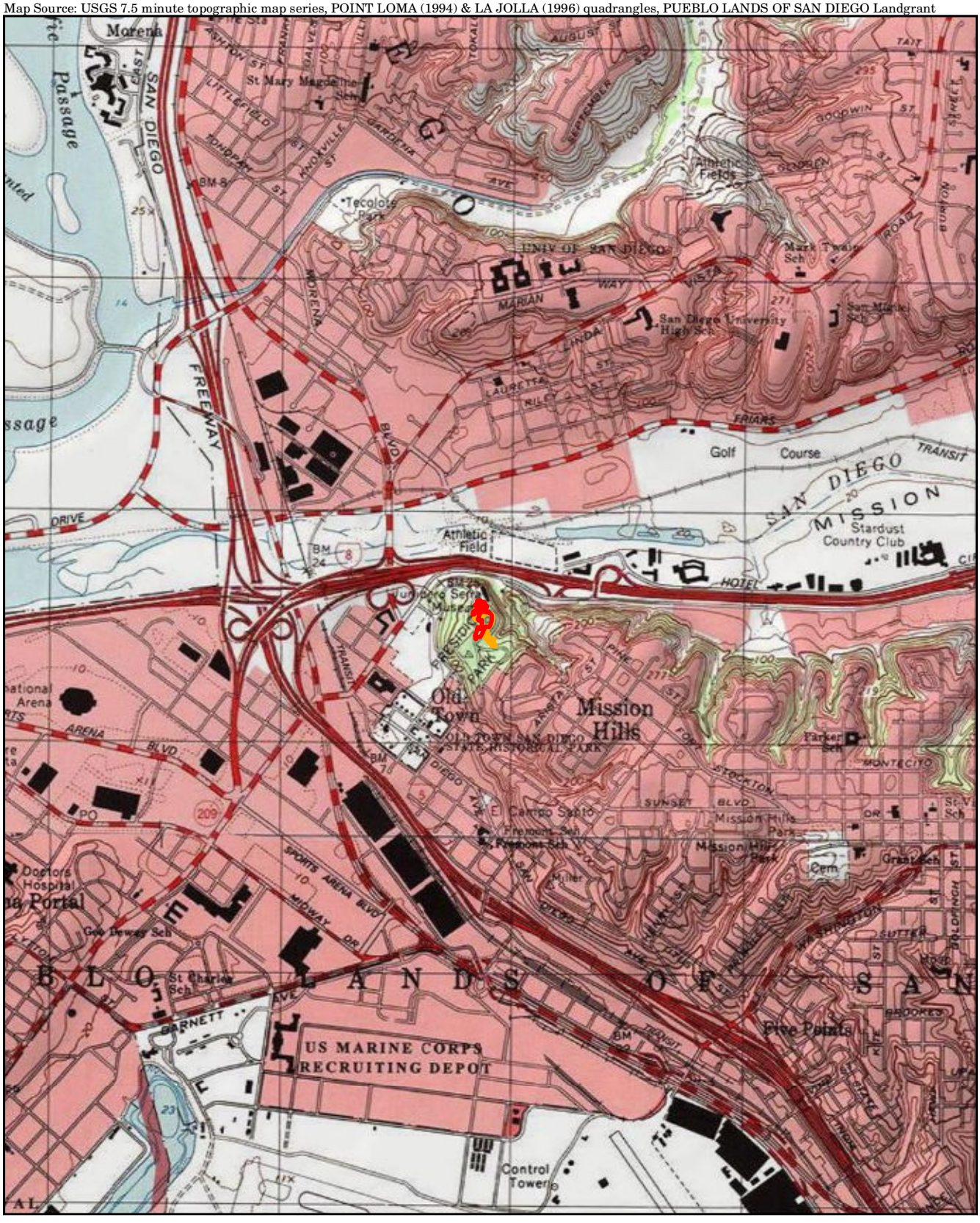

Project Location

# FIGURE 1
## Regional Location

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Map Source: USGS 7.5 minute topographic map series, POINT LOMA (1994) & LA JOLLA (1996) quadrangles, PUEBLO LANDS OF SAN DIEGO Landgrant




Project Boundary

Driveway Alternative

FIGURE 2

Project Location on USGS Map

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Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 210-1701




FIGURE 3

Project Location on City 800' Map

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Image Source: Nearmap (flown February 2019)

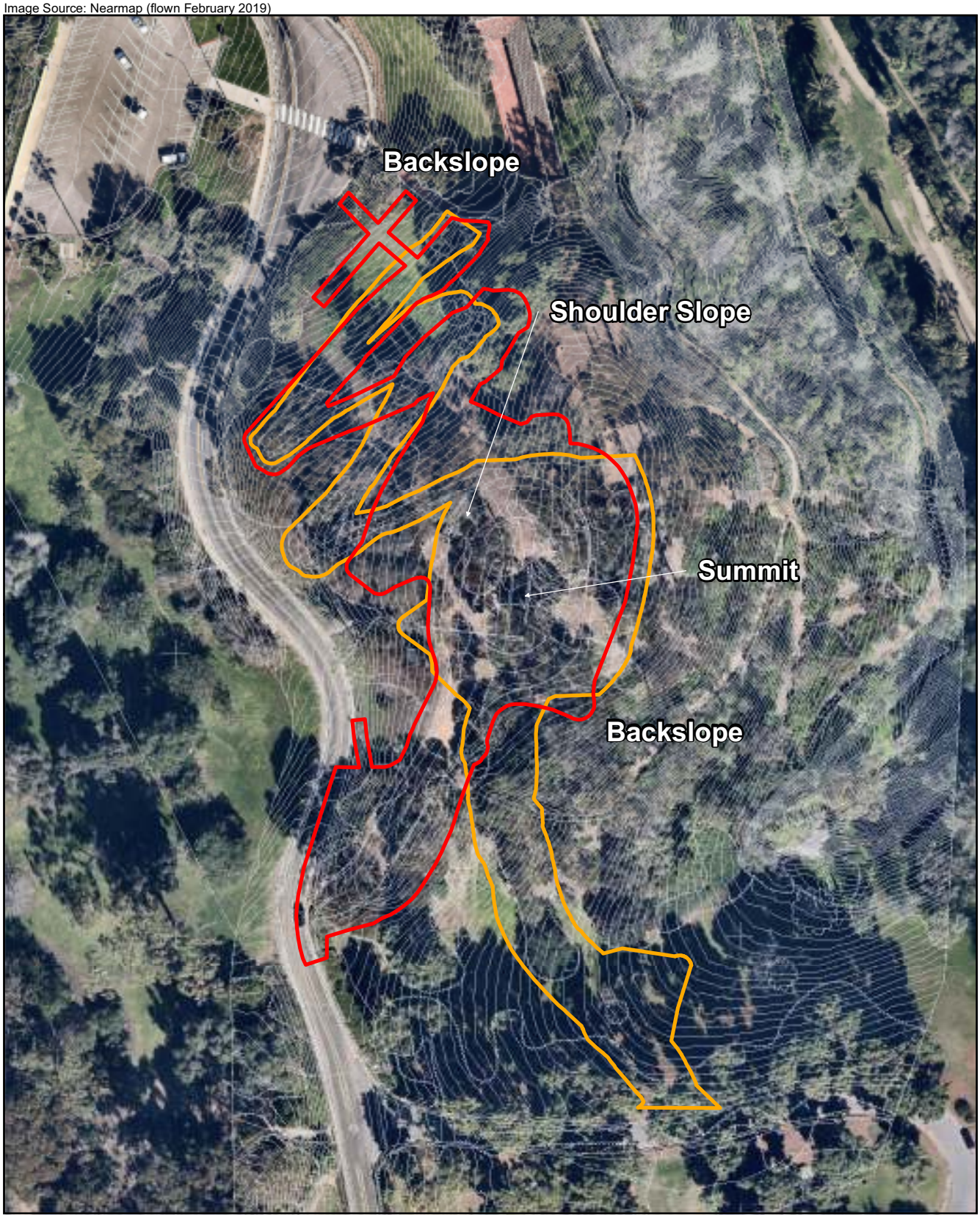



FIGURE 4

Topographic Map of Project Location

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## 2.2 Project Personnel

This report was prepared in compliance with the California Environmental Quality Act (CEQA) and with policies and procedures of the City of San Diego. The following individuals participated in the field tasks or preparation of this report. The Native American monitor was from Red Tail Environmental. Resumes for key personnel are on file with the City of San Diego.

| | |
|---|---|
| Principal Investigator | Carmen Zepeda–Herman, M.A. |
| Geoarchaeologist | Jeffrey A. Homburg, Ph.D. |
| GPR Consultant | Scott Byram |
| Field Archaeologist/Monitor | Harry Price |
| Native American representative | Dennis "Bobo" Linton |
| GIS Specialist | Benjamin Arp |
| Production Specialist | Stacey Higgins |

Ms. Carmen Zepeda-Herman earned a master of arts degree in Anthropology from San Diego State University and is a Registered Professional Archaeologist. She has over 18 years of field experience involving prehistoric resources in the southern California region. She qualifies as a Principal Investigator per the City of San Diego guidelines (City of San Diego 2001). Dr. Jeffrey Homburg holds a master of arts degree in Anthropology from Louisiana State University, earned a doctorate in Soil Science (Pedology) from Iowa State University, and is a Registered Professional Archaeologist. Dr. Homburg performed soil analysis and co-authored this results report.

## 2.3 Acknowledgements

Dr. Homburg would like to acknowledge the people listed below who helped him at the San Diego History Center collect various photographs and maps.

Bill Lawrence, Executive Director
Christina Homburg, Scientific Illustrator
Chris Travers, Senior Archivist Photo Collection
Renato Rodriguez, Archivist
Natalie Fiocre, Image Technician
Carol Myers, Photo Archivist
Tammie Bennett, Registrar
Kaytie Johnson, Bruce Kamerling Curator
Tatiana Zhdanova-Anderson, Visitor Engagement Associate at the Junípero Serra Museum

# 3.0 Setting

## 3.1 Natural Setting and Historic Changes

The proposed ADA parking lot for the project is on a prominent knoll south of the Junípero Serra Museum. The property has a commanding view of the San Diego River, Mission Bay, and many parts of San Diego. The San Diego River is located immediately north of the project area and has served as a reliable source of fresh water for millennia. It has also served as a thoroughfare throughout prehistory and history for the movement of people and animals between the coast and interior mountains and hills. The potential for intact cultural deposits is possible in many locations along the San Diego river valley (now known as Mission Valley).

The property is surrounded by residential and business developments with a golf course to the west. The knoll top, the ridge the knoll sits on, and the adjacent hill slopes contain both native and non-native vegetation. Within the survey area are foot paths, road tracks, concrete pads for picnic tables, maintained lawns, trees planted for Presidio Park, and landscaping. A channelized drainage runs south to north along the east side of the survey area and drains into a storm drain to the north on Taylor Street. Elevation in the area of potential effects (APE) for the proposed parking lot, driveway, and access ramp ranges from 138.5 to 180 feet (approximately 43-55 meters) above mean sea level (AMSL). The lowest point is in the sloping swale at the southeast end of the APE and the highest point is the knoll where the parking lot is proposed. Prior to planting of the thick eucalyptus grove in the APE, the hilltop would have a panoramic view of the San Diego River and Mission Valley to the north and Mission Bay to the west.

European explorer Juan Rodriguez Cabrillo named the area now called Mission Bay "False Bay" because he and other explorers thought it was the entrance into San Diego Bay. Prior to historic dredging between 1946 and 1962, Mission Bay was a tidal marsh under natural conditions. In prehistory, Mission Bay likely shifted episodically between a lagoon, estuary, or tidal marsh due to natural shifts at the terminus of the San Diego River. Mission Bay was one of two original natural outlets of the San Diego River, the other being San Diego Bay.

Led by George Derby, the U.S. Army Corps of Engineers constructed a levee in 1855 to divert the San Diego River to permanently discharge into Mission Bay (then called False Bay) (Herron 1986; Wiegel 1994) to prevent sediment from infilling San Diego Bay. This levee was rebuilt in 1875 and again in 1885 after it was washed out by flooding (Wiegel 1994). The mouth of the San Diego River is closed by littoral drift during extreme rainfall and runoff events. A lowered weir was constructed into the middle jetty to allow potential floodwaters to discharge through both the river channel and the entrance to the bay (Griggs et al. 2005). The San Diego River has a watershed of about 435 square miles (Minan 2004). Historically, the San Diego River contributed an average of 71,900 cubic yards per year of sand to Mission Bay, but dams built upstream on the river have reduced the sediment yield in modern times to about 6,600 cubic yards per year of sand (Willis et al. 2002).

### 3.1.1 Geologic Context

The project area is in the coastal portion of the Peninsular Ranges Geomorphic Province, a region characterized by northwest-trending structural blocks and intervening fault zones. The Province extends over more than 900 miles from the Los Angeles Basin to the southern tip of Baja California, and it varies in width from about 30 to 100 miles. Bedrock units in the Peninsular Ranges Province include Jurassic (approximately 144-206 million years old), metavolcanic and metasedimentary rocks, and Cretaceous (approximately 65 to 144 million years old) igneous rocks of the Southern California Batholith, a large intrusive igneous body. The coastal portion of the Province in San Diego County typically has a sequence of Upper Cretaceous, Tertiary (approximately 2 to 65 million years old), and Quaternary (less than approximately 2 million years old) marine and non-marine sedimentary strata that form a dissected coastal plain, with old paralic deposits (late to middle Pleistocene).

The project area falls in the coastal plain portion of San Diego County (Griner and Pryde 1976), a coastal strip that is a 130 kilometers (80.75 miles) long by 5 to 15 kilometers (3 to 5 miles) wide between the Peninsular Ranges and the Pacific Ocean (Weber 1963). About 4 kilometers (2.5 miles) north of the project area, the Rose Canyon drainage has entrenched a narrow canyon along the Rose Canyon Fault. No standardized nomenclature exists for the lower (80 to 120 thousand years ago) marine terraces in the San Diego area, but they are commonly referred to as the Bird Rock and Nestor terraces, respectively (Kern and Rockwell 1992). Bay Point deposits consist of a lower nearshore marine sub-unit and an overlying alluvial or eolian sub-unit. However, as noted by Lajoie et al. (1979), the complex set of deposits that characterize the Bay Point Formation makes it difficult to divide it into uniform, laterally traceable sub-units. Non-marine alluvial Bay Point Formation deposits have also been mapped as river terraces that represent relict late Pleistocene floodplain alluvium (Weber 1982).

Rose Canyon cuts into a Quaternary marine terrace known as the Nestor terrace, a prominent wave-cut platform that rises 20 to 23 meters (65 to 75 feet) AMSL just inland from the modern coast (Kennedy and Peterson 1979). The Nestor terrace surface is directly underlain by poorly consolidated fossiliferous sandstones of the late to middle Pleistocene Bay Point Formation (Kennedy and Peterson 1979). The Bay Point Formation (now referred to as Old Paralic deposits) is a near-shore marine and non-marine (talus and slopewash) sedimentary deposit composed of poorly cemented, light brown sandstone that was deposited on currently-raised wave-cut platforms. The lithology consists mainly of fine- to medium-grained, silty and clayey sand that is occasionally interbedded with sandy clay. It has a maximum thickness of 100 feet or more and it dates to approximately 0.13 to 0.08 million years old (Kennedy and Peterson 1979; Kennedy and Tan 2007; Tan and Kennedy 1996). The Bay Point Formation is exposed along the San Diego waterfront and the mouths of major river valleys (e.g., San Diego River, Soledad Valley, Peñasquitos Canyon, Carmel Valley, and San Dieguito Valley), shores of Mission Bay and San Diego Bay, and throughout the city of Coronado.

Studies of late Pleistocene and Holocene landscape evolution for coastal drainages in southern California indicate three major geologic events have taken place over the last

24,000 years (Waters et al. 1999; Shlemon 1992; Masters 1994). The first involved the deep entrenchment of coastal drainages between 24 and 18 thousand years ago in response to a global drop in sea level of at least 120 meters (393 feet) below present levels (Fairbanks 1989; Masters 1988; Muhs et al. 2003). Most coastal drainages adjusted to this lowered base level by deeply incising their valleys and prograding onto the exposed continental shelf. The second event began after 18 thousand years ago when the formerly incised valleys began to fill in with sediment that aggraded in response to late-glacial sea level rise. By approximately 8 thousand years ago, sea level had risen to within 16 meters (53 feet) of its modern position. Sea level continued to steadily rise through the middle to late Holocene until approximately 5 thousand years ago. Between 5 and 3 thousand years ago, sea levels rose more rapidly and the rate of sediment deposition increased along coastal streams. After 3 thousand years ago, sea level rise slowed dramatically until it reached its present position. The final major geologic event occurred approximately 500 years ago when coastal streams incised their floodplains, thereby creating a low terrace (Waters et al. 1999). Formation of this low terrace was followed by a brief period of aggradation and then a second pulse of stream incision took place to form a second low terrace. Although heavily disturbed by construction of I-8 and other developments, areas immediately north of the project along former courses of the San Diego River would have had these two late Holocene terraces. The episodes of channel incision were most likely caused by increased precipitation associated with El Niño-Southern Oscillation events over the last 500 years. A period of major flooding has been recorded in other areas of California around this time (Schimmelmann et al. 1998; Malamud-Roam et al. 2006).

The APE lies in the Lindavista Formation, a Quaternary deposit located just west of a fault known as the Old Town Fault (Figure 5). Geologic units in Presidio Park consist mainly of the Lindavista and Mission Valley formations. The Pomerado Conglomerate, San Diego Formation, and Bay Point Formation are also represented, but in fewer outcrops. The Lindavista and Mission Valley formations are exposed in road cuts and trails in the park. Much of Presidio Park was mapped by Kennedy (1975) as Bay Point Formation. Hart (2014) reassigned this geologic unit to the Lindavista Formation based on differences in grain size and color. Bay Point sediments are typically poorly sorted and have a higher fraction of silt and clay than the Lindavista Formation, which consists mostly of moderately well-cemented, very coarse, reddish-brown sandstone and minor amounts of cobbly conglomerate. According to Hart, the Rose Canyon Fault marks the northern edge of a graben (a depressed block of crust between two parallel fault lines marked by points A and B in Figure 5). Hart refers to this geologic feature as the Presidio Park Graben, bound by a fault exposed in a low cut for a hiking trail in the east-central part of the park. The southwest end of the graben below Jackson Street appears to have been disrupted by a landslide downslope and to the west of the Presidio (Hart 2014; see Figure 5). This is visible on steep slopes of Presidio Park and along road cuts and trails.

Image Source: Nearmap (flown February 2019)




**Geologic Types**

| | | |
|---|---|---|
| Qaf | Qya | Project Boundary |
| Qls | Tmv | Driveway Alternative |
| Qop6 | Tp | Graben Location (source: Hart 2014) |
| Qvop11 | Tsd | Presidio Park Parcels |

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FIGURE 5
Geologic Map of Project Location

Landforms in the APE can be divided into three slope elements for different landscape positions: summits, shoulder slopes, and backslopes (Figure 6). Summits and shoulder slopes are where the parking lot is proposed and backslopes are where the ADA path of travel and driveway alternatives are proposed. All three of these slope elements (plus the footslope and toeslope positions not in the APE) are listed in Table 1, with a summary of the types of geomorphic processes for each element and expectations for how these processes may affect cultural deposits, if present. Of the three slope elements in the project area, the summit and shoulder slope are the most likely to have intact, subsurface cultural deposits. Backslopes have steeper slopes, places where artifacts may be transported, and so they have a lower likelihood for having cultural deposits. It is possible; however, that prehistoric or historic period trash deposits could exist on backslopes.

**Table 1**
**Effects of Slope Position on Soil-Geomorphic Processes, Artifact Density, and Stratigraphic Integrity**

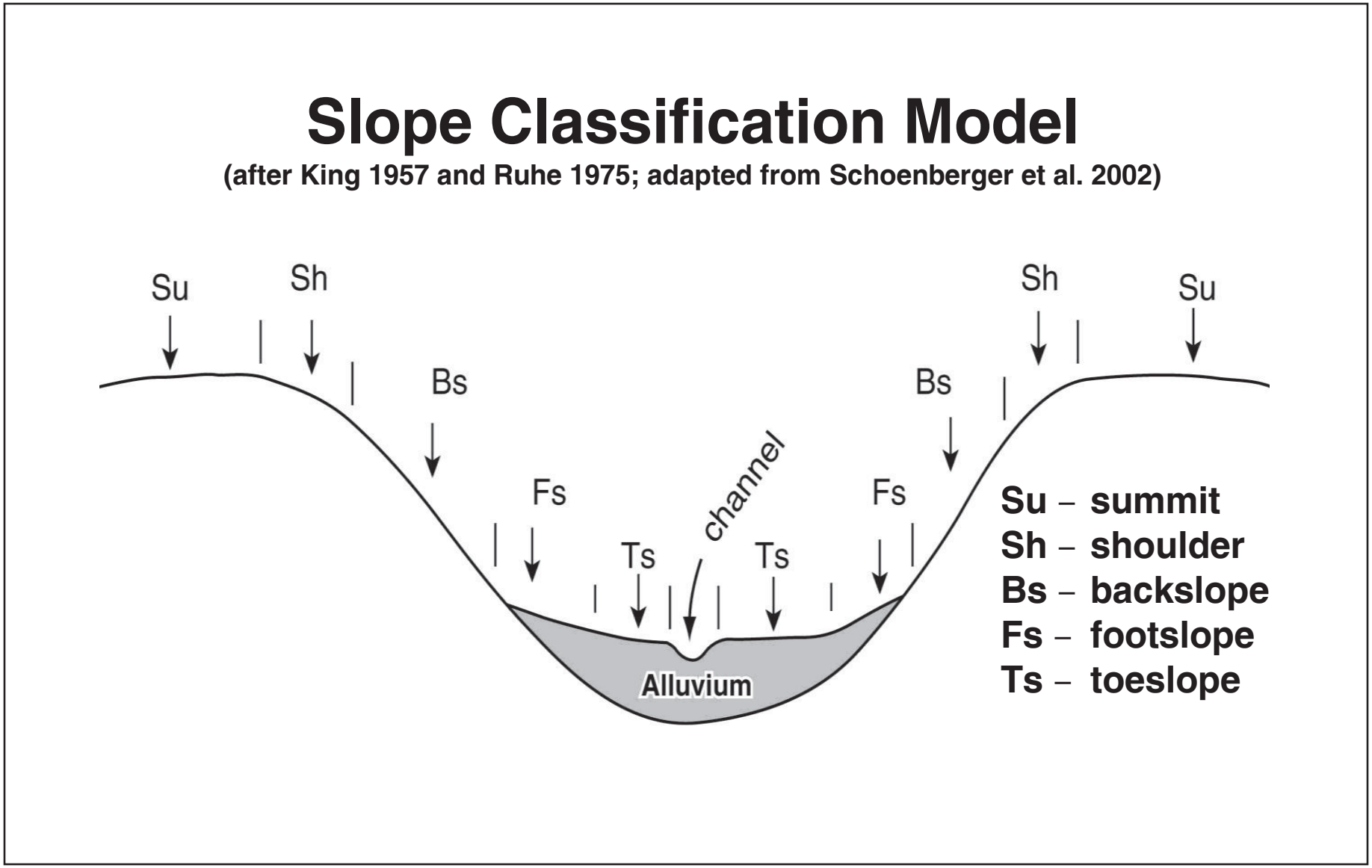
| Slope Element | Dominant Geomorphic Processes | Expected Artifact Density and Stratigraphic Integrity |
|---|---|---|
| Summit | Sheetwash erosion<br>Seepage<br>Pedogenesis | High artifact visibility<br>Patchy intact deposits<br>Artifacts concentrated on surface |
| Shoulder | Heavy sheetwash erosion<br>Soil creep | Moderate artifact density<br>Artifacts subject to erosion<br>Upper A horizon eroded |
| Backslope | Sediment transport<br>Mass movement by flow, slide, slump, and creep | Low artifact density<br>Artifacts subject to erosion and transport |
| Footslope | Colluvial deposition<br>Redeposition by mass movement and slopewash<br>Pedogenesis | Moderate to high artifact density<br>Artifacts subject to burial by colluvium<br>High stratigraphic integrity |
| Toeslope | Alluvial deposition | Low artifact density<br>Artifacts subject to burial by alluvium |

### 3.1.2 Soils

Gaviota and Olivenhain soil series are the only soils mapped in the APE (Figure 7). A third series (Tujunga) occurs outside to the north along the San Diego River (Bowman 1973). Detailed information on these and other soils in the San Diego area are presented in Attachment 1.

The Gaviota soil consists of brown gravelly loam with a shallow to very shallow lithic contact of hard sandstone bedrock. This soil is located on the ridge and hill slopes in the central and east portions of the APE. These soils areas are extensive, especially in the California Coastal Ranges. Natural vegetation includes California sage, chamise, manzanita, purple needlegrass, and miscellaneous annual grasses. They are very shallow or shallow, well drained, residual soils that formed in material weathered from sandstone or meta-sandstone. Gaviota soils are on hills and mountains and have slopes of 2 to 100 percent. These soils are classified in the U.S. Department of Agriculture (USDA) Soil Taxonomy as loamy, mixed, superactive, nonacid, and thermic Lithic Xerorthents. These

Map Source: Dr. Jeff Homburg, 2018




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FIGURE 6

Slope Elements for Different Landscape Positions

Image Source: Nearmap (flown February 2019)




**Soil Types**

- GaF Gaviota fine sandy loam, 30 to 50 percent slopes
- HuC Huerhuero-Urban land complex, 2 to 9 percent slopes
- OkE Olivenhain-Urban land complex, 9 to 30 percent slopes
- TeF Terrace escarpments
- TuB Tujunga sand, 0 to 5 percent slopes
- Rm Riverwash
- Ur Urban land

- Project Boundary
- Driveway Alternative
- Presidio Park Parcels

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# FIGURE 7

## Soil Map Units of Project Location

are in the Entisols soil order, which are characterized by weak development and relatively young age. Because of the moderate to steep slopes, they are subject to periodic erosion and exposure of the underlying bedrock. Soil horizons in a typical Gaviota soil are as follows:

(1) A1 horizon -- 0 to 6 inches (0-15 centimeter [cm]); brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; neutral (pH 7.0); clear smooth boundary.

(2) A2 horizon -- 6 to 10 inches (15-25 cm); brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; neutral (pH 6.8); abrupt wavy boundary.

(3) R -- 10 to 17+ inches (25-43+ cm); pale brown (10YR 6/3) hard meta-sandstone.

The Olivenhain soil consists of brown very cobbly loam over reddish-brown cobbly clay grading to pinkish-white cobbly loam. The Olivenhain soil is located mainly in the west part of the APE. The soil is moderately extensive in southern California. Natural vegetation consists of flattop buckwheat, wild oats, chamise, morning glory, filaree, soft chess, and cactus. This soil formed in Quaternary cobbly, dissected alluvial fan remnants of Pleistocene age. Olivenhain soils are classified in the USDA Soil Taxonomy as clayey-skeletal, kaolinitic, thermic Ultic Palexeralfs. These soils are in the Alisols soil order, a soil characterized by some leaching of soil bases (e.g., calcium, potassium, and magnesium) and the presence of an argillic horizon (a Bt horizon, a zone where clay translocated from above accumulates in the subsoil). Typically, the argillic horizon in Olivenhain soils are very cobbly or very gravelly clay with 35 to 60 percent rock fragments. The clay increase at the A-B horizon boundary is generally in the range of 15 to 25 percent (absolute change in clay percent, not a relative percent change). The argillic horizon is medium or strongly acid and has 60 to 75 percent base saturation. The C horizon is cobbly loam or clay loam and is medium or strongly acid. Soil horizons in a typical Olivenhain soil are as follows:

(1) A1 horizon -- 0 to 6 inches (0-15 cm); brown (7.5YR 4/4) very cobbly loam, dark reddish brown (5YR 3/4) moist; weak medium and fine granular structure; soft, friable, nonsticky, nonplastic; common medium, many very fine and fine roots; many fine and very fine interstitial, common fine tubular pores; 25 percent cobblestones; medium acid (pH 5.7); abrupt wavy and irregular boundary. (4 to 8 inches, 10 -20 cm thick)

(2) A2 horizon -- 6 to 10 inches (15-25 cm); reddish brown (5YR 4/4) very cobbly heavy loam, dark reddish brown (5YR 3/4) moist; weak and moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine, few medium roots; common fine interstitial and tubular pores; 25 percent cobblestones; medium acid (pH 5.6); abrupt wavy and irregular boundary. (4 to 6 inches, 10-15 cm thick)

(3) Bt1 horizon -- 10 to 19 inches (25-48 cm); reddish brown (5YR 4/4 dry and moist) very cobbly clay; reddish brown (2.5YR 4/4) mottles, dark reddish brown (2.5YR 3/4)

moist; moderate medium subangular blocky structure; very hard, firm, sticky, plastic; few medium fine and very fine roots; few very fine and fine tubular pores; common moderately thick clay films lining pores and on faces of peds and pebbles; 40 percent cobblestones; medium acid (pH 5.6); clear wavy and irregular boundary. (6 to 11 inches, 15-28 cm thick)

(4) Bt2 horizon -- 19 to 29 inches (48-74 cm); red (2.5YR 5/6) very cobbly clay, red (2.5YR 4/6) moist; yellowish red and reddish brown (5YR 5/6, 5/3) mottles, reddish brown and yellowish red (5YR 4/3, 4/6) moist; weak and moderate coarse subangular and angular blocky structure; very hard, firm, sticky, plastic; few fine and medium roots; few fine tubular pores; common thin and moderately thick clay films lining pores and on faces of peds and on pebbles and cobbles; 40 percent cobblestones; strongly acid (pH 5.4); clear wavy and irregular boundary. (7 to 12 inches, 18-30 cm thick)

(5) Bt3 -- 29 to 42 inches (74-107 cm); pink (5YR 8/3) very cobbly clay loam, light reddish brown (5YR 6/3) moist; pinkish white (7.5YR 8/2) mottles, pinkish gray (7.5YR 6/2) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few thin and moderately thick clay films on pebbles; 40 percent cobblestones; strongly acid (pH 5.3); clear wavy and irregular boundary. (8 to 18 inches, 20-46 cm thick)

(6) C1 horizon -- 42 to 68 inches (107-173 cm); pinkish white (7.5YR 8/2) cobbly loam, pinkish gray (7.5YR 6/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; 25 percent cobblestones; strongly acid (pH 5.1).

Tujunga soil series consists of stratified brown and pale brown sand, sandy loam, and loamy sand. These soils are from recent fan and stream alluvium from granitic sources. This is located just north of the project area on the floodplain and low terraces of the San Diego River. The APE does not include this soil series. Tujunga soils are classified in the USDA Soil Taxonomy as mixed, thermic Typic Xeropsamments. These soils are Entisols, recently developed soils that are not well developed, soils characterized by an A-C soil horizon sequence, due to episodic flooding and sedimentation (Bowman 1973).

### 3.1.3 Flora and Fauna

The APE is in the eucalyptus grove on the ridge south of the Junípero Serra Museum. These trees, planted in the 1930s after construction of the museum, include swamp gum (*Eucalyptus robusta*), swamp gum narrowleaf ironbark *(E. creba*), sugar gum (*E. cladocalyx*), ironbark (*E. sideroxylon*), leather-jacket (*E. punctate*; one of the largest trees in the grove), river red gum (*E. rostrata*), and bushy yate (*E. lehmanni*), and there are carob/St. Johnsbread trees (*Ceratonia siliqua*) in the southwest part of the grove. In contrast to the hilltop location of the APE, a dense riparian corridor would have occurred along the San Diego River, dominated by trees such as cottonwood, willow, and sycamore.

# 3.2 Cultural Setting

The prehistoric cultural sequence in San Diego County is generally described as comprising three basic periods: the Paleoindian, dated between about 11,500 and 8,500 years ago and manifested by the artifacts of the San Dieguito Complex; the Archaic, lasting from about 8,500 to 1,500 years ago (A.D. 500) and manifested by the cobble and core technology of the La Jollan Complex; and the Late Prehistoric, lasting from about 1,500 years ago to historic contact (i.e., A.D. 500 to 1769) and represented by the Cuyamaca Complex. This latest complex is marked by the appearance of ceramics, small arrow points, and cremation burial practices. It is important to note that Native American lifeways did not cease at European contact (i.e., 1769). Protohistoric refers to the chronological trend of continued Native American lifeways at the cusp of the recorded historic period in the Americas.

Mission Bay and San Diego Bay have archaeological evidence of continuous occupation from 8,000–10,000 years ago to historical-period contact. Subsistence patterns, particularly the procurement of different species, varied considerably over time and with location along the San Diego coastline. There is significant variability in resource procurement for different parts of the San Diego coastline. For example, shellfish use was highly situational; where sufficient data are available, with each drainage and portion of the coastline appearing to have had its own distinct history (Byrd and Reddy 1999; Reddy 1999). The exploitation of marine invertebrates was also highly variable and, like shellfish, reflected emphasis on different local habitats. For example, shellfish with soft substrates were emphasized along the shoreline of San Diego Bay, kelp beds and open ocean habitats near Mission Bay. Noah (1998) argues that there is a long tradition of fishing along the San Diego coast for more than 8,000 years. By contrast, a maritime adaptation—involving an emphasis on marine mammals and pelagic fish—characterized the Santa Barbara Channel area, but was not common anywhere along the San Diego coast.

## 3.2.1 Tribal Context

The Kumeyaay (also known as the Ipay/Tipay) have roots that extend thousands of years in San Diego County and northern Baja California. The pre-contact cultural sequences are locally characterized by the material culture recovered during archaeological investigations as early as the 1920s, and through early accounts of Native American life in San Diego, recorded as a means to salvage scientific knowledge of native lifeways. The best information of Native American lifeways, however, comes from the Kumeyaay themselves, from the stories and songs passed down through the generations, in their own words. According to ethnographies based on interviews with local tribal elders, there are hundreds of words that describe a given landform, showing a close connection with nature. There are also stories associated with the land. The San Diego area in general, including Old Town, the San Diego river valley and the City as it existed as late as the 1920s, was known as *qapai* (meaning uncertain). According to Kumeyaay elder Jane Dumas, some native speakers referred to what is now I-8 as *oon-ya*, meaning trail or road, describing one of the main routes linking the interior of San Diego with the coast. The floodplain from Mission San Diego de Alcalá to the ocean was

*hajir* or *qajir* (Harrington 1925, 1927), and the modern-day Mission Valley area was known as *Emat kuseyaay*, which means spirit land, land with spirits, or place of spirit person, and may have been in reference to the presence of Spanish priests in the valley after 1769 (Robertson 1982). The narrows of Mission Gorge within present-day Mission Trails Regional Park carries the name *Ewiikaakap*, meaning rocks where the river narrows (Robertson 1982).

Villages and campsites were generally located in areas where water was readily available, preferably on a year-round basis. The San Diego River, which traverses north and downslope of APE, provided an important resource not only as a reliable source of water, but as a major transportation corridor through the region. Major coastal villages were known to have existed along the San Diego River, including the village of *Kosaii* (also known as *Cosoy* or *Kosa'aay*) near the mouth of the San Diego River (Gallegos et al. 1998; Kroeber 1925), which took its name from the Kumeyaay word for drying place or dry place (Dumas 2011). This ranchería appears in the earliest of Spanish travelogues for the area, and was the village closest to the Presidio. Although the actual location of the village is unknown, it has been described as being near the mouth of the San Diego River, and also reported by Bancroft in 1884 in the vicinity of Presidio Hill and Old Town. The Kumeyaay are the identified Most Likely Descendants for all Native American human remains found in the City.

### 3.2.2 Paleoindian Period

The Paleoindian Period in San Diego County is most closely associated with the San Dieguito Complex, as identified by Rogers (1938, 1939, 1945). The San Dieguito assemblage consists of well-made scraper planes, choppers, scraping tools, crescentics, elongated bifacial knives, and leaf-shaped points. The San Dieguito Complex is thought to represent an early emphasis on hunting (Warren et al. 1993:III-33).

### 3.2.3 Archaic Period

The Archaic Period in coastal San Diego County is represented by the La Jollan Complex, a local manifestation of the widespread Millingstone Horizon. This period brings an apparent shift toward a more generalized economy and an increased emphasis on seed resources, small game, and shellfish. The local cultural manifestations of the Archaic Period are called the La Jollan Complex along the coast and the Pauma Complex inland. Pauma Complex sites lack the shell that dominates many La Jollan sites. Along with an economic focus on gathering plant resources, the settlement system appears to have been more sedentary. The La Jollan assemblage is dominated by rough, cobble-based choppers and scrapers, and slab and basin metates. Elko series projectile points appeared late in the period. Large deposits of marine shell at coastal sites argue for the importance of shellfish gathering to the coastal Archaic economy (True 1980).

### 3.2.4 Late Prehistoric Period

Near the coast and in the Peninsular Mountains beginning approximately 1,500 years ago, patterns began to emerge which suggest the ancestors of the ethnohistoric Kumeyaay occupied the area. This period is characterized by higher population densities and elaborations in social, political, and technological systems. Economic systems diversify and intensify during this period, with the continued elaboration of trade networks, the use of shell-bead currency, and the appearance of more labor-intensive but effective technological innovations. The late prehistoric archaeology of the San Diego coast and foothills is characterized by the Cuyamaca Complex. It is primarily known from the work of D.L. True (1970) at Cuyamaca Rancho State Park. The Cuyamaca Complex is characterized by the presence of steatite arrowshaft straighteners, steatite pendants, steatite comales (heating stones), Tizon Brown Ware pottery, ceramic figurines reminiscent of Hohokam styles, ceramic "Yuman bow pipes," ceramic rattles, miniature pottery, various cobble-based tools (e.g., scrapers, choppers, hammerstones), bone awls, manos and metates, mortars and pestles, and Desert Side-Notched (more common) and Cottonwood Series projectile points (True 1970).

### 3.2.5 Ethnohistory

The Kumeyaay occupied the southern two-thirds of San Diego County. The Kumeyaay lived in semi-sedentary, politically autonomous villages or rancherias. A settlement system typically consisted of two or more seasonal villages with temporary camps radiating away from these central places (Cline 1984). Their economic system consisted of hunting and gathering, with a focus on small game, acorns, grass seeds, and other plant resources. The most basic social and economic unit was the patrilocal extended family. A wide range of tools was made of locally available and imported materials. A simple shoulder-height bow was used for hunting. Numerous other flaked-stone tools were made, including scrapers, choppers, flake-based cutting tools, and biface knives. Preferred stone types were locally available metavolcanics, quartzite, and quartz. Obsidian was imported from the deserts to the north and east. Ground stone objects include mortars and pestles typically made of locally available fine-grained granite. Both portable and bedrock types are known. The Kumeyaay made fine baskets. These employed either coiled or twined construction. The Kumeyaay also made pottery, using the paddle-and-anvil technique. Most were a plain brown utility ware called Tizon Brown Ware, but some were decorated (May 1978; Meighan 1954; Spier 1923).

### 3.2.6 Historic Period

The proposed project area occurs within the City-owned Presidio Park, which has a long history of cultural occupation and activity. A detailed review of the archaeology and history of the Presidio is beyond the scope of this geoarchaeological assessment, but Table 2 provides a historical timeline for events significant to the Presidio. Prehistorically, the Kumeyaay lived in the village of *Cosoy/Kosaii/Kosa'aay* located at the foot of Presidio Hill along the San Diego River (Mogilner 2016; Figure 8), where they were well positioned to

take advantage of nearby spring riverine, estuarine, and coastal food and other types of resources.

**Table 2**
**Timeline of Significant Historical Events at San Diego Presidio**

| Date | Event |
|---|---|
| September 28, 1542 | The Spanish ships San Salvador and Victoria sailed into San Diego Bay and dropped anchor near Point Loma. Juan Rodriguez Cabrillo claimed the land for the crown and named it. San Miguel. As the first European to set foot in present-day California, Cabrillo documented Native American groups living in coastal villages along the Southern California coast in October of 1542. He spent six days ashore in present-day San Diego, where he interacted with the Native American Kumeyaay who occupied present-day San Diego. |
| November 10, 1602 | About 60 years later another Spanish explorer, Sebastián Vizcaíno, landed about 10 miles from the present Presidio. Under Vizcaíno's command, the San Diego, Santo Tomás, and frigate Tres Reyes dropped anchor on San Diego Bay, and the port was renamed "San Diego de Alcalá |
| May 14, 1769 | El Presidio Reál de San Diego (Royal Presidio of San Diego), a historic Spanish fort established by Gaspar de Portola, leader of the first European land exploration of Alta California, a province of New Spain. This Presidio was the first permanent European settlement on the U.S. Pacific Coast. As the first Spanish presidio and mission in California, it served as the base for further Spanish expansion and colonization. |
| July 16, 1769 | Mission Basilica San Diego de Alcalá, the first Franciscan mission in Alta California, was founded by Spanish friar Junípero Serra on Presidio Hill in area long inhabited by the Kumeyaay, the Native American group who occupied present-day San Diego. |
| August, 1769 | There was a Kumeyaay uprising that resulted in the injury of four Spaniards and the death of a boy. |
| March, 1770 | Spaniards finished constructing a stockade around the Presidio and two cannons were placed, one aimed at the bay and other at *Cosoy/Kosaii/Kosa'aay*, the Kumeyaay village along the San Diego River downslope of Presidio Hill. |
| 1773-74 | Adobe built to replace temporary wood and brush structures at the Presidio. In 1774 the Mission was moved 6.3 miles upstream in Mission Valley to separate Kumeyaay from the influence of the garrison at the Presidio. |
| 1775 | Kumeyaay revolt destroyed the Mission of San Diego de Alcalá. |
| 1778 | Kumeyaay uprising led to the murder of the Priest Father Luis Jayme at the mission (Luksic and Kendziorski 1999). |
| 1793 | British Captain George Vancouver sailed into San Diego Bay while returning from the Pacific Northwest. He reported that the port was poorly guarded and that Point Lomas was better positioned for defense, after which the Spanish built Fort Guijarros below Point Loma, inside the bay at present-day Ballast Point. |
| 1800 | First American ship, little brig Betsy, sailed into San Diego Bay. |
| 1803 | Fort Guijarros fired cannons on two American fur-trading ships, Alexander and Lelia Byrd, who were trying to smuggle otter skins out of San Diego Bay. |
| 1809-1820 | Lieutenant Francisco María Ruiz was Acting Commandant of the San Diego Presidio. |
| 1821-1848 | The Presidio came under Mexican control after Mexican Independence from Spain. |

| Table 2<br>Timeline of Significant Historical Events at San Diego Presidio | |
|---|---|
| Date | Event |
| 1821-1827 | Ruiz became Captain and Commandant during the time Spain relinquished the Presidio in 1822. He led the move to settle the flatter land west of Presidio Hill and helped develop the first town of San Diego. In 1823, Captain Ruiz received the first private land grant in present San Diego County, the 8,486-acre (34.34 km²) Rancho Los Peñasquitos (Little Cliffs Ranch). |
| April 20, 1822 | The Presidio was officially relinquished by Spain. |
| 1825-29 | The Presidio served as the residence for the Mexican governor. |
| 1927 | Jedediah Smith became the first American to make the overland route across the harsh desert Southwest to reach California from eastern United States. |
| 1833 | The Mexican government secularized the missions and divided the land into large rancheros for themselves and other members of the emerging ruling class. Mexican land management was dominated by cattle ranching in response to demand for the hide trade. Kumeyaay who had been assimilated into Spanish mission life were subjugated as slaves by wealthy Mexican Rancheros. |
| 1834 | Mexico granted San Diego "Pueblo Status". |
| 1846 | This year marks the end of Mexican control and the beginning of the American era in San Diego. |
| 1835 | San Diego Presidio was abandoned by Mexico and fell into ruins. |
| 1848 | Treaty of Guadalupe Hidalgo was signed, thus ending the Mexican American era. |
| 1850 | William Heath Davis laid out Old Town. |
| 1851 | U. S. Coast Survey map and report by A. D. Bache asserted that government action was needed to prevent San Diego Bay from being silted in by the San Diego River by diverting the river into Mission Bay (then known as False Bay). |
| 1853 | A wooden dike was constructed by Lt. George Horatio Derby of the U. S. Army Corps of Engineers to divert water from the San Diego River into Mission Bay. Derby noted that during the rainy season, the marsh south of town was flooded along with parts of the floodplain along the river and so he wanted to build a straight channel and river levees. Instead, he was commanded to deepen the old channel and build a levee from a point at the foot of the Presidio Hill to the foot of Point Loma (1190 yards). Derby complained that the government plan was unsound and that funds were insufficient, and sure enough, the first flood eroded part of the dike and heavy flooding in 1855 returned the river back into San Diego Bay (Figure 9). |
| 1875 | Congress appropriated funds to build an earthen levee to divert the San Diego River into Mission Bay and to prevent it from flooding Old Town and from depositing sediment in San Diego Bay. In 1876, Lt. Weeden supervised completion of the Derby Dike. |
| 1907 | George Marston, a wealthy department store owner in San Diego, bought Presidio Hill with an interest in preserving the site and developing it into a European-style park with landscaped trees and manicured lawns. |
| 1913 | Serra Cross was constructed in the approximate place where Father Serra established his original mission on July 16, 1769. It was erected by the Order of Panama from red tile salvaged from the rubble of the Presidio. |
| 1925 | After being unable to secure public funding, Marston built a private park at Presidio Hill in 1925 with the help of architect John Nolen. |
| 1928-29 | Marston funded construction of the Junípero Museum, designed by William |

| Table 2<br>Timeline of Significant Historical Events at San Diego Presidio | |
|---|---|
| Date | Event |
| | Templeton Johnson in Spanish Revival style architecture, to curate and showcase the collection of the San Diego Historical Society (now the San Diego History Center, which has since moved to the museum complex at Balboa Park). |
| 1932 | San Diego Presidio was registered as a California Historic Landmark. |
| 1930s | City Engineer Percy M. Broell donated his detailed topographic map of the Presidio and notes with the Serra Museum on some archaeological test excavations. |
| 1930s | During the Depression the Works Progress Administration (WPA) built concrete and cobble ditches along Presidio Drive. |
| 1935 | El Capitan Dam and Reservoir built in upper reach of San Diego River watershed. |
| 1943 | San Vicente Dam and Reservoir built in upper reach of San Diego River watershed. |
| 1950 | Work on the flood channel and new channel entrance to Mission Bay was begun and completed in 1953. In all, levees with rock-revetments were built 3.3 miles long and 25 feet high, with a 200 to 250 feet wide channel. |
| October 9, 1960 | San Diego Presidio was declared a National Historic Landmark. |
| October 15, 1966 | San Diego Presidio was added to the National Register of Historic Places. |
| February 29, 1968 | San Diego Presidio added to the City of San Diego Historical Resources Register as HRB #4 |
| March 7, 1968 | Presidio Site designated a California Historic Landmark #59 |
| December 6, 1969 | Presidio Park added to the City Historic Resources Register as HRB #240 |
| November 6, 1970 | Presidio excavation site added to the City Historic Resources Register as HRB #35 |

Map Source: Dr. Jeff Homburg, 2018

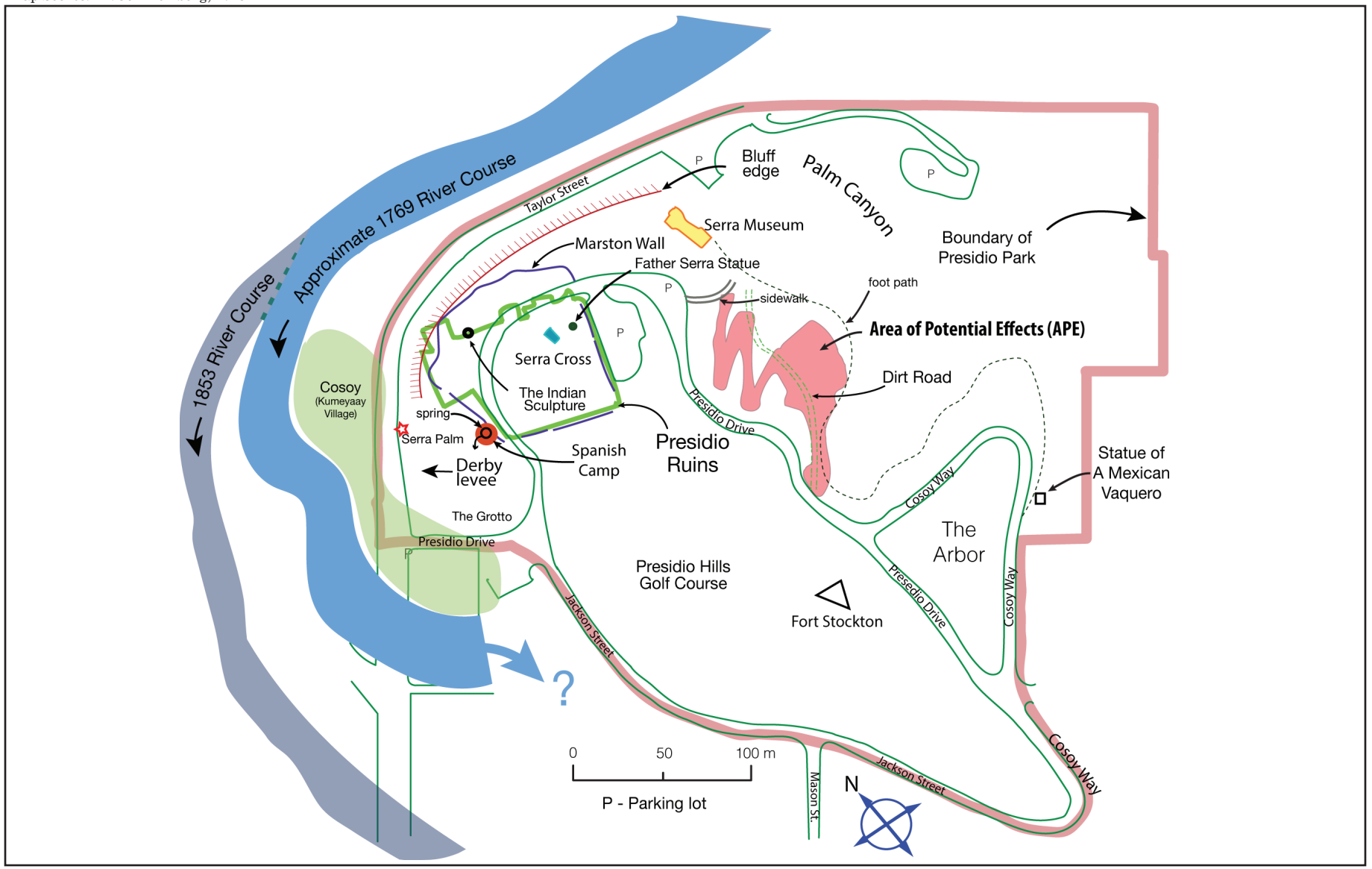



FIGURE 8
Key Cultural Landscape Features and Landmarks of Presidio Park

RECON

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Map Sources: Survey of the Coast of the United States, (A) 1853; (B) 1859




RECON

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FIGURE 9
1853 and 1859 Maps

To stem Russian encroachment into southern California, Spanish explorers constructed the San Diego Presidio in 1769 for occupation by military personnel, civilians, and Native Americans. A Spanish encampment was established next to a spring on the footslope immediately downslope prior to building the Presidio (see Figure 8). The Presidio was strategically located on a hilltop where cannons could be emplaced on prominent overlooks. It was built next to potable water resources as well as land suitable for agricultural production. The hilltop has a commanding view of the river, San Diego Bay, and Mission Bay, where the fort could thwart enemy attacks from the bay and keep Kumeyaay living in Cosoy along the river below in check. The Presidio began as a wooden compound with a stockade, huts, chapel, and informal hospital, which was abandoned between 1770 and 1774. By 1779, a 300-by-300-foot adobe quadrangle had been constructed with soldiers' barracks, commander's house, a guardhouse, homes for civilians and troopers, residential area for visiting padres, storehouses for missionaries and the crown, a blacksmith shop and a carpenters' shop. By 1810, four triangular bastions (one at each corner of outer wall of the Presidio), rear yards and corrals, a new chapel, a new commander's house, a second communal barracks complex, and a gun battery had been added (Williams 2004).

During Mexico's War for Independence (1810–1821), the Presidio fell into disrepair; portions of the outer defense wall and bastions had collapsed. Room blocks in the northern and western sides were expanded during the Mexican Period as the Mexican governor and others moved to the Presidio. The Presidio was by then an open plaza because portions of the defense wall had collapsed. Buildings and the fort wall of the Presidio were abandoned and left to crumble by 1835. Portions of roof and floor tiles and building timbers were dismantled and sold for reuse (Williams 2004). Empty rooms were used as corrals for sheep and cattle as well as for butchering on-site (Williams 1996). People moved downhill to Old Town and other nearby communities (Williams 2004). During the Mexican-American War (1846–1848), the Americans used Presidio Hill due to its defensive location and renamed it Fort Stockton.

During the American Period, Presidio Hill gained the interest of George Marston in 1907. Marston, as a supporter of park and city planning, acquired 20 acres for the future Presidio Park in 1925. Marston commissioned John Nolen, a city planner and landscape architect, to design the park landscape to reflect a more lush and romanticized landscape with trees, grasses, curvilinear roads and paths, and a museum. In 1928, the city water reservoir located between Cosoy Way and Fort Stockton (also called the Bowl) was removed (KTU+A 2013). Marston donated 37 acres to the City in 1929 for use as a park. The adobe wall ruins were protected by mounds of dirt placed over the ruins and the planting of landscaping grass (Snell 1963). Based on an interview with Percy Broell (hired by Marston to manage plants in 1932 and later named superintendent of Presidio Park) conducted in 1978 by the San Diego Historical Society Oral History Program, alluvial soil from the middle of the San Diego river bed was brought to cover the ruins. Removal of a portion of the hill for fill in the construction of the San Diego River dike and Mission Valley Road destroyed the remains of one row of quarters and wall. Park roads also impacted another section of the fort. Because more ruins were uncovered during surveys, grading, landscaping, and road construction for park development by Marston, a wall was constructed to protect and delineate the remaining ruins in the late 1920s (Herrmann 2012).

Between 1928 and 1930, 20,000 plants including eucalyptus, pines, palms, acacias, California holly, rhus, sumac, and Catalina cherry were installed. During the Depression, the Works Progress Administration (WPA), founded in 1935, constructed cobble-lined ditches and graded roads. The Junípero Serra Museum was built in 1929 and dedicated on the 160th anniversary of Presidio Hill. Post 1932, Broell had green lawns installed in open areas and other amenities such as picnic areas, restrooms, automatic sprinklers, and the Franciscan garden and fountain (KTU+A 2013).

Between the late 1960s and the late 1990s, archaeological excavations occurred at the Presidio. This left adobe walls exposed. In 1998, the City began to explore the idea of site stabilization and reburial to protect the remains of the north wing ruins. The project began with removing standing water, weeds, sandbags, invasive plants, and the old sprinkler system. Mud was applied to exposed adobe walls, which were then covered with a geotextile barrier to hold the walls in place to prevent roots and water from contributory erosion. Each room was mapped with a global positioning system (GPS) unit, photodocumented, and marked for future reference. Approximately 4,000 cubic yards of clean fill soil was placed one foot at a time, to a maximum of five feet, where it was hand-tamped, covered with topsoil, and hand-rolled. Mulch was the final layer (Herrmann 2012).

# 4.0 Previous Research

A records search with a 0.25-mile radius buffer was requested from the SCIC at San Diego State University in order to determine if previously recorded prehistoric or historic cultural resources occur within the project area (Confidential Attachment 1).

The record search indicated that there have been 81 cultural resource investigations along with 47 recorded cultural resources (42 historic-era; 1 historic-era isolated artifact; 2 prehistoric; and 2 multi-component (prehistoric and historic) within a 0.25-mile radius of the survey area (Table 3; Confidential Attachment 1). The historic-era resources consist of Fort Stockton, Presidio Park, single-family houses, adobe houses, a cemetery, a dike, and trash scatters. Prehistoric resources consist of a shell scatter and a burial. The multi-component resources consist of a foundation, a trash scatter, a water conveyance system, and prehistoric ceramic and lithic scatters. One previously recorded cultural resource, P-37-000038/CA-SDI-38, is present within the survey area (see Confidential Attachment 1). A total of 41 historic addresses have been recorded within the search radius, none of which are within the proposed project area.

The Native American Heritage Commission (NAHC) files indicated that Native American cultural sites have been located within the survey area. The NAHC recommended contacting the Viejas Band of Mission Indians and the Ipay Nation of Santa Ysabel for more information about these sites (see the attached correspondence; Attachment 2).

| Table 3<br>Cultural Resources within 0.25-mile of Area of Potential Effects | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Site Type | Age | Date Recorded |
| P-37-000038 | CA-SDI-000038 | Habitation debris; foundations; ceramic scatter; burials; trash scatter; hearths; structure remains | Historic | 1968 (P. Ezell) |
| P-37-013664 | CA-SDI-013664 | Trash scatter | Historic | 1993 (Affinis) |
| P-37-013665 | CA-SDI-013665 | Trash scatter | Historic | 1993 (Affinis); 2016 (LSA Associates) |
| P-37-013666 | CA-SDI-013666 | Trash scatter | Historic | 1993 (Affinis); 2014 (PanGIS) |
| P-37-013667 | CA-SDI-013667 | Trash scatter | Historic | 1994 (Affinis) |
| P-37-014247 | CA-SDI-014074 | Trash scatter | Historic | 1995 (Walter Enterprises) |
| P-37-019194 | | Trash scatter | Historic | 2001 (Brian F. Smith) |
| P-37-021834 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021835 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021894 | | Single Family Property | Historic | 2002 (Compushare) |
| P-37-021900 | | Adobe | Historic | 2002 (Compushare) |
| P-37-021901 | | Park | Historic | 2002 (Compushare) |
| P-37-021902 | | Cemetery | Historic | 2002 (Compushare) |
| P-37-021903 | | Monument | Historic | 2002 (Compushare) |
| P-37-021906 | | Monument | Historic | 2002 (Compushare) |
| P-37-021907 | | Religious Building | Historic | 2002 (Compushare) |
| P-37-023767 | | Single Family Property | Historic | 2001; 1998 (Alexandar D. Bevil) |
| P-37-023919 | | Missing site form | | |
| P-37-023921 | | Missing site form | | |
| P-37-023941 | | Trash scatter | Historic | 2001 (Brian F. Smith and Associates) |
| P-37-023942 | | Wall | Historic | 2001 (Brian F. Smith and Associates) |
| P-37-024558 | CA-SDI-016288 | Burial | Prehistoric | 2007; 1996 (RECON) |
| P-37-024559 | CA-SDI-016289 | Shell scatter | Prehistoric | 2002 (Harris Archaeological Cons.) |
| P-37-027055 | CA-SDI-017688 | Trash scatter | Historic | 2005 (EDAW) |
| P-37-027058 | CA-SDI-017691 | Trash scatter; Wells; Fences | Historic | 2005 (EDAW) |
| P-37-028431 | CA-SDI-018352 | Fort | Historic | 2007 (N/A) |
| P-37-028444 | | Dike | Historic | 2007 (N/A) |
| P-37-028502 | | Cemetery | Historic | 2007 (N/A) |
| P-37-028600 | CA-SDI-018591 | Adobe | Historic | 2007 (State of California District Preservation Officer); 2008 (Department of Parks and Recreation) |
| P-37-029967 | | Single Family Property | Historic | |
| P-37-030930 | | Isolate | Historic | 2008 (Laguna Mountain Environmental, Inc.) |
| P-37-030937 | CA-SDI-019630 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030939 | CA-SDI-019632 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030940 | CA-SDI-019633 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-030941 | CA-SDI-019634 | Trash scatter | Historic | 2009 (Laguna Mountain Environmental, Inc.) |

| Table 3<br>Cultural Resources within 0.25-mile of Area of Potential Effects | | | | |
|---|---|---|---|---|
| Primary Number | Trinomial Number | Site Type | Age | Date Recorded |
| P-37-030942 | CA-SDI-019635 | Wall | Historic | 2009 (Laguna Mountain Environmental, Inc.) |
| P-37-031962 | CA-SDI-020233 | Lithic scatter; Trash scatter; Well; Water Conveyance system | Prehistoric, Historic | 2011 (Brian F. Smith & Associates) |
| P-37-032538 | CA-SDI-020661 | Foundations/structure pads; trash scatters; Ceramic scatter | Prehistoric, Historic | 2012 (Laguna Mountain Environmental, Inc.) |
| P-37-032899 | CA-SDI-020784 | Trash scatter | Historic | 2013 (Brian F. Smith & Associates) |
| P-37-032949 | | Single family property | Historic | 2013 (Scott Moomjian) |
| P-37-033537 | CA-SDI-021080 | Artifact scatter | Historic | 2014 (Brian F. Smith & Associates) |
| P-37-033920 | CA-SDI-021307 | Trash scatter | Historic | 2014 (Larry Tift, ASM Affiliates, Inc.) |
| P-37-034095 | CA-SDI-021346 | Foundations; trash scatter | Historic | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034096 | CA-SDI-021347 | Foundation | Historic | 2014 (Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034098 | CA-SDI-021350 | Foundation; trash scatter | Historic | 2014 (Nicole Turner, Bethany Weisberg, California Department of Parks and Recreation, Southern Service Center) |
| P-37-034100 | CA-SDI-021352 | Foundations; Trash scatter | Historic | 2014 |
| P-37-034555 | CA-SDI-021539 | Trash scatter | Historic | 2014 (Helix) |
| P-37-035592 | | Single Family Property | Historic | 2014 (Peter Dixon |
| P-37-036522 | | Street furniture | Historic | 2017 (Lauren Downs, AECOM) |

# 4.1 Past Investigations for Recorded Sites

## 4.1.1 P-37-000038/CA-SDI-38 (Presidio Park)

### 4.1.1.1 Past Investigations

Site P-37-000038/CA-SDI-38 was recorded in 1968 as Presidio Park with Colonial Spanish, Mexican, Native American, and early American remains. Midden soils, lithics, ceramics, hearth features, burials, and fallen walls were noted. It was also known as "Old Spanish Fort" (Ezell 1968). A surface collection was completed. The archaeological remains are listed as California Historical Landmark #59 and on the National Register of Historic Places (NRHP) as #66000226. It was added to the NRHP in 1966 as being eligible under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. The Presidio functioned as a defensive position, a

fortification and a village site. The establishment of the Presidio marks the founding of the first permanent European settlement on the Pacific Coast as well as the site of the first mission in California, founded by Father Junípero Serra. It was the military seat between 1769 and 1837 and the residence of the Mexican governor between 1825 and 1829 (Snell 1963). Currently, it is within the City's Presidio Park.

A number of archaeological excavations have occurred in the Presidio. Percy Broell, hired by Marston in 1932 to manage plantings in the park, was first to conduct an informal excavation. Paul Ezell excavated in the south wing between 1965 and 1976. Diana Barbolla excavated in the west wing and adjacent gun battery. In 1987 and 1990 Brad Bartel excavated in the north wing. No comprehensive report exists for these excavations (Williams 2004).

In 1964, Dr. Ray Brandes, newly appointed director of the Serra Museum, proposed an archaeological research-and-training program for the Presidio to be carried out through the San Diego State University, Department of Anthropology, sponsored by the San Diego History Center. Paul Ezell, archaeology professor at San Diego State University, directed archaeological excavations for a field school in Presidio chapel by San Diego State University, with the latter seasons in collaboration with San Diego Mesa College and professors Mike Axford and Diane Barbolla). Donald Brockington of San Diego State and Dr. Brandes planned and directed the first archaeological excavation seasons, and then Paul Ezell of San Diego State assumed directorship duties after sabbatical leave from the university. Major findings included discovery of a tiled floor, painted walls (as many as eight coatings of paint), and traces of gold leaf that indicated the structure functioned as a chapel, not the entry to the Presidio as some had thought. Ezell found further evidence that the structure functioned as a chapel, including a raised area, a sanctuary with a pedrella (raised and plastered platform), altar (pile of tile), and ambry/piscinum (square receptacle made in the floor). By 1976, 118 burials had been found in the chapel, including ones that were interred during the use of the chapel and ones that post-date use of the chapel. Ezell also documented earthen bread ovens, roasting pits, post holes (possibly from an earlier structure, one with a metal crucifix that was very weathered but possibly made of silver), and steatite bowl fragments that may be traces of a baptismal font. The Spanish obtained lime for architectural plaster for the chapel and other buildings by burning sea shells (Ezell 1976).

Jack Williams initiated the San Diego Presidio Archaeology project in 1992 with the goal to facilitate effective investigation, management, conservation, and development of cultural resources of the Presidio. This project excavated 40 rooms as well as a yard in the north wing between 1994 and 1996 (Williams 1996). Artifacts recovered from the excavation include construction materials (cobbles, adobe bricks, roof tiles, roof beams, plaster). Native American and European plainware ceramics, Chinese porcelain, Majolica ceramics, prehistoric ground stone and lithic artifacts, glassware, glass jewelry, metal items (nails, hardware, spikes, cooking items, utensils, buttons, tools, munitions, watch parts), plant remains (corncobs, beans, peach and olive pits), and the remains from domesticated animals, wild animals, sea mammals, fish, and shellfish (Williams 2004).

In 1998, the City began to explore the idea of site reburial of the north wing ruins as a conservation measure after consulting with the archaeological staff from City Development Services Department. Experts in the fields of adobe conservation, archaeology, history, and architecture produced a draft plan with guidelines for site conservation, collections management, and intellectual property. The stabilization and reburial of the north wing was completed in 1999. This included cleaning the site, removing standing water, old sandbags, weeds and invasive plants, installation of a French drain along the base of the Marston Wall on the west side of the north wing, and removal of the old sprinkler system. After cleaning was completed, mud was applied to exposed adobe walls for extra protection and covered with a geotextile barrier prior to backfilling. Soil from the observation platform for Williams excavation were screened for additional artifacts. Each room was mapped, photo-documented, and markers were placed on the floors of each room for future reference. The site was then buried with 4,000 cubic yards of inorganic yellow soil, hand-tamped to protect the fragile walls, and covered with topsoil and mulch (Herrmann 2012).

#### 4.1.1.2 Recent Work

Most recently on September 12, 2018, the project area was surveyed by RECON archaeologist Nathanial Yerka, accompanied by a Native American monitor from Red Tail Environmental. Although present in the Park at the time the Presidio Excavation Site was added to the federal, state, and local historic registers, one previously unrecorded historic cultural resource (P-37-038268) was recorded (see Confidential Attachment 2). This consisted of rock features built by the WPA in the 1930s as park improvements. The features include the cobble-lined gutters along both sides of Presidio Drive/Cosoy Way, the cobble-lined channel on the eastern end of the survey area at the bottom of a drainage between the Presidio knoll and the mesa top of Mission Hills, and cobble steps on the southern portion of the survey area. These three features were constructed with cobbles and concrete. The gutter is approximately 2 feet wide and extends past the survey area; however, only the portion within the survey area was recorded. The cobble and cement lined channel is trapezoidal in cross-section, encompassing an approximately 6-foot-wide flat bottom, with two 45-degree banks yielding a total width of approximately 8 feet. The channel starts at the south end with a cobble-lined retaining wall and ends on the north end at a culvert on Taylor Street. The cobble stairs consist of four treads. Some of the cobbles have been spray-painted, likely to help with visibility. The WPA also paved roads, cut paths, and constructed a lookout on the west side providing a view of the ocean and mouth of the San Diego River, a flagstaff, sprinkler system, much of the landscaping, and restrooms (Branton 1991).

Marine shellfish remains were also noted in two different areas at the top of the knoll. The remains comprised 25-plus shell fragments of California hornsnail (*Cerithidea californica*), Wavy Chione (*Chione undatella*), and oysters (*Ostrea* spp.). The shell fragments are not considered a cultural resource because their locations are within disturbed areas in which the shell was likely imported within fill soils. No artifacts were associated with the shell fragments.

The GPR survey was conducted over the course of five days: August 8, 9, 28, 29, and 30, 2018. Results indicate numerous subsurface anomalies, including water/utility lines, tree roots, a metal feature, rectangular features, soil changes, landscaping features, cobble alignment, trackways, wagon road, and concrete park associated features. The results are presented in amplitude slice maps including shallow, middle, and deep GPR slice map composites; 9 grids were divided into 10-35 cm, 35-60 cm, and 60-85 cm slices and 11 grids were divided into 10-22 cm, 22-44 cm, 44-64 cm, and 64-90 cm slices. For details on findings, see the attached GPR results report (Attachment 3). Table 4 summarizes the results by grid. The features identified in the table are conjecture based on GPR signal interpretation of high-amplitude reflections.

**Table 4**
**GPR Results by Grid**

| Bore # | Grid | Possible Feature or Landscape Element | Soil Type | Landform |
|---|---|---|---|---|
| 1 | n/a | backslope ADA path | Olivenhain-Urban | backslope ADA path |
| 2 | 4 | curved lines, pathway, wagon road | Gaviota fine sandy loam | summit |
| 3 | 8 | shoulder slope | Olivenhain-Urban | shoulder slope |
| 4 | 13 | shoulder slope | Gaviota fine sandy loam | shoulder slope |
| 5 | 6 | shoulder slope | Gaviota fine sandy loam | shoulder slope |
| 6 | 1 | backslope Presidio Driveway | Gaviota fine sandy loam | backslope Presidio Driveway |
| 7 | 2 | cobbles, brick, tile | Gaviota fine sandy loam | backslope Presidio Driveway |
| 8 | 4 | summit | Gaviota fine sandy loam | summit |
| 9 | 6 | NW metal | Olivenhain-Urban | outside APE |
| 10 | 11 | road, stock piling | Gaviota fine sandy loam | summit |
| 11 | 12 | flagpole, pit, lookout | Gaviota fine sandy loam | outside APE |
| 12 | 14 | stratified layers | Olivenhain-Urban | backslope ADA path |
| 13 | 14 | stratified layers | Olivenhain-Urban | backslope ADA path |
| 14 | 16 | rectilinear feature | Olivenhain-Urban | backslope ADA path |
| 15 | 18 | cobble align | Olivenhain-Urban | backslope ADA path |
| 16 | 18 | planar feature, buried stratum | Olivenhain-Urban | backslope ADA path |
| 17 | 19 | evenly spaced feature | Olivenhain-Urban | backslope Cosoy Driveway |
| 18 | 19 | road, stock piling | Olivenhain-Urban | backslope Cosoy Driveway |
| 19 | 20 | planar feature | Olivenhain-Urban | backslope Cosoy Driveway |
| 20 | 20 | planar feature | Gaviota fine sandy loam | backslope Cosoy Driveway |

## 4.2 Research Design

Because of the long history and cultural and historical sensitivity of the Presidio, this research design was developed to guide design plans to minimize direct impacts to significant cultural deposits and features. The goals of this investigation are:

(1) to gather enough data to determine site significance per CEQA and City guidelines;

(2) to identify and/or verify features based on the GPR results in order to avoid significant impacts to buried features;

(3) to identify areas with a higher likelihood of finding intact features and/or deposits; and

(4) to document and interpret the soil stratigraphy for the purpose of making a geoarchaeological assessment.

Research questions related to site formation processes, chronology, and site function are listed below.

(1) Site formation processes: What is the soil stratigraphy on the knoll? Are imported fill soils present? Have top soils been removed from any location? Are there any intact deposits left or have the trenching for water and irrigation lines and vehicular and pedestrian traffic disturbed most of the area?

Data needs: Geoarchaeological core samples from a variety of soil types and landform/landscape positions. The soils descriptions for these samples will provide stratigraphy needed to reconstruct the site formation processes.

(2) Site function: What was the knoll used for? Did Native American groups primarily use the area or was it primarily used during historic times?

Data needs: The variety in type of artifacts recovered from the core samples may help address site function. Identification of cobble foundations and/or adobe blocks or melt may also address site function.

(3) Chronology: During which period was the knoll used primarily? Are prehistoric and historic artifacts present? Which artifacts, if any, date to Spanish, Mexican, or American periods of occupation or other types of land use?

Data needs: Same as those for site function.

# 5.0 Methods

Prior to fieldwork, background research was conducted to compile information on the soils and geology of the project area. An archaeological testing plan was submitted to the City outlining research questions and locations for core samples within the project area and an alternative driveway connecting to Cosoy Way. After the City approved the testing plan, RECON coordinated with Dig Alert and City park staff to mark underground utilities and irrigation lines in areas proposed for each core location. RECON also coordinated with Pacific Drilling Co. to collect the core samples under the direction of Dr. Jeffrey Homburg, Catena Affiliates geoarchaeologist. RECON subcontracted to Red Tail Environmental to provide a Native American monitor during the three days of the coring operation for geoarchaeological testing.

Cores were collected on three days: January 14, 16, and 18, 2019. Depending on the slope gradient, three different hydraulic drilling rigs were used: a truck-mounted rig was used on the more gentle slopes of the knoll and ridge line (Photograph 1), a custom-built rig called the Wolverine on intermediate slopes in the upper swale of the southeast APE (Photograph 2), and a custom-built rig on tracks called the Mole on steeper slopes in the northern APE, the area of the proposed switchback ramp (Photograph 3).

The testing plan consisted of twenty 2.5-inch diameter cores (Cores 1 to 20). Prior to drilling, a clinometer was used to measure the percent slope for the ground surface at each core location. Core depths varied depending on the depth of sandstone bedrock, or presence of cobbles or tree roots that impeded or blocked a core from being extracted. After each core was removed, the bore hole was then filled and compacted with bentonite clay to return the surface to its pre-existing grade. Each sample was labeled appropriately (that is, Core 1 to 20, respectively, along with information on each core box for which direction is up) and taken to the RECON laboratory for analysis. Core locations were recorded with a hand-held GPS unit, a Trimble GEO-XH with a linked beacon receiver.

The core locations were chosen to investigate both the project area and the alternative driveway connecting to Cosoy Way (Figure 10). Locations included cores placed to sample areas where possible cultural features were identified by the GPR results, as well as other places to sample the three landscape positions (that is, summits, shoulders, and backslopes), Table 5 lists 20 locations along with data on soils, landform, and GPR anomalies that may indicate possible buried cultural features. From highest to lowest in elevation, these include the summit and shoulder slopes where parking lot construction is planned as well as the backslopes where the driveway and ADA path of travel to the parking lot are to be built.

Core samples were analyzed by Dr. Homburg in RECON's laboratory in San Diego. Dr. Homburg described the cores over a 9-day period between January 14, 2019 and January 24, 2019, during times not in the field. It was rainy when the cores were collected, especially on the first day, and cores were laid out in the lab to dry. The cores were then photographed along with a vertical scale. The photographs were later cropped and combined in a series of illustrations for cross sections of the APE.

Core descriptions followed standard soil survey methods as outlined by Schoenberger et al. (2002) and in the Natural Resources Conservation Service Soil Survey Manual (Soil Survey Division Staff 1993). Sediment properties recorded focused on ones most informative for making interpretations of stratigraphic integrity and buried site potential. Soil descriptions for each core included the following: soil master horizon and depths below surface, Munsell colors (dry and moist), textural estimates by the ribbon method, gravel content, and soil features such as root sizes and abundance, pore types, calcium carbonate concentrations, and pedofeatures. The latter focused on identifying clay films indicative of argillic horizons, an important diagnostic subsurface horizon that indicates that significant clay has been



PHOTOGRAPH 1
Truck-mounted Drilling Rig Used on the Gentler Slopes
on the Knoll and Ridge Crest in the Central APE

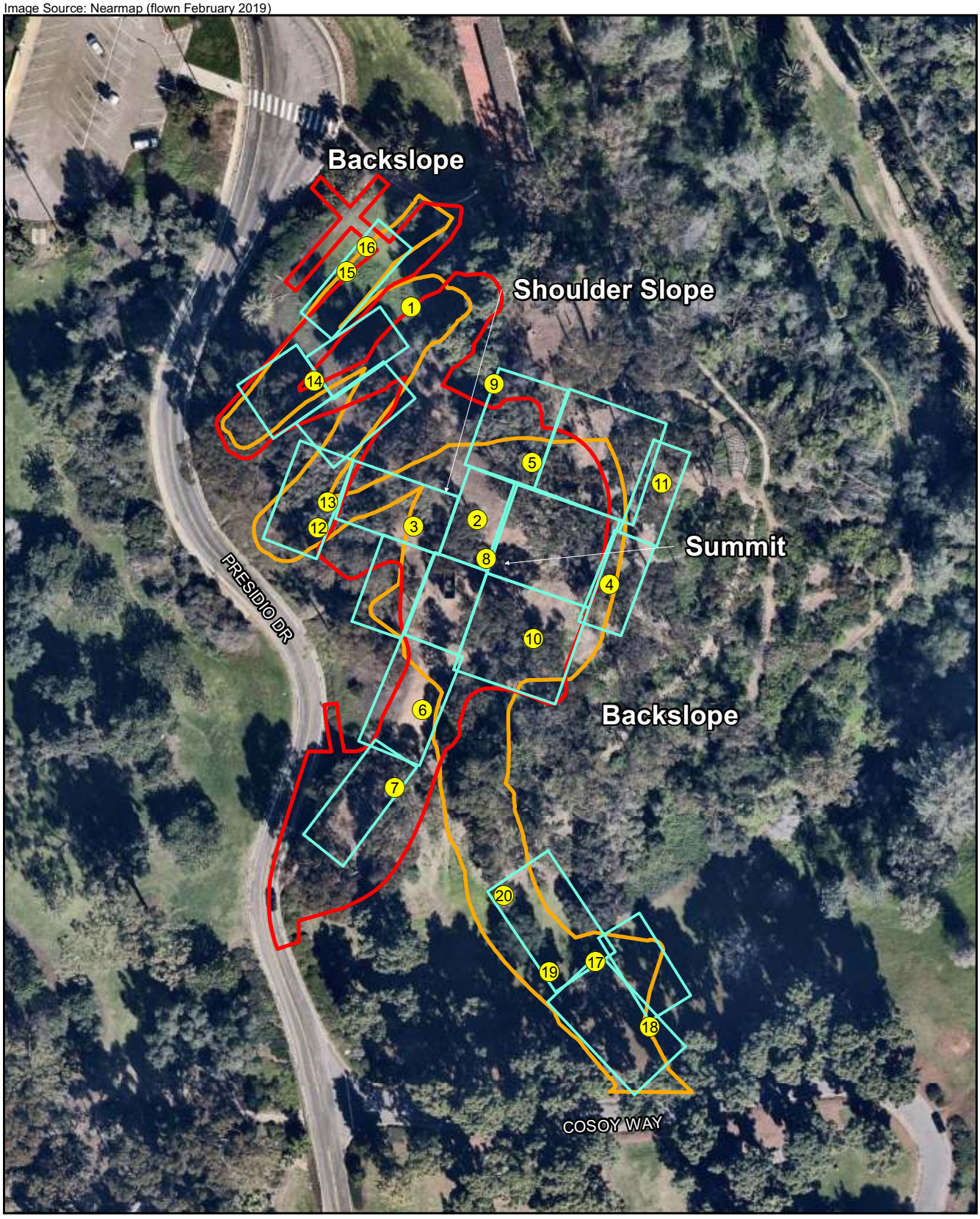


PHOTOGRAPH 2
Wolverine Drilling Rig on Tracks Used on Intermediate Slopes
in the Central and Southeast APE



PHOTOGRAPH 3
Mole Drilling Rig on Tracks Used on Steeper Slopes
in the Northwest APE

Image Source: Nearmap (flown February 2019)




Test Core
Grid
Project Boundary
Driveway Alternative

0 Meters 30

# FIGURE 10

## Geoarchaeological Coring Locations

RECON

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**Table 5**
**Locational, Topographic, and Soil Data for the Cores**

| Core # | Grid # | GPR Anomaly | | UTM Coordinates (Zone 11S) | | Elevation (AMSL) | | Core Depth (cm) | Slope | | | Soil Series | Slope Element |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Description | Depth (cm) | Easting | Northing | meter | feet | | Percent | Aspect | | | |
| 1 | n/a | n/a | | 481870.0 | 3624581.4 | 45.7 | 150 | 55 | 38 | West | 295° | Olivenhain | Backslope |
| 2 | 4 | Curved lines, pathway, wagon road | 10-60 | 481884.6 | 3624535.5 | 52.4 | 172 | 115 | 6 | Northwest | 330° | Gaviota | Summit |
| 3 | 8 | n/a | | 481870.9 | 3624534.0 | 51.8 | 170 | 87 | 8 | Northwest | 310° | Olivenhain | Shoulder |
| 4 | 13 | n/a | | 481913.3 | 3624521.9 | 53.0 | 174 | 60 | 12 | East | 75° | Gaviota | Shoulder |
| 5 | 6 | n/a | | 481896.4 | 3624548.1 | 53.6 | 176 | 50 | 14 | West | 275° | Gaviota | Shoulder |
| 6 | 1 | n/a | | 481873.1 | 3624494.4 | 52.1 | 171 | 97 | 4 | South | 180° | Gaviota | Summit |
| 7 | 2 | Cobbles, brick, tile | 64-90 | 481867.2 | 3624477.5 | 51.8 | 170 | 37 | 4 | Northeast | 50° | Gaviota | Summit |
| 8 | 4 | n/a | | 481886.6 | 3624527.2 | 52.7 | 173 | 34 | 3 | South | 210° | Gaviota | Summit |
| 9 | 6 | Metal | 22-44 | 481888.0 | 3624564.9 | 51.5 | 169 | 108 | 18 | West | 260° | Olivenhain | Shoulder |
| 10 | 11 | Road, stock piling | 10-60 | 481897.0 | 3624509.9 | 52.7 | 173 | 97 | 4 | East | 110° | Gaviota | Summit |
| 11 | 12 | Flagpole, pit, lookout | 64-90 | 481924.4 | 3624543.7 | 52.4 | 172 | 92 | 12 | East | 105° | Gaviota | Shoulder |
| 12 | 14 | Stratified layers | 22-44 | 481850.3 | 3624533.6 | 49.4 | 162 | 105 | 12 | West | 280° | Olivenhain | Backslope |
| 13 | 14 | Stratified layers | 22-44 | 481852.3 | 3624539.2 | 49.8 | 164 | 96 | 14 | West | 285° | Olivenhain | Backslope |
| 14 | 16 | Rectilineal feature | 35-60 | 481849.2 | 3624565.3 | 44.2 | 145 | 96 | 25 | Northwest | 300° | Olivenhain | Backslope |
| 15 | 18 | Cobble alignment | 44-64 | 481856.0 | 3624588.9 | 42.4 | 139 | 100 | 22 | West | 290° | Olivenhain | Backslope |
| 16 | 18 | Planar feature, buried stratum | 10-22 | 481860.3 | 3624594.4 | 41.8 | 137 | 104 | 22 | West | 280° | Olivenhain | Backslope |
| 17 | 19 | Evenly spaced feature | 22-44 | 481910.9 | 3624440.2 | 41.8 | 137 | 103 | 9 | Northeast | 50° | Olivenhain | Backslope |
| 18 | 19 | Road, stock piling | 10-44 | 481922.7 | 3624426.2 | 41.9 | 138 | 98 | 8 | North | 10° | Olivenhain | Backslope |
| 19 | 20 | Planar feature | 10-22 | 481900.9 | 3624437.9 | 43.0 | 141 | 100 | 16 | East | 80° | Olivenhain | Backslope |
| 20 | 20 | Planar feature | 10-44 | 481891.0 | 3624454.4 | 43.9 | 144 | 35 | 18 | East | 110° | Gaviota | Backslope |

AMSL = above mean sea level; cm = centimeter

reorganized within the soil profile, with clay (especially fine clay) translocated from surface horizons and accumulating in the subsoil. Gravel content was estimated visually and a subsample of each horizon was screened through 2 mm sieves to quantify the percentage of fine gravel. Soil pH was measured by colorimetry using a Hellige-Truog test kit.

After the cores were photographed and described, the fill for each core was screened by soil horizon through 1/8-inch (3.275 millimeter) mesh hardware cloth. All material retained in the screen was then examined to search for materials such as lithic or ceramic artifacts, shell, faunal bone, charcoal, or any other remains that may reflect human activity.

## 5.1 Native American Participation

A Native American observer participated during fieldwork to extract the soil cores. Native American participation was aimed at ensuring the Native American community was represented during project phases, advising the project archaeologist with regard to the respectful treatment of any possible Native American human remains, prehistoric grave goods, or artifacts that may be encountered during the testing phase.

# 6.0 Archaeological Coring Results

Coring was completed on January 14, 16, and 18, 2019. Following are the geoarchaeological descriptions and assessments of the 20 cores.

## 6.1 GPR Survey Findings and Core Descriptions

Tables 6 and 7 provide detailed information on the color, texture, structure, and other soil properties for each soil horizon in the cores. In all, 16.25 meters of core length were collected for Cores 1 to 20. Some cores were impeded by large cobbles or tree roots, and in one instance, the 29-70 cm section of Core 12 was unrecovered due to loose, unconsolidated soil that was not retained in the barrel of the core. But overall, there was excellent soil recovery by the drilling rigs that were used to collect the cores. Core depths were limited mainly by the depth to bedrock. Some cores even penetrated somewhat into soft, weathered sandstone, present at the bottom of many cores. A few cores (Cores 2, 3, and 6) penetrated into an argillic horizon that was often redder in color (mainly 7.5YR Munsell hues, but some as red as 5YR in color).

Most possible cultural features identified by the GPR survey could be ruled out as being cultural features (Table 8). Still, the 2.5-inch-wide cores still constitute a very small sample. Because of possible sampling bias, archaeological test units are recommended to test three of the soil anomalies to determine if they are in fact historic features. These include: (1) Core 7 (GPR Grid 2 – "Cobbles, brick, and tile" identified at 64-90 cm depth, but the core was unable to penetrate below 20 cm due a large cobble blocking it); (2) Core 11 (Grid 12 – "Flagpole, pit, lookout" identified at 64-90 cm depth; no trace found in core, but

**Table 6**
**Soil Horizon Sequence, Color, Texture, pH, and Structure for Cores 1-20**

| Core # | Run | Depth (cm) Top | Depth (cm) Bottom | Thickness (cm) | Soil Horizon | Color (dry) Munsell | Color (dry) Name | USDA Soil Texture (and soft bedrock) | Rock Fragments (SR-subrounded, SA-subangular) | % Clay (estimated) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 18 | 18 | A1 | 10YR 4/2 | Dark grayish brown | Loam | 2% SR fine gravel | 20 | 6.6 |
| 1 | 1 | 18 | 38 | 20 | A2 | 10YR 3/3 | Pale brown | Sandy loam | 5% SR fine gravel | 18 | 6.3 |
| 1 | 1 | 38 | 55 | 17 | AC | 7.5YR 4/4 | Brown to dark brown | Gravelly sandy clay loam | 16% SR fine-coarse gravel | 25 | 6.2 |
| 1 | 1 | | 55+ | | R | 10YR 5/3 | Brown | Sandstone bedrock | | | |
| 2 | 1 | 5 | 48 | 43 | A1 | 7.5YR 5/2 | Brown | Fine sandy loam | 3% SR fine gravel | 15 | 6.5 |
| 2 | 1-2 | 48 | 71 | 23 | A2 | 7.5YR 4/5 | Brown to dark brown | Fine sandy loam | 5% SR fine gravel | 15 | 6.5 |
| 2 | 2 | 71 | 88 | 17 | BAt | 7.5YR 4/6 | Strong brown | Clay loam | 2% SR/SA fine-coarse gravel | 27 | 6.2 |
| 2 | 2-3 | 88 | 115 | 27 | Bt | 5YR 4/4 | Reddish brown | Clay loam | 1% SR/SA fine gravel | 30 | 5.7 |
| 3 | 1 | 5 | 35 | 30 | A | 10YR 5/2 | Grayish brown | Sandy loam | 6% SR/SA fine-medium gravel | 15 | 6.6 |
| 3 | 1-2 | 35 | 54 | 19 | Bt1 | 7.5R 4.5/4 | Brown | Silt loam | 8% SR fine-medium gravel | 27 | 5.6 |
| 3 | 2 | 54 | 87 | 33 | Bt2 | 7.5YR 4/6 | Strong brown | Silt loam | 8% SR fine-medium gravel | 30 | 6.1 |
| 4 | 1 | 0 | 46 | 46 | A1 | 10YR 2/2 | Very dark brown | Loam | <1% SR fine gravel | 18 | 6.2 |
| 4 | 1 | 46 | 60 | 14 | A2 | 10YR 4/3 | Dark brown | Clay loam | <1% SR fine gravel | 29 | 6.1 |
| 5 | 1-2 | 0 | 36 | 36 | A | 10YR 5/3 | Brown | Very gravelly loam | 40% SR fine-coarse gravel | 15 | 6.5 |
| 5 | 2 | 36 | 50 | 14 | AC | 10YR 6/3 | Pale brown | Fine sandy loam | 10% SR fine-medium gravel | 18 | 6.3 |
| 6 | 1 | 5 | 13 | 8 | A | 10YR 3/3 | Dark brown | Loam | 3% SR fine gravel | 15 | 6.5 |
| 6 | 1 | 13 | 45 | 32 | BAt | 7.5YR 3.5/4 | Dark brown | Very gravelly clay loam | 35% SR fine-coarse gravel | 22 | 6.2 |
| 6 | 1-2 | 45 | 72 | 27 | Bt1 | 7.5YR 3.5/4 | Dark brown | Clay loam | 15% SR/SA fine-coarse gravel | 30 | 6.3 |
| 6 | 2 | 72 | 97 | 25 | Bt2 | 5YR 3/4 | Dark reddish brown | Gravelly clay loam | 8% SR/SA fine-coarse gravel | 22 | 5.7 |
| 7 | 1 | 5 | 20 | 15 | A | 10YR 4/4 | Dark yellowish brown | Very gravely loam | 6% SR fine-coarse gravel | 15 | 6.5 |
| 7 | 1 | 20 | 37 | 17 | AC | 10YR 4/4 | Dark yellowish brown | Very gravely loam | 6% SR fine-coarse gravel | 15 | 6.5 |
| 8 | 1 | 5 | 24 | 19 | A1 | 10YR 4/3 | Brown | Sandy loam to loam | 5% SR fine-medium gravel | 15 | 6.7 |
| 8 | 1 | 24 | 34 | 10 | A2 | 10YR 2.5/3 | Very dark brown | Sandy loam to loam | 5% SR fine gravel | 15 | 6.6 |
| 9 | 1 | 0 | 37 | 37 | A1 | 10YR 3.5/2 | Very dark grayish brown | Loam | 2% SR/SA fine-medium gravel | 15 | 6.3 |
| 9 | 1 | 37 | 47 | 10 | A2 | 10YR 3/3 | Dark brown | Loam | 2% SR/SA fine gravel | 16 | 6.3 |
| 9 | 2 | 47 | 73 | 26 | AC | 7.5YR 5/2 | Brown | Clay loam | 1% SR/SA fine gravel | 18 | 6.4 |
| 9 | 2-3 | 73 | 108 | 35 | C | 10YR 3/4 | Dark yellowish brown | Clay | 1% SR/SA< fine gravel | 40 | 6.7 |
| 10 | 1 | 5 | 31 | 26 | A1 | 10YR 3.5/2 | Very dark brown | Loam | 2% SR fine gravel | 15 | 6.4 |
| 10 | 1-2 | 31 | 60 | 29 | A2 | 10YR 4/2 | Dark grayish brown | Gravelly loam | 15% SR fine-coarse gravel | 15 | 6.0 |
| 10 | 2 | 60 | 71 | 11 | A3 | 10YR 4.5/2 | Dark grayish brown | Loam | 5% SR fine-medium gravel | 18 | 5.8 |
| 10 | 2 | 71 | 97 | 26 | C | 10YR 4/2 | Dark grayish brown | Clay | 2% SR fine gravel | 40 | 5.7 |
| 11 | 1 | 0 | 36 | 36 | A | 10YR 4/3 | Brown to dark brown | Loam | 1% SR finegravel | 16 | 6.3 |
| 11 | 1-2 | 36 | 66 | 30 | AC | 10YR 4.5/2 | Dark grayish brown | Clay | 1% SR fine gravel | 40 | 6.5 |
| 11 | 2 | 66 | 92+ | 26 | R | | | Soft sandstone bedrock | | | 6.2 |
| 12 | 1 | 0 | 29 | 29 | A1 | 10YR 4/2 | Dark grayish brown | Loam | 10% SR fine-coarse gravel | 18 | 6.3 |
| 12 | 1 | 29 | 70 | 41 | Unrecovered section | | | | | | |
| 12 | 2 | 70 | 89 | 19 | A2? | 10TR 7/3 | Very pale brown | Clay | None | 40 | 6.0 |
| 12 | 2 | 89 | 105 | 16 | R | 10YR 4.5/3 | Brown | Soft sandstone bedrock | | | |
| 13 | 1 | 5 | 21 | 16 | A1 | 10YR 4/2 | Dark yellowish brown | Loam | 3% SR fine-medium gravel | 19 | 6.4 |
| 13 | 1 | 21 | 38 | 17 | A2 | 10YR 5/3 | Unrecovered | Loam | 2% SR fine-medium gravel | 24 | 6.3 |
| 13 | 2 | 38 | 53 | 15 | AC | 10YR 5/4.5 | Brown | Gravelly loam | 30% SR fine-coarse gravel | 28 | 6.1 |
| 13 | 2 | 53 | 78 | 25 | C1 | 10YR 6/6 | Dark yellowish brown | Very gravelly clay loam | 38% SR fine-coarse gravel | 27 | 6.1 |
| 13 | 2 | 78 | 96 | 18 | C2 | 10YR 7/4 | Brown | Gravelly clay loam | 20% SR fine-coarse gravel | 27 | 6.2 |

**Table 6**
**Soil Horizon Sequence, Color, Texture, pH, and Structure for Cores 1-20**

| Core # | Run | Depth (cm) Top | Depth (cm) Bottom | Thickness (cm) | Soil Horizon | Color (dry) Munsell | Color (dry) Name | USDA Soil Texture (and soft bedrock) | Rock Fragments (SR-subrounded, SA-subangular) | % Clay (estimated) | pH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 2 | | 96+ | | R | 10YR 7/3 | Very pale brown | Soft sandstone bedrock | | | |
| 14 | 1-2 | 0 | 62 | 62 | A | 10YR 4/2 | Dark grayish brown | Gravelly loam | 15% SR fine/coarse gravel | 15 | 6.5 |
| 14 | 2 | 62 | 96 | 34 | C | 7.5YR 3/4 | Dark brown | Gravelly clay loam | 1% SR fine-coarse gravel, 5% SR cobbles | 28 | 6.8 |
| 15 | 1 | 0 | 20 | 20 | A1 | 10TR 4/2 | Dark grayish brown | Loam | 5% SR fin-coarse gravel | 15 | 6.3 |
| 15 | 1 | 20 | 39 | 19 | A2 | 10YR 5/3 | Brown | Loam | 5% SR fine-medium gravel | 15 | 6.4 |
| 15 | 1-2 | 39 | 71 | 32 | A3 | 10YR 5/4 | Yellowish brown | Loam | 3% SR fine-medium gravel | 15 | 6.3 |
| 15 | 2 | 71 | 90 | 19 | AC | 10YR 5/4 | Yellowish brown | Very fine sandy loam | 5% SR fine-medium gravel | 18 | 6.2 |
| 15 | 2 | 90 | 100 | 10 | C | 7.5YR 6/4 | Light brown | Very fine sandy loam | 7% SR fine/medium gravel | 20 | 6.2 |
| 16 | 1 | 4 | 43 | 39 | A1 | 10YR 4/2 | Dark grayish brown | Loam | <% SR fine gravel | 15 | 6.4 |
| 16 | 1-2 | 43 | 56 | 13 | A2 | 10YR 5/3 | Brown | Sandy loam | 2% SR fine gravel | 20 | 6.3 |
| 16 | 2 | 56 | 67 | 11 | AC | 10YR 5/4 | Yellowish brown | Clay | 6% SR fine-coarse gravel | 45 | 6.0 |
| 16 | 2 | 67 | 92 | 25 | C | 10YR 5/4 | Yellowish brown | Clay | 5% SR fine gravel | 48 | 5.9 |
| 16 | 2 | 92 | 104 | 12 | 2C | 7.5YR 4/4 | Brown to dark brown | Sandy clay loam | 5% SR fine gravel | 22 | 5.8 |
| 17 | 1 | 0 | 31 | 31 | A1 | 10YR 5/3 | Brown | Loam | 2% SR fine-medium gravel | 22 | 6.4 |
| 17 | 1 | 31 | 44 | 13 | A2 | 10YR 4/2 | Dark grayish brown | Clay loam | 2% SR fine-medium gravel | 35 | 6.3 |
| 17 | 1-2 | 44 | 83 | 39 | A3 | 10YR 5/4 | Yellowish brown | Clay loam | 2% SR fine-medium gravel | 20 | 6.3 |
| 17 | 2 | 83 | 103 | 20 | AC | 10YR 5/6 | Yellowish brown | Clay loam | 2% SR fine-medium gravel | 24 | 6.3 |
| 18 | 1 | 0 | 24 | 24 | A1 | 10YR 4/2 | Dark grayish brown | Clay loam | 2% SR fine gravel | 35 | 6.0 |
| 18 | 1-2 | 24 | 60 | 36 | A2 | 10YR 4/3 | Brown to dark brown | Loam | 2% SR fine gravel | 25 | 6.0 |
| 18 | 2 | 60 | 98 | 38 | A3 | 10YR 4.5/3 | Brown | Loam | 2% SR fine gravel | 18 | 5.8 |
| 19 | 1 | 0 | 16 | 16 | A1 | 10YR 4/2 | Dark grayish brown | Loam | 2% SR fine gravel | 26 | 6.3 |
| 19 | 1 | 16 | 51 | 35 | A2 | 10YR 5.5/3 | Brown to pale brown | Clay loam | 4% SR fine gravel | 30 | 6.3 |
| 19 | 2 | 51 | 88 | 37 | AC | 10YR 5/4 | Yellowish brown | Clay | <1% SR fine-coarse gravel | 50 | 6.2 |
| 19 | 2 | 88 | 100 | 12 | C | 10YR 5/4 | Yellowish brown | Clay | 3% SR fine-medium gravel | 40 | 6.2 |
| 20 | 1 | 5 | 24 | 19 | A | 10YR 4/2 | Dark grayish brown | Clay loam | 5% SR fine-medium gravel | 28 | 6.4 |
| 20 | 1 | 24 | 35 | 11 | AC | 7.5YR 5/2 | Brown | Very gravelly loam | 50% SR fine-very coarse gravel | 20 | 6.2 |
| 20 | 2 | | 35+ | | R | 7.5YR 6/6 | Reddish yellow | Soft sandstone bedrock | | | |

**Table 7**
**Soil Structure, Consistence, Carbonate Concentrations, and Pedofeatures for Cores 1-20**

| Core # | Run | Depth (cm) | | Thickness (cm) | Soil Horizon | Structure | | | Consistence | | | | Carbonate Concentration, Pedofeatures (clay films and bridges), and Other Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Top | Bottom | | | Grade | Size | Shape | Dry | Moist | Stickiness | Plasticity | |
| 1 | 1 | 0 | 18 | 18 | A1 | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 1 | 1 | 18 | 38 | 20 | A2 | Weak | Fine | Granular | Hard | Very firm | Slightly sticky | Slightly plastic | |
| 1 | 1 | 38 | 55 | 17 | AC | Weak | Fine | Granular | Extremely hard | Slightly rigid | Moderately sticky | Moderately plastic | Few, small, distinct, white calcium carbonate ($CaCO_3$) masses and ped/rock coatings |
| 1 | 1 | | 55+ | | R | Moderate | Medium | Granular | | | | | |
| 2 | 1 | 5 | 48 | 43 | A1 | Weak | Fine-med. | Granular | Moderately hard | Firm | Nonsticky | Nonplastic | |
| 2 | 1-2 | 48 | 71 | 23 | A2 | Weak | Fine | Granular | Hard | Slightly rigid | Nonsticky | Nonplastic | |
| 2 | 2 | 71 | 88 | 17 | BAt | Moderate | Medium | Subangular | Extremely hard | Rigid | Moderately sticky | Moderately plastic | Few, faint, yellowish red (5YR 4/6) clay films and bridges |
| 2 | 2-3 | 88 | 115 | 27 | Bt | Strong | Medium | Subangular | Extremely hard | Rigid | Moderately sticky | Moderately plastic | Common, distinct, reddish brown (5YR 4/4) clay films and bridges |
| 3 | 1 | 5 | 35 | 30 | A | Weak | Fine | Granular | Hard | Firm | Nonsticky | Nonplastic | |
| 3 | 1-2 | 35 | 54 | 19 | Bt1 | Weak | Medium | Subangular | Very hard | Very firm | | Moderately plastic | |
| 3 | 2 | 54 | 87 | 33 | Bt2 | Moderate | Medium | Subangular | Extremely hard | Extremely firm | Moderately sticky | Moderately plastic | |
| 4 | 1 | 0 | 46 | 46 | A1 | Weak | Medium | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 4 | 1 | 46 | 60 | 14 | A2 | Weak | Medium | Granular | Extremely hard | Slightly rigid | Moderately sticky | Moderately plastic | |
| 5 | 1-2 | 0 | 36 | 36 | A | Weak | Fine-med. | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 5 | 2 | 36 | 50 | 14 | AC | Moderate | Medium | Subangular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 6 | 1 | 5 | 13 | 8 | A | Weak | Fine-med. | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 6 | 1 | 13 | 45 | 32 | BAt | Moderate | Fine-med. | Subangular | Very hard | Extremely firm | Slightly sticky | Slightly plastic | Few, faint, strong brown (7.5YR 4/6) clay films on ped faces |
| 6 | 1-2 | 45 | 72 | 27 | Bt1 | Moderate | Medium | Subangular | Very hard | Extremely firm | Slightly sticky | Slightly plastic | Common, faint, strong brown (7.5YR 4/6) clay films on ped faces |
| 6 | 2 | 72 | 97 | 25 | Bt2 | Moderate | Medium | Subangular | Extremely hard | Slightly rigid | Moderately sticky | Moderately plastic | Common , faint, yellowish red (5YR 4/6) red clay films on ped faces |

**Table 7**
**Soil Structure, Consistence, Carbonate Concentrations, and Pedofeatures for Cores 1-20**

| Core # | Run | Depth (cm) | | Thickness (cm) | Soil Horizon | Structure | | | Consistence | | | | Carbonate Concentration, Pedofeatures (clay films and bridges), and Other Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Top | Bottom | | | Grade | Size | Shape | Dry | Moist | Stickiness | Plasticity | |
| 7 | 1 | 5 | 37 | 32 | A | Weak | Fine-med. | Granular | Slightly hard | Firm | Nonsticky | Nonplastic | |
| 8 | 1 | 5 | 24 | 19 | A1 | Weak | Fine | Granular | Soft | Very friable | Nonsticky | Nonplastic | |
| 8 | 1 | 24 | 34 | 10 | A2 | Weak | Fine | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 9 | 1 | 0 | 37 | 37 | A1 | Weak | Fine-med. | Granular | Soft | Friable | Nonsticky | Nonplastic | |
| 9 | 1 | 37 | 47 | 10 | A2 | Weak | Fine | Granular | Slightly hard | Firm | Nonsticky | Nonplastic | |
| 9 | 2 | 47 | 73 | 26 | AC | Weak | Fine | Granular | Hard | Very firm | Slightly sticky | Slightly plastic | |
| 9 | 2-3 | 73 | 108 | 35 | C | Weak | Medium | Granular | Extremely hard | Slightly rigid | Very sticky | Very plastic | Few, small, faint, spherical, white (10YR 8/1) carbonate masses and filaments |
| 10 | 1 | 5 | 31 | 26 | A1 | Weak | Fine-med. | Granular | Soft | Very friable | Nonsticky | Nonplastic | |
| 10 | 1-2 | 31 | 60 | 29 | A2 | Weak | Fine-med. | Granular | Soft | Very friable | Nonsticky | Nonplastic | |
| 10 | 2 | 60 | 71 | 11 | A3 | Weak | Fine-med. | Granular | Soft | Friable | Nonsticky | Nonplastic | |
| 10 | 2 | 71 | 97 | 26 | C | | | Massive | Rigid | Rigid | Very sticky | Very plastic | Very compact (traffic pan of road surface?) |
| 11 | 1 | 0 | 36 | 36 | A | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 11 | 1-2 | 36 | 66 | 30 | AC | Weak | Fine | Granular | Rigid | Rigid | Very sticky | Very plastic | Few, small, prominent, spherical, white (10YR 8/1) carbonate masses and filaments |
| 11 | 2 | 66 | 92+ | 26 | R | | | | | | | | Few, small, distinct, spherical, white (10YR 8/1) carbonate masses |
| 12 | 1 | 0 | 29 | 29 | A1 | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 12 | 1 | 29 | 70 | 41 | Unrecovered section | | | | | | | | |
| 12 | 2 | 70 | 89 | 19 | AC | Weak | Fine | Granular | Rigid | Slightly rigid | Very sticky | Very plastic | |
| 12 | 2 | 89 | 105 | 16 | R | | | | | | | | |
| 13 | 1 | 5 | 21 | 16 | A1 | Weak | Fine-med. | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 13 | 1 | 21 | 38 | 17 | A2 | Weak | Fine-med. | Granular | Hard | Firm | Nonsticky | Nonplastic | |
| 13 | 2 | 38 | 53 | 15 | AC | Weak | Fine | Granular | Very hard | Very firm | Slightly sticky | Slightly plastic | |
| 13 | 2 | 53 | 78 | 25 | C1 | | | Massive | Extremely | Extremely | Nonsticky | Nonplastic | |

**Table 7**
**Soil Structure, Consistence, Carbonate Concentrations, and Pedofeatures for Cores 1-20**

| Core # | Run | Depth (cm) | | Thickness (cm) | Soil Horizon | Structure | | | Consistence | | | | Carbonate Concentration, Pedofeatures (clay films and bridges), and Other Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Top | Bottom | | | Grade | Size | Shape | Dry | Moist | Stickiness | Plasticity | |
| | | | | | | | | | hard | firm | | | |
| 13 | 2 | 78 | 96 | 18 | C2 | | | Massive | Rigid | Rigid | Nonsticky | Nonplastic | Few, small, faint to distinct, spherical, white (10YR 8/1) carbonate filaments |
| 13 | 2 | | 96+ | | R | | | | | | | | |
| 14 | 1-2 | 0 | 62 | 62 | A | Weak | Fine-med. | Granular | Soft | Friable | Nonsticky | Nonplastic | |
| 14 | 2 | 62 | 96 | 34 | C | | | Massive | Rigid | Rigid | Slightly sticky | Slightly plastic | |
| 15 | 1 | 0 | 20 | 20 | A1 | Weak | Fine-med. | Granular | Soft | Friable | Nonsticky | Nonplastic | |
| 15 | 1 | 20 | 39 | 19 | A2 | Weak | Fine-med. | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 15 | 1-2 | 39 | 71 | 32 | A3 | Weak | Fine-med. | Granular | Slightly hard | Friable | Nonsticky | Nonplastic | |
| 15 | 2 | 71 | 90 | 19 | AC | Very weak | Fine | Granular | Hard | Firm | Nonsticky | Nonplastic | |
| 15 | 2 | 90 | 100 | 10 | C | | | Massive | Very hard | Friable | Slightly sticky | Slightly plastic | |
| 16 | 1 | 4 | 43 | 39 | A1 | Weak | Fine-med. | Granular | Soft | Friable | Nonsticky | Nonplastic | |
| 16 | 1-2 | 43 | 56 | 13 | A2 | Weak | Fine-med. | Granular | Slightly hard | Firm | Slightly sticky | Slightly plastic | |
| 16 | 2 | 56 | 67 | 11 | AC | Very weak | Fine | Granular | Rigid | Rigid | Very sticky | Very plastic | |
| 16 | 2 | 67 | 92 | 25 | C | | | Massive | Hard | Rigid | Very sticky | Very plastic | |
| 16 | 2 | 92 | 104 | 12 | 2C | | | Massive | Hard | Very firm | Slightly sticky | Slightly plastic | Lithological discontinuity from clay above |
| 17 | 1 | 0 | 31 | 31 | A1 | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 17 | 1 | 31 | 44 | 13 | A2 | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | Darker A2 could mark a buried surface |
| 17 | 1-2 | 44 | 83 | 39 | A3 | Weak | Fine-med. | Granular | Extremely hard | Slightly rigid | Moderately sticky | Moderately plastic | |
| 17 | 2 | 83 | 103 | 20 | AC | Very weak | Med.-coarse | Granular | Very hard | Extremely firm | Slightly sticky | Slightly plastic | |
| 18 | 1 | 0 | 24 | 24 | A1 | Weak | Fine-med. | Granular | Very hard | Very firm | Moderately sticky | Moderately plastic | |
| 18 | 1-2 | 24 | 60 | 36 | A2 | Weak | Fine-med. | Granular | Hard | Firm | Slightly sticky | Slightly plastic | Vertical animal burrow at 27- 40 cm ,filled with pale brown loam |
| 18 | 2 | 60 | 98 | 38 | A3 | Weak | Fine-med. | Granular | Hard | Friable | Slightly sticky | Slightly plastic | |

**Table 7**
**Soil Structure, Consistence, Carbonate Concentrations, and Pedofeatures for Cores 1-20**

| Core # | Run | Depth (cm) | | Thickness (cm) | Soil Horizon | Structure | | | Consistence | | | | Carbonate Concentration, Pedofeatures (clay films and bridges), and Other Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Top | Bottom | | | Grade | Size | Shape | Dry | Moist | Stickiness | Plasticity | |
| 19 | 1 | 0 | 16 | 16 | A1 | Weak | Fine-med. | Granular | Slightly hard | Friable | Slightly sticky | Slightly plastic | |
| 19 | 1 | 16 | 51 | 35 | A2 | Weak | Fine-med. | Granular | Very hard | Very firm | Slightly sticky | Slightly plastic | |
| 19 | 2 | 51 | 88 | 37 | AC | | | Massive | Rigid | Slightly rigid | Very sticky | Very plastic | |
| 19 | 2 | 88 | 100 | 12 | C | | | Massive | Extremely hard | Extremely firm | Moderately sticky | Moderately plastic | |
| 20 | 1 | 5 | 24 | 19 | A | Weak | Fine-med. | Granular | Hard | Very firm | Slightly sticky | Slightly plastic | |
| 20 | 1 | 24 | 35 | 11 | AC | Weak | Fine | Granular | Extremely hard | Rigid | Slightly sticky | Slightly plastic | |
| 20 | 2 | | 35+ | | R | | | | | | | | |

**Table 8**
**Geoarchaeological Assessment and Archaeological Recommendations for Soil Anomalies Identified by GPR**

| Core # | GPR Anomalies | Depth (cm) | Soil Horizon | Description/Core Results | Archaeological Recommendations |
|---|---|---|---|---|---|
| 2 | Curved lines, pathway | 10-60 | A1-A2 | Not identified in core | No further work |
| 7 | Cobbles, brick, tile | 64-90 | A2-Bt | Cobble blocked core at 37 cm | Archaeological test unit |
| 9 | Metal | 22-44 | A1-A2 | Not found in core | No further work |
| 10 | Road, stock piling | 10-60 | A1-A2 | Compact zone at bottom of A2 subhorizon at 60 cm may be traffic pan of dirt road | No further work |
| 11 | Flagpole, pit, lookout | 64-90 | AC-R | No cultural features identified in core, but bedrock was found at 66 cm. | Archaeological test unit |
| 12 | Stratified layers | 22-44 | A1-? | Core unrecovered at 29-70 cm, but stratified layers likely reflect a natural lithological change from loam to gravelly loam | No further work |
| 13 | Stratified layers | 22-44 | A2-AC | Stratified layers likely indicate natural lithological change from loam to gravelly loam texture. | No further work |
| 14 | Rectilineal feature | 35-60 | A | Not found, but A to C transition at 62 cm could correlate to bottom of feature. | Archaeological test unit |
| 15 | Cobble alignment | 44-64 | A3 | No soil indication of alignment or cultural layer in core | No further work |
| 16 | Planar feature, buried stratum | 10-22 | A1 | No buried stratum identified with A1 horizon | No further work |
| 17 | Evenly spaced feature | 22-44 | A1 | No trace in core | No further work |
| 18 | Road, stock piling | 10-44 | A1-A2 | No indication in core of a buried surface | No further work |
| 19 | Planar feature | 10-22 | A1-A2 | No planar cultural feature found, but slightly lighter-colored soil with mica flecks found at 16 cm | No further work |
| 20 | Planar feature | 10-44 | A-R | No cultural layer found, but bedrock was encountered at 35 cm. | No further work |

NOTE: Only cores with possible cultural features are listed.
GPR = ground-penetrating radar; cm = centimeter

soft sandstone bedrock observed below 66 cm could have been mistaken as concrete, or else the core just missed penetrating through or to the possible feature); and (3) Core 14 (Grid 16 – a "Rectilineal feature," quite possibly a small structure of some sort, given the regular spacing of what appear to be postholes and wall alignments).

Other soil anomalies identified as planar features and stratified layers seem to be best explained as natural soil horizons such as lithological discontinuities (e.g., change from loamy to gravelly or very gravelly soil horizons), or the contact with sandstone bedrock at the bottom of the soil. Suspected road trackways were also identified as GPR anomalies. These could not be identified with certainty in Core 2 (Grid 4) or 18 (Grid 19), but a compacted clayey soil in Core 10 (Grid 11) at 60 cm depth may correlate with a buried traffic pan caused by vehicular traffic. Historic aerial photos indicate one or more dirt road segments on the knoll and ridge line. According to Bill Lawrence (Executive Director of the San Diego History Center), the dirt road on the ridge line of the APE is the same roadway that was used for transporting construction materials during construction of the Serra Museum. This dirt road was used because it was easier to transport building materials along and downslope along this route than carrying it up the steeper uphill route from Presidio Drive. No further archaeological work is recommended for these possible dirt road segments.

Additional research was done to further check if any historical architectural or other types of features are indicated in historical photographs and maps in the archives of the San Diego History Center. Table 9 lists the archival materials that were examined. No cultural features were found in the photos, but dirt road segments are visible in some of the photographs on the ridge line.

## 6.2 Stratigraphic Cross Sections

Figures 11-14 show the soil stratigraphy for four cross sections including four to five cores that formed approximate lines across the APE. Figure 11 is an approximate north-south cross section (A-A') length-wise along the ridgeline and over the knoll in the central APE (Cores 7, 6, 8, 2, and 9); Figure 12 is a northwest-southeast cross section (B-B') of the ridge summit to the backslope in the southeast APE sector (Cores 7, 20, 17, and 18); Figure 13 is a northwest to southeast cross section (C-C') for the backslope to shoulder slope in the northern APE (Cores 16, 1, 9, 5, and 4); and Figure 14 is a roughly west to east cross section (D-D') for the backslope to shoulder slope across the central APE (Cores 13, 3, 8, and 4). Figure 15 shows the soil stratigraphy for all other cores (10, 11, 12, 14, 15, and 19), those cores not included in one of the four cross sections. Where possible, soil horizon boundaries aided in making stratigraphic correlations for different slope elements.

**Table 9**
**Summary Information for Archives (Photographs and Maps) Examined in Presidio Park Collection (MS 71), San Diego History Center Document Collection, San Diego**

| SDHC Archive # | Other Reference # | Year | View | Photo Type/Map | Description | Quality |
|---|---|---|---|---|---|---|
| 1850 | | 1850 | North | Drawing | San Diego Presidio and Mission Hills | Medium |
| 11675-1 | | 1874 | South | Map | Presidio Hill from San Diego River | Poor |
| 11675 | | 1883 | North | Ground | West side of Presidio Hill with Taylor Street and San Diego River in background | Medium |
| 15448 | | 1890 | West | Ground | Serra Palm with Presidio Hill in background | High |
| 3862B | | 1903 | Northeast | Ground | View of Old Town Plaza and flagpole, with Presidio Hill in background | Medium |
| 13764 | | 1905 | Northeast | Ground | Presidio Hill from Old Town | Medium |
| 11460 | | 1916 | North | Aerial | Oblique view of Mission Valley from hill at Old Town | High |
| 80:1783-A | | 1927 | East | Aerial | Oblique view of Presidio Hill | Good |
| 80:3549 | | 1927 | Northeast | Aerial | Oblique view of Presidio Hill | Medium |
| 79:741-1609 | | 1927 | Northeast | Aerial | Oblique view of Presidio Hill | High |
| Ms 35 | John Nolen et al. | 1927 | Down | Map | Plan for Presidio park | High |
| 80:3549 | | 1928 | Northeast | Aerial | Oblique view of Presidio Hill | Poor |
| 3862-D | | 1928 | Northwest | Ground | View of Spanish canon (cast of El Jupiter) at Fort Stockton, with Mission Valley | High |
| 5432 | Averrett Studio 15784-2 | 1928 | Northwest | Ground | Construction crew building Serra Museum with crane | Medium |
| 89:14641 | Bunnel PhotoShop | 1929 | West | Aerial | Oblique view of Serra Museum and Mission Bay | Medium |
| 80:3554 | | 1930 | Northeast | Aerial | Oblique view of Presidio Hill | Medium |
| 5277 | | 1930 | Northwest | Ground | Serra Museum and Mission Bay | Medium |
| 80:3548 | Erickson, S.D., 35-166-5 | 1935 | East | Aerial | Oblique view of Presidio Hill | High |
| 80:3552 | | 1935 | Down | Aerial | Aerial view of Presidio Hill | High |
| 79:741-367 | | 1937 | Northeast | Aerial | Oblique view of Old Town, Presidio Hill, and Mission Valley | High |
| 92:18835 | | 1951 | Northeast | Aerial | Oblique aerial view of Presidio Hill | Medium |
| 92:18835-2576 | | 1951 | Northeast | Aerial | Oblique aerial view of Presidio Hill and Mission Hills | Medium |
| 92:18835-2377 | | 1954 | Southwest | Aerial | Oblique view of Presidio Hill, Mission Hills, and Old Town | High |
| 157 PAR-PRE | Allice M. Clark | 1961 | Down | Map | Presdio Park map with key for every tree species in the park | High |
| 79:00:00 | Erickson, S.D., 35-166-5 | post-Serra | East | Aerial | Oblique view of Presidio Hill | Medium |
| 80:5338 | | post-Serra | East | Aerial | Oblique view of Presidio Hill | High |
| 10311-2 | | post-Serra | Northeast | Ground | Low oblique view of Presidio Hill from Old Town | High |
| S-7133 | | post-Serra | Southeast | Aerial | Low oblique view of Serra Museum and Presidio | High |
| 2600-54 | | post-Serra | Down | Map | Presidio Hill Park | Medium |
| 17037 | Title, Ins. & Trust Co. | post-Serra | East | Aerial | Oblique view (mostly down) of Presidio Park | High |

Map Source: Dr. Jeff Homburg, 2019

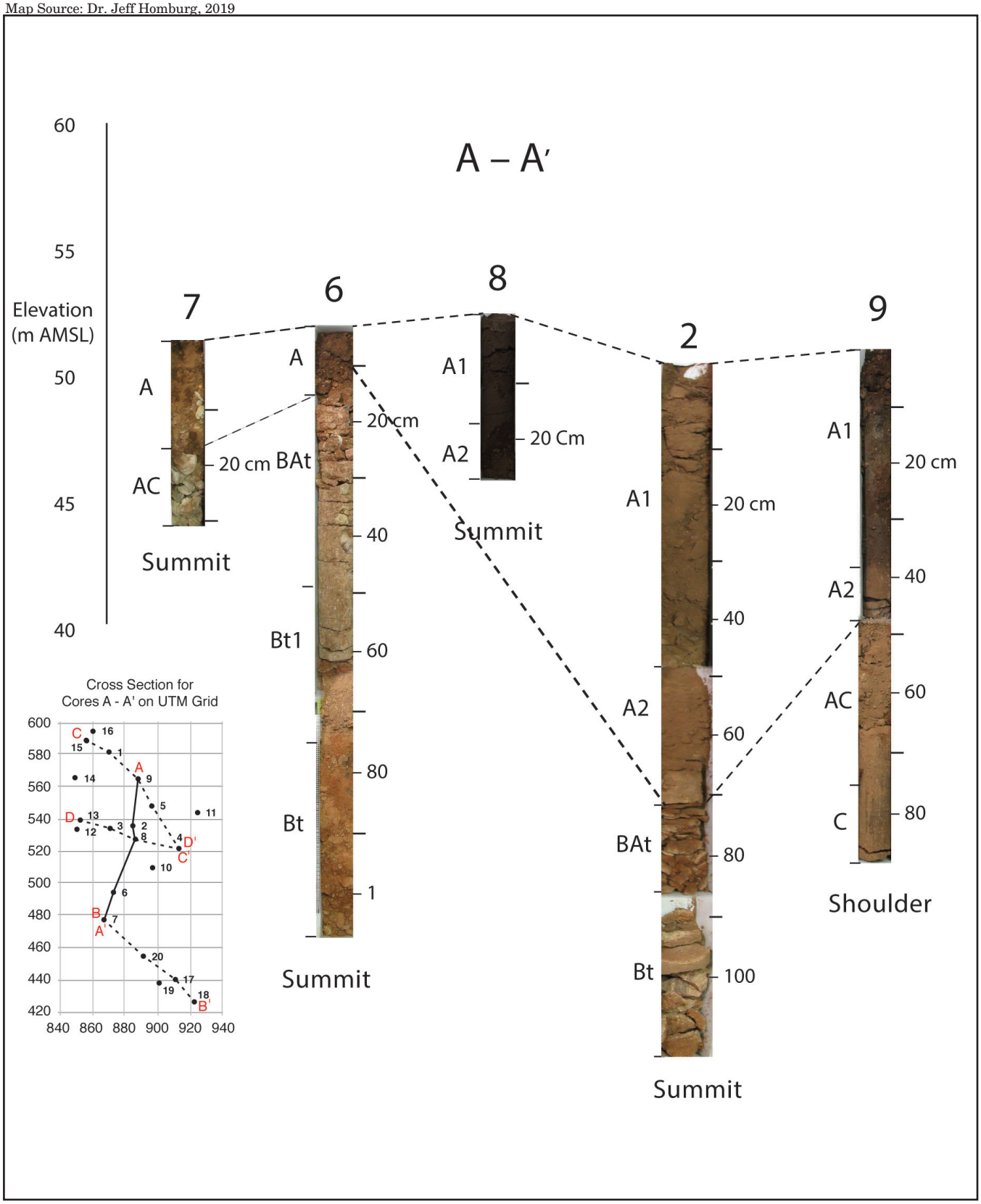



FIGURE 11

A-A' Soil Stratigraphic Cross Section for Cores 7, 6, 8, 2, and 9 on Summit of Ridgeline

RECON

M:\JOBS5\9087\arc\graphics\fig11_arcexc.ai 05/31/19 bma

Map Source: Dr. Jeff Homburg, 2019

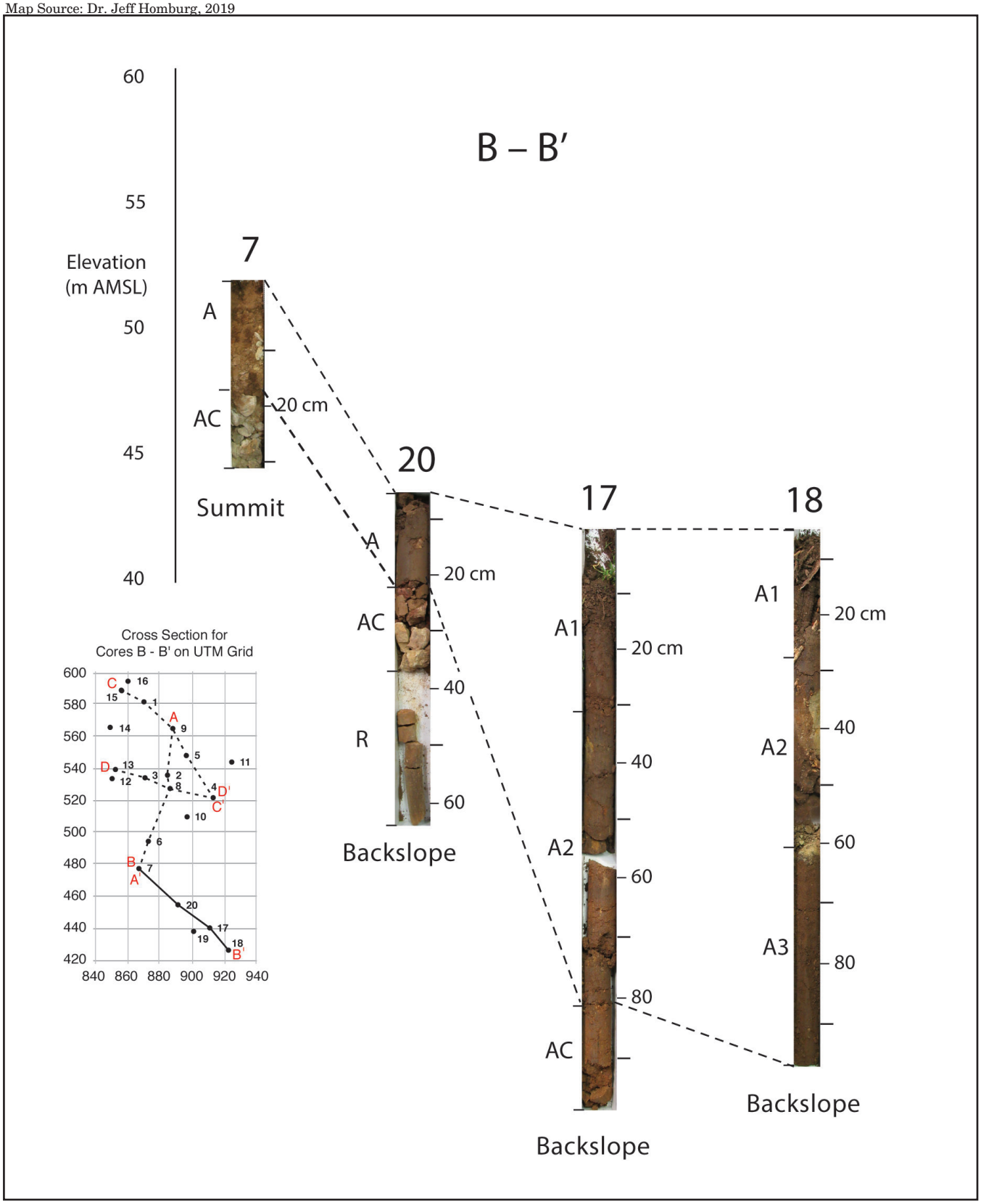



FIGURE 12

B-B' Soil Stratigraphic Cross Section for Cores 4, 18, 9, and 8 for Summit to Backslope

RECON

M:\JOBS5\9087\arc\graphics\fig12_arcexc.ai 05/31/19 bma

Map Source: Dr. Jeff Homburg, 2019

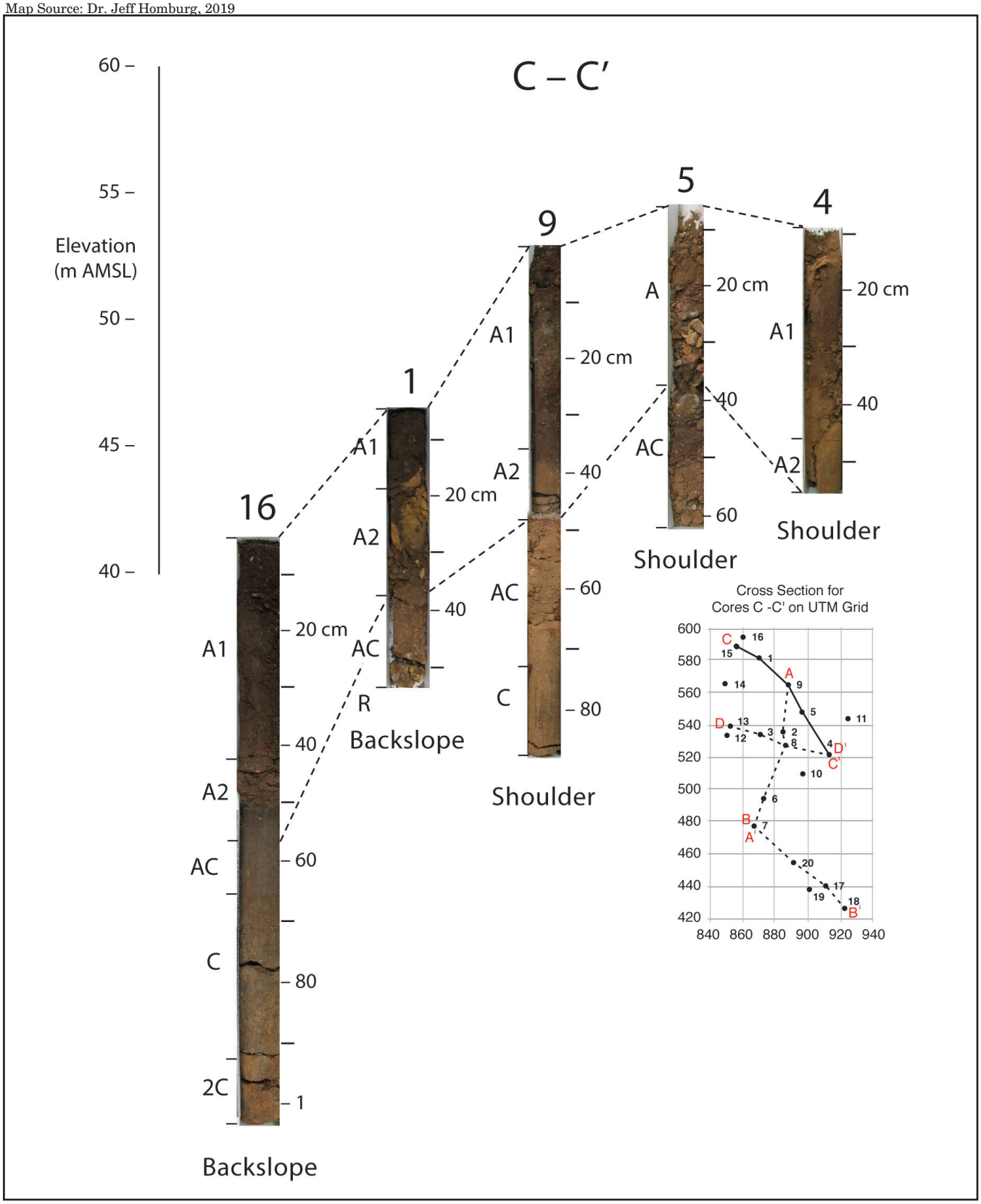



FIGURE 13

C-C’ Soil Stratigraphic Cross Section for
Cores 16, 1, 9, 5, and 4 for Shoulder Slope to Backslope

RECON

M:\JOBS5\9087\arc\graphics\fig13_arcexc.ai 05/31/19 bma

Map Source: Dr. Jeff Homburg, 2019

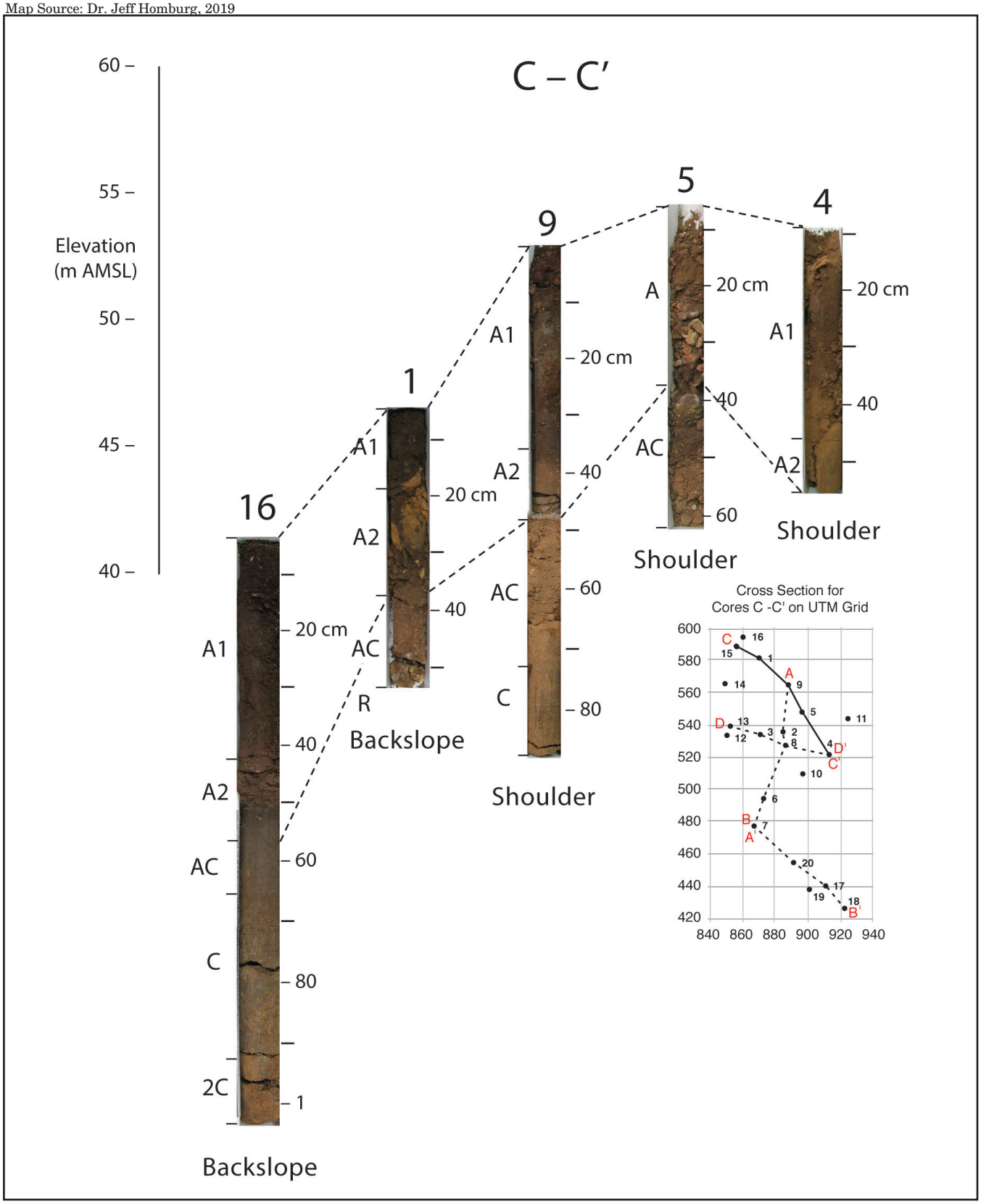



FIGURE 14

D-D' Soil Stratigraphic Cross Section for Cores 13, 3, 8, and 4 for Summit to Backslope

RECON

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Map Source: Dr. Jeff Homburg, 2019

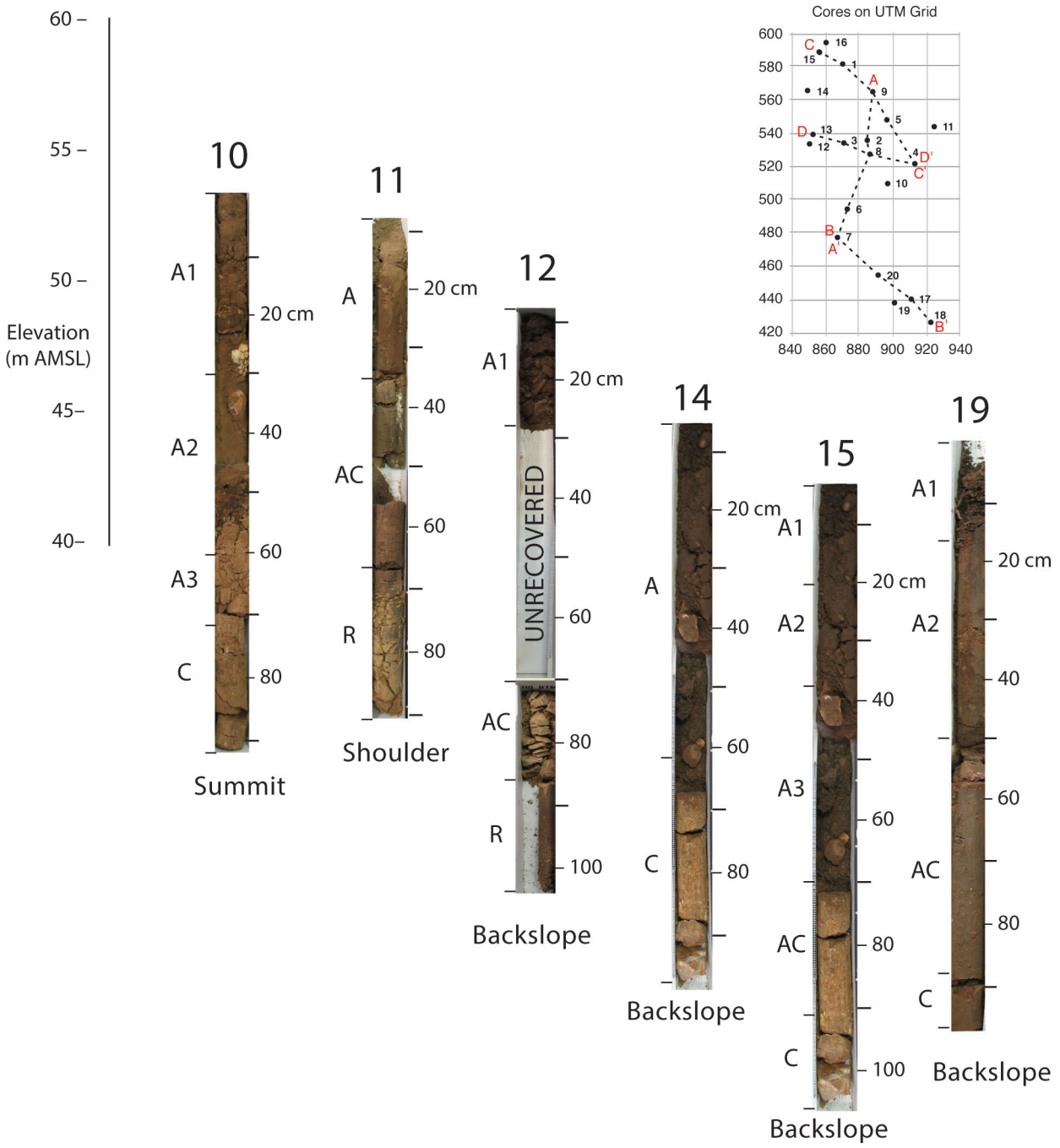



FIGURE 15
Soil Stratigraphy for
Other Cores (10, 11, 12, 14, 15, and 19)

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Photographs for the cores in these four cross sections show a number of special trends. Most notably, the summit (knoll and ridge crest) tends to be eroded where much of the soil is exposed to vehicular traffic and compacted on the dirt road located on the main axis of the ridge line. The clay-enriched argillic horizons are mainly concentrated on the summit and occasionally on the more stable shoulder slope positions. Thicker A horizons were found in pockets of colluvium where eroded soil material is actively being transported and temporarily stored on more concave in profile (from upslope to downslope) footslope-like portions of backslopes. Significant deposits (up to approximately 15 cm thick) of undecomposed leaf litter (that is, an O horizon indicative of organic soil) are accumulating in pockets of land on backslopes, especially in the northwest APE, thus attesting to how active transportation of sediment is as a geomorphic process in this landscape position. A-C soil profiles characterize all of the cores except the three with argillic horizons. This level of weak soil development is consistent with the main soil mapped in the APE, the Gaviota soil series of the Entisoils soil order.

## 6.3 Geoarchaeological Assessment of Cores and Site Formation Processes

No artifacts were found in any of the core samples. No artifacts were observed while logging the soil stratigraphy and none were recovered when the fill was screened through 1/8-inch mesh hardware cloth. Compacted soils noted in some cores may indicate near surface historic-period roadways. There are also traces of a possible structure marked by outline of post holes, and a possible flagpole feature. These and other possible cultural features are treated in more detail, along with archaeological recommendations, later in this report where the research questions are addressed.

Site formation processes include ones related to soil pH, the degree of mixing and the major soil-forming factors of climate, organisms, relief, parent material, and time (Jenny 1941). The combination of these five factors at a given location influences the rate and intensity of the four major types of soil-forming processes: additions (organic matter/biomass, atmospheric dust), losses (leaching, erosion, decomposition of organic matter), transformations (physical and chemical weathering of parent material), and translocations (general down-profile movement of soil particles, weathering products, and organic matter) (Simonson 1959).

The most important processes responsible for the appearance and functioning of the soil include organic matter additions. The dark color and thickness of the A horizons indicate forming mainly under the grassland vegetation that existed prior to planting of the trees throughout Presidio Park in the early 1930s. The organic matter in grassland soils comes mainly from decomposition of roots. In such grassland soils, about three-fourths of the root mass is in the upper half of the total rooting depth.

Several kinds of disturbance processes have affected the soils of the APE. Most important is erosion of the A horizon in many cores, especially on the summit and on shoulder slopes, where the upper A horizons was found to be truncated in places by either erosion or heavy machinery use on the knoll and ridge (note: park landscapers commonly placed piles of vegetation and soil material, which can disturb the surface over time as vegetation on the

surface is scraped mechanically or eroded. Trenches for irrigation pipe were found in numerous parts of the APE by the GPR survey.

Another site formation factor is bioturbation, mainly activity by burrowing animals, especially pocket gophers (Geomyidae), in the loamy soils (less so in clayey and gravelly soils). Penetration by tree roots is another type of bioturbation factor, as indicated both by tree roots in the core sections and by the disturbance below and near trees documented by the GPR survey. Although bioturbation has affected the APE, stratigraphic integrity still dominates over mixing processes. The best evidence of stratigraphic integrity is that soil horizons themselves were clearly visible while logging the cores. If mixing had been the dominant soil-forming process, then the boundaries between soil horizons would be mixed and thus less distinct

Soil pH is a crucial taphonomic factor in bone preservation. The ideal pH for preservation of hydroxyapatite ($Ca_{10}[PO_4]_6$ $[OH]_2$), the mineral component of bone, is 7.88 (Lindsay 2001; Linse 1992), conditions that are moderately alkaline. It is well known that acidic soil conditions can dissolve bone, but highly alkaline soils can also destroy it. The pH of soils in the APE are slightly acidic with pH levels averaging 6.2 and ranging from 6.0 to 6.8. Under such acidic conditions animal or human bone will dissolve within a few centuries. Aside from pH, sodium crystals can form in tiny voids in bone, sometimes with enough expansion to physically break down or destroy it.

## 6.4 Buried Site Modeling

Landform and soil ages were assessed for this project by: (1) analyzing the stratigraphy of the 20 cores collected from the APE, (2) reviewing the published soil map units for the APE and neighboring areas, and (3) using age assignments made by geologists for geologic map units (Tan and Kennedy 1996, Kennedy and Tan 2007) for geologic map units. The USDA Soil Taxonomy classification for each soil series provides information on relative soil age and the factors of soil formation. Soils are powerful age predictors because soil development is time-dependent (Birkeland 1999, Holliday 2004, Jenny 1941). Older landforms have well-developed soils (if not severely eroded) with diagnostic subsurface horizons (B horizons such as argillic horizons and duripans) whereas younger landforms have weakly developed soils with simple A-C horizonation (no B horizon). Diagnostic surface and subsurface soil horizons supplied key data for assessing buried-site potential for the APE, Presidio Park and nearby areas. For example, soils with a duripan (subsoils cemented with silica) are likely to predate the archaeological record of the project area. Soils with a cambic (soils with minimal soil structure and/or a color change from the parent material) horizon and ones that lack a B horizon are younger and less well developed, and consequently have greater potential for containing buried cultural deposits, especially when associated with alluvial or aeolian deposition. The potential for each soil map unit in the APE and neighboring areas was classified as having a high, medium, or low for containing buried archaeological deposits (Table 10). Soil groups 1 to 7 form an elevational transect from the Pacific coast inland to the mountains to the east. These soil groups form a continuum in age, with Group 1 being the youngest (except for recent alluvial soils of Group 5) and Group 7 being the oldest.

| Table 10<br>Soil Groups and Major Soil Series in San Diego Area | | | | | |
|---|---|---|---|---|---|
| Soil Series | Typical Soil Colors and Textures | USDA Soil Taxonomy Family | Diagnostic Subsurface Horizons | Parent Material/Landform | Buried Site Probability |
| Group 1: Soils formed in near-shore aeolian and marine deposits (Entisols, Inceptisols, and Alfisols) | | | | | |
| Marina | Grayish brown loamy sand and light brown loamy sand with lamellae over light brown sand | Mixed, thermic Lamellic Xeropsamments | None | Aeolian sand | Moderate to high |
| Chesterton | Brown sandy loam over brown and red sandy clay over strongly cemented duripan | Fine, kaolinitic, thermic Abruptic Durixeralfs | Argillic Duripan | Uplifted marine sediments and old terraces | Low |
| Carlsbad | Brown very gravelly loamy sand over pale brown loamy sand and weakly cemented duripan | Sandy, mixed, thermic Entic Durixerepts | Cambic Duripan | Sandy marine terraces | Low to moderate |
| Group 2: Quaternary Alluvial soils formed in marine deposits (Alfisols) | | | | | |
| Huerhuero (now included in Antioch series) | Light brownish gray loam over light yellowish brown clay or clay loam | Fine, smectitic, thermic Typic Natrixeralfs | Natric | Fan and stream alluvium from mixed sources | Low to moderate |
| Stockpen | Light gray gravelly clay over gray gravelly clay | Fine, smectitic, thermic Typic Natrixeralfs | Natric | Alluvium on marine terraces | Low to moderate |
| Group 3: Quaternary soils formed in cobbly, dissected alluvial fan remnants (Alfisols) | | | | | |
| Redding | Yellowish red gravelly loam over yellowish red clay over yellowish red duripan | Fine, mixed, active, thermic Abruptic Durixeralfs | Argillic Duripan | Soils formed in cobbly clay of dissected marime terraces | Low |
| Olivenhain* | Brown very cobbly loam over reddish brown very cobbly clay grading to pinkish white cobbly loam | Clayey-skeletal, kaolinitic, thermic Ultic Palexeralfs | Argillic | Soils formed in cobbly clay of dissected marime terraces | Low |

| Table 10<br>Soil Groups and Major Soil Series in San Diego Area | | | | | |
|---|---|---|---|---|---|
| Soil Series | Typical Soil Colors and Textures | USDA Soil Taxonomy Family | Diagnostic Subsurface Horizons | Parent Material/Landform | Buried Site Probability |
| Group 4: Clayey residual soils formed from calcareous marine sandstone and shale (Vertisols and Mollisols) | | | | | |
| Diablo | Dark gray silty clay over light olive gray silty clay and fractured and weathered sandstone and shale | Fine, smectitic, thermic Aridic Haploxererts | None | Residuum weathered from shale and sandstone in undulating to steep uplands | Low |
| Altamont | Brown clay over fractured and weathered sandstone and shale | Fine, smectitic, thermic Aridic Haploxererts | None | Residuum weathered from shale in uplands and some landslides on mtn. slopes | Low |
| Linne | Dark gray clay loam over white fine sand loam and mudstone | Fine-loamy, mixed, superactive, thermic Calcic Pachic Haploxerolls | None | Residuum weathered from relatively soft shale and sandstone | Low |
| Group 5: Recent alluvial soils (Entisols and Mollisols) | | | | | |
| Salinas | Very dark gray clay loam over grayish brown very fine sandy loam | Fine-loamy, mixed, superactive, thermic Pachic Haploxerolls | None | Alluvium weathered from sandstone and shale | Moderate |
| Corralitos | Stratified grayish brown loamy sand and light brownish gray and pale brown loamy sand | Mixed, thermic Typic Xeropsamments | None | Recent sandy alluvium derived from acid sandstone and related rocks | Moderate to high |
| Tujunga | Stratified brown and pale brown sand, sandy loam, and loamy sand | Typic Xeropsamments | None | Fan and stream alluvium from granitic sources | Moderate to high |
| Group 6: Residual soils formed from marine sandstone (Entisols and Alfisols) | | | | | |
| Gaviota* | Brown gravelly loam over sandstone bedrock | Lithic Xerorthents | None | Residuum weathered from sandstone in hills and mountains | Low |

| Table 10<br>Soil Groups and Major Soil Series in San Diego Area | | | | | |
|---|---|---|---|---|---|
| Soil Series | Typical Soil Colors and Textures | USDA Soil Taxonomy Family | Diagnostic Subsurface Horizons | Parent Material/Landform | Buried Site Probability |
| Las Flores | Light brownish gray loamy sand over grayish brown sandy clay grading to weathered marine sandstone | Fine, smectitic, thermic Natric Palexeralfs | Natric | Residuum weathered from sandstone of marine terraces | Low |
| Group 7: Residual soils formed from shaly marine breccia (Mollisols) | | | | | |
| Hambright | Brown and dark brown very stony loam over fractured basic igneous bedrock | Loamy-skeletal, mixed, superactive, thermic Lithic Haploxerolls | None | Residual soils weathered from basic igneous rocks on plateaus, basalt flows, and hillslopes | Low |
| *Olivenhain and Gaviota soil series are the ones in the APE for this project south of the Serra Museum in Presidio Park. | | | | | |

### 6.4.1 Background on Buried Site Modeling

Preservation and visibility of the archaeological record is principally a function of earth surface processes and, therefore, inherently biased (Waters 1992, Waters and Kuehn 1996, Schiffer 1983). Because of cycles of erosion and deposition over the last 15,000+ years, older archaeological deposits are significantly under-represented at the modern surface (Byrd and O'Neill 2002; Homburg et al. 2014; Meyer and Rosenthal 2008; Pope 2005; Rosenthal and Meyer 2004; Waters et al. 1999; Windingstad and Reddy 2012). Regionally, a number of buried prehistoric archaeological sites have been documented in southern California (Homburg 2014, Homburg and McLean 2017; Pope 2005, Waters et al. 1999). Eustatic sea-level rise since the last glacial maximum (24,000-18,000 years ago), coastal bluff erosion, tectonic uplift, and alluvial sedimentation along streams have all dramatically impacted the landscape since humans first arrived on the southern California coast (approximately 13,000-15,000+ years ago). These processes strongly influenced human settlement and subsistence patterns in the past and they largely determine how and where evidence of past human occupation is preserved today.

All buried site sensitivity models are based on the relationship between landform-age and the age of human settlement in North America. Put simply, buried archaeological resources are not possible in the subsoil of landforms that formed prior to human colonization of the continent, which based on our current understanding, occurred sometime in the latest Pleistocene. Using this concept as a methodological framework, the first step in modeling buried site potential is to delineate late Pleistocene or older landforms from those that aggraded coeval with human habitation (Latest Pleistocene to the present). Landform age can be evaluated by analyzing geologic and soil maps, along with aerial photography, and correlating local landforms/soils with regional geomorphic and geochronological studies. More robust models include field verification via subsurface testing, such as coring and/or trenching, and by dating stratigraphic sequences using radiocarbon or other dating methods such as optically stimulated luminescence or archaeomagnetic dating.

Although all terrestrial landforms that aggraded since the latest Pleistocene have at least some potential for buried archaeology, the probability for a buried site is related to more than just landform age (Meyer et al. 2010). Buried site models based exclusively on geologic potential will likely over-estimate potential in some areas and underestimate it in others. To compensate for this potential ambiguity, some sensitivity models incorporate a subset of environmental variables that are known to influence prehistoric settlement location. These variables generally include slope gradient, slope aspect, elevation, proximity to water sources, and distance to stream confluences (Hansen et al. 2004; Meyer 2010; Windingstad and Homburg 2016). Even with these variables included, however, there are several caveats to consider.

Soils vary at all scales, from subatomic and microscopic scales to entire landscapes and biomes. When soil surveys are used as the model foundation, it is important to recognize that unlike many geologic units, soil boundaries rarely have abrupt contacts; rather, soils usually grade more gradually from one type to another over shorter to longer distances and small pockets of two or more sharply contrasting soils are common within a single soil map

unit. As defined in the Soil Taxonomy, a soil mapping unit (soil series) may include up to 10 percent of a contrasting soil type or up to 50 percent if the inclusion is similar to the primary mapping unit (Soil Survey Staff 1975). Consequently, most mapped soil series include other soil types, including soils significantly different from the mapped unit. It is also important to note that the minimum size delineated on county soil maps can range from 1 to 4 hectares in area (1 hectare equals 10,000 square meters or about 2.5 acres) (Soil Survey Staff 1993). Many archaeological sites are significantly smaller than this size and so they often do not correspond to the scale of soil map units (Holliday 2004). Furthermore, soil and geologic maps that are available from state and federal agencies are not produced with the archaeologist in mind. Rather, the archaeologist must adopt these maps for their own purposes with the knowledge that the temporal and spatial scales used by earth scientists will result in some uncertainty at the scale of interest in most archaeological studies (Holliday 2004).

Nevertheless, buried site sensitivity models provide a valuable tool especially for cultural resource management projects. By identifying areas where buried cultural resources are more likely or possible, before the ground is disturbed for development, it is often possible to minimize or avoid damage to potentially significant important buried archaeological deposits but also prevents costly downtime and delays during the construction process. Buried sites represent a critical archaeological resource because in many cases overlying sedimentation can effectively protect them from the disturbance processes that operate at or near the surface. Bioturbation by burrowing rodents in particular can destroy the stratigraphic integrity and thus undermine research potential for many surficial sites in California (Bocek 1992; Erlandson 1984).

Buried archaeological sites have been identified in coastal lagoon and floodplain settings of the San Diego County coast along Las Flores and San Mateo Creeks on Camp Pendleton (Byrd 1996; Reddy and Pope 2005; Waters et al. 1999), the Otay River floodplain near San Diego Bay (Pope 2003), and the margin of San Elijo lagoon (Pope 2005, Smith 1986). Although initially recorded as a Late Prehistoric shell midden, extensive coring at P-37-00811/CA-SDI-811 on the floodplain of Las Flores Creek identified three buried occupational levels at 2 meters, 3 meters, and 5 meters below surface. These buried occupations were dated to 1700, 3300, and 5600 BC, respectively (Reddy and Pope 2005). Below the T-2 Holocene terrace along San Mateo Creek, Reddy et al. (1996) and Waters et al. (1999) dated buried hearths and cultural marine shell at sites P-37-013324/CA-SDI-13324, P-37-013325/CA-SDI-13325, and P-37-008435/CA-SDI-8435. These sites, found within 1-2 m of the modern surface, dated from 1310 to 3720 14C years BP. The dated stratigraphic sequences along San Mateo and Las Flores Creeks suggest that archaeological sites older than 4000 BP will be deeply buried and will not be visible on the modern surface. Finally, a buried sequence of stratified cultural deposits was discovered near San Diego Bay on the lower Otay River at 1 meter, 3 meters, and 5 meters below surface, and dated to AD 1600, AD 1400, and 3300 BC respectively. As with P-37-00811/CA-SDI-811, coring there centered on a previously identified late prehistoric site with a surface expression.

Alluvial settings in valley margins and low coastal terraces also provide important settings where archaeological sites are often buried. Slope wash deposits originating from

Pleistocene marine terraces and Tertiary bedrock hills can bury sites that were originally associated with higher ground. At San Elijo Lagoon buried archaeological deposits at site P-37-010220/CA-SDI-10,220 were identified down to 4 meters below surface and dated to 1300-2400 cal BC (Smith 1986, Pope 2005). Along the edges of Ballona Lagoon in coastal Los Angeles, late Prehistoric archaeological resources at P-19-000047/CA-LAN-47 and P-19-000211/CA-LAN-211/H were identified in alluvial fan and alluvial plain deposits to depths of 1 m or more (Altschul et al. 1992, 2003).

To produce a buried site model, it is important to understand the fundamental difference between soil and sediment. Sedimentary deposits are created by erosion, transport, and deposition of clastic material (gravel, sand, silt, and clay) via water, wind, or gravity. Soil horizons, by contrast, are the result of in situ weathering of sedimentary deposits after deposition ends or in situ weathering of bedrock (that is, residual soils, or more simply, residuum) as in the APE for this project within Presidio Park. Soil horizons are not depositional units, although they can be correlated for a particular archaeological site because they both often parallel the Earth's surface. The type of soil that develops in a sedimentary or residual setting is dictated by the major soil-forming factors: climate, organisms, relief, parent material, and time (Jenny 1941). The combination of these five factors at a given location influences the rate and intensity of the four soil-forming processes: additions (organic matter/biomass, atmospheric dust), losses (leaching, erosion, decomposition of organic matter), transformations (physical and chemical weathering of parent material), and translocations (general down-profile movement of soil particles, weathering products, and organic matter) (Simonson 1959).

Geologic maps reveal the age and distribution of sedimentary deposits and bedrock type at or near the earth's surface. County soil maps delineate soils using the concept of the soil series, which by definition represent a grouping of soils that have horizons similar in arrangement and in differentiating characteristics (Soil Survey Staff 1993). Soil geomorphic relationships, soil formation, and physiographic setting are not emphasized, and as a consequence, a poor correlation often exists between geologic maps and soil surveys (Holliday 2004, Simonson 1997). However, when the individual soil series are combined at higher levels of soil taxonomy (e.g. at the soil order level: Entisol, Alfisol, Mollisol, etc.), a much stronger correlation often exists (Holliday 2004: 57).

### 6.4.2 Model of Buried Site Potential for the APE, Presidio Park, and San Diego Area

Photographs 4-7 show north and south views from the knoll in the central APE and views in the southeast and northwest parts of the APE. Figure 16 shows the seven major soil groups in the Coastal Plain of the San Diego area for the coast inland to the foothills (adapted from Bowman 1973:Fig. 5). The APE is within Group 3. Table 10 is provided as a key for the soils of each major group shown in Figure 16. Soil pedon descriptions presented in Attachment 1 served as the basis for creating a model of buried site potential for soils in the APE, Presidio Park, and the main soils of the Coastal Plain in San Diego. The soils in Table 10 are classified as having a high, medium, or low probability for containing buried



PHOTOGRAPH 4
North View of APE from Knoll for Proposed Parking Lot



PHOTOGRAPH 5
South View of APE from Knoll for Proposed Parking Lot

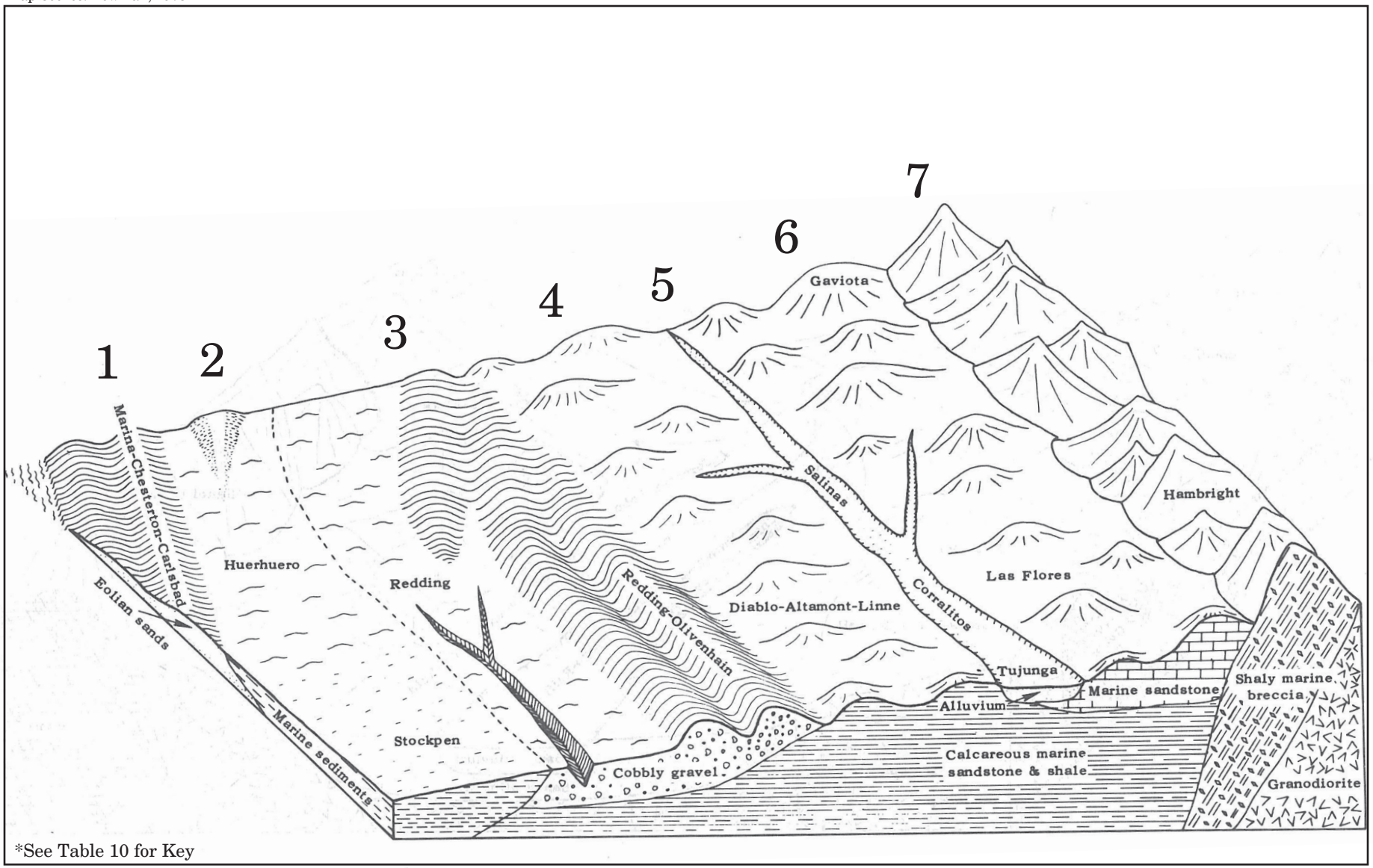


PHOTOGRAPH 6
East View of Southeast Part of APE from Presidio Drive



PHOTOGRAPH 7
South View of Northeast Part of APE from Serra Museum Sidewalk

Map Source: Bowman, 1973




*See Table 10 for Key

FIGURE 16
Block Diagram for Major Soil Groups in the San Diego Area

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archaeological sites. Most landforms and soils in the San Diego area have low potential. Areas with moderate to high buried site potential are limited mainly to alluvial soils along water courses and aeolian soils along the coast. Soils assessed as having low probability are characterized as soils that are too steep, too old or too young, or associated with landforms humans are unlikely to have used, such as steep rocky slopes.

Table 11 provides more detailed information on soil properties, landform associations, vegetation, and modern land use information. This information is used to interpret buried site potential specifically for the APE and Presidio Park. This buried site model outlined in Table 11 concludes that both soils in the APE have a low potential for buried or subsurface cultural deposits, other than possible intrusive cultural features such as prehistoric or historical-period pits used for storage, trash disposal, or various kinds of cooking or the soil anomalies identified by GPR. As a cautionary note, it is important to keep in mind that colluvial footslopes suitable for buried archaeological sites may exist in small pockets of land within soil map units that otherwise have an overall low potential for buried sites. Although there are some caveats associated with buried site sensitivity models based on existing soil and geologic maps, this model presented here provides a solid foundation for future geoarchaeological research in the Presidio Park area as well as San Diego more broadly.

This preliminary buried site model could be improved greatly by incorporating the soil map data into a geographic information system for rigorous spatial analysis and predictive modeling. Such a refinement should incorporate other important variables like topography (e.g., elevation, relative elevation above water, slope aspect and gradient, etc.).

The Gaviota and Olivenhain soils in the APE both have low potential for buried cultural resources. Gaviota soils are thin, residual soils weathered in situ from the underlying bedrock. These are recent soils (Entisols) that are poorly developed (that is, with an A-C soil horizonation and no B horizon) that have a low probability of containing intact buried archaeological resources. Because Gaviota soils are associated with elevated landforms that are unstable geomorphologically (that is, highly erodible), they are typically stripped away faster than the time span needed to advance past A-C horizonation (that is, to a B horizon, defined by changes in structure, color, and/or clay accumulation in the subsoil that differentiate it from the underlying C horizon, the soil parent material which has very little to no pedogenic (or soil-forming) development. Olivenhain soils formed in cobbly, Pleistocene alluvial fan deposits. These soils predate human occupation of North America and so they also have a low probability of containing buried archaeological sites.

Outside of the APE within Presidio Park (aside from the Presidio itself which is covered with about 1.5 meters of earthen fill to protect the architectural ruins), areas with the highest likelihood of having intact cultural deposits include a thin strip of Tujunga soils at the north edge of the park north of APE and on the south side of Taylor Street along the former floodplain of the San Diego River. Tujunga soils north of the APE and are formed in recent alluvium of the San Diego River. These are areas of active sedimentation (at least

**Table 11**
**Taxonomy, Geographic Setting, Land Use and Vegetation, and Buried Site Probability for Soil Map Units In and Near Presidio Park**

| Map Unit Symbol | Soil Map Unit | Soil Taxonomic Class (family level of USDA Soil Taxonomy) | Diagnostic Subsurface Horizons (depth in cm) | Geographic Setting | Drainage and Permeability | Land Use and Vegetation in Unurbanized Areas) | Geomorphic Stability | Buried Site Probability |
|---|---|---|---|---|---|---|---|---|
| **Entisols** | | | | | | | | |
| AuF | Anderson very gravelly sandy loam, 9-45% slopes | Loamy-skeletal, mixed, active, nonacid, thermic Typic Xerofluvents | | These soils are nearly level, but include some areas of colluvium on moderately steep slopes. They are on fans, flood plains and valley footslopes. They formed in gravelly and cobbly alluvium derived from a wide variety on rock sources, typically at elevations between 350 and 1,200 ft. | Somewhat excessively drained; slow/medium runoff; moderately rapid permeability. Some lower horizons are coarse textured and rapidly permeable. | Used for range and pasture and for growing citrus and avocados. Vegetation in uncultivated areas is annual grasses and forbs, sagebrush, coast live oak, Digger pine and shrubs. | Low to moderate | Moderate to high |
| GaF* | Gaviota fine sandy loam, 30-50% slopes | Loamy, mixed, superactive, nonacid, thermic Lithic Xerorthents | | Gaviota soils are on hills and mountains. Slope is 2 to 100 percent. These soils formed in material weathered from sandstone and meta-sandstone, typically at elevations of 200 to 4,400 feet. Rock outcrops are commonly associated with this soil and occupy from less than 2 percent to 50 percent of the surface area. | Well/excessively well drained; very low to very high runoff; moderately rapid permeability. | Used mostly for livestock grazing. Some of the less sloping areas are cropped to dryland grain. Natural vegetation is California sage, chamise, manzanita, purple needlegrass and annual grasses. | Low | Low |
| RkC | Reiff fine sandy loam, 9-30% slopes | Coarse-loamy, mixed, superactive, nonacid, thermic Mollic Xerofluvents | | The Reiff soils are on flood plains, or alluvial fans and are nearly level to moderately sloping. The soils formed in material weathered from mixed sources. Elevations are 30 to 500 feet. | Well drained; very slow to slow runoff; moderately rapid permeability. Some areas subject to occasional periods of flooding in December to April. | Used for row, field and orchard crops such as tomatoes, sugar beets, flowers, alfalfa, corn, beans, grapes, almonds, walnuts, avocados and citrus. Uncultivated areas have annual grasses and forbs, such as soft chess, filaree, wild oats, mustard and oak. | Low | Moderate |

**Table 11**
**Taxonomy, Geographic Setting, Land Use and Vegetation, and Buried Site Probability for Soil Map Units In and Near Presidio Park**

| Map Unit Symbol | Soil Map Unit | Soil Taxonomic Class (family level of USDA Soil Taxonomy) | Diagnostic Subsurface Horizons (depth in cm) | Geographic Setting | Drainage and Permeability | Land Use and Vegetation in Unurbanized Areas) | Geomorphic Stability | Buried Site Probability |
|---|---|---|---|---|---|---|---|---|
| TuB | Tujunga sand, 0-5% slopes | Mixed, thermic Typic Xeropsamments | | Setting include alluvial fans and floodplains with slopes: 0 to 9 percent. Parent material is alluvium weathered from granitic or similar sources. In urban areas there is usually a thin layer of human-transported materials spread over the surface. | Somewhat excessively drained; negligible to low runoff; high saturated hydraulic conductivity. Flooding is none to frequent. | This soil is used for grazing, citrus, grapes, other fruits, and urban residential or commercial development. Uncultivated areas have a cover of shrubs, annual grasses and forbs. In urban areas ornamentals and turf-grass are common. | Low | Moderate to high |
| **Inceptisols** | | | | | | | | |
| CcC | Carlsbad - urban land complex, 2-9% slopes | Sandy, mixed, thermic Entic Durixerepts | Duripan (99-127 cm; top varies from ~60 to 100 cm) | Carlsbad soils are gently sloping to moderate steep and are at elevations of 30 to 300 feet. They formed in marine terraces that almost parallel the coast. | Well/moderately well drained; medium/rapid runoff; moderately rapid permeability to slowly/very slowly permeable duripan. | Used to grow truck crops and flowers. Native vegetation is mostly chamise, sumac, black sage, scrub oak, annual grasses, and forbs. | Moderate | Moderate |
| **Alfisols** | | | | | | | | |
| None | Antioch (now includes Huerhuero series) | Fine, smectitic, thermic Typic Natrixeralfs | Natric (48-152 cm) | Antioch soils are on nearly level to strongly sloping alluvial fans and terraces at elevations less than 1,100 feet. Slopes are usually less than 3 percent. | Moderately well/somewhat poorly drained; slow/medium runoff; very slow permeability. | Used for production of annual pasture, dry farmed grain and some irrigated row crops. Vegetation in untilled areas is annual grasses, forbs and weeds with scattered oaks. | Moderate | Moderate |
| HuC | Huerhuero series-Urban, 2-9% slopes | Fine, smectitic, thermic Typic Natrixeralfs | Natric (48-152 cm) | Nearly level to strongly sloping alluvial fans and terraces at elevations less than 1,100 feet. Slopes are usually less than 3 percent. | Moderately well/ somewhat poorly drained; slow/medium runoff; very slow permeability. | Used for production of annual pasture, dry farmed grain, irrigated row crops, and urban development. Vegetation in untilled areas includes annual | Moderate | Moderate |

| Table 11<br>Taxonomy, Geographic Setting, Land Use and Vegetation, and Buried Site Probability for Soil Map Units In and Near Presidio Park | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Map Unit Symbol | Soil Map Unit | Soil Taxonomic Class (family level of USDA Soil Taxonomy) | Diagnostic Subsurface Horizons (depth in cm) | Geographic Setting | Drainage and Permeability | Land Use and Vegetation in Unurbanized Areas) | Geomorphic Stability | Buried Site Probability |
| | | | | | | grasses, forbs and weeds with scattered oaks. | | |
| HuE | Huerhuero series-Urban, 9-30% slopes | Fine, smectitic, thermic Typic Natrixeralfs | Natric (48-152 cm) | Nearly level to strongly sloping alluvial fans and terraces at elevations of less than 1,100 feet. Slopes are usually less than 3 percent. | Moderately well/somewhat poorly drained; slow/medium runoff; very slow permeability. | Used for production of annual pasture, dry farmed grain, irrigated row crops, and urban development. Vegetation in untilled areas includes annual grasses, forbs and weeds with scattered oaks. | Low to moderate | Low to moderate |
| Oke* | Olivenhain series-Urban | Clayey-skeletal, kaolinitic, thermic Ultic Palexeralfs | Argillic (25-107 cm) | Gently sloping to strongly sloping, dissected marine terraces at elevations less than 600 feet. | Well-drained; slow or medium runoff; very slow permeability. | Used principally for grazing and urban development. The natural vegetation is flattop buckwheat, wild oats, chamise, morning glory, filaree, soft chess, and cactus. | Moderate to high | Low to moderate |
| RhC | Redding-urban land complex, 9-30% slopes | | Argillic (48-56 cm), Duripan (56-69 cm) | Redding soils are on nearly level or dissected fan remnants. Micro relief may be hummocky. Gravel and cobbles tend to concentrate in the swales in hummocky areas. Vernal pools are common in areas with slopes of 0 to 3 percent. Slopes are 0 to 30 percent. Elevations are 40 to 2,000 feet | Well/moderately well drained, very low to high runoff, except for local ponding in intermound areas; very slow to slow permeability. | Used for rangeland and dryland small grain. A few areas are used for irrigated pasture. Natural vegetation is annual grasses and forbs. | | |

**Table 11**
**Taxonomy, Geographic Setting, Land Use and Vegetation, and Buried Site Probability for Soil Map Units In and Near Presidio Park**

| Map Unit Symbol | Soil Map Unit | Soil Taxonomic Class (family level of USDA Soil Taxonomy) | Diagnostic Subsurface Horizons (depth in cm) | Geographic Setting | Drainage and Permeability | Land Use and Vegetation in Unurbanized Areas) | Geomorphic Stability | Buried Site Probability |
|---|---|---|---|---|---|---|---|---|
| **Not Soil** | | | | | | | | |
| Rm | Riverwash | | | Drainage ways | May be poorly drained | | Low | Low |
| TeF | Terrace escarpments | | | Alluvial terrace escarpments | Usually well drained | | Low to moderate | Moderate |
| Ur | Urban land | | | Urban areas usually have a thin layer of human-transported materials on surface. | Usually well drained | | Low to high | Low to high |

prior to construction of dams upstream on the San Diego River) where human activities (occupation and resource procurement) were concentrated in the past. These soils have a moderate to high probability of containing buried archaeological sites). The footslope downslope and west of the Presidio is another place where intact archaeological resources may exist. In this case they could be buried below colluvial deposits eroded from the hillslopes of Presidio Hill. Depending on the age of the possible landslide deposits in the northwest and southwest parts of Presidio (if less than about 15,000 years in age; see Figure 8), it is possible that archaeological sites could be buried, especially in the area of the spring where the first members of Portola's expedition first camped before the Presidio was constructed.

The Huerhuero soil series (a series that has since been subsumed under the Antioch series) is mapped on the terrace at the base of Presidio Hill southwest of the Presidio ruins. Buried late Paleoindian artifacts associated with radiocarbon dates placing it to about 9,000 years in age, have been found in the Antioch soil by Scott Lindvall, geologist, and Thomas Rockwell, geology professor at San Diego State University while trenching across the Rose Canyon fault about 4 km to the north of Presidio Hill (Homburg and McLean 2017, Lindvall and Rockwell 1995). Antioch soils have a natric horizon, a special type of argillic horizon marked by significant amounts of sodium in the soil. Argillic horizons typically date to the late Pleistocene at a minimum in the American West and Southwest, but in a sodium-saturated soil system, clay particles are more easily deflocculated (dispersed) so they can be translocated downward more readily in soil cracks that are repeatedly wetted after rainfall events and drain through the soil, especially on more gradual slopes that have geomorphic stability.

Correlation with regionally dated stratigraphic successions and late Quaternary landscape development models, ages assigned to the geologic mapping units (Tan and Kennedy 1996, Kennedy and Tan 2007), and the level of soil formation associated with each landform provides temporal information for project landforms. As discussed previously, these landform-age determinations are the basis for the geologic potential values (low, medium, and high) assigned for the project area. Muh's (1982) research on San Clemente Island marine terrace soils indicates that some Alfisols in xeric conditions (soils with moisture regimes characteristic of a Mediterranean climate, that is mild wet winters and warm dry summers) in southern California coastal environments of southern California, like those of the APE and Presidio Park, have been dated at greater than 200,000 years old. Alfisols are also mapped on an alluvial terrace along Rose Creek, a terrace identified as Qt1, a late Pleistocene terrace, on the Tan and Kennedy (1996) geologic map and as Qoa (old alluvial floodplain deposits, late to middle Pleistocene, undivided) on the Kennedy and Tan (2007) map. If the terrace deposits Qt1 terrace are as young as suggested by Tan and Kennedy (1996), then they likely correspond to the last marine transgression and could be less than 15,000 years old. It is possible, therefore, that early prehistoric camps and dispersed village (or rancheria) settlements like Cosoy are buried in the terrace alluvium.

Waters et al. (1999) described and radiocarbon dated buried soils and archaeological sites from 500-4000 years old at Camp Pendleton. Entisols (young weakly developed soils) occur in limited extent in Presidio Park but are mapped as a ribbon of soil along the San Diego

River floodplain and lowermost terrace to the north. Much of this area has been heavily disturbed, however, due construction of I-8 and other modern developments, and so it is unclear how much stratigraphic integrity remains. Late Holocene floodplains, alluvial fans, alluvial plains, terrace escarpments, lower marine terraces, are all places that may have buried archaeological sites.

**Research Questions Revisited**

As noted in the research design, this investigation aimed to address four objectives. These objectives are listed below, along with discussion of each:

(1) to gather enough data to determine site significance per CEQA and City guidelines;

This geoarchaeological assessment is based on soil coring to assist in assessing significance regarding CEQA and City guidelines. Soil stratigraphic analysis of the cores is sufficient to indicate that intact, non-intrusive cultural remains (both features and artifacts) are highly unlikely in the APE. No artifacts were recovered from the screened fill of the cores and no midden deposits or traces of adobe architecture were observed during analysis of the cores. Given the proximity of the knoll and ridge line of the APE to the San Diego River, the ethnohistoric Kumeyaay village *Cosoy/Kosaii/Kosa'aay*, the Presidio occupied by Spanish colonists and briefly the Mexican governor, and the American Fort Stockton, which is right across the street from the south end of the APE, it would be surprising if the property was not used in prehistory or more recent historic times. Such use may have been ephemeral (i.e., use as a transportation corridor for pedestrian trails or wagon or vehicular road segments, picnicking, resting, hunting station overlooking the adjacent canyon and hillslopes, or perhaps a brief stop to resharpen lithic tools such as projectile points or cutting implements).

(2) to identify and/or verify features based on the ground-penetrating radar (GPR) results in order to avoid significant impacts to buried features;

Intrusive cultural features, including possible features identified as GPR anomalies may still be present.

(3) to identify areas with a higher likelihood of finding intact features and/or deposits;

The areas with the highest likelihood for having buried, intact features or cultural features are on slopes greater than 2 or 3 percent, enough slope to generate runoff when the intensity of precipitation exceeds the infiltration capacity of the soil, when the runoff is sufficient to detach soil particles from the surface and carry them downslope. Conversely, the high slope gradients of backslopes are the least likely places to have such cultural traces, aside from small pockets where soil material that may be stored temporarily on these slopes dominated by sediment transport.

(4) to document the soil stratigraphy.

Detailed descriptions and interpretations were made by photographing and logging the stratigraphy of each core in order to fully document stratigraphy of the APE. Stratigraphic cross sections were compiled for four transects across different landscape positions of the APE. Special attention was given to search for soil properties and changes that might be associated with soil anomalies indicative of cultural activity.

Geoarchaeological research questions related to site formation processes, chronology, and site function include:

The soil stratigraphy on the knoll indicates that sandstone bedrock is usually within a meter of the surface. No unequivocal evidence of Native American use was identified by this geoarchaeological coring study. Imported fill deposits were not identified, but it is likely that some sod was placed on portions of the APE, especially in the manicured lawn area in the southeast part of the APE near Cosoy Drive. There is no clear indication that top soils (that is, A horizons) have been removed from any location, other than natural erosion of shoulder slopes and summits. Intact deposits were indicated by the soil horizons visible in the cores, thus showing that intact soils are still preserved despite the crisscrossing of trenching for water and irrigation lines. Geoarchaeological core samples were spread out in the APE to test for possible features and to sample a wide variety of soil types and landscape positions. The soils descriptions provided stratigraphic data needed for reconstructing the major site formation processes.

Site function: What was the knoll used for? Did Native American groups primarily use the area or was it primarily used during historic times.

No evidence of Native American use was identified, which suggests that human activities in the past, even historically, must have been ephemeral activities unlikely to leave much if any archaeological traces. No indications of cobble foundations or adobe melt or blocks were found. Archaeological test excavations are recommended for three GPR anomalies (near Cores 7, 11, and 14; see Table 8) that could not be tested adequately in the soils for evaluating them. The commanding view of Mission Bay and the San Diego River suggests that the knoll could have served a lookout at certain times in the past.

Chronology: During which period was the knoll used primarily? Are there more prehistoric than historic artifacts? Do any of the artifacts date to Spanish, Mexican, or American periods?

No diagnostic artifacts of any of these times or cultures were found while evaluating the cores or while screening the fill, so this is still an unanswered question. The absence of such cultural remains suggests, however, that human activities were ephemeral in the past.

Overall, this study showed coring to be effective as a relatively nondestructive technique for examining, documenting, and interpreting the vertical distribution of the natural soil stratigraphy and to search for possible cultural deposits identified as soil anomalies by GPR. Coring, however, is less effective at documenting the horizontal distribution and variability of natural and cultural deposits. Caution is therefore necessary given the very small sample obtained, a narrow view of the subsurface in only a 2.5-inch core.

# 7.0 Management Considerations

The regulatory framework and methods for determining impacts on cultural resources associated with the proposed project include compliance with the requirements of CEQA, as defined in Section 15064.5 of the CEQA Guidelines and with City of San Diego Historical Resources Guidelines. Both sets of guidelines require the identification of cultural resources that could be affected by the proposed project, the evaluation of the significance of such resources, an assessment of the proposed project impacts on significant resources, and a development of a research design and data recovery program to avoid or address adverse effects to significant resources. Significant resources, also called historical resources, are those cultural resources (whether prehistoric or historic) that have been evaluated and determined to be eligible for listing in the California Register of Historical Resources (CRHR).

Under CEQA, effects of a proposed project on significant cultural resources, or historical resources, must be considered in the planning process. According to CEQA, a resource is historically significant if it meets one of the criteria for listing on the CRHR (Public Resources Code 5024.1, Title 14 California Code of Regulations [CCR], Section 4852). That is, a property is significant if it:

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

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

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

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

In addition to meeting one of the above criteria, a resource must retain enough of its integrity, or the authenticity of a historical resource's physical characteristics that existed during the resource's period of significance (CCR Title 14, Chapter 11.5 Section 4852 (c)). CEQA also recognizes resources listed in a local historic register or deemed significant in a historical resource survey. Some resources that do not meet these criteria may still be historically significant for the purposes of CEQA.

According to CEQA, a significant impact is a project effect that may cause a substantial adverse change in the significance of a historical resource. Adverse changes include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings resulting in the impairment of the resource's significance (Section 15064.5.4b, CEQA Guidelines). Mitigation measures are required for adverse effects on significant historical resources (Sec. 21083.2 CEQA Code).

The City has developed a set of guidelines that ensure compliance with state and federal regulations for the management of historical resources. These guidelines are stated in the Historical Resources Guidelines. The intent of the City's guidelines is to ensure consistency in the identification, evaluation, preservation/mitigation, and development of the City's historical resources.

The criteria used by the City to determine significance for historical resources reflect a more local perspective of historical, architectural, and cultural importance. For inclusion on the City's Historical Resources Register, the resource can meet one or more of the following criteria:

a. Exemplifies or reflects special elements of the City's, a community's, or a neighborhood's historical, archaeological, cultural, social, economic, political, aesthetic, engineering, landscaping, or agricultural development.

b. Is identified with persons or events significant in local, state, or national history.

c. Embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or crafts.

d. Is representative of the notable work of a master builder, designer, architect, engineer, landscape architect, interior designer, artist, or craftsman.

e. Is listed or has been determined eligible by National Park Service for listing on the National Register of Historic Places, or is listed or has been determined eligible by the State Historical Preservation Office for listing on the State Register of Historic Resources.

f. Is a finite group of resources related to one another in a clearly distinguishable way or is a geographically definable area or neighborhood containing improvements which have a special character, historical interest, or aesthetic value, or which represent one or more architectural periods or styles in the history and development of the city (City of San Diego 2001).

Core analysis indicated that the APE has relatively good stratigraphic integrity; however, the analysis did not identify any midden deposits, artifacts, or unequivocal soil indicators of possible cultural features identified by the GPR survey of the APE. If the APE was used in prehistory, there is no clear indication of that. If artifacts are present in sparse densities, they would have to be limited to the surface, unless moved downward by animal burrowing or the growth and decay of tree roots. Isolated artifacts would not be considered significant

As noted above, cultural features were not identified with the core samples. If features are present as suggested by the GPR survey, they could represent significant cultural resources that may yield information about past prehistoric or historic uses. Because of the potential of unknown cultural features and the archaeological significance of the San Diego Presidio and its proximity to the APE, combined with its importance as a tribal cultural resource for Native Americans, the proposed project has the potential to impact unknown (buried) significant cultural resources. Therefore, RECON recommends the presence of qualified archaeological and Native American monitors during earth-moving activities, particularly near Cores 7, 11, and 14 (see Figure 10).

After the completion of the monitoring, an appropriate report shall be prepared. If no significant cultural resources are discovered, a brief letter shall be prepared. If significant cultural resources are discovered, a report with the results of the monitoring and data recovery (including the interpretation of the data within the research context) shall be prepared.

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# ATTACHMENTS

# ATTACHMENT 1

# Official Soil Series Descriptions for Project Area and San Diego Area

# Attachment 1
# Official Soil Series Descriptions
# for Project Area and San Diego Area

(Compiled by Jeffrey A. Homburg from
https://soilseries.sc.egov.usda.gov/osdname.aspx, accessed March 11, 2019)

## ALTAMONT SERIES

LOCATION ALTAMONT, CA
Established Series
Rev. LEW/GMK/JJJ/WRR/SBS
11/2009

The Altamont series consists of deep, well drained soils that formed in material weathered from fine-grained sandstone and shale. These soils are on gently sloping to very steep uplands. The average annual precipitation is about 17 inches and the mean annual temperature is about 59 degrees F.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Aridic Haploxererts
**TYPICAL PEDON:** Altamont clay, range. (Colors are for dry soil unless otherwise stated.)
**A**--0 to 7 inches; brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; very thin surface crust grayish brown (10YR 5/2) or lighter; strong coarse prismatic and strong coarse and medium blocky structure; very hard, very firm, very sticky and very plastic; common fine roots which tend to concentrate on faces of peds, roots appear flattened or compressed; few very fine tubular pores in places; very dark brown and black films and mats on faces of peds; slightly acid (pH 6.5) clear smooth boundary. (4 to 9 inches thick)
**Bss1**--7 to 19 inches; brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; moderate coarse prismatic and moderate coarse blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; mostly on faces of peds; common very fine tubular pores; many slickensides; few whitish films of carbonates on surface of peds in lower portion; neutral (pH 6.8); clear smooth boundary. (8 to 12 inches thick)
**Bss2**--19 to 28 inches; brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; moderate coarse prismatic and moderate coarse and medium blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; concentrated mainly on faces of peds; few very fine tubular pores; many slickensides; slightly calcareous, carbonates mostly disseminated; few fine whitish soft or slightly hard carbonate segregations and films; slightly alkaline (pH 7.8); clear smooth boundary. (8 to 9 inches thick)
**Bssk1**--28 to 37 inches; finely mixed brown (10YR 4/3) and dark yellowish brown (10YR 4/4) clay, dark brown (10YR 3/3) and dark yellowish brown (10YR 3/4) moist; weak coarse prismatic and moderate medium blocky structure; very hard, very firm, very sticky and very plastic; few fine roots mostly on faces of peds; few very fine tubular pores; few soft fine yellowish brown 10YR 5/6 and yellowish brown 10YR 5/8 iron oxide segregations; few small embedded shale fragments; many slickensides; moderately calcareous, carbonates mostly disseminated; few fine whitish soft or slightly hard carbonate segregations and films; slightly alkaline (pH 7.8); clear smooth boundary. (8 to 12 inches thick)
**Bssk2**--37 to 50 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; weak medium blocky structure; very hard, very firm, sticky and plastic; few fine roots; mostly along faces of peds; few very fine tubular pores; few small embedded shale fragments; few slickensides; many embedded soft or slightly hard whitish carbonate segregations or nodules; moderately calcareous, with much disseminated as well as segregated carbonates; moderately alkaline (pH 8.0); clear smooth boundary. (8 to 16 inches thick)
**Cr**--50 to 65 inches; olive (5Y 5/3) highly fractured and weathered fine grained sandstone and shale, dark olive gray (5Y 3/2) moist; light olive brown (2.5Y 5/4) silty clay loam along fracture planes, olive brown (2.5Y 4/4) moist; increasingly shaley and undecomposed with increased depth; shale fragments appear very slightly calcareous; many soft or somewhat hardened whitish carbonate segregations, nodules, and films in upper portion; progressively less disseminated and segregated carbonates with greater depth; moderately alkaline (pH 8.0).

**TYPE LOCATION:** Alameda County, California; 6 miles northeast of Livermore, 750 feet east and 2,250 feet south of the northwest corner of section 19, in the SE1/4, SW1/4, NW1/4 section 19, T. 2 S., R. 3 E.; Latitude 37 degrees, 44 minutes, 47 seconds North and Longitude 121 degrees, 41 minutes, 30 seconds West.
**GEOGRAPHIC SETTING:** Altamont soils are on uplands, hills and mountains. Some Altamont soils are on slides on mountain slopes. Slope is 0 to 75 percent. Elevation is 100 to 4,480 feet. These soils formed in material weathered from fine-grained sandstone and shale. The climate is dry subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 10 to 25 inches. Mean annual temperature is 57 degrees to 62 degrees F. The mean January temperature is about 45 degrees to 48 degrees F. and the mean July temperature about 65 degrees to 80 degrees F. The frost-free season is 180 to 340 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Azule, Contra Costa, Diablo, Linne, Los Osos, Nacimiento, San Ysidro, San Benito and Vaquero soils. Azule soils, on hills, have an argillic horizon. Contra Costa soils, on foothills and mountains, have an argillic horizon and have a mixed mineralogy class. Diablo soils, have a Cr horizon at a depth of 40 to 80 inches and have 5Y color hues. Linne soils, on hills, have a paralithic contact at a depth of 20 to 40 inches and a fine-loamy particle-size control section. Los Osos soils, on uplands, have an argillic horizon and a paralithic contact at a depth of 20 to 40 inches. Nacimiento soils, on uplands, have a paralithic contact at a depth of 20 to 40 inches and have a fine-loamy particle-size control section. San Ysidro soils, on low terraces, are very deep and have an argillic horizon. San Benito soils, on hills, have a fine-loamy particle-size control section. Vaquero soils, on hills and mountains, have a paralithic contact at a depth of 20 to 40 inches.
**DRAINAGE AND PERMEABILITY:** Well drained; medium to very high runoff; after cracks swell shut, permeability is slow.
**USE AND VEGETATION:** Used for livestock grazing and dry farmed grains, mainly barley. The principal vegetation is annual grasses, forbs, and scattered oak trees.
**DISTRIBUTION AND EXTENT:** In the Diablo Ranges in the California Coast Ranges in central and southern California and the Sutter Buttes. The soils are extensive. MLRA 15, 18, 20.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Livermore Area, California, 1910.
**REMARKS:** Restricting this series to fewer MLRA's would be a good place to start a new correlation process. Thorough research of all Soil Survey Areas that have mapped Altamont soil was not done during the 2002 update. This soil was mapped at 3,000 feet elevation in Kings County and the highest elevation of 4,480 feet is located in the Fresno County, Western Part Soil Survey. Further research of this extensive soil may reveal mapping at similar elevations. Competing series updated October 2009.
**ADDITIONAL DATA:** Eight NSSL characterization pedons: S93CA-011-001, S93CA-011-003, S93CA-011-004 from Colusa County; S58CA-001-003 (Series type location) and S58CA-001-004 from Alameda County; three pedons in Glenn County; S85CA-021-001, S85CA -021-002, and S85CA -021-003; one pedon in Los Angeles County S81CA-037-002.


Nevada
Carson City
Sacramento
San Jose
California
Fresno
Las Vegas
Los Angeles
San Diego
Tijuana
Mexicali

## ANDERSON SERIES

LOCATION ANDERSON, CA
Established Series
Rev. SBJ-LCL
01/2003

The Anderson series have brown, medium acid, gravelly loam A horizons and reddish brown, slightly acid, very gravelly sandy loam C horizons.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, active, nonacid, thermic Typic Xerofluvents
**TYPICAL PEDON:** Anderson gravelly loam, grass-forb vegetation (Colors are for dry soil unless otherwise noted.)
**A1**--0 to 23 inches; Brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 4/3) moist; massive; hard, friable, nonsticky, nonplastic; many fine roots and pores; moderately acid (pH 6.0); gradual smooth boundary. (10 to 24 inches thick)
**C1**--23 to 43 inches; Reddish brown (5YR 5/3) very gravelly sandy loam, reddish brown (5YR 4/3) moist massive; hard, friable, nonsticky; few roots and pores; slightly acid (pH 6.2); diffuse boundary. (15 to 30 inches thick)
**C2**--43 to 60 inches; Reddish brown (5YR 5/3) gravelly sandy loam, reddish brown (5YR 4/3) moist; single grained; loose; slightly acid (pH 6.5).
**TYPE LOCATION:** Stanislaus County, California; SW 1/4 sec. 17, T. 1 N, R. 11 E.
**GEOGRAPHIC SETTING:** These Anderson soils usually are nearly level, but include some in colluvium on moderately steep slopes. They are on fans, flood plains and valley footsloped at elevations of 350 to 1,500 feet. They formed in gravelly and cobbly alluvium derived from a wide variety on rock sources. The climate is dry subhumid mesothermal and has warm to hot dry summers and cool moist winter. Mean annual precipitation is 16 to 45 inches. Average January temperature is 45 to 51 F; average July temperature is about 62 F. The freeze-free season is 225 to 300 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Soboba and Tujunga soils and the Bear Creek, Honcut, Perkins, Ramona and Wymansoils. Bear Creek, Perkins, Ramona, and Wyman soils have argillic horizons and less than 35 percent rock fragments. Honcut soils have less than 35 percent rock fragments.
**DRAINAGE AND PERMEABILITY:** Somewhat excessively drained; slow to medium runoff; moderately rapid permeability. Some lower horizons are coarse textured and rapidly permeable.
**USE AND VEGETATION:** Used for range and pasture and for growing citrus and avocados. Vegetation in uncultivated areas is annual grasses and forbs, sagebrush, coast live oak, Digger pine and shrubs.
**DISTRIBUTION AND EXTENT:** Sacramento and Central Valleys and in small; valleys in southern California. The soils are moderately extensive (12,000 acres). Map below shows the extent of the Anderson soil (in red) in California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Shasta County (Redding Area), California, 1907.
**REMARKS:** The Anderson soils were formerly classified as Alluvial soils. Differentiate between the Cortina and Anderson should be strengthened or the two series should be combined.
The activity class was added to the classification in January of 2003. Competing series were not checked at that time. - ET
Last revised by the state on 6/73.


Nevada
Carson City
Sacramento
San Francisco
San Jose
California
Fresno
Las Vegas
Los Angeles
San Diego
Tijuana
Mexicali

## ANTIOCH SERIES

LOCATION ANTIOCH, CA
Established Series
Rev. LAB-GMK-LCL
3/97

The Antioch series have light brownish gray and brown, medium acid, loam Ap and Al horizons, light gray A2 horizons, light yellowish brown yellowish brown, medium acid and moderately alkaline clay and clay loam B2t horizons.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Typic Natrixeralfs
**TYPICAL PEDON:** Antioch loam - plowed field (Colors are for dry soil unless otherwise noted.)
**Ap**--0 to 5 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; common fine yellowish brown (10YR 5/6) mottles, strong brown (7.5YR 5/6) moist; massive; hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine roots; many very fine and medium tubular pores; medium acid (pH 5.6); clear smooth boundary. (5 to 10 inches thick)
**A1**--5 to 14 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; few fine yellowish brown (10YR 5/6) mottles, strong brown (7.5YR 5/6) moist massive; hard, friable, slightly sticky, slightly plastic; few very fine roots; many fine and medium acid (pH 6.0); clear wavy boundary. (8 to 15 inches thick)
**A2**--14 to 19 inches; light gray (10YR 7/2) loam, dark grayish brown (10YR 4/2) moist; common fine yellowish sticky, slightly sticky; slightly plastic; few very fine roots; many fine pores; Mn stains; slightly acid (pH 6.5); abrupt smooth boundary. (1/4 to 5 inches thick)
**Bt1**--19 to 34 inches; light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 3/3) moist; moderate very coarse prismatic structure; extremely hard, very firm, sticky, very plastic; few very fine roots; common very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; few dark stains; medium acid (pH 6.0); clear wavy boundary. (9 to 16 inches thick)
**Bt2**--34 to 37 inches; yellowish brown (10YR 5/4) heavy clay loam, dark brown (10YR 4/3) moist; weak medium angular blocky structure; extremely hard, very firm, sticky, plastic; common very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; many dark stains; moderately alkaline (pH 8.0); clear wavy boundary. (8 to 14 inches thick)
**Bt3**--37 to 46 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist, dark brown (7.5YR 3/2) and dark grayish brown (2.5Y 4/2) ped faces moist; weak medium angular blocky structure; hard, firm, sticky, plastic; common very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; common dark stains; moderately alkaline (pH 8.0); diffuse boundary. (0 to 10 inches thick)
**Bt4**--46 to 60 inches; pale brown (10YR 6/3) silty clay loam, olive brown (2.5Y 4/2) and dusky red (2.5YR 3/2) faces of peds moist; weak medium angular blocky structure; hard, firm, sticky, plastic; common very fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; common dark stains; moderately alkaline (pH 8.0); clear wavy boundary. (0 to 14 inches thick)
**C1**--60 to 76 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; weak medium angular blocky structure; slightly hard, friable, slightly sticky, plastic; many very fine tubular pores; common thin clay films on faces of peds and lining pores; common dark stains; moderately alkaline (pH 8.0); clear wavy boundary. (10 to 20 inches thick)
**C2**--76 to 81; Dark yellowish brown (10YR 4/4) moist fine sandy loam; weak medium angular blocky structure; slightly hard, friable, many very fine tubular pores; few thin clay films on faces of peds and lining pores; moderately alkaline (pH 8.0); common Fe and Mn stains.
**TYPE LOCATION:** Solano County, California; 1 1/2 miles east of Suisun City; SW1/4 SE1/4 SW1/4 sec. 29, T. 5 N., R. 1 W., MDB&M 38 degrees North latitude 14 minutes, 40 seconds, 122 degrees West longitude 00 minutes, 5 seconds.
**GEOGRAPHIC SETTING:** Antioch soils are on nearly level to strongly sloping alluvial fans and terraces at elevations of less than 1,100 feet. Slopes are usually less than 3 percent. The climate is subhumid mesothermal with warm to hot dry summers and cool moist winter. Mean annual precipitation is 12 to 20 inches. Average January temperature is about 46 F, average July temperature about 68 F, mean annual temperature about 58 F, and the freeze-free season ia about 260 days.

**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Altamont, Los Osos, Pleasanton, Rincon, and San Ysidro soils and the competing Solano soils. Altamont soils are of fine texture throughout and have cracks. Los Osos soils have mollic epipedons. Pleasanton, Rincon, and San Ysidro soils lack natric horizons.
**DRAINAGE AND PERMEABILITY:** Moderately well to somewhat poorly drained; slow to medium runoff; very slow permeability.
**USE OF VEGETATION:** Used for production of annual pasture, dry-farmed grain and some irrigated row crops. Vegetation in untilled areas is annual grasses, forbs and weeds with scattered oaks.
**DISTRIBUTION AND EXTENT:** Along the central and southern Coast Range valleys in California. They are of moderate extent in MLRA 14 and 17. Map below shows the extent of the Antioch soil (in red; the Huerhuero is now included in the Antioch soil series) in California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California

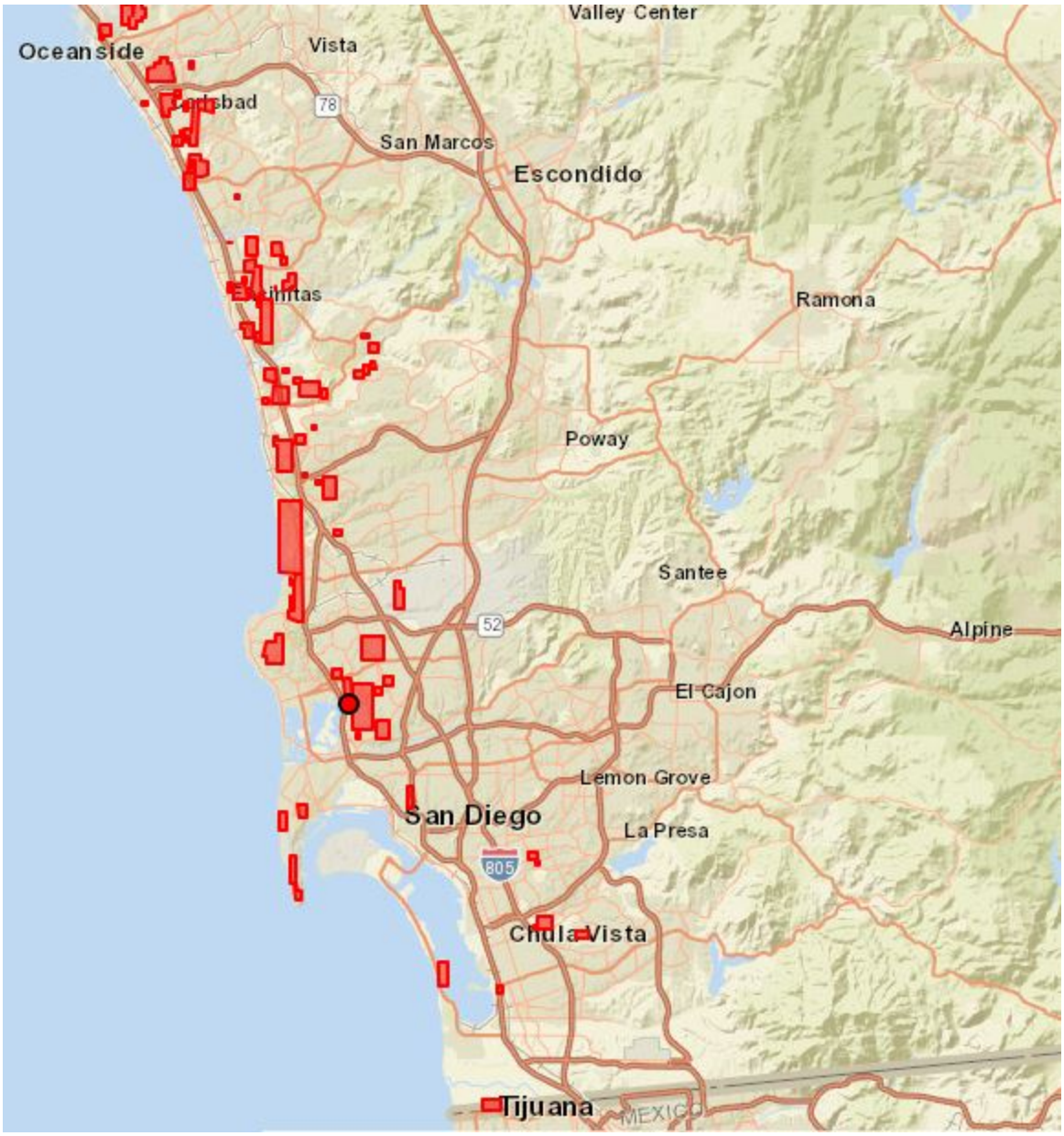


## CARLSBAD SERIES

LOCATION CARLSBAD, CA
Established Series
Rev. GK-RCH-LAB
03/2009

The Carlsbad series have brown, pale brown, and very pale brown slightly acid gravelly loamy sand A horizons, pale brown and light brown, slightly and strongly acid heavy loamy sand C horizons underlain by weakly cemented duripans at a depth of 38 inches.

**TAXONOMIC CLASS:** Sandy, mixed, thermic Entic Durixerepts
**TYPICAL PEDON:** Carlsbad gravelly loamy sand - shrubgrass. (Colors are for dry soil unless otherwise noted).
**Acn1**--0 to 3 inches; brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable; common fine roots; many fine tubular and interstitial pores; pebbles are iron concretions that make up 20 percent by volume of the horizon; slightly acid (pH 6.50; abrupt smooth boundary. (3 to 10 inches thick)
**Acn2**--3 to 21 inches; pale brown and very pale brown (10YR 6/3, 7/3) gravelly loamy sand, dark yellowish brown and yellowish brown (10YR 4/4, 5/4) moist; massive; hard, friable; few fine and course roots; many fine tubular and interstitial pores; common iron concretions; slightly acid (pH 6.5); clear smooth boundary. (6 to 18 inches thick)
**C1**--21 to 31 inches; pale brown (10YR 6/3) heavy loamy sand, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky, slightly plastic; few fine and coarse roots; many fine tubular and interstitial pores; few iron concretions; slightly acid (pH 6.5); gradual smooth boundary. (7 to 10 inches thick)
**C2**--31 to 39 inches; brown and light brown (7.5YR 5/4, 6/4) heavy loamy sand; dark brown and brown (7.5YR 4/4, 5/4) moist; massive; very hard, friable, slightly sticky, slightly plastic; few medium and coarse roots; common fine tubular and interstitial pores; strongly acid (pH 5.5); clear smooth boundary. (8 to 10 inches thick)
**Cm**--39 to 50 inches; brown and light brown (7.5YR 5/4, 6/4) weakly cemented sandy duripan.
**TYPE LOCATION:** San Diego County, California; 150 feet north of water tank at Oak Ridge School, near center sec. 14, T. 13 S., R. 4 W. (projected). UTN zone 11 475113e and 3656196n NAD83. 117 degrees, 15 minutes, 55 seconds west longitude, 33 degrees, 2 minutes 38 seconds north latitude.
**GEOGRAPHIC SETTING:** The Carlsbad soils are gently sloping to moderate steep and are at elevations of 30 to 300 feet. They formed in marine terraces that almost parallel the coast.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Chesterton soils and the Alo, Corralitos, Las Flores, Marina, Salinas, and Tujunga soils. Alo soils are clayey soils developed on shale. Corralitos soils are very deep alluvial soils. Las Flores soils have clay subsoils. Marina, Salinas, and Tujunga soils lack iron concretions and duripans.
**DRAINAGE AND PERMEABILITY:** Well or moderately well drained; medium or rapid runoff; moderately rapid permeability to the duripan, the duripan is slowly or very slowly permeable.
**USE AND VEGETATION:** Used to grow truck crops and flowers. Native vegetation is mostly chamise, sumac, black sage, scrub oak, annual grasses, and forbs.
**DISTRIBUTION AND EXTENT:** Coastline of southern California. The soils are not extensive. Map below shows the extent of the Anderson soil (in red) in coastal southern California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** San Diego County (Oceanside Area), California, 1929.
**REMARKS:** Carlsbad soils were formerly classified as Noncalcic Brown soils.
Last revised by the state on 12/73. UTM added 3/2009 ET.
**ADDITIONAL DATA:** NSSL pedon S56CA-073-001 (taxadjunct) and pedon S78CA-073-009 (no soil description)


Valley Center
Oceanside
Vista
78
San Marcos
Escondido
Ramona
Poway
Santee
52
Alpine
El Cajon
Lemon Grove
San Diego
La Presa
805
Chula Vista
Tijuana
MEXICO

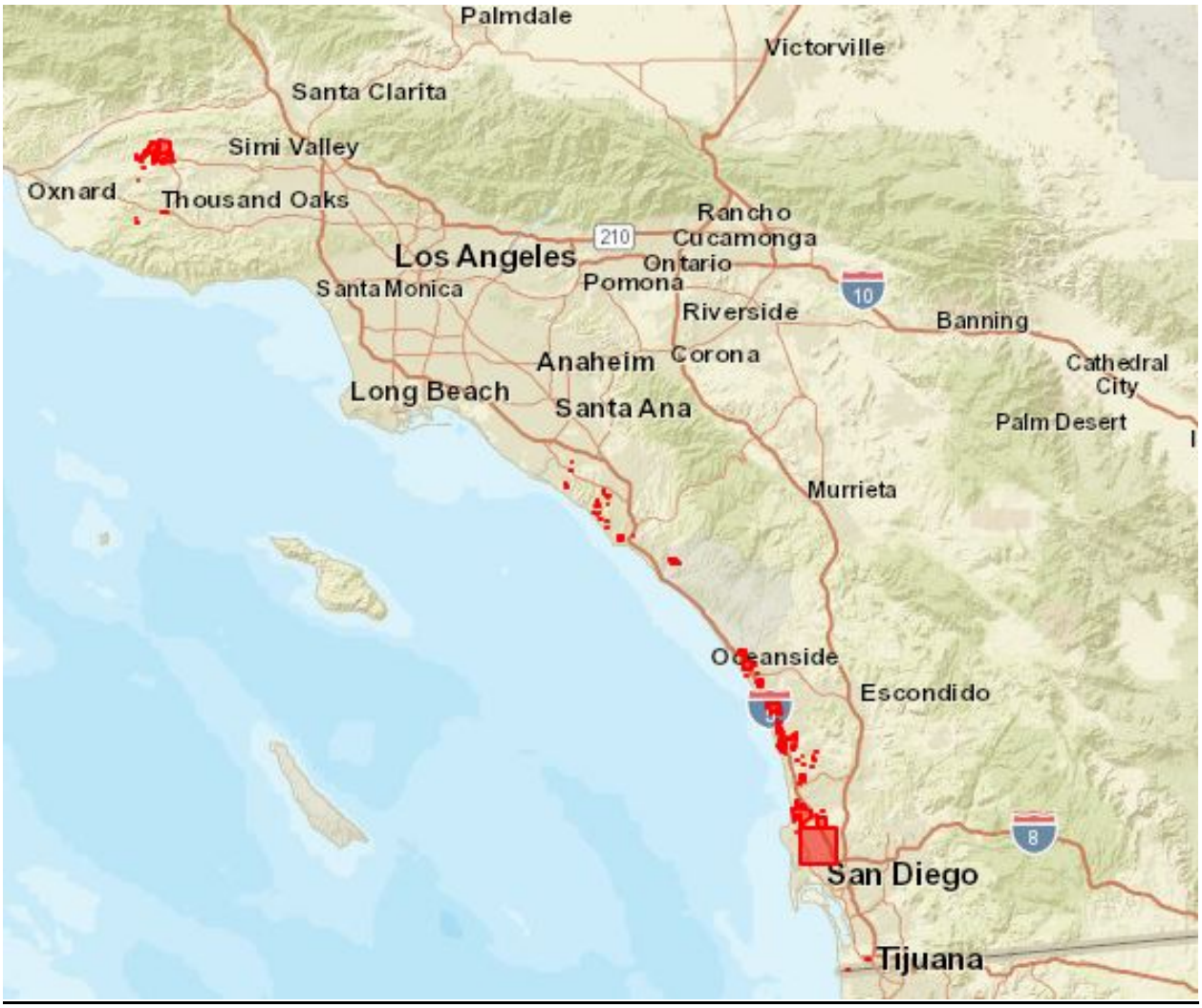
## CHESTERTON SERIES

LOCATION CHESTERTON, CA
Established Series
Rev.GK-LAB-LCL
3/93

The Chesterton series are moderately well-drained, very slowly permeable soils on uplifted marine sediments and old terraces. They are gently sloping to moderately steep. Mean annual precipitation is 10 to 14 inches. Average annual temperature is 60 to 62 degrees F.

**TAXONOMIC CLASS:** Fine, kaolinitic, thermic Abruptic Durixeralfs
**TYPICAL PEDON:** Chesterton fine sandy loam. (Colors are for dry soil unless otherwise noted).
**A11**--0 to 7 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; common fine tubular, many very fine interstitial pores; few rounded iron concretions; medium acid (pH 6.0); abrupt smooth boundary. (4 to 9 inches thick)
**A12**--7 to 15 inches; brown (7.5YR 4/4) fine sandy loam, dark brown (7.5YR 3/4) moist; weak fine and medium granular structure; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many fine interstitial, common fine tubular pores; many rounded iron concretions; medium acid (pH 6.0); abrupt smooth boundary. (5 to 10 inches thick)
**A2cn**--15 to 19 inches; reddish yellow (7.5YR 6/6) heavy fine sandy loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, friable, nonsticky, nonplastic; few very fine and fine roots; common very fine tubular pores; many rounded iron concretions; medium acid (pH 5.9); abrupt smooth boundary. (3 to 6 inches thick)
**B21t**--19 to 27 inches; mottled brown (7.5YR 5/4) and red (2.5YR 5/6) sandy clay, brown (7.5YR 4/4) and red (2.5YR 4/6) moist; weak coarse prismatic and weak angular blocky structure; very hard, firm, sticky, plastic; few very fine and fine roots; few very fine tubular, few very fine interstitial pores; common thin clay films on faces of peds; few rounded iron concretions; medium acid (pH 5.7); clear smooth boundary. (5 to 12 inches thick)
**B22t**--27 to 34 inches; mottled red (2.5YR 4/6) brown (10YR 5/3) and gray (5YR 5/1) sandy clay; moderate coarse prismatic and weak medium angular blocky structure; extremely hard, very firm, sticky, plastic; few very fine and fine roots; few very fine tubular, few very fine interstitial pores; common thin clay films on faces of peds; strongly acid (pH 5.2); abrupt wavy boundary. (5 to 9 inches thick)
**Cm**--34 to 42 inches; reticulate mottled, strongly cemented, iron-silica hardpan.
**TYPE LOCATION:** San Diego County, California; 2.5 miles northeast of La Jolla, California; 2,200 feet west of Miramar Road, 50 feet east of Genesee Avenue; NW 1/4 NE 1/4 sec. 17, T. 15 S., R. 3 W. (Projected).
**GEOGRAPHIC SETTING:** The Chesterton soils are gently sloping to moderately steep and are on uplifted marine sediments and old terraces at elevations of about 50 to 600 feet. The climate is one of dry, somewhat foggy summers and short mild moist winters. Mean annual precipitation is 10 to 14 inches. The average January temperature is 55 degrees F, average July temperature is 69 degrees F, and the average annual temperature is 60 to 62 degrees F. The frost-free season is 300 to 350 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Carlsbad soils and the Antioch, Olivenhain, Marina, and Stockpen soils. Antioch soils have hue of 10YR or yellower throughout and lack duripans. Olivenhain soils have more than 35 percent cobblestones and pebbles and lack duripans. Marina soils are sandy and lack argillic horizons and duripans. Stockpen soils have natric horizons and lack duripans.
**DRAINAGE AND PERMEABILITY:** Moderately well-drained; slow to medium runoff; very slow permeability. The duripan is probably impervious in places.
**USE AND VEGETATION:** Used for growing truck crops, flowers, and winter vegetables in areas where irrigation water is available and growing dry beans and grains. Vegetation in uncultivated areas is mainly chamise, sumac, black sage, and annual grasses and weeds.
**DISTRIBUTION AND EXTENT:** Along the coastline of southern California. The series is inextensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** San Diego County, California, 1973.

**REMARKS:** Chesterton soils were formerly classified as Planosols. In earlier mapping most of the Chesterton soils were included with delineations of the Carlsbad series.
Last revised by the state on 8/73.



## CORRALITOS SERIES

LOCATION CORRALITOS, CA
Established Series
Rev. GWH-RCH-TDC
4/93

The Corralitos series consists of deep, somewhat excessively drained soils that formed in recent sandy alluvium derived from acid sandstone and related rocks. Corralitos soils are on alluvial fans and in small valleys and have slopes of 0 to 15 percent. The mean annual precipitation is about 20 inches and mean annual air temperature is about 58 degrees F.

**TAXONOMIC CLASS:** Mixed, thermic Typic Xeropsamments
**TYPICAL PEDON:** Corralitos loamy sand - rangeland. (Colors are for dry soil unless otherwise noted).
**A11**--0 to 8 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; single grained; loose; many very fine, common fine and few medium and coarse roots; many very fine and fine interstitial pores; medium acid (pH 6.0); abrupt wavy boundary. (3 to 10 inches thick)
**A12**--8 to 20 inches; grayish brown (10YR 5/2) loamy sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots, and few medium and coarse roots; many very fine and fine interstitial pores and many very fine, fine, and medium tubular pores; medium acid (pH 6.0); gradual irregular boundary. (6 to 13 inches thick)
**A13**--20 to 32 inches; grayish brown (10YR 5/2) loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium, and coarse roots; many very fine and fine interstitial and many fine and common medium tubular pores; medium acid (pH 6.0); gradual irregular boundary. (7 to 12 inches thick)
**C1**--32 to 49 inches; light brownish bray (10YR 6/2) light loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium, and coarse roots; many very fine and fine interstitial pores and many very fine, fine, and medium tubular pores; medium acid (ph 6.0); abrupt wavy boundary. (10 to 18 inches thick)
**C2**---49 to 72 inches; pale brown (10YR 6/3) loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine and few medium roots; many very fine and fine interstitial and few very fine and fine tubular pores; medium acid (pH 6.0). (10 to 14 inches thick
**TYPE LOCATION:** Santa Barbara, California; 3 1/4 miles east along the north edge of San Antonio Valley from the Lompos-Casmalia road intersection and 1.8 miles north on side road, east of road fork.
**GEOGRAPHIC SETTING:** The Corralitos soils are on alluvial fans and in small valleys at elevations of 25 to 1,000 feet. Slopes are 0 to 15 percent. The soils formed in recent sandy alluvium derived from acid sandstone and related sources. The climate is dry subhumid mesothermal with dry somewhat foggy summers and cool moist winters. Mean annual precipitation is 12 to 30 inches. Average January temperature is 50 to 52 degrees F, average July temperature is 62 to 66 F, and mean annual temperature is 57 to 60 degrees F. The frost-free season is 250 to 330 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Antioch, Cortina, Elder, Las Flores, Metz and Pico soils and the competing Arnold soils. Antioch and Las Flores soils have a fine textured argillic horizon. Cortina soils are loamy and have more than 35 percent rock fragments. Elder and Pico soils are sandy loam and have a mollic epipedon. Metz soils are stratified with strata finer than loamy fine sand.
**DRAINAGE AND PERMEABILITY:** Somewhat excessively drained; slow runoff; rapid permeability. Some areas subject to localized flooding and deposition. Channels and other flood control measures now protect some areas.
**USE AND VEGETATION:** Used for range, dryland crops, urban development, and for growing truck crops, alfalfa, citrus, and other fruits under irrigation. Uncultivated areas have a cover of annual grasses, forbs, coyotebush, other shrubs, and a few live oak trees.
**DISTRIBUTION AND EXTENT:** Small coastal valleys from central California southward. The soils are moderately extensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Santa Cruz County (Pajaro Valley Area), California, 1908.

**REMARKS:** This description represents a change in the type location which was formerly in Santa Cruz County. Corralitos was not mapped in Santa Cruz County during the soil survey completed in 1976. This does not change the concept of the series. Soils of the Laguna series are now dominantly included in the Corralitos series. Continued study is needed to establish acceptable differentia between the Corralitos and Arnold series. Arnold soils are underlain by soft sandstone at depths of 40 inches or more.
Last revised by the state on 11/77.



# DIABLO SERIES

LOCATION DIABLO, CA
Established Series
Rev. LEW/RCH/JJJ/SBS/KP
06/2017

The Diablo series is a member of the fine, smectitic, thermic family of Aridic Haploxererts. Typically, Diablo soils have dark gray, neutral and mildly alkaline, silty clay upper A horizons, gray and olive gray, calcareous, silty clay lower A horizons, and light olive gray, silty clay AC and C horizons that rest on shale.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Aridic Haploxererts
**TYPICAL PEDON:** Diablo silty clay, grain field. (Colors are for dry soil unless otherwise noted.)
**Ap**--0 to 6 inches; dark gray (5Y 4/1) silty clay, very dark gray (5Y 3/1) moist; the immediate very thin surface crust dries gray(5Y 6/1) and light gray (5Y 7/1); the surface 1 to 3 inches has string medium granular structure, the remainder has strong coarse and medium blocky structure; very hard, very firm, sticky, very plastic; common fine roots mainly along faces of peds; few very fine tubular pores; neutral; clear wavy boundary. (4 to 10 inches thick)
**A**--6 to 15 inches; dark gray (5Y 4/1) silty clay, very dark gray (5Y 3/1) moist; moderate coarse prismatic and moderate coarse blocky structure; very hard, very firm, sticky, very plastic;few fine roots mainly along faces of peds; noneffervescent except for an occasional small white lime nodule; mildly alkaline; clear smooth boundary. (8 to 20 inches thick)
**Bkss1**--15 to 26 inches; finely mixed gray (5Y 5/1) and olive gray (5Y 5/2) silty clay, dark gray (5Y 4/1) and olive gray (5Y 4/2) moist; moderate coarse prismatic and medium blocky structure; very hard, very firm, sticky, very plastic; few fine roots along faces of peds; few fine and very fine tubular pores; numerous slickensides; slightly effervescent in matrix, strongly effervescent few white lime nodules; moderately alkaline; clear wavy boundary. (3 to 12 inches thick)
**Bkss2**--26 to 32 inches; finely mixed gray (5Y 5/1) and olive gray ( 5Y5/2) silty clay, dark gray (5Y 4/1) and olive gray (5Y4/2) moist); weak coarse prismatic and weak medium blocky structure; very hard, very firm, sticky, very plastic; few fine roots mainly along faces of peds, roots distinctly flattened in appearance; few fine and very fine tubular pores; numerous slickensides; slightly effervescent matrix, strongly effervescent few small hard white lime nodules; moderately alkaline; diffuse smooth boundary. (4 to 8 inches thick)
**Bk**--32 to 42 inches; light olive gray (5Y 6/2) silty clay, olive gray (5Y 5/2) moist; weak medium subangular blocky structure; very hard, very firm, slightly sticky, plastic; few fine roots; few fine and very fine tubular pores; many white lime films and soft segregations; moderately alkaline; clear wavy boundary. (10 to 16 inches thick)
**C**--42 to 50 inches; fine and medium mottled appearing olive gray (5Y 5/2) and light olive gray (5Y 6/2) silty clay loam, olive gray (5Y 5/2) and olive gray (5Y 4/2) moist; weak fine and medium subangular blocky structure; very hard, very firm, slightly sticky, plastic; few fine roots; few fine and very fine tubular pores; many shale fragments; strongly effervescent soft white filaments; soft and hard lime nodules; moderately alkaline; clear smooth boundary. (8 to 16 inches thick)
**Cr**--50 to 60 inches; light olive gray (5Y 6/2) slightly effervescent shale and fine grained sandstone with white films on facings.
**TYPE LOCATION:** Alameda County, California; approximately 3 miles northeast of Livermore; 1,325 feet east and 275 feet north of the SW corner of section 25, T.2 S., R.1 E.
**GEOGRAPHIC SETTING:** Diablo soils are on complex undulating, rolling to steep uplands with slopes of 5 to 50 percent. Elevations are 25 to 3,000 feet. These soils formed in residuum weathered from shale, sandstone, and consolidated sediments with minor areas of tuffaceous material. The climate is dry subhumid mesothermal with warm, dry summers and cool, moist winters. The mean annual precipitation is 10 to 35 inches. The average January temperature is 45 to 53 degrees F.; the average July temperature is 65 to 75 degrees F.; and the mean annual temperature is about 57 to 62 degrees F. The average frost free season is about 220 to 320 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Alo, Altamont, and Linne soils and the Azule, Los Osos, Nacimento, San Benito, and Shedd soils. Azule and Los Osos soils have argillic horizons. Nacimento and San Benito soils have less than 35 percent clay. Shedd soils have dry value of 6 or less.
**DRAINAGE AND PERMEABILITY:** Well drained; slow runoff when soil is dry, medium to rapid when soils are moist; slow permeability.
**USE AND VEGETATION:** Used for grazing and for production of dry farmed grain, mainly barley. Uncultivated areas have a cover of annual grasses and forbs.

**DISTRIBUTION AND EXTENT:** Soils are extensive in central and southern Coast Ranges of California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Livermore Valley Area, California, 1910.
**REMARKS:** The Diablo soils were formerly classified as Grumusols and then "Fine, montmorillonitic, thermic Chromic Pelloxererts"
Series reclassified April, 1996. Competing series not reviewed at that time.
Using the range of the months for open cracks in the Range of Characteristics, one could argue that there is a possibility that the soil could be both open or closed for 180 consecutive days. That is, it could classify as Aridic or Typic. Looking at the extent of where Diablo has been mapped and the climate at those locations, we may likely have two clayey soils with similar properties of Diablo but with different cracking patterns. An investigation of a more detailed look at the climatic data would help to resolve this or be more explicit in the OSED when the soil dries or cracks and swells upon wetting and cracks close.



# GAVIOTA SERIES

LOCATION GAVIOTA, CA
Established Series
Rev. GWH/CAF/KP
10/2007

The Gaviota series consists of very shallow or shallow, well drained soils that formed in material weathered from hard sandstone or meta-sandstone. Gaviota soils are on hills and mountains and have slopes of 2 to 100 percent. The average annual precipitation is about 20 inches and the mean annual temperature is about 60 degrees F.
**TAXONOMIC CLASS:** Loamy, mixed, superactive, nonacid, thermic Lithic Xerorthents
**TYPICAL PEDON:** Gaviota gravelly loam, grass range. (Colors are for dry soil unless otherwise noted.)
**A1**--0 to 6 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; neutral (pH 7.0); clear smooth boundary.
**A2**--6 to 10 inches; brown (7.5YR 5/4) gravelly loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; neutral (pH 6.8); abrupt wavy boundary.
**R**--10 to 17 inches; pale brown (10YR 6/3) hard meta-sandstone.
**TYPE LOCATION:** Stanislaus County, California; nine miles west of the town of Westley, California; 1,700 feet north and 500 feet east of the southwest corner of section 6, T. 5 S., R. 6 E., MDB&M; USGS Solyo, California Quadrangle, NAD 27.
**GEOGRAPHIC SETTING:** Gaviota soils are on hills and mountains. Slope is 2 to 100 percent. These soils formed in material weathered from sandstone and meta-sandstone. Elevation is 200 to 4,400 feet. Rock outcrops are commonly associated with this soil and occupy from less than 2 percent to 50 percent of the surface area. The climate is dry subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 10 to 30 inches. Mean January temperature is about 42 degrees F. and about 56 degrees F. along the coast of California; mean July temperature is about 75 degrees F.; mean annual temperature is about 56 to 65 degrees F. The frost-free season is 175 to 350 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Altamont, Los Gatos, Los Osos, Vallecitos and Wadesprings soils. Altamont soils, on uplands, hills and mountains, have a fine particle-size control section. Los Gatos soils, on mountains, are moderately deep and have an argillic horizon. Los Osos soils, on uplands, have an argillic horizon and a paralithic contact at a depth of 20 to 40 inches. Vallecitos soils, on hills, have an argillic horizon and a clayey particle-size control section. Wadesprings soils, on uplands, have an argillic horizon and magnesic mineralogy.
**DRAINAGE AND PERMEABILITY:** Well and excessively well drained; very low to very high runoff; moderately rapid permeability.
**USE AND VEGETATION:** Used mostly for livestock grazing. Some of the less sloping areas are cropped to dryland grain. Natural vegetation is California sage, chamise, manzanita, purple needlegrass and annual grasses.
**DISTRIBUTION AND EXTENT:** Mostly in the California Coast Ranges. The soils are extensive. MLRA 15, 20.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Stanislaus County (Newman Area), California, 1941.
**REMARKS:** Soils in the Amargosa series as recognized in the Antelope Valley Area, California are not included in the Gaviota series. Soils formed in material weathered from granite are now excluded from the Gaviota series.
The revision made on 09/96 moves the type location to better represent the series as mapped for the Gaviota series.
CEC/Clay ratio estimated from similar soils with laboratory data in the W. Stanislaus Soil Survey Area.
Runoff terminology adjusted 4/96 to adjective criteria of the Soil Survey Manual, 10/93.
Competing series updated 01/2003.
Warmer January temperatures occur along the southern Coastal range. These were phased until a possible later decision to split these out as separate series.


Nevada
Carson City
Sacramento
San Francisco
San Jose
California
Fresno
Las Vegas
Los Angeles
San Diego
Tijuana
Mexicali

# HAMBRIGHT SERIES

LOCATION HAMBRIGHT, CA
Established Series
SBJ/DJE/ET
02/2003

The Hambright series consists of shallow, well drained soils formed in material weathered from basic igneous rocks. Hambright soils are on plateaus, basalt flows, and hillslopes and have slopes of 2 to 75 percent. The mean annual precipitation is 25 inches and the mean annual temperature is 60 degrees F.

**TAXONOMIC CLASS:** Loamy-skeletal, mixed, superactive, thermic Lithic Haploxerolls
**TYPICAL PEDON:** Hambright very stony loam - on a south facing slope of 55 percent in an area that was severely burned in the summer of 1981. Vegetation is scrub oak, laurel, and annual grasses at 960 feet elevation. (Colors are for dry soil unless otherwise stated. When described on June 13, 1983, the soils were dry from 0 to 1 inch, slightly moist from 1 to 6 inches and wet from 6 to 12 inches.
**A**--0 to 1 inch, dark grayish brown (10YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular and interstitial pores; 50 percent pebbles, cobbles, and stones; moderately acid (pH 5.6); clear smooth boundary.
**AB**--1 inch to 6 inches; brown (10YR 4/3) very stony loam, dark reddish brown (5YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; many very fine tubular pores; 60 percent pebbles, cobbles, and stones; moderately acid (pH 5.6);clear wavy boundary.
**Bw**--6 to 12 inches, dark brown (7.5YR 4/4) very stony loam, dark reddish brown (5YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; many very fine tubular pores; 60 percent pebbles, cobbles, and stones; moderately acid (pH 5.6); abrupt wavy boundary.
**R**--12 inches, fractured basic igneous bedrock.
**TYPE LOCATION:** Napa County, California; 2 1/2 miles NE on Atlas Peak Road from intersection of Westgate Drive, at the north end of the Silverado Country Club golf course; 100 feet west of Atlas Peak Road in the NE1/4NE1/4, sec. 13, R. 4 W., T. 6 N.
**GEOGRAPHIC SETTING:** Hambright soils are on hillslopes of plateaus and basalt flows. Slopes are 2 to 75 percent. The soils formed in material weathered from basic igneous rocks, mainly basalt. Elevations are 300 to 3,000 feet. Hambright soils are commonly mapped in complex with rock outcrop. The climate is subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 20 to 40 inches. Mean January temperature is 42 degrees F; mean July temperature is 76 degrees F; and mean annual temperature varies from 56 to 62 degrees F. Frost-free season is 160 to 260 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Toomes soils and the Forward, Gilroy, Guenoc, Kidd, and Sobrante soils. Forward soils are 20 to 40 inches deep and have more than 60 percent pyroclastic materials. Gilroy, Guenoc, and Sobrante soils are 20 to 40 inches deep and have argillic horizons. Kidd soils are mesic and have more than 60 percent pyroclastic materials.
**DRAINAGE AND PERMEABILITY:** Well drained; medium to very rapid runoff; moderate permeability.
**USE AND VEGETATION:** Used for grazing. Vegetation is annual grasses and forbs with a few blue oaks and shrubs.
**DISTRIBUTION AND EXTENT:** In the Coast Range of California where the soils are moderately extensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Glenn County, California 1957.
**REMARKS:** Hambright soils were originally mapped in Glenn County. However, because of the low acreage, the soils were correlated to the Toomes series. The name Hambright was used for soils mapped in Lake, Napa, Solano, San Diego and Ventura counties. In San Diego Soil Survey Report, the soils are a taxadjunct because they are brighter, have a more clayey subsoil and few rock fragments throughout the profile. In Ventura County, Hambright soils include clay loams and soils that would now be recognized as having an argillic horizon. The concept of the soil now is one that has a mollic epipedon, more than 35 percent rock fragments and has loam or silt loam textures with no or only slight increases in clay content. The series is now described with properties that only include the series ranges as mapped in Lake, Napa, and Solano counties.

checked at that time. - ET


Nevada
Carson City
Sacramento
San Francisco
San Jose
California
Fresno
Los Angeles
San Diego
Tijuana

## HUERHUERO SERIES

Note: this series is now included in the Antioch series (see description and map of extent above)

**SERIES ESTABLISHED:** Reconnaissance of Sacramento Valley, California, 1913.
**REMARKS:** The soils were formerly classified in the solodized-Solonetz group. Soils of the Huerhuero series are now included with the Antioch series.
Last revised by the state on 5/72.
**ADDITIONAL DATA:** NSSL pedon S64CA-095-008 (type location) and S78CA-000-000 (range in characteristics).

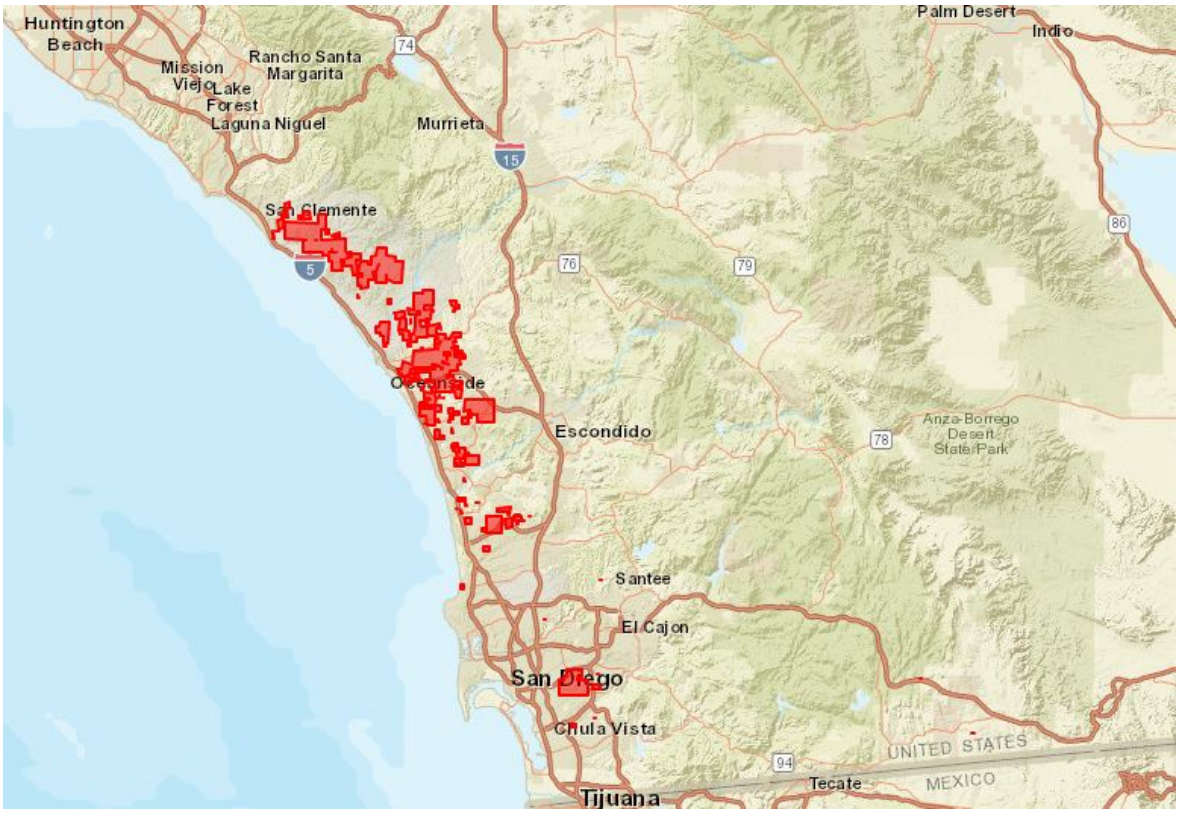
## LAS FLORES SERIES

LOCATION LAS FLORES, CA
Established Series
Rev. GB/LAB/LCL
02/97

The Las Flores series la a member of the fine, montmorillonitic, thermic family of Natric Palexeralfs. Typically, Las Flores soils have light brownish gray, slightly and medium acid, loamy sand A horizons, grayish brown and light brownish gray, slightly acid and neutral, sandy clay B2t horizons grading to weakly consolidated siliceous marine sandstone.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Natric Palexeralfs
**TYPICAL PEDON:** Las Flores loamy sand - native pasture. (Colors are for dry soil unless otherwise noted.)
**A11**--0 to 3; Light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial pores; medium acid (pH 5.8); abrupt smooth boundary. (2 to 4 inches thick)
**A12**--3 to 14 inches; Light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; massive; hard, friable, nonsticky, nonplastic; common fine roots; many fine tubular pores; slightly acid ( H 6.2); abrupt wavy boundary. (8 to 12 inches thick)
**B21t**--14 to 22 inches; Grayish brown (10YR 5/2) sandy clay, dark grayish brown (10YR 4/2) moist; strong medium columnar structure; very hard, firm, very sticky, very plastic; few very fine exped roots; common very fine tubular pores; continuous moderately thick clay films on faces of peds; slightly acid (pH 6.5); gradual smooth boundary. (6 to 10 inches thick)
**B22t**--22 to 38 inches; Light brownish gray (10YR 6/2) sandy clay, grayish brown (10YR 5/2) moist; strong medium prismatic structure; very hard, firm, very sticky, very plastic; few very fine exped roots; common very fine tubular pores; continuous thick clay films on faces of peds; neutral (pH 6.8); diffuse irregular boundary. (12 to 18 inches thick)
**C1**--38 to 48 inches; Pale yellow (5Y 8/3) loamy coarse sand, pale yellow (5Y 8/4) moist; weak coarse angular blocky structure; hard, friable, slightly sticky, nonplastic; few fine exped roots; few fine tubular pores; few moderately thick clay films on faces of peds; neutral (pH 7.0); diffuse smooth boundary. (8 to 12 inches thick)
**C2**--48 to 54 inches; Light gray (5Y 7/1) soft marine sandstone; hard, firm, nonsticky, nonplastic; few fine tubular pores; few moderately thick clay films along fracture planes in the weathered rock; neutral (pH 7.3).
**TYPE LOCATION:** San Diego County, California; about 5 miles west of Vista, on south side of State Highway 78; approximately 1,600 feet west-southwest of NE corner sec. 33, T.11S., R.4W., (projected).
**SETTING:** Las Flores soils are gently to strongly sloping and are on marine terraces at elevations of less than 700 feet. The climate is dry subhumid mesothermal with warm dry summers and cool moist winters. Mean annual precipitation is about 10 to 13 inches. Average January temperature is 53 degrees F., average July temperature is 71 degrees F., and mean annual temperature is 61 degrees F. The frost-free season is 300 to 340 days.
**PRINCIPAL ASSOCIATED SOILS:** These are the competing Antioch and Stockpen soils and the Altamont, Diablo, and Shedd soils. Altamont and Diablo soils have fine textured sola with prominent slickensides. Shedd soils are light gray and lack argillic horizons.
**DRAINAGE AND PERMEABILITY:** Moderately well-drained; medium to rapid runoff; very slow permeability.

**USE AND VEGETATION:** Used for growing irrigated truck crops, nonirrigated beans, and pasture, and urban use.
**DISTRIBUTION AND EXTENT:** Coastal plains of southern California. The soils are moderately extensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** San Diego County, California, 1915.
**REMARKS:** The Las Flores soils formerly were classified as (maximal) Noncalcic Brown soils.
OSED scanned by SSQA. Last revised by state on 10/73.



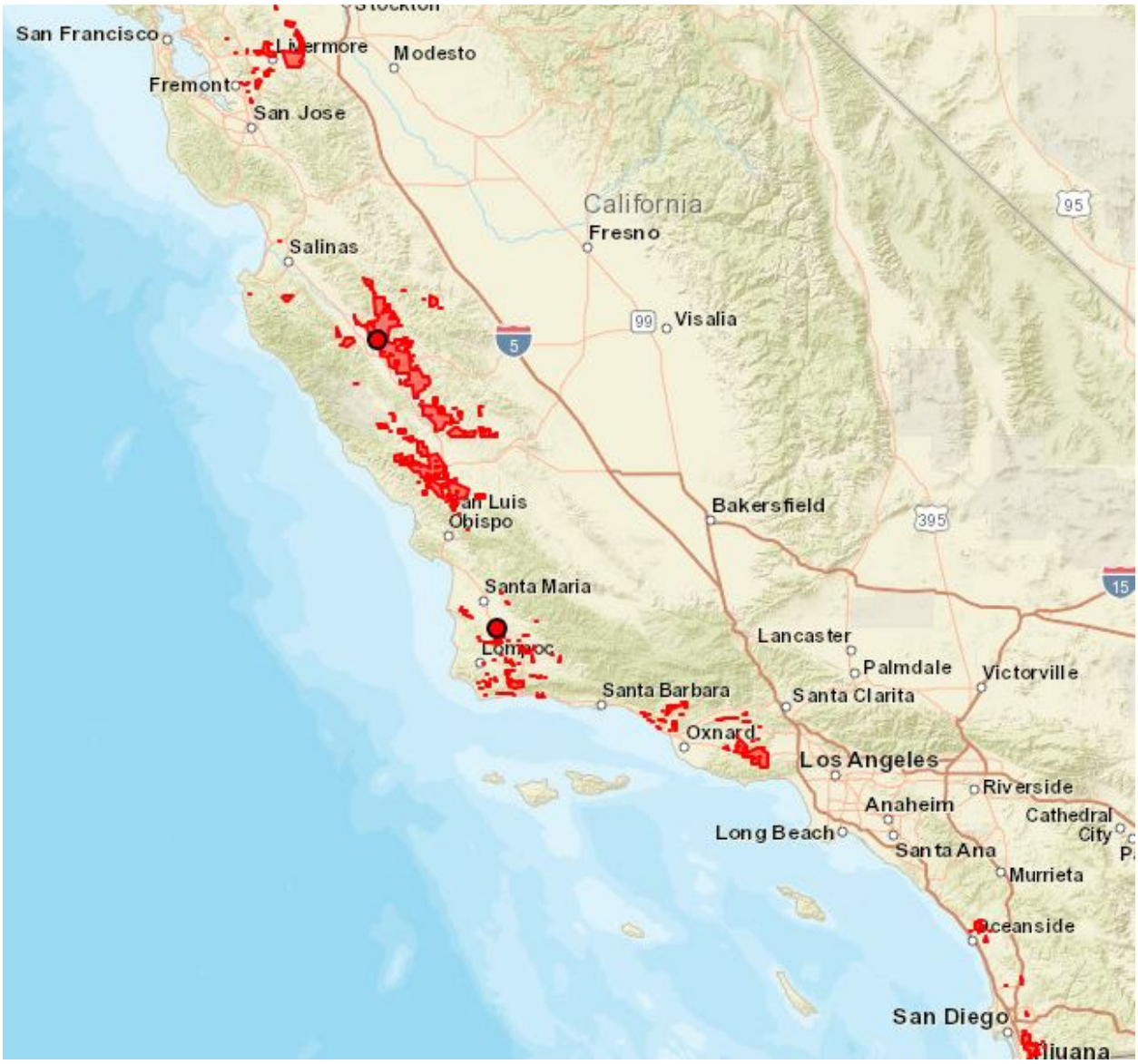

## LINNE SERIES

LOCATION LINNE, CA
Established Series
Rev. GES/LCL/RWK
06/2001

The Linne series consists of moderately deep, well drained soils that formed in material weathered from fairly soft shale and sandstone. Linne soils are on hills and have slopes of 5 to 75 percent. The mean annual precipitation is about 16 inches and the mean annual air temperature is about 59 degrees F.

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive, thermic Calcic Pachic Haploxerolls
**TYPICAL PEDON:** Linne clay loam, rangeland. (Colors are for dry soil unless otherwise noted.)
**Ap**--0 to 9 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; moderate coarse subangular blocky structure, 1/6 to 1/3 of horizon strong fine granular between larger peds, larger peds part mostly to granular; very hard, friable, sticky and plastic; common very fine roots; many very fine few fine interstitial pores 1/4 of horizon is krotovinas 2 to 3 inches across; slightly effervescent, disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary. (7 to 12 inches thick)

**A12**--9 to 14 inches; dark gray (10YR 4/1) clay loam, black (10YR 2/1) moist; weak coarse prismatic structure; very hard, friable, sticky and plastic; common very fine roots; many very fine, common fine interstitial pores and few fine tubular pores; 1/3 of horizon is krotovinas 2 to 3 inches across, strongly effervescent disseminated lime and few fine lime filaments, especially on faces of larger peds; moderately alkaline (pH 8.0); gradual wavy boundary. (4 to 9 inches thick)
**A13**--14 to 29 inches; gray (10YR 5/1) clay loam, very dark gray (10YR 3/1) moist; weak coarse prismatic structure that parts to medium and coarse angular blocky with much medium granular structure; very hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and few fine and medium tubular pores; 1/3 of horizon is krotovinas 2 to 3 inches across; violently effervescent disseminated lime and many fine lime filaments especially on faces of larger peds; moderately alkaline (pH 8.0); gradual wavy boundary. (7 to 16 inches thick)
**AC**--29 to 32 inches; gray and light gray (10YR 5/1 and 7/1) sandy clay loam, gray and light brownish gray (10YR 5/1 and 6/2) moist; weak coarse and medium angular blocky structure with some coarse granules; very hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and few fine tubular pores; several krotovinas 2 to 3 inches across; violently effervescent, disseminated lime and many distinct lime filaments; moderately alkaline (pH 8.0); clear irregular boundary. (2 to 6 inches thick)
**Clca**--32 to 36 inches; white (N 8/ and N 10/) fine sandy loam, very pale brown and white (10YR 7/2 and 8/2) moist; massive; extremely hard, firm, sticky and plastic; common very fine interstitial and few very fine tubular pores; several krotovinas 2 to 3 inches across; this horizon somewhat discontinuous and variable in thickness, also broken by squirrel holes; violently effervescent; moderately alkaline (pH 8.0); clear irregular boundary. (0 to 7 inches thick)
**C2r**--36 to 51 inches; white (N 8/) mudstone, light gray and pale yellow (2.5Y 7/2 and 8/4) moist; massive; very hard, firm; common very fine interstitial and few fine tubular pores in cracks; several krotovinas 2 to 3 inches across; strongly effervescent; moderately alkaline (pH 8.0).
**YPE LOCATION:** Santa Barbara County, California; 11 miles SE of Santa Maria; from just north of Solomon Summit 1 1/2 miles south on Union Oil Company road and 750 feet east; latitude 34 degrees 48 degrees 62" N., longitude 120 degrees 21 degrees 06"W., equivalent to center of sec. 4, T.8N., R.33W.
**GEOGRAPHIC SETTING:** Linne soils are on mountainous uplands and foothills. Elevations are 100 to 2,200 feet. The soils formed in material weathered from light gray or white, fairly soft shale, and sandstone. Slopes are 5 to 75 percent. The climate is subhumid mesothermal with warm dry summers and cool moist winters. Mean annual precipitation is 12 to 24 inches. Average January temperature is 45 degrees to 55 degrees F., average July temperature is 67 degrees to 79 degrees F., and the mean annual temperature is 55 degrees to 62 degrees F. The average freeze-free season is 200 to 330 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Nacimiento, San Benito and Shedd soils and the Antioch, Diablo, Los Osos and Santa Lucia soils. Antioch soils have argillic horizons with a SAR of more than 13. Diablo soils have more than 35 percent clay and have intersecting slickensides. Los Osos soils have a fine textured argillic horizon. Santa Lucia soils have more than 35 percent rock fragments and a base saturation of 50 to 75 percent.
**DRAINAGE AND PERMEABILITY:** Well drained; medium to very rapid runoff; moderately slow permeability.
**USE AND VEGETATION:** Used for range. Some areas farmed to small grains, related crops, and almonds. Naturalized and native vegetation is annual grasses and forbs, some live oak, and coastal sage.
**DISTRIBUTION AND EXTENT:** Scattered throughout the Coast Range from central California to San Diego. The soils are moderately extensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** San Diego County (Oceanside Area), California, 1929 .
**ADDITIONAL DATA:** Riverside Laboratory; S62Calif-42-11.
OSED scanned by SSQA. Last revised by state on 3/77.


San Francisco
Livermore
Modesto
Fremont
San Jose
California
Fresno
Salinas
99
Visalia
5
Bakersfield
395
Santa Maria
Lancaster
Palmdale
Victorville
Santa Barbara
Santa Clarita
Oxnard
Los Angeles
Riverside
Anaheim
Cathedral City
Long Beach
Santa Ana
Murrieta
Oceanside
San Diego

## MARINA SERIES

LOCATION MARINA, CA
Established Series
Rev. GES/LCL/ET
03/2001

The Marina soils have grayish brown and brown, slightly and moderately acid, loamy sand A horizons, light brown, moderately and strongly acid, loamy sand B2 horizons with lamellae and light brown and pink, moderately acid, sand C horizons.
**TAXONOMIC CLASS:** Mixed, thermic Lamellic Xeropsamments
**TYPICAL PEDON:** Marina loamy sand - annual grasses, formerly cultivated. (Colors are for dry soil unless otherwise noted.)
**Ap1**--0 to 7 inches; grayish brown (10YR 5/2) light loamy sand, dark brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine interstitial and few fine tubular pores; slightly acid (pH 6.5); (low acidity may be related to past management); abrupt smooth boundary. (0 to 8 inches thick)
**Ap2**--7 to 12 inches; grayish brown (10YR 5/2) light loamy sand, dark brown (10YR 4/3) moist; massive; hard, friable (tillage pan), nonsticky, nonplastic; common very fine and few fine roots; many very fine interstitial and common fine and few medium tubular pores; moderately acid (pH 6.0); clear wavy boundary. (0 to 8 inches thick)
**A**--12 to 27 inches; brown (7.5YR 5/4) light loamy sand, dark brown (7.5YR 4/4) moist; single grained; soft, very friable, nonsticky, nonplastic; few very fine and few fine roots; many very fine interstitial and many fine tubular pores; moderately acid (pH 6.0); clear wavy boundary. (12 to 30 inches thick)
**B1**--27 to 33 inches; light brown (7.5YR 6/4) loamy sand, appears to be slightly finer than above, reddish brown (5YR 4/4) moist; massive; slightly hard, friable, nonsticky, nonplastic; few very fine and fine roots; common very fine interstitial and few fine and medium tubular pores; several thin 1/4 inch thick discontinuous lamellae, dark reddish brown (5YR 3/2 dry, 3/3 moist), lamellae are hard when dry and have thick clay bridges; very weak clay bridges in matrix; moderately acid (pH 6.0); gradual wavy boundary. (4 to 8 inches thick)
**B2**--33 to 50 inches; light brown (7.5YR 6/4) light loamy sand, reddish brown (5YR 5/4) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine interstitial and few very fine tubular pores; 3 continuous distinct lamellae, top, bottom and middle, 1/4 to 3/4 inch thick, hard and friable, reddish brown (5YR 4/4) dry; thick clay bridges in lamellae, very weak bridges in matrix; strongly acid (pH 5.5); gradual wavy boundary. (12 to 20 inches thick)
**C1**--50 to 61 inches; light brown (7.5YR 6/4) sand, strong brown (7.5YR 5/6) moist; massive; soft, loose; few very fine roots; many very fine interstitial pores; several brown (7.5YR 4/3) dry lamellae 1/4 to 3/4 inch thick, bands hard and friable; moderate clay bridges in lamellae; moderately acid (pH 6.0); gradual wavy boundary. (6 to 15 inches thick)
**C2**--61 to 88 inches; pink (7.5YR 7/4) sand, reddish yellow (7.5YR 6/6) moist; single grained; soft, loose; many very fine interstitial pores; weak continuous lamellae 1 to 1.5 inches thick about 3 inches apart; thin clay bridges in lamellae; moderately acid (pH 6.0).
**TYPE LOCATION:** Santa Barbara County, California; about 7 miles southeast of Santa Maria, California; NW1/4SW1/4 sec. 7, T.9N., R.33W.
**GEOGRAPHIC SETTING:** The Marina soils are gently sloping to moderately steep and are on short rolling dune-like slopes at elevations of 100 to 700 feet. They formed in old sand dunes near the coast. The climate is dry subhumid mesothermal with dry somewhat foggy summers and cool moist winters. Mean annual precipitation is 12 to 16 inches. Average January temperature is 50 degrees to 55 degrees F., average July temperature is 62 degrees to 67 degrees F., and mean annual temperature is 58 degrees to 61 degrees F. The freeze-free season is 300 to 350 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Baywood, Corralitos, Garey, and Oceano soils and the Carlsbad and Chesterton soils. Carlsbad soils have concretions and a weak duripan. Chesterton soils have a duripan and a fine textured argillic horizon.
**DRAINAGE AND PERMEABILITY:** Somewhat excessively drained; slow to rapid runoff; moderate permeability. The soil above the B2 horizons is wet for several days to a week or more after periods of unusually heavy precipitation.
**USE AND VEGETATION:** Used mostly for range. Some areas used for irrigated alfalfa and special crops. Vegetation is chamise, flattop buckwheat, black sagebrush, small live oak trees, annual grasses, and forbs.

**DISTRIBUTION AND EXTENT:** Coast areas in south and south-central California. The soils are moderately extensive. Map below shows the extent of Marina soils in southern California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Monterey County (Salinas Area), California, 1925.
**REMARKS:** The Marina soils were formerly classified as Regosols. The classification was updated in February 2001 using the Eighth Edition to Soil Taxonomy. This series was formerly classified as mixed, thermic, Alfic Xeropsamments. Competing series were not checked at that time.
OSED scanned by SSQA. Last major revision by state on 9/73.
**ADDITIONAL DATA:** NSSL pedon S76CA-073-001 (range in characteristics).



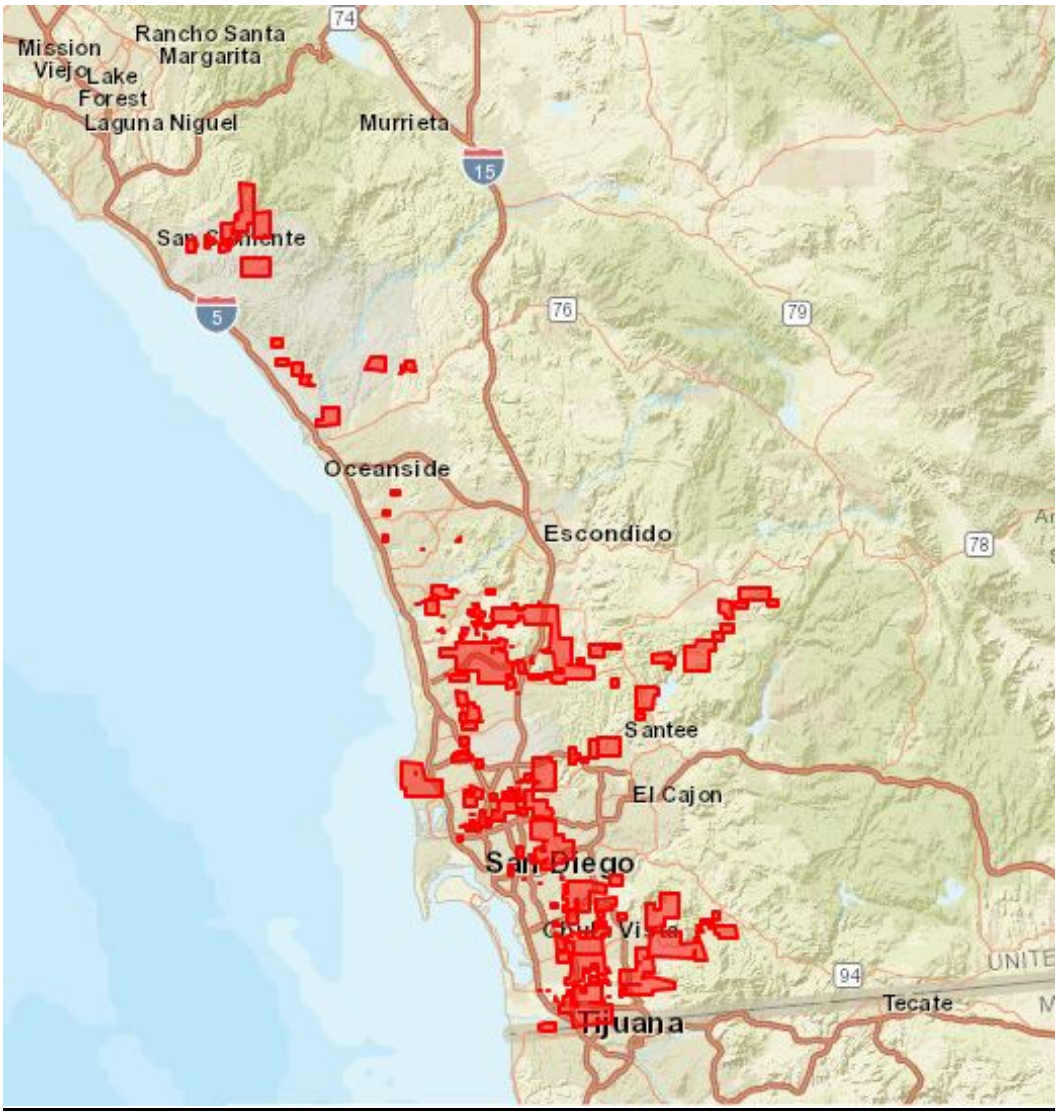
## OLIVENHAIN SERIES

LOCATION OLIVENHAIN CA
Established Series
Rev. GK/LAB/LCL
6/73

The Olivenhain series is a member of the clayey-skeletal, kaolinitic, thermic family of Ultic Palexeralfs. Typically, Olivenhain soils have brown and reddish brown, medium acid, very cobbly loam A horizons, reddish brown and red, medium and strongly acid, very cobbly clay B2t horizons, grading to pinkish white cobbly loam C horizons.

**TAXONOMIC CLASS:** Clayey-skeletal, kaolinitic, thermic Ultic Palexeralfs
**TYPICAL PEDON:** Olivenhain very cobbly loam - native pasture. (Colors are for dry soil unless otherwise noted.)
**A11**--0 to 6 inches; brown (7.5YR 4/4) very cobbly loam, dark reddish brown (5YR 3/4) moist; weak medium and fine granular structure; soft, friable, nonsticky, nonplastic; common medium, many very fine and fine roots; many fine and very fine interstitial, common fine tubular pores; 25 percent cobblestones; medium acid (pH 5.7); abrupt wavy and irregular boundary. (4 to 8 inches thick)
**A12**--6 to 10 inches; reddish brown (5YR 4/4) very cobbly heavy loam, dark reddish brown (5YR 3/4) moist; weak and moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine, few medium roots; common fine interstitial and tubular pores; 25 percent cobblestones; medium acid (pH 5.6); abrupt wavy and irregular boundary. (4 to 6 inches thick)
**B21t**--10 to 19 inches; reddish brown (5YR 4/4 dry and moist) very cobbly clay; reddish brown (2.5YR 4/4) mottles, dark reddish brown (2.5YR 3/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky, plastic; few medium fine and very fine roots; few very fine and fine tubular pores; common moderately thick clay films lining pores and on faces of peds and pebbles; 40 percent cobblestones; medium acid (pH 5.6); clear wavy and irregular boundary. (6 to 11 inches thick)
**B22t**--19 to 29 inches; red (2.5YR 5/6) very cobbly clay, red (2.5YR 4/6) moist; yellowish red and reddish brown (5YR 5/6, 5/3) mottles, reddish brown and yellowish red (5YR 4/3, 4/6) moist; weak and moderate coarse subangular and angular blocky structure; very hard, firm, sticky, plastic; few fine and medium roots; few fine tubular pores; common thin and moderately thick clay films lining pores and on faces of peds and on pebbles and cobbles; 40 percent cobblestones; strongly acid (pH 5.4); clear wavy and irregular boundary. (7 to 12 inches thick)
**B3**--29 to 42 inches; pink (5YR 8/3) very cobbly clay loam, light reddish brown (5YR 6/3) moist; pinkish white (7.5YR 8/2) mottles, pinkish gray (7.5YR 6/2) moist; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few thin and moderately thick clay films on pebbles; 40 percent cobblestones; strongly acid (pH 5.3); clear wavy and irregular boundary. (8 to 18 inches thick)
**C1**--42 to 68 inches; pinkish white (7.5YR 8/2) cobbly loam, pinkish gray (7.5YR 6/2) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; 25 percent cobblestones; strongly acid (pH 5.1).
**TYPE LOCATION:** San Diego County, California; about 2 miles northwest of Poway; approximately 2,450 feet east of Pomerado Road; SW1/4NE1/4 sec. 11, T.14S., R.2W.
**RANGE IN CHARACTERISTICS:** The mean annual soil temperature at 20 inches depth is 62 degrees to 64 degrees F. The soil between depths of 6 and 15 inches is usually moist in some part from about December 1 until late May and is continuously dry the rest of the time. The A horizon is yellowish brown, brown or reddish brown (10YR 5/4, 7.5YR 4/4, 5/4; 5YR 4/4). It is cobbly loam or cobbly sandy loam and has less than 1 percent organic matter below a depth of 4 inches. This horizon is slightly or medium acid. The B2t horizon is brown to red (7.5YR 4/4; 5YR 3/4, 4/4, 5/3, 5/4, 5/6; 2.5YR 3/4, 4/4, 5/6). This horizon is very cobbly or very gravelly clay with 35 to 60 percent rock fragments. The clay increase at the A-B horizon boundary is 15 to 25 percent (absolute). This horizon is medium or strongly acid and has 60 to 75 percent base saturation. The C horizon is cobbly loam or clay loam and is medium or strongly acid.
**COMPETING SERIES:** These are the Cometa, Corning, Guenoc, Keefers, Kimball, Placentia, Positas, and Redding series. All of these soils except Keefers have less than 35 percent rock fragments in the argillic horizons. Keefers soils lack an abrupt or clear A-B horizon boundary with as much as 15 to 20 percent absolute difference in clay content. Also, Cometa, Corning, Positas, and Kimball soils have a base saturation of more than 75 percent in the argillic horizon. Guenoc soils have a lithic contact 20 to 40 inches below the surface. Placentia soils have more than 15 percent exchangeable sodium in the argillic horizon. Redding soils have a duripan.

**SETTING:** Olivenhain soils are gently sloping to strongly sloping and are on dissected marine terraces at elevations of 100 to 600 feet. The climate is dry subhumid mesothermal. Summers are warm and dry and winters are cool and moist. Mean annual precipitation is 12 to 16 inches. Average January temperature is 50 degrees F., average July temperature is 75 degrees F., and mean annual temperature is 62 degrees F. The frost-free season is 290 to 330 days.
**PRINCIPAL ASSOCIATED SOILS:** These are the Antioch, Bosanko, Diablo, Linne, and Stockpen soils. Antioch and Stockpen soils have natric horizons and lack rock fragments. Bosanko and Diablo soils have dark gray, fine textured profiles with intersecting slickensides. Linne soils have strongly calcareous mollic epipedons.
**DRAINAGE AND PERMEABILITY:** Well-drained; slow or medium runoff; very slow permeability.
**USE AND VEGETATION:** Used principally for grazing. The natural vegetation is flattop buckwheat, wildoats, chamise, morning glory, filaree, soft chess, and cactus.
**DISTRIBUTION AND EXTENT:** Coastal plains of southern California. The soils are of moderate extent. Map below shows the extent of the Olivenhain soil (in red) in coastal southern California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** San Diego County (Oceanside Area), California, 1929.
**REMARKS:** The Olivenhain soils were formerly classified as Noncalcic Brown soils. The series concept has been narrowed to include only pedons with more than 35 percent rock fragments.
OSED scanned by SSQA. Last revised by state on 6/73.



## REDDING SERIES

LOCATION REDDING, CA
Established Series
Rev. SBJ/DJL/DJE/MAV/AJT/SBS/AEC
03/2018

The Redding series consists of moderately deep to duripan, well or moderately well drained soils that formed in alluvium derived from mixed sources. They are on nearly level or dissected fan remnants. Slopes are 0 to 30 percent. The average annual precipitation is about 24 inches (630 mm) and the average annual temperature is about 63 degrees F (17 degrees C).

**TAXONOMIC CLASS:** Fine, mixed, active, thermic Abruptic Durixeralfs
**TYPICAL PEDON:** Redding gravelly loam - on an east facing slope of 1 percent with mound and swale micro topography, about halfway between a mound and a swale, under annual grasses and forbs, at 315 feet elevation (96 m). (Colors are for dry soil unless otherwise noted. When described on April 2, 1945, the soil was moist throughout.)
**A1**--0 to 8 inches (0 to 20 cm); yellowish red (5YR 5/6) gravelly loam, dark reddish brown (2.5YR 3/4) moist; weak medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine roots, many very fine pores; 17 percent gravel; moderately acid (pH 5.7); gradual smooth boundary.
**A2**--8 to 19 inches (20 to 48 cm); yellowish red (5YR 5/6) gravelly loam, red (2.5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; many very fine, few fine pores; 15 percent gravel; moderately acid (pH 5.6); abrupt wavy boundary. (Combined thickness of the A horizon is 4 to 30 inches, 10 to 76 cm)
**2Bt**--19 to 22 inches (48 to 56 cm); yellowish red (5YR 4/6) clay, red (2.5YR 4/6) with dark red (2.5YR 3/6) coatings moist; weak medium prismatic structure parting to moderate, medium subangular blocky; extremely hard, extremely firm, sticky and very plastic; few very fine roots, common very fine tubular pores; 10 percent gravel; thick continuous clay films on vertical faces of peds; colloid nearly fills all voids; numerous iron-manganese masses on faces of peds; strongly acid (pH 5.3); abrupt wavy boundary. (3 to 12 inches thick, 8 to 30 cm)
**3Bqm**--22 to 35 inches (56 to 89 cm); yellowish red (5YR 4/6) duripan; massive, indurated with iron-silica; red (2.5YR 4/6) moist with dark red (2.5YR 3/6) clay films and iron-manganese masses on fracture faces; very few fine pores; 35 percent gravel, very strongly acid in upper part, neutral below.
**TYPE LOCATION:** Tehama County, California; 0.42 miles north of benchmark 311, about 5 miles south of Red Bluff. 40 degrees, 6 minutes, 17 seconds N latitude and 122 degrees, 13 minutes, 55 seconds W longitude, Gerber Quad.
**GEOGRAPHIC SETTING:** Redding soils are on nearly level or dissected fan remnants. Microrelief may be hummocky. Gravel and cobbles tend to concentrate in the swales in hummocky areas. Vernal pools are common in areas with slopes of 0 to 3 percent. Slopes are 0 to 30 percent. Elevations are 40 to 2,000 feet (12 to 610 m). The soils formed in alluvium of mixed rocks. Climate is subhumid with hot dry summers and cool moist winters. Mean annual precipitation is 10 to 35 inches (254 to 889 mm). Average January temperature is 45 degrees F (7 degrees C); average July temperature is 80 degrees F (27 degrees C); mean annual temperature is 60 to 63 degrees F (16 to 17 degrees C). The frost-free season is 230 to 320 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing San Joaquin soils and the Anderson, Auburn, Corning, Kimball, Newton, Newville,Perkins and Red Bluff. San Joaquin soils are on lower, relatively younger terraces. Auburn soils have bedrock at 10 to 20 inches (25 to 51 cm) and are usually on foothills above Redding soils. Anderson soils lack a duripan and are on flood plains. Corning soils lack a duripan and are in similar landscape positions, often in complex with Redding. Kimball soils lack a duripan and are on lower, relatively younger terraces. Newton, Newville, Perkins and Red Bluff soils lack a duripan.
**DRAINAGE AND PERMEABILITY:** Well or moderately well drained, very low to high runoff, except for local ponding in intermound areas; very slow to slow permeability.
**USE AND VEGETATION:** Used for rangeland and dryland small grain. A few areas are used for irrigated pasture. Natural vegetation is annual grasses and forbs.
**DISTRIBUTION AND EXTENT:** Fan remnants along the northern and eastern edge of the Central Valley in California. The soils are extensive in MLRA-17. Map below shows the extent of the Redding soil (in red) in California.

**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Redding Area, California, 1907.
**REMARKS:** The Redding soils were formerly classified as having kaolinitic mineralogy.
Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from the surface to a depth of 19 inches (0 to 48 cm) (A1, A2).
Argillic horizon - the zone from 19 to 22 inches (48 to 56 cm)(2Bt).
Duripan - the zone from 22 to 35 inches (56 to 89 cm) (3Bqm).
Abruptic subgroup - the argillic horizon has an abrupt upper boundary with an absolute clay increase of 15 to 40 percent.
Edit log: 5/04/2003 edits for use in Butte County: change hardpan to duripan, expand thickness of the A horizon from 10 to 4 inches; Range in Characteristics-added some pedons have a BA horizon, to the A horizon added 7.5YR 4/6, 3/3, and 10YR 3/4 moist, added sandy clay loam or gravelly sandy clay loam; expanded reaction from slightly acid to neutral; in the Bt horizon added 7.5YR 5/4 dry, 5YR 4/6, 2.5YR 3/4 moist, added gravelly loam, cobbly loam, sandy clay loam, gravelly sandy clay loam, cobbly sandy clay loam, gravelly clay loam, and cobbly clay loam, expanded reaction from slightly acid to neutral; in the 2 Bt horizon expanded reaction from slightly acid to neutral; in the 3 Bqm added 10YR 3/4 moist; Drainage and Permeability; expand range to include very slow to slow permeability. In Butte County, Redding will be used only on mounds.
Edits made after sdjr projects - AEC
**ADDITIONAL DATA:** Data from the type location (sampled as reference project) established mineralogy as mixed. Redding mapped in San Diego County is outside the range for the series.
Other lab data to support this classification are samples S45CA-57-005 and S79CA-067-001. This data is in the NSSL data base. NSSL pedon S45CA-103-005 is the type location. Typical pedon for Northen Stanislaus Soil Survey area was NSSL pedon 05N0393.


Nevada
Carson City
Sacramento
San Francis
San Jose
California
Fresno
Las Vegas
Los Angeles
San Diego
Tijuana
Mexicali

## REIFF SERIES

LOCATION REIFF, CA
Established Series
Rev. WFA-WBS-DJE-CEJ
12/2000

The Reiff series consists of very deep, well drained soils formed in coarse to medium textured alluvium weathered from mixed sources. Reiff soils are on flood plains and alluvial fans. Slopes are 0 to 9 percent. The annual precipitation is about 14 inches and the annual temperature is about 62 degrees F.

**TAXONOMIC CLASS:** Coarse-loamy, mixed, superactive, nonacid, thermic Mollic Xerofluvents
**TYPICAL PEDON:** Reiff very fine sandy loam - on a E facing slope of 1 percent that is cultivated at 40 feet elevation. (Colors are for dry soil unless otherwise stated. When described the profile was moist below a depth of 2 feet.)
**Ap**--0 to 3 inches; grayish brown (10YR 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure parting to granular; hard, friable, slightly sticky and slightly plastic; few coarse and common very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.5); abrupt smooth boundary. (3 to 10 inches thick)
**A**--3 to 16 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; common medium and coarse and many very fine roots; many very fine interstitial and common very fine tubular pores; colloid stains on mineral grains; neutral (pH 7.0); clear wavy boundary. (8 to 15 inches thick)
**AC**--16 to 24 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common medium and many very fine roots; many very fine interstitial and common very fine tubular pores; colloid stains on mineral grains; mildly alkaline (pH 7.5); clear irregular boundary. (6 to 10 inches thick)
**C1**--24 to 43 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common medium and many very fine and fine roots; many very fine interstitial and tubular pores; colloid stains on mineral grains; moderately alkaline (pH 8.0); diffuse smooth boundary. (15 to 25 inches thick)
**C2**--43 to 60 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and nonplastic; common medium and very fine roots; many very fine interstitial and tubular pores; colloid stains on mineral grains; moderately alkaline (pH 8.0).
**TYPE LOCATION:** Yolo County, California; about 2 miles southwest of Knights Landing; about 0.75 miles west of Road 102 and 100 feet north of Road 14 and 1,300 feet east of the SW corner of section 22 T. 11 N, R. 2 E, MDB&M. Knights Landing Quadrangle.
**GEOGRAPHIC SETTING:** The Reiff soils are on flood plains, or alluvial fans and are nearly level to moderately sloping. The soils formed in material weathered from mixed sources. Elevations are 30 to 500 feet. The climate is subhumid with hot dry summers and cool moist winters. Mean annual precipitation varies from 10 to 20 inches. Mean January temperature is 46 degrees F; mean July temperature is 77 degrees F; mean annual temperature varies from 60 to 63 degrees F. Frost-free period ranges from 240 to 275 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Anderson, Columbia, Visalia and Yolo soils. Anderson soils are loamy-skeletal. Columbia soils have a water table within 60 inches during part of the year. Visalia soils have more than 20 inches thick of mollic surface horizons. Yolo soils are fine-silty.
**DRAINAGE AND PERMEABILITY:** Well drained; very slow to slow runoff; moderately rapid permeability. Areas in Sacramento and San Joaquin Counties are subject to occasional periods of flooding in December to April.
**USE AND VEGETATION:** Used for row, field and orchard crops such as tomatoes, sugar beets, flowers, alfalfa, corn, beans, grapes, almonds, walnuts, avocados and citrus. Uncultivated areas have annual grasses and forbs, such as soft chess, filaree, wild oats, mustard and valley oak.
**DISTRIBUTION AND EXTENT:** Sacramento Valley and the northern part of San Joaquin Valley, California. The series is moderately extensive in MLRA- 17. Map below shows the extent of the Redding soil (in red) in coastal southern California. Map below shows the extent of the Reiff soil (in red) in southern California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Yolo County, California, 1971.
**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to a depth of 24 inches (Ap, A, AC)
The Reiff soils that were mapped in the 1974 Shasta County Area report are excluded from this revised concept. These soils will probably be reclassified as mollisols when re-mapped. Soils mapped in the San Diego Area report are now excluded from the range of the Reiff concept due to having more than 15 percent very coarse plus coarse sand.



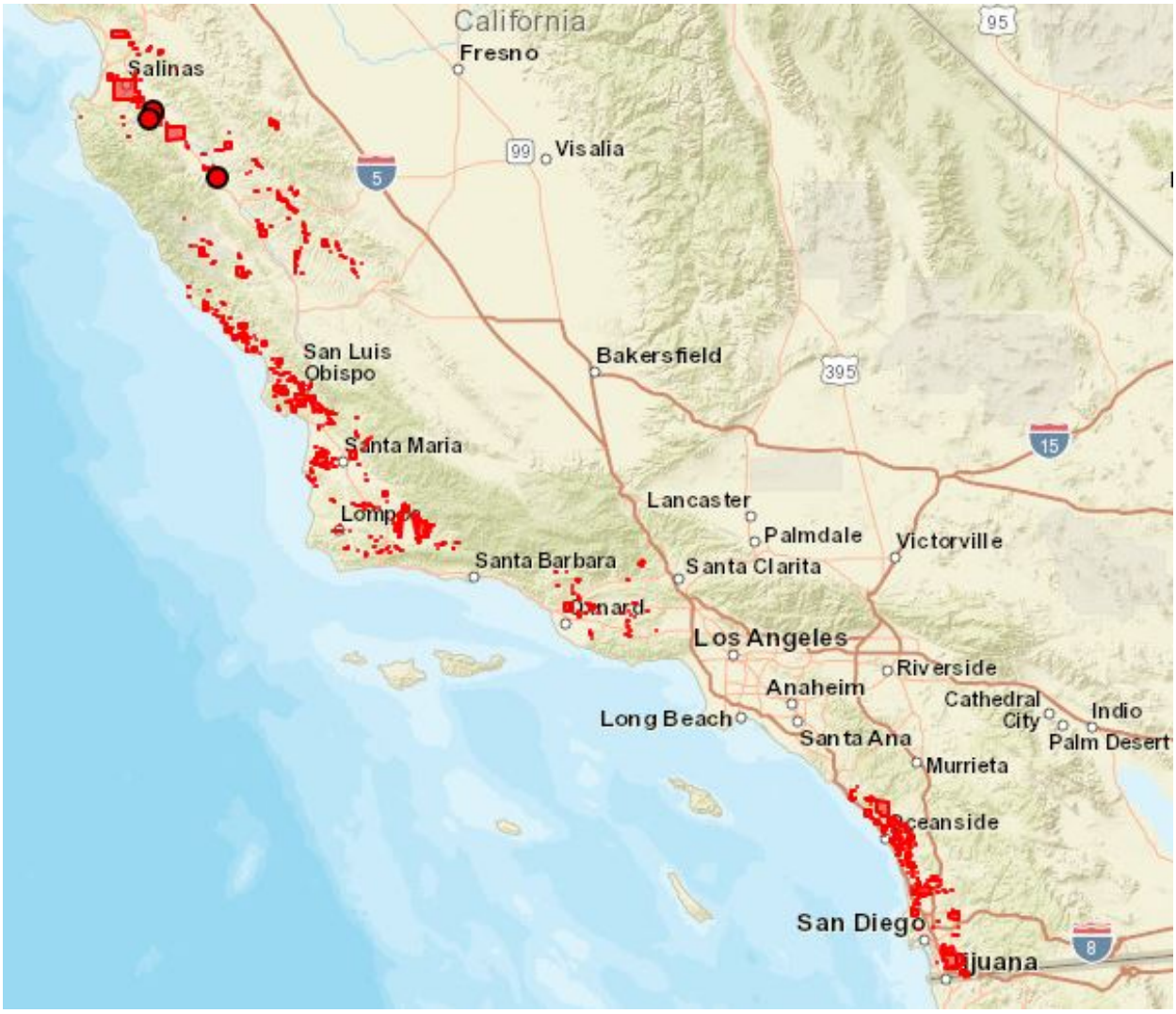
## SALINAS SERIES

LOCATION SALINAS, CA
Established Series
Rev. LCL/TDC/GWH/ET
03/2003

The Salinas series consists of deep, well drained soils that formed in alluvium weathered from sandstone and shale. Salinas soils re on alluvial plains, fans, and terraces and have slopes of 0 to 9 percent. The mean annual precipitation is about 16 inches and the mean annual air temperature is about 59 degrees F.

**TAXONOMIC CLASS:** Fine-loamy, mixed, superactive, thermic Pachic Haploxerolls
**TYPICAL PEDON:** Salinas clay loam, cultivated. (Colors are for dry soil unless otherwise noted. When described, the soil was dry to 5 inches and moist below 5 inches.)
**Ap1**--0 to 5 inches; very dark gray (10YR 3/1) clay loam, black (10YR 2/1 rubbed) moist; weak coarse subangular ; very hard, firm, very sticky and plastic; common very fine roots; common very fine interstitial, few medium and fine tubular pores; moderately alkaline (pH 8.0); clear smooth boundary. (4 to 6 inches thick)
**Ap2**--5 to 13 inches; very dark gray (10YR 3/1 moist or dry) clay loam; weak coarse subangular blocky structure; very hard, firm, very sticky plastic; common very fine roots; common very fine interstitial, few medium and fine tubular pores; moderately alkaline (pH 8.0); clear smooth boundary. (7 to 9 inches thick)
**A13**--13 to 23 inches; very dark gray (10YR 3/1 moist or dry) clay loam; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common very fine interstitial and common very fine and few fine tubular pores; some dark grayish brown (10YR 4/2 moist) lumps and mottles, probably due to rodent activity, increasing with depth; moderately alkaline (pH 8.0); gradual wavy boundary. (10 to 12 inches thick)
**A14**--23 to 33 inches; dark gray (10YR 4/1) loam, dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and common very fine and few fine tubular pores; this horizon and all following horizons have about 10 to 14 percent rodent activity with filling of darker A material; moderately alkaline (pH 8.0); diffuse smooth boundary. (8 to 10 inches thick)
**C1**--33 to 40 inches; grayish brown (2.5Y 5/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine interstitial, few medium and fine and common very fine tubular pores; about 5 percent root channels filled with darker A material; slightly effervescent, disseminated lime; moderately alkaline (pH 8.0); gradual smooth boundary. (0 to 10 inches thick)
**C2**--40 to 49 inches; grayish brown (2.5Y 5/2) very fine sandy loam, olive brown (2.5Y 4/3) moist; massive; soft, very firm, nonsticky and nonplastic; many very fine interstitial, few very fine and fine tubular pores; slightly effervescent, disseminated lime, few fine bodies strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary. (8 to 12 inches thick)
**C3**--49 to 75 inches; light brownish gray (2.5Y 6/2) very fine sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, friable, slightly sticky and slightly plastic; many very fine interstitial pores; strongly effervescent with disseminated lime; moderately alkaline (pH 8.0).
**TYPE LOCATION:** Monterey County, California; 1.3 miles south of Chualar underpass on Highway 101; 1,100 feet SW on paved road, 600 feet SE on Farm Road, about 50 feet NE into field.
**GEOGRAPHIC SETTING:** Salinas soils are on alluvial plains, fans, and terraces not subject to current accretions. Slopes are 0 to 9 percent. The soils formed in mixed alluvium mostly from sandstone and shale. They are at elevations of 50 to 2,000 feet. The climate is dry subhumid mesothermal with cool to warm rainless summers with some fog and cool moist winters. Mean annual precipitation is 12 to 20 inches. The average January temperature is 46 degrees to 50 degrees F.; average July temperature is 62 degrees to 73 degrees F.; mean annual temperature is 57 degrees to 60 degrees F. The average frost-free season is 233 to 300 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the competing Agueda soils and the Clear Lake, Docas and Metz soils. Clear Lake soils are clay soils with slickensides. Docas soils lack a mollic epipedon and are calcareous throughout. Metz soils are stratified and the control section is sandy.
**DRAINAGE AND PERMEABILITY:** Well drained; slow to medium runoff; moderately slow permeability.
**USE AND VEGETATION:** Used mainly for growing irrigated truck, field, and forage crops. Some small valleys used for dry farmed small grain. Noncultivated areas have annual grass and forbs with scattered oak and sycamore in places.

**DISTRIBUTION AND EXTENT:** Salinas soils are extensive in the valleys of the central and south-central Coast Range of California.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Monterey County (Lower Salinas Valley), California, 1901.
**REMARKS:** This is a change in classification from Calcic Pachic Haploxerolls to Pachic Haploxerolls. This site is usually compacted and occurs in a cultivated field subject to long and heavy traffic.
The activity class was added to the classification in February of 2003. Competing series were not checked at that time. - ET
**ADDITIONAL DATA:** Riverside Laboratory pedon No. S65-Calif-27-11. SSIR No. 24.

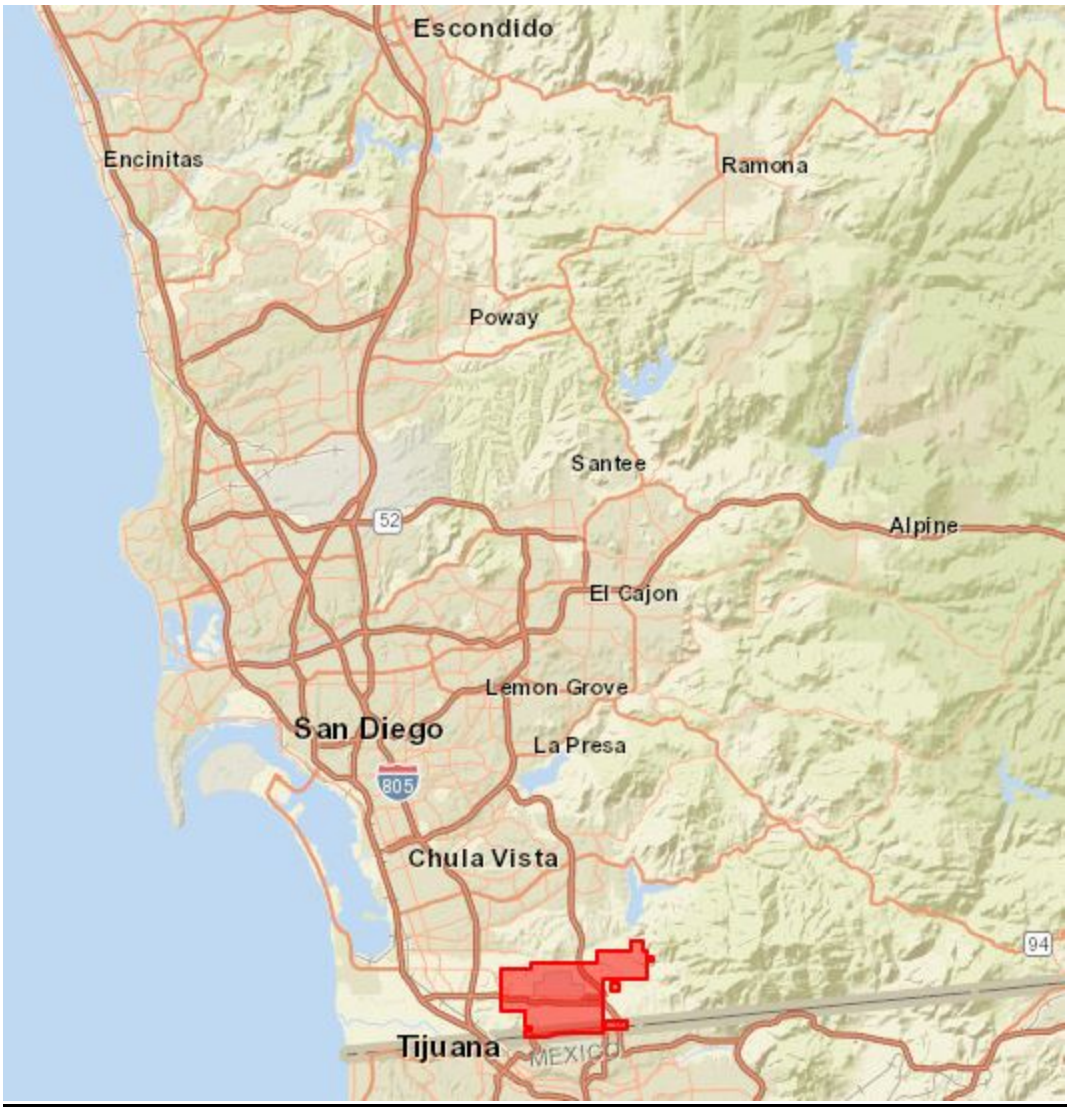


**STOCKPEN SERIES**

LOCATION STOCKPEN, CA
Established Series
Rev. GB/LAB/GNK
03/2009

The Stockpen series consists of deep, moderately well drained clay soils that formed in alluvium. Stockpen soils are on marine terraces ant have slopes of up to 5 percent. Mean annual precipitation is about 11 inches and the mean air temperature Frature is about 61 degrees F.

**TAXONOMIC CLASS:** Fine, smectitic, thermic Typic Natrixeralfs
**TYPICAL PEDON:** Stockpen gravelly clay loam, native pasture. (Colors are for dry soil unless otherwise noted.)
**A2**--0 to 3 inches; light gray (10YR 7/1) gravelly clay loam, gray (10YR 5/1) moist; massive; hard, friable, slightly sticky and plastic; many very fine roots; many fine tubular pores; 15 percent gravel; slightly acid (pH 6.5); abrupt smooth boundary. The uppermost quarter inch is slightly darker and sandier than the rest of the horizon. (1 to 5 inches thick)
**B21t**--3 to 13 inches; gray (10YR 5/1) gravelly clay, dark gray (10YR 4/1) moist; strong medium columnar structure; extremely hard, firm, very sticky and very plastic; common fine exped roots; few fine tubular pores; continuous, thick clay film on peds; 15 percent gravel; slightly alkaline (pH 7.8); gradual smooth boundary. (8 to 12 inches thick)
**B22t**--13 to 21 inches; gray (10YR 5/1) gravelly clay, dark gray (10YR 4/1) moist; strong coarse angular blocky structure; extremely hard, firm, very sticky and very plastic; few fine exped roots; few fine tubular pores; continuous, thick clay films on peds; 15 percent gravel; moderately alkaline (pH 8.0); gradual smooth boundary. (6 to 18 inches thick)
**B3ca**--21 to 34 inches; gray (10YR 5/1) clay, dark gray (2.5Y 4/1) moist; strong coarse, angular blocky structure; extremely hard, firm, sticky and very plastic; many fine tubular pores; continuous thick clay films on peds; a small proportion of angular gravel; strongly effervescent with lime segregated in rounded medium sized soft masses; moderately alkaline (pH 8.0); gradual smooth boundary. (10 to 16 inches thick)
**C**--34 to 60 inches; olive gray (5Y 5/2) clay, gray (5Y 5/1) moist; moderate coarse angular blocky structure; hard, firm, sticky and very plastic; common fine tubular pores; moderately alkaline (pH 8.0).
**TYPE LOCATION:** San Diego County, California; about six miles northeast of San Ysidro, California; approximately 450 feet east of the northwest corner of sec. 23, T.l8S., R.lW; 32 degrees, 35 minutes, 0 seconds north latitude, 116 degrees, 57 minutes, 30 seconds west longitude; UTM zone 11 503918e 3605091n NAD83.
**GEOGRAPHIC SETTING:** The Stockpen soils are on nearly level to gently sloping marine terraces at elevations of less than 700 feet. The climate is subhumid mesothermal with warm to hot dry summers and cool moist winters. Mean annual precipitation is 10 to 12 inches. Average January temperature is about 53 degrees F., average July temperature is about 71 degrees F., and mean annual temperature is about 61 degrees F. The frost-free season is 320 to 340 days.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Alo and Diablo soils and the competing Las Flores soils. Alo and Diablo soils have clay texture throughout, have intersecting slickensides, and when dry have cracks open to the surface.
**DRAINAGE AND PERMEABILITY:** Moderately well drained; medium runoff; very slow permeability.
**USE AND VEGETATION:** Irrigated truck crops, non-irrigated grain or grain-hay. Vegetation in untilled areas is annual grasses and forbs.
**DISTRIBUTION AND EXTENT:** Coastal Plains of Southern California. The soils are inextensive.
**MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Orange County (Capistrano Area), California, 1929.
**REMARKS:** These soils were formerly classified as (maximal) Noncalcic Brown soils.
OSED scanned by SSQA. Last revised by state on 6/75.
UTM, latitude and longitude added 2/2009 - ET


Escondido
Encinitas
Ramona
Poway
Santee
52
Alpine
El Cajon
Lemon Grove
San Diego
La Presa
805
Chula Vista
94
Tijuana
MEXICO

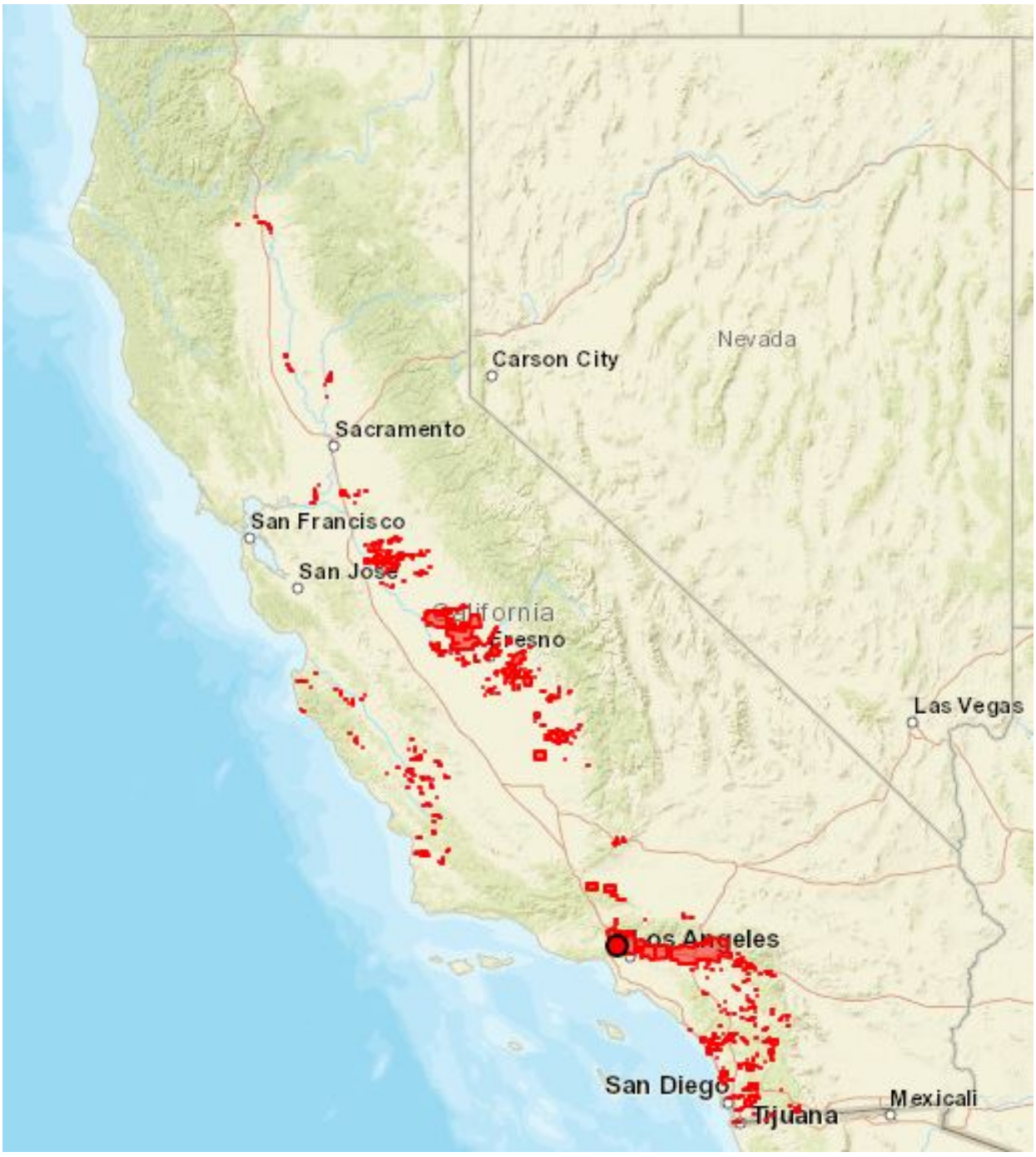
# TUJUNGA SERIES

LOCATION TUJUNGA, CA
Established Series
Rev. RCH/SBS/RLR
03/2017

The Tujunga series consists of very deep, somewhat excessively drained soils that formed in alluvium from granitic sources. Tujunga soils are on alluvial fans and floodplains, including urban areas. Slopes range from 0 to 12 percent. The mean annual precipitation is about 450 mm and the mean annual temperature is about 18 degrees C.

**TAXONOMIC CLASS:** Mixed, thermic Typic Xeropsamments
**TYPICAL PEDON:** Tujunga, on a 4 percent slope under in a maintained lawn at an elevation of 184 meters (603 feet). When described the soil was dry throughout. (Colors are for dry soil unless otherwise noted).
**A**--0 to 4 centimeters; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2), moist; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common very fine interstitial pores; neutral (pH 6.6); clear wavy boundary.
**C1**--4 to 21 centimeters; pale brown (10YR 6/3) fine sandy loam, dark grayish brown (10YR 4/2), moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; common very fine roots and common very coarse roots; common very fine tubular and common medium tubular pores; 1 percent subrounded granitic gravels; moderately alkaline (pH 7.9); clear smooth boundary.
**C2**--21 to 70 centimeters; pale brown (10YR 6/3) coarse sand, brown (10YR 5/3), moist; single grain; loose, loose, nonsticky, nonplastic; common very fine roots; 2 percent subrounded granitic cobbles and 9 percent subrounded gravel; slightly alkaline (pH 7.7); clear smooth boundary.
**C3**--70 to 125 centimeters; pale brown (10YR 6/3) sand, brown (10YR 5/3), moist; single grain; loose, loose, nonsticky, nonplastic; common very fine roots; 2 percent subrounded granitic cobbles and 3 percent granitic fine gravel; slightly alkaline (pH 7.4).
**C4**--125 to 200 centimeters; brown (10YR 5/3) loamy fine sand, dark grayish brown (10YR 4/2), moist; single grain; loose, loose, nonsticky, nonplastic; slightly alkaline (pH 7.4).
**TYPE LOCATION:** Los Angeles County, California, Valley Village Park, Los Angeles City Parks. 50ft. east of road near the intersection at Morrison Drive near two Sycamore trees. 34 degrees North latitude, 9 minutes, 38 seconds and 118 degrees, 22 minutes, 56 seconds West longitude, WGS84 - U.S.G.S Quad: Van Nuys.
**GEOGRAPHIC SETTING:**
Setting: alluvial fans and floodplains.
Slopes: 0 to 9 percent.
Parent materials: alluvium weathered from granitic sources or similar. In urban areas there is usually a thin layer of human-transported materials spread over the surface.
Elevation: 2 to 600 meters.
Mean annual precipitation: 254 to 635 millimeters.
The mean annual temperature: 15 to 18 degrees C.
Frost free season: 225 days inland and 365 days approaching coastal areas.
**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the Elder, Gorgonio, Grangeville, Hanford, Hueneme, Metz, Pico, Palmview, San Emigdio, andSoboba soils.
Elder soils: have an irregular decrease in organic carbon and occur on similar landscape positions.
Gorgonio soils: have a mollic epipedon and occur on similar landscape positions.
Grangeville soils: are somewhat poorly drained and occur on slightly lower landscape positions.
Hanford soils: have a coarse-loamy particle size class, frost free season of 200 to 280 days and occur on similar landscape positions.
Hueneme soils: are somewhat poorly drained and occur on flooplains and low lying alluvial fans.
Metz soils: are derived from sedimentary sources, have thin lenses of loamy material and occur on floodplains.
Pico soils: have a mollic epipedon, coarse-loamy textures and occur on similar landscape positions.
Palmview soils: have a coarse-loamy particle size class and occur on slightly higher landscape positions.
San Emigdio soils: have weak or strong starification and there is an irregular decrease of organic carbon and occurs on alluvial fans or floodplains.
Soboba soils: have greater than 35 percent rock fragments in the control section and occur on alluvial fans in or near canyons..

**DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY:** Somewhat excessively drained; negligible to low runoff; high saturated hydraulic conductivity. Flooding is none to frequent.
**USE AND VEGETATION:** This soil is used for grazing, citrus, grapes, other fruits, and urban residential or commercial development. Uncultivated areas have a cover of shrubs, annual grasses and forbs. In urban areas ornamentals and turf-grass are common.
**DISTRIBUTION AND EXTENT:** Central and southern coastal plains and valleys in MLRA 14 & 19. These soils are extensive. Map below shows the extent of the Tujunga soil (in red) in California.
**SOIL SURVEY REGIONAL OFFICE (SSRO) RESPONSIBLE:** Davis, California
**SERIES ESTABLISHED:** Los Angeles County, California
**REMARKS:** Map units of Tujunga soil which occur at elevations above 1500 feet should probably be set up as a new series during MLRA updates. There are no taxonomic or series criteria to separate the high elevation soils. Tujunga soils mapped in the San Bernardino Co., S.W. part, Western Riverside Area, Tulare Co., Central part, occur above 1,500 feet in places and all of the Tujunga soil map units in the Kern Co., N. E. and S.E. parts are above 1,500 feet. Presently used in too many MLRAs: 14, 17, 18, 19, 29, 30.
Tujunga soils are being restricted to elevation range of 0 to 600 meters (0 to 1968 feet) in coastal plains and valleys in central and southern coastal areas of MLRA 14 and 19.
Type Location relocated to Valley Plaza Park in Los Angeles, CA during the Los Angeles County, Southeastern Part Soil Survey. OSD was modified at this time.
Surface disturbance (designated with the ^) is not series criteria and may or may not be present.
Diagnostic horizons and features recognized in this pedon are:
Ochric Epipedon: the zone from a depth of 0 to 4 cm
Human-transported materials: the zone from a depth of 0 to 21 cm
Particle Size Control Section for this pedon: 25 to 100 cm
**ADDITIONAL DATA:**
NSSL Pedon No: 13N56584
User Site ID: S2013CA037007, 2012Ca696538
User Pedon ID: S2013CA037007
Classified using the Twelfth Edition Keys to Soil Taxonomy (2014)


Nevada
Carson City
Sacramento
San Francisco
San Jose
Fresno
Las Vegas
Los Angeles
San Diego
Tijuana
Mexicali

# ATTACHMENT 2

# Letter from Native American Heritage Commission

**NATIVE AMERICAN HERITAGE COMMISSION**
**Environmental and Cultural Department**
**1550 Harbor Blvd., ROOM 100**
**West SACRAMENTO, CA 95691**
**(916) 373-3710**
**Fax (916) 373-5471**

August 2, 2018

Carmen Zepeda-Herman
RECON Environmental

Sent by Email: czepeda@reconenvironmental.com

Re : Junipero Serra Museum ADA Project, San Diego County

Dear Ms. Zepeda-Herman,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results indicate Native American cultural sites are present. Please contact the Viejas Band of Mission Indians and Ipay Nation of Santa Ysabel. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

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

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

**Native American Heritage Commission**
**Native American Contacts**
**August 2, 2018**

Ewiiaapaayp Band of Kumeyaay Indians
Robert Pinto Sr.. Chairperson
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Alpine , CA 91901
(619) 445-6315

(619) 445-9126 Fax

Viejas Band of Kumeyaay Indians
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(619) 766-4957 Fax

Jamul Indian Village
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Jamul , CA 91935
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(619) 669-4817

San Pasqual Band of Diegueño Mission Indians
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(760) 782-9092 Fax

**This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed**
**Junipero Serra Museum ADA Project, San Diego County**

**Native American Heritage Commission**
**Native American Contacts**
**August 2, 2018**

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Inaja-Cosmit Band of Indians
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Juaneno Band of Mission Indians Acjachemen Nation
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1889 Sunset Drive Luiseno
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(760) 699-6919 Fax

Pechanga Band of Luiseño Indians
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**Junipero Serra Museum ADA Project, San Diego County**

**Native American Heritage Commission**
**Native American Contacts**
**August 2, 2018**

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(760) 699-6924 Fax

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(619) 443-0681

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(760) 742-3189 Fax

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# ATTACHMENT 3

# Ground-Penetrating Radar Results

# Ground-Penetrating Radar for the Presidio Hill Park ADA Project at the Serra Museum

Scott Byram, October, 2018

Prepared for RECON Environmental, Inc.



*Photo of GPR equipment at west edge of Grid 8, facing north towards the northwestern grids with Junipero Serra Museum in the distance.*

Archaeological ground-penetrating radar (GPR) investigations were conducted in August, 2018 at Presidio Hill Park for the City of San Diego's Junipero Serra Museum ADA expansion. This is southeast of Presidio San Diego, dating to the 18th and 19th centuries, as well as other fortifications on the ridge to the southwest. The focus of the project is to identify and delineate possible buried adobe foundations, cairns, pits, ditches or other structural archaeological features relating to mission era, precontact, or U.S. period (e.g. Fort Stockton) occupation. In an effort to identify and map potential historic features

and any precontact Native American features that may be present, 21 GPR grids consisting of 530 transects were surveyed and analyzed. These data are suitable for amplitude slice map generation and identification of potential archaeological features and cultural strata. The results of this survey are presented in this report, following context and methodology discussion. Fieldwork, including site mapping and project planning, was performed in collaboration with RECON archaeologists Carmen Zepeda-Herman and Richard Shultz, in consultation with City of San Diego planner Myra Herrmann.

Because of extensive buried rocks as well as tree growth and utility line placement (primarily park irrigation), indications of features are sometimes difficult to discern in the data set. Additionally, geological strata include cobble concentrations in some cases, so distinguishing stone architecture, earth ovens, buried cairns etc. from natural deposits may be challenging without excavation to identify smaller diagnostic artifacts. The GPR data are most useful for delineating larger features and tracing buried strata.

## GPR Methods

GPR survey involves scanning along evenly-spaced parallel transects within rectangular grids using a sled or cart-mounted GPR transmitting and receiving antenna. GPR data are generated by sending pulses of radar energy into the ground from a surface antenna at a specific time interval (Conyers 2004, 2012). The energy reflected off of buried objects, features, or strata is measured as the waves return to the receiving antenna as it is moved along the transect, with traces collected at intervals tallied with a calibrated survey wheel. The data are sampled and processed by a control unit designed for this purpose (GSSI SIR 4000 controller), attached by cable to the GPR antenna (either 350 or 900 MHz for this project).

As radar energy passes through different subsurface materials the velocity of the waves changes depending on the physical and chemical properties of the material (Conyers 2004). The larger the contrast in electromagnetic properties (measured as RDP, or relative dielectric permittivity) between two materials at an interface, the stronger the reflected signal. This determines the amplitude of the radar wave at a specific depth. Radar variation depends on sediment mineralogy, ground moisture, survey depth (radar time window) and site topography. Electrically conductive or highly magnetic materials including salt and some clays will attenuate the radar energy, resulting in little or no reflection in profile and less depth of data profiles. Dry sediments are generally more reflective than saturated sediments, resulting in deeper penetration and more detailed reflections when traces are combined to form a transect profile.

Data processing was done with GPR Viewer 2017, developed by Lawrence Conyers of Denver University, and amplitude slice map generation derived from MRI software (GPR Process 2010), and reflection amplitude topographic plots generated with GPR Process and Surfer 7.0. Amplitude slice maps are generated from multiple adjacent transects collected in a grid at fixed intervals. These maps represent varying depths, or segments of the time window for radar travel.

Analysis of transect profiles is central to archaeological interpretation of GPR data (Sunseri and Byram 2017; Conyers 2004, 2012). There are several steps to processing radar data for interpretation. For an individual transect profile, signal gains may be adjusted to compensate for diminishing signal return with depth. Continuous, horizontal background waves may be uniformly removed, though care must be taken to avoid removal of horizontal patterns that are not due to ambient radar energy. Filtering of high and low frequency radar energy may be adjusted. Determining depth through assessment of RDP value and hyperbola fitting may be useful, RDP in one part of a site may be different from another, particularly when stratum constituents vary across the site. In this report, an approximate depth scale appears at the left axis of GPR transect profile images. Often radar return time in nanoseconds is displayed instead of depth.

## Project-Specific Methodology

A total of 602 GPR transect profiles were collected for the Serra Museum project, including 530 transects from the 21 grids. The relative locations of the GPR grids are shown in the three composite maps (pp. 25-27) In addition to the GPR slice maps, select transect profiles are also presented as figures throughout the report. These transect profiles are the elements of grids, which are sets of parallel transects that can be analyzed together to produce horizontal slice maps. The RDP value for the project area ranges from 7 to 17, with most grids at the lower end of this range, allowing good depth for radar signal returns. These assessments were based on hyperbola fitting in real time with the SIR4000. The typical depth range for the 350HS antenna at the site is 170 cm, with occasional deeper returns.

GPR grids were surveyed at 0.5 meter transect intervals. Each grid consists of parallel transects that are positioned adjacent to one another for transect data processing in GPR slicing software (Table 1). Data from individual transects are shown as transect profiles, and data from grids are presented as amplitude slice maps, each representing a specified depth range (or time interval for radar travel). Depth estimates are approximate due to soil variation and surface conditions, but in general the GSSI SIR4000 and 350HS provided reflective information through the full range of known site deposits.

All data files are archived and may be viewed and adjusted in open access software such as GPR Viewer 2017. To locate a numbered transect within a given GPR grid, refer to the amplitude slice map and the grid/transect inventory table (Table 1). Each grid has a 0/0 point. The first transect is an odd numbered file beginning in the lower left of the plotted slice maps and heading towards the upper left. The second transect is even numbered and heads back to the lower left, one half meter in from the first transect. This sequence repeats through the grid, with odd numbered transects in one direction and even numbered transects in the opposite. The perimeter of the grid is in meters on the slice maps in this report. Since there are four transects per meter in each grid, locating the line of a given transect on the slice map requires counting intervals at 0.25 meters from the 0/0 starting point. All transects are run on the Y axis of the grid, so the 0/0 point is in the lower left, and counting transect intervals goes from left to right.

Subsequent to test excavations, project survey maps were modified with shallow, middle and deep GPR slice map composites as background (see pages 25-27). For Grids 1 through 18, the dry, rocky sediments allowed high quality radar returns to a depth of roughly 1.2 meters. Wetter park landscaping sediments in Grids 19-21 yielded data at lesser depth limits.

The RDP (dielectric) is set at 7.5 for Grids 1-18, yielding data to a depth of 1.7 meters. The RDP changes to 17 in Grid 19, and 12 in Grids 20, 21. The higher dielectric relates to the drying, rocky nature of the soils on the upper terrace.

| Grid Number | Direction from 0/0 corner | Starting file No. | End file No. | Grid Width m | Transect Length m |
|---|---|---|---|---|---|
| **1** | N from SW | 27 | 54 | 14 | 24 |
| **2** | N from SW | 57 | 78 | 11 | 26 |
| **3** | N from SW | 79 | 100 | 11 | 20 |
| **4** | N from SW | 101 | 122 | 11 | 20 |
| **5** | N from SW | 123 | 146 | 12 | 19 |
| **6** | N from SW | 147 | 178 | 16 | 22 |
| **8** | E from NW | 191 | 215 | 12.5 | 22 |
| **9** | N from SW | 217 | 262 | 23 | 20 |
| **10** | N from SW | 265 | 300 | 18 | 18 |
| **11** | N from SW | 303 | 348 | 23 | 21 |
| **12** | N from SW | 349 | 366 | 9 | 21 |
| **13** | N from SW | 367 | 384 | 9 | 20 |
| **14** | N from SW | 391 | 413 | 11.5 | 20 |
| **15** | SW from NE | 415 | 438 | 12 | 24 |
| **16** | SW from NE | 439 | 466 | 14 | 15 |
| **17** | SW from NE | 467 | 488 | 11 | 19 |
| **18** | SW from NE | 489 | 506 | 9 | 24 |
| **19** | N from SW | 507 | 534 | 14 | 25 |
| **20** | N from SW | 535 | 564 | 15 | 26 |
| **21** | S from NE | 565 | 582 | 9 | 17 |

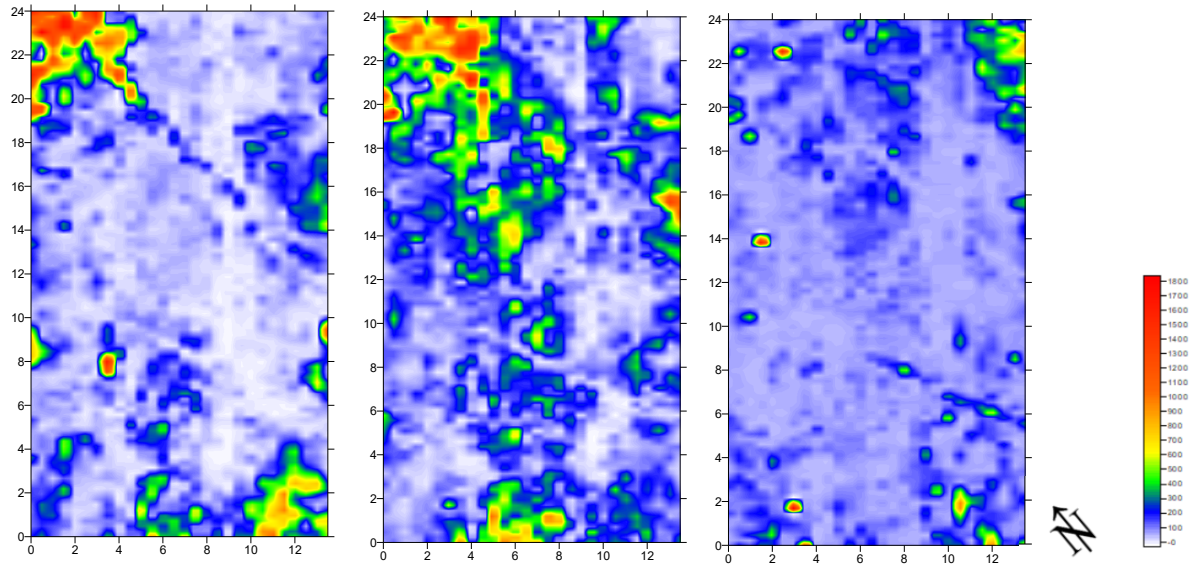
*Table 1: GPR Grid and Transect Inventory*

The discussion of findings for each grid follows the numbered sequence, beginning with Grid 1 and ending with Grid 21 (See composite maps inset for grid locations, pages 25-27). Each grid is discussed separately below, presented with a set of sequential slice maps, from shallow to deep (left to right), representing the range of relevant GPR data. This is generally the upper 1.2 meters, but in grids where there is no useful data below 80 cm, only the upper three slices are shown. North arrows shown with

the slice maps apply to all slices for the respective grid. Amplitude scale is the same across all grids, with Red at this high amplitude end and blue and white at the low amplitude end. Features may show up as either high amplitude or low amplitude relative to surrounding grid data, though in this project area features are more often of comparatively high amplitude. Utility trenches sometimes show as low amplitude gaps in higher amplitude data, as rendered on a slice map.

## Grid 1

The first grid surveyed for the Serra Museum ADA project is located along the park area entry drive at the point where the terrace widens northward toward the ridgetop. The northwest corner of the grid is an area of recent utility excavation and apparent replacement. The high amplitude reflections in the upper two slices likely relate to this excavation. Linear features running across the grid from northwest to southeast are likely water lines or trenches related to water lines and drainage.



10-35 cm 35-60 cm 60-85 cm

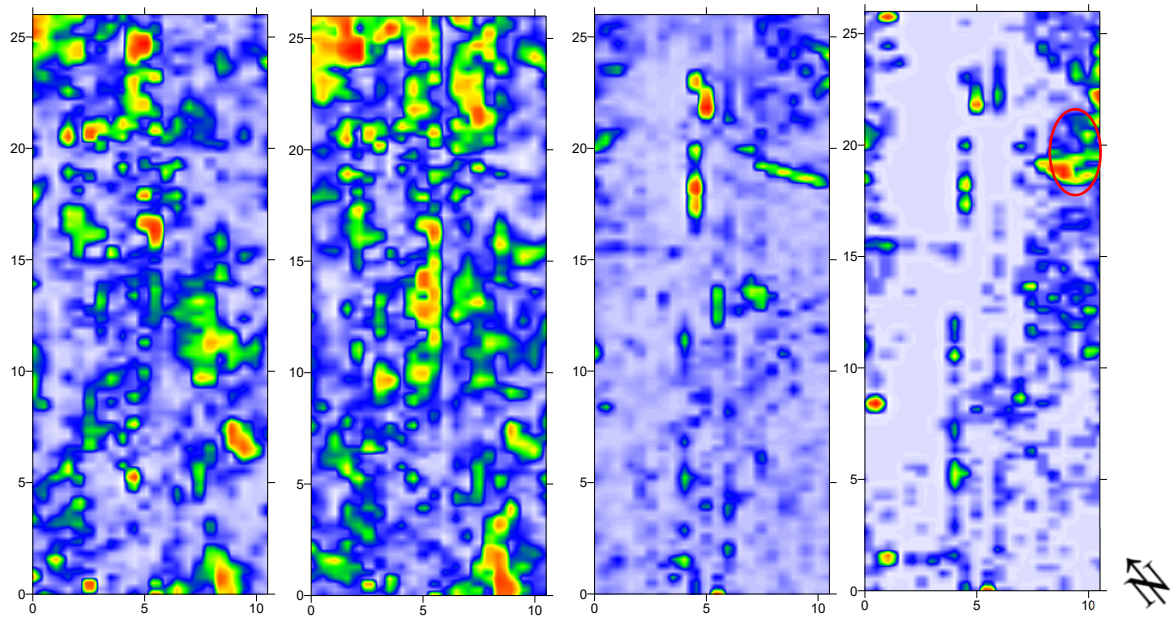
*Above: Grid 1 slice maps 1 through 3, from shallowest at left to deepest at right, representing 10-90 cm depth.*

## Grid 2

A feature appears to be present in the center east to northeast portion of Grid 2, 7 meters south of the north wall. It is 6-7 meters long, consisting of reflection nodes that may represent cobbles, bricks or tiles. Inspection of the slope to the east showed an exposure of cobbles that likely relates to this

reflection feature. The cobbles may be part of a marine terrace deposit, as seen elsewhere in the project area.

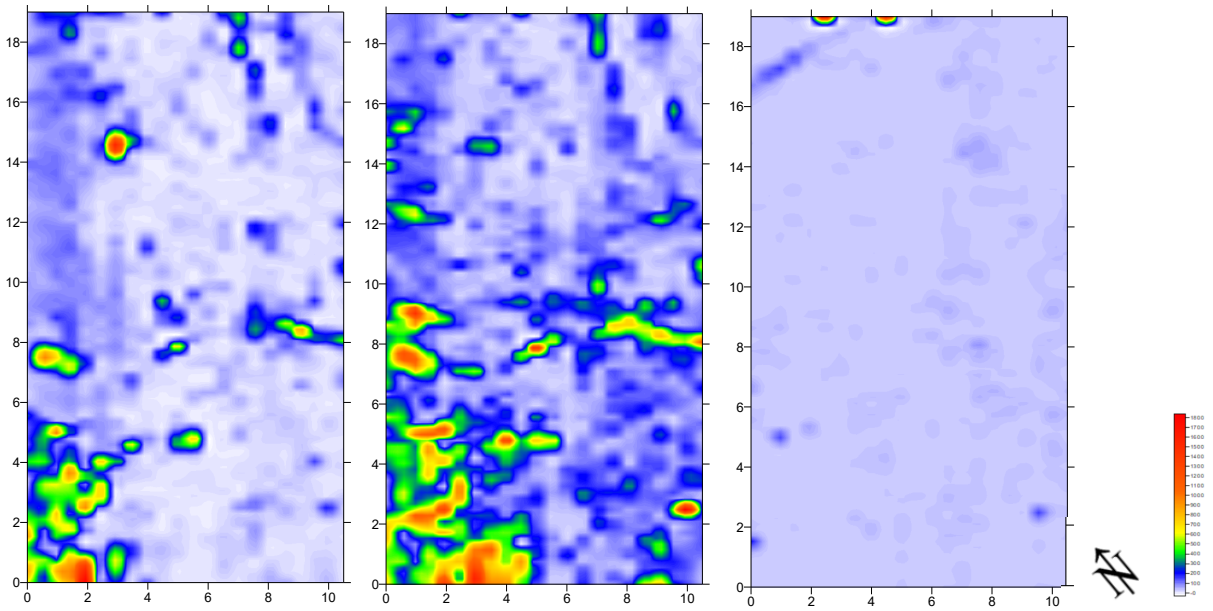
Grid 2 includes the entry driveway for this upper portion of the park, and some of the high amplitude reflections (especially north-south in Slice 2) in the center of the grid likely relate to this. Given current park irrigation maps for the project, some linear feature in Grid 2 likely represent buried water lines.




*Above: Grid 2, slices 1-4. Feature of interest circled in slice 4. Compacted drive likely accounts for high amplitude reflections in the center of the grid, running north to south.*

## Grid 3

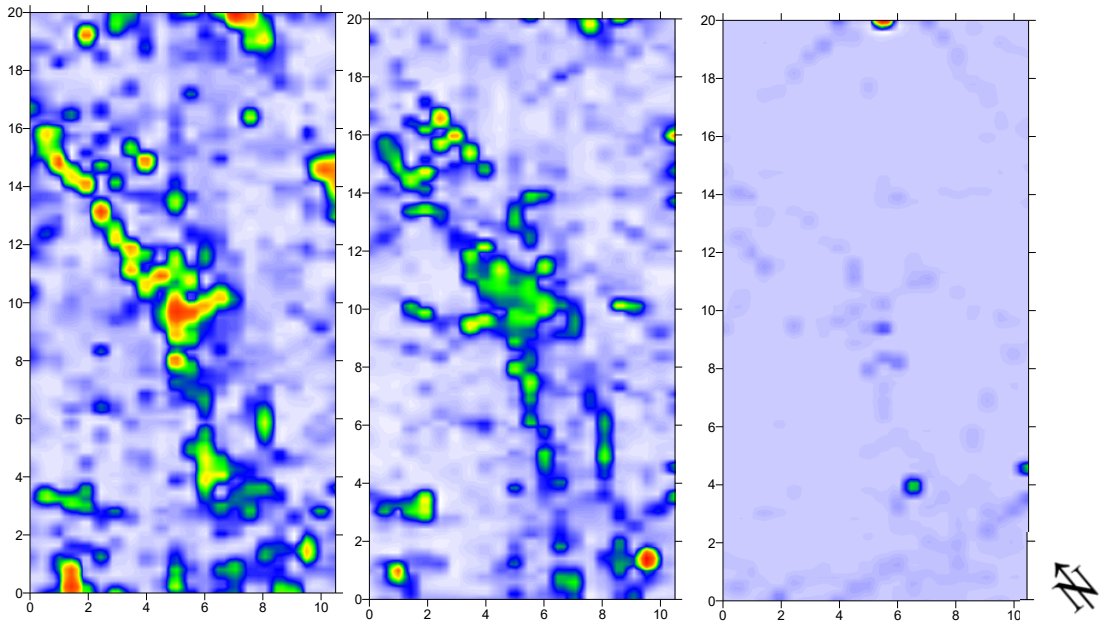
This central grid is located adjacent to an area of active brush piling in the east, and a picnic area to the west. Drive or track related features clearly expressed in Grid 4 likely account for the two parallel lines in the northeast portion of this grid, though these are not especially high amplitude features. Expansive high amplitude reflections in the southwest corner of Grid 3 likely relate to the exposed utility excavation at the shared corner of grids 5, 8, 1 and 3.




*Above: Grid 3, Slices 1-3, from 10-85 cm approximate depth. The amplitude color scale at right applies to slice maps for all grids.*

## Grid 4

Trees are present in and around this grid, as are water lines, most evident in the deepest of the three slices. The most distinctive feature is a curved, 3 meter wide high amplitude reflection that may be a wagon road, bordered path, or other feature, possibly relating to the early landscaping of the museum. It is not expressed on the surface.

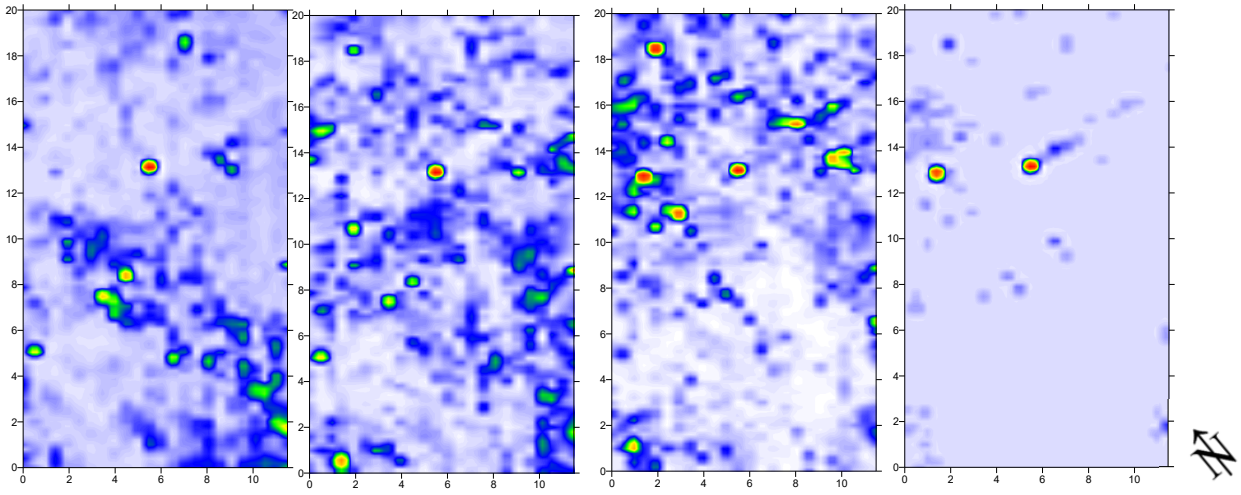


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 4, slices 1-3.*

## Grid 5

Red gum trees are numerous in this portion of the project area. A surface staircase descends from the southwest corner of the grid to the paved street below. Tree roots at 13-14 meters. Roots should be through much of unit with five large trees present.



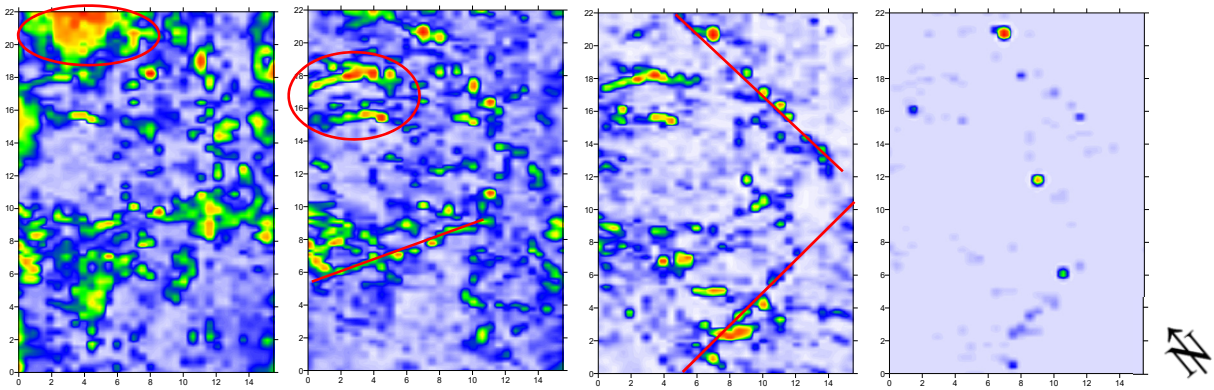
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slice maps 1-4 for Grid 5. Tree roots likely account for most of the variability in this grid.*

## Grid 6

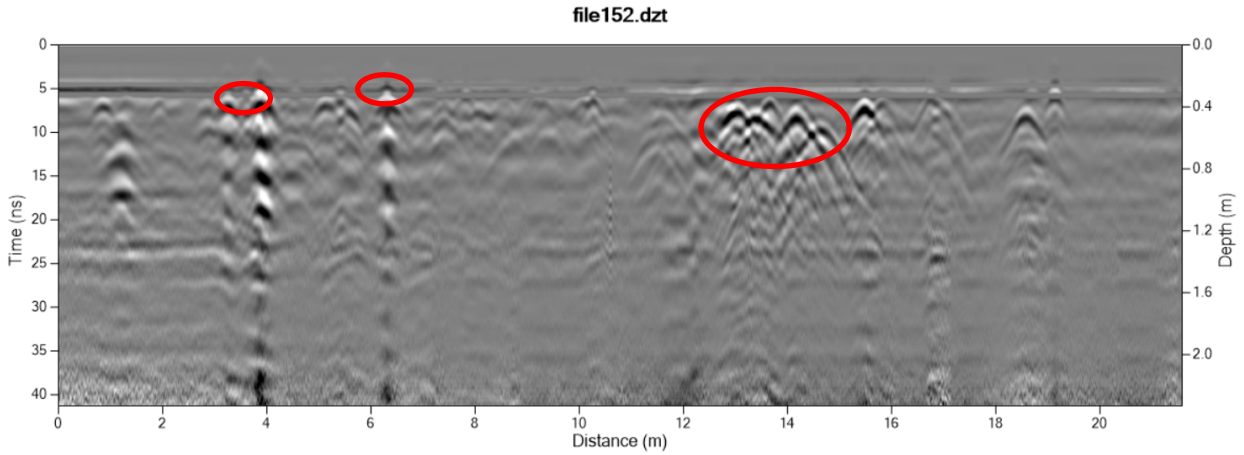
Trees and stumps are present in this grid, as well as a thick blanket of red gum needles, which obscures the ground surface. Transect length varies somewhat due to slippage on sloping areas with needle duff.

Both metal and non-metal node clusters were identified in Grid 6. Linear reflection features may be from utilities or fence lines, possibly large roots. Metal objects in the northwest suggest tracks or rails, and a near-surface planar reflection in the northwest corner is unexplained.



10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Grid 6, slices 1-4. A shallow planar feature is evident in slice 1 (red oval), adjacent to two roughly parallel metal bars, rails or pipes (circled in Slice 2). Some of the high amplitude reflections across the grid at 8-10 meters north may be roots, but deeper linear features in Slice 3 could be from a line of fence posts or cobble alignment, fainter but partly evident in Slice 4 as well.*



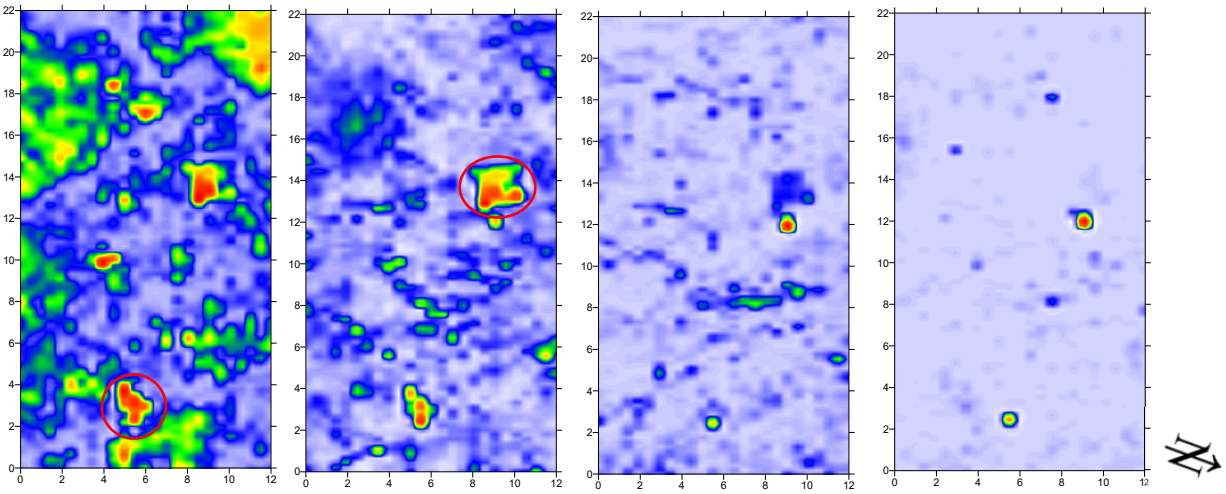

*Above: File 152 in the western portion of Grid 6, facing east. The tall, narrow reflections at the left are likely metal near the surface. The cluster of nodes at 14 meters between 40 and 60*

*cm depth are likely tree roots, given the distribution of red gum trees in this grid, though this may be part of a large filled trench running east-west between 8-10 meters north of the south wall of the grid.*

Note that there is no Grid 7. Transects initially recorded as Grid 7 were later combined with Grid 6.

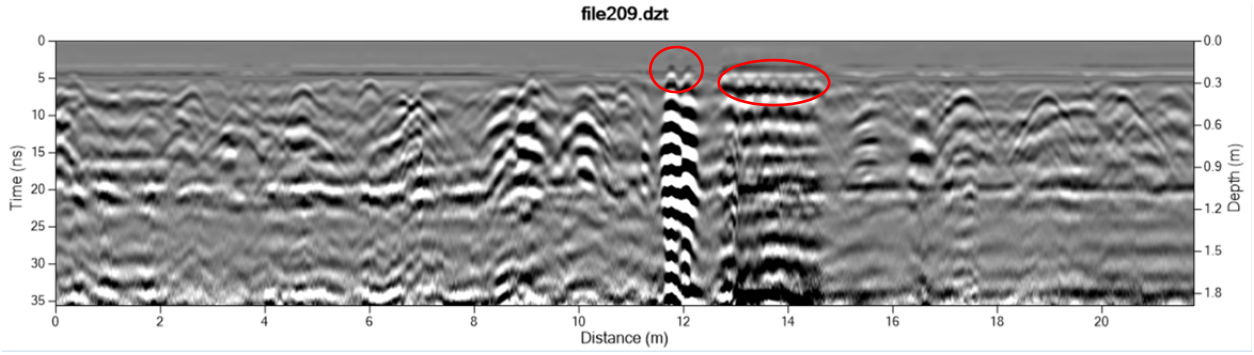
## Grid 8

This grid is located in a picnic area, with features of concrete and active utility lines present. Woodchips are present on the surface in the south, and these may obscure some radar data.



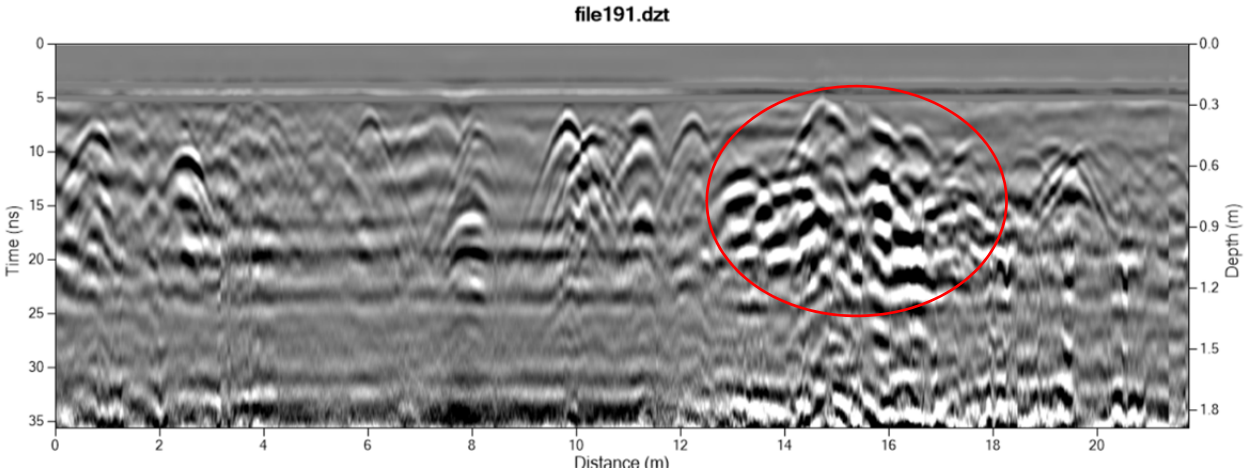
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 from Grid 8, showing surface concrete features (red circles) in an area developed for park picnicking.*




*Above: File 209 in Grid 8, south half, showing rebar and concrete at 13 to 14.5 meters (oval to right). Facing north. A metal object is located at 12 meters on this transect profile (circle to left). The metal from this object as well as the evenly spaced rebar produced multiple*

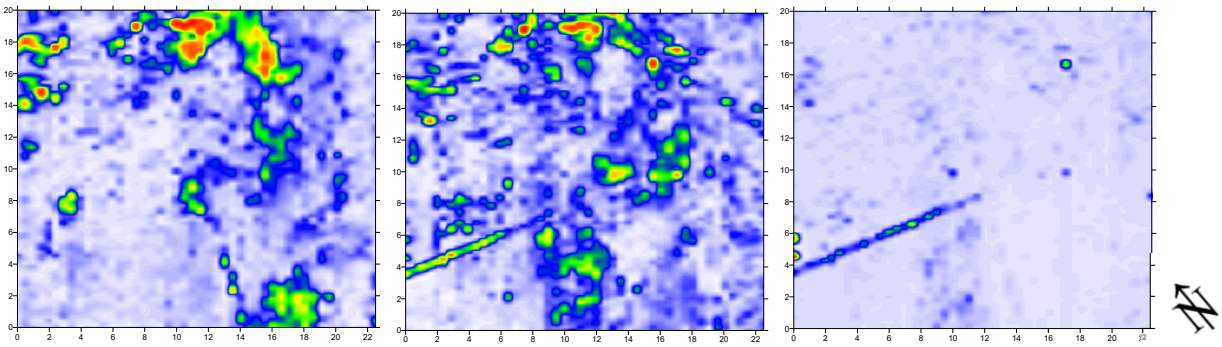
*reflections as the radar energy reverberates off of the buried metal through the open time window as the antenna moves across the surface.*




*Above: A large root system is likely the explanation for a large cluster of nodes at 13-17 meters (circled in red) in file 191 in Grid 8. This portion of the transect ran adjacent to a large tree trunk.*

## Grid 9

This grid is located in the center of the main proposed parking lot area, near the ridge crest. Grid 9 shows extensive root expansion, as well as at least one linear utility pipe. Standing trees are present within the grid, including a large one in the north-center.

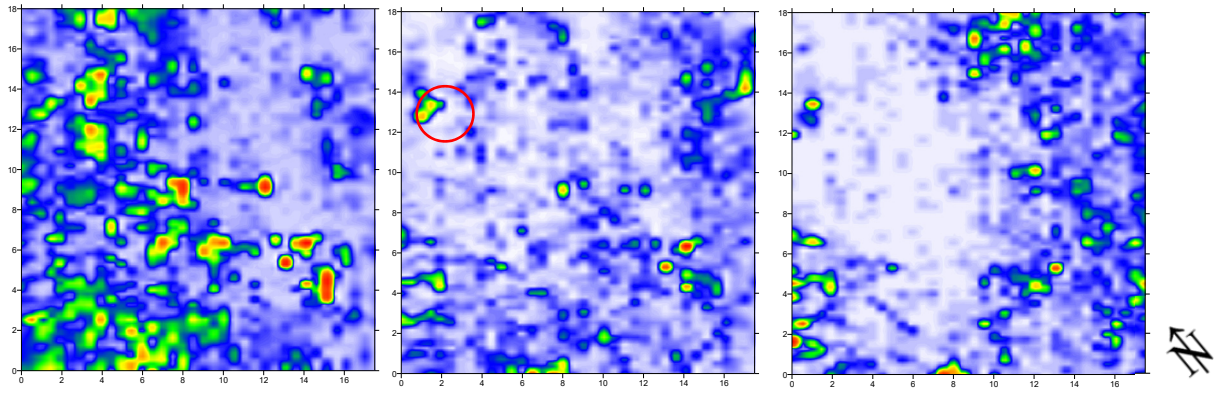


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 9, slices 1-3. The distinct linear feature in the south half is likely a water line. Planar features in the north center and the eastern half of the southeast wall are likely roots of trees.*

## Grid 10

This grid is located on the ridge crest, and an abandoned concrete water fountain is located in the northwest corner. There is a large tree in the southwest quadrant, accounting for some of the high amplitude variation here. No other cultural features were noted. This area appears deflated.

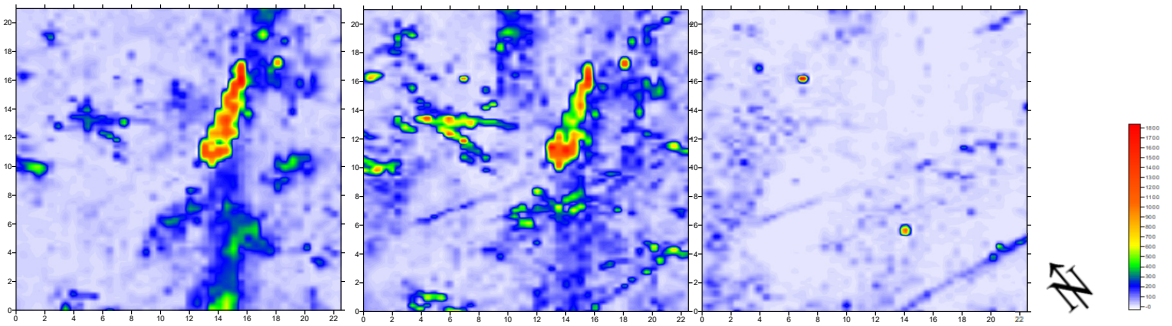


10-35 cm 35-60 cm 60-85 cm

*Above: Slices 1 through 3 for Grid 10. The location of the concrete pad for a water fountain is circled in red.*

## Grid 11

Grid 11 is relatively level in the western third, and slopes up to the north-south trending ridge top ridge in center of the east half. The ridge crest corresponds to a diffuse area of higher amplitude reflection in the grid slice maps . Grid 11 is forested but trees are fewer in the northeast. Eucalyptus predominates. Much of the grid surface is compacted from use as a refuse storage area. There is a small overlap with Grid 1 in the southwest corner.

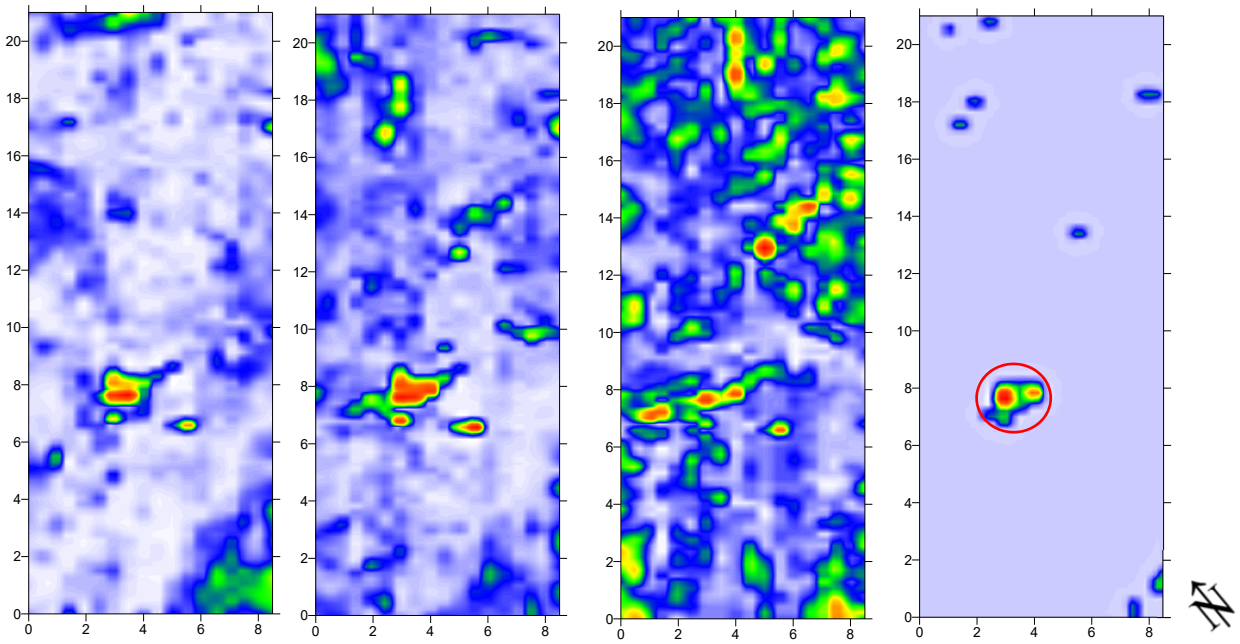


10-35 cm 35-60 cm 60-85 cm

*Above: Grid 11 includes linear features that are likely from one or more networks of irrigation lines. A more diffuse north-south trending feature at 14-18meters east crosses the grid, with very high amplitude from 11-17 meters north. This diffuse feature may be related to the stockpiling and possibly seasonal burning of organic debris such as branches and leaves, or it may represent former use of the ridge top as a road.*

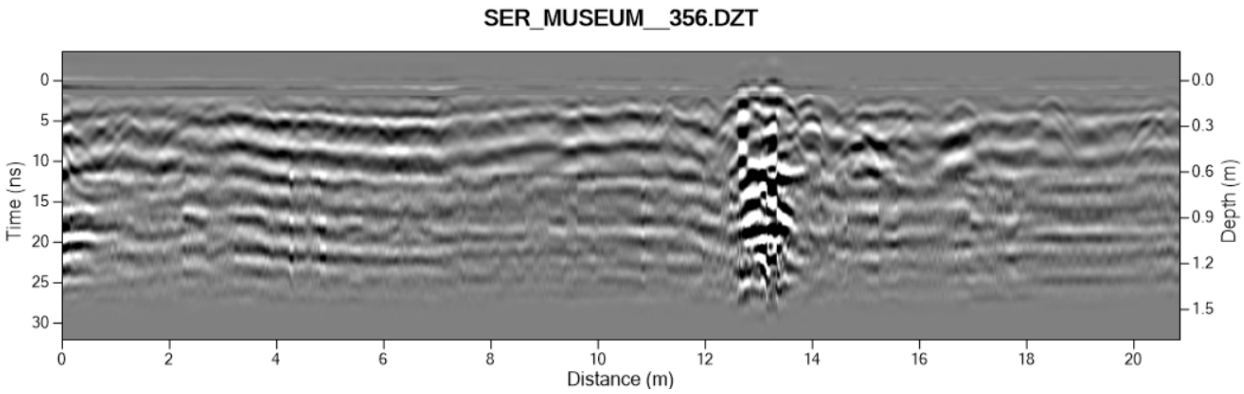
## Grid 12

Grid 12 is the most northeasterly of the grids. The slope descend to the north and east, and rises to the ridge crest in the west. In Slice map 3 (44-64 cm depth) there is a buried horizon that likely represents a stratigraphic change. At 8 meters north, 3-4 meters east there is a vertical feature that may be a pit or post (flagpole or utility pole?).



10-22 cm 22-44 m 44-64cm 64-90cm

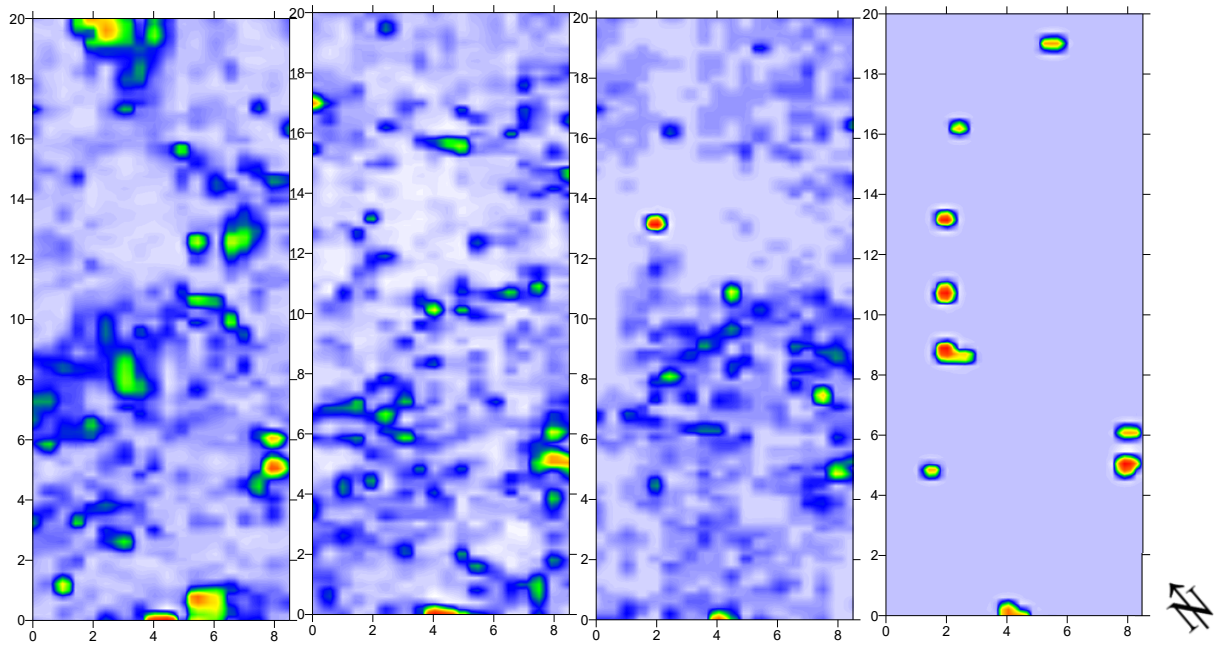
*Above: Slice maps 1-4 in Grid 12. Note the possible pit feature (circled in red in Slice 4) at 8 meters north, 3-4 meters east.*




*Above: Profile 356 in Grid 12, showing a vertical feature at 13 meters. This feature appears to contain metal, and may be a post base or flagstaff, given its location.*

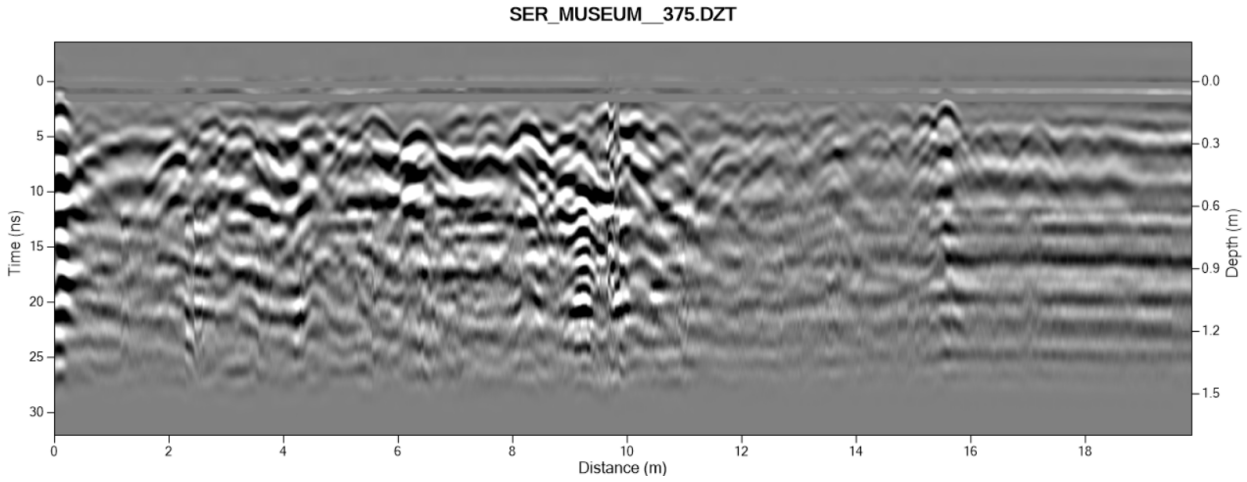
## Grid 13

The slope descends to the east of Grid 13. A wood chip pile in south has been spread, but may affect readings. No distinct features were observed in this grid. Tree roots likely account for more linear patterns.

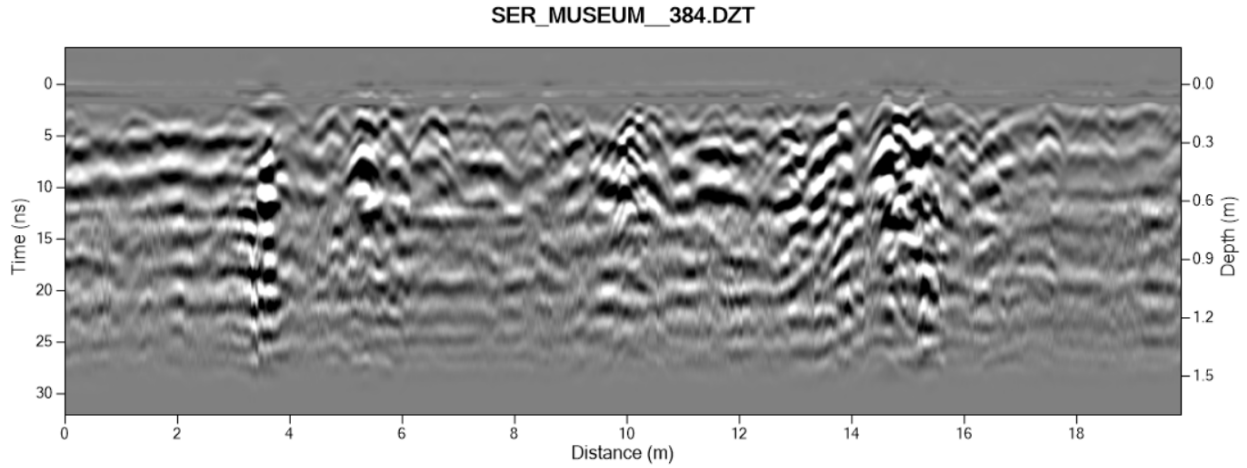


10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slice maps 1 through 4 for Grid 13*



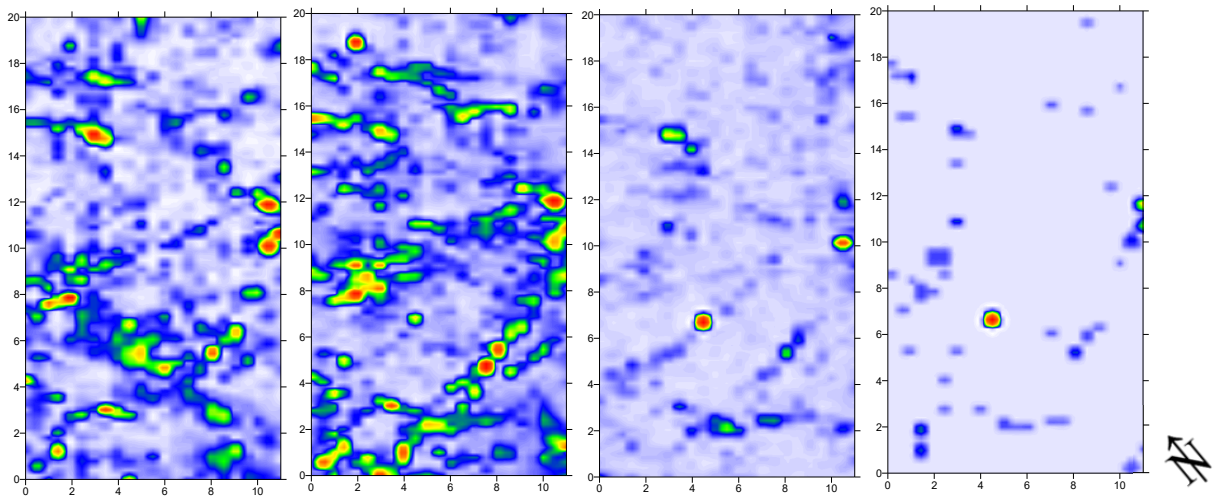

*Above: File 375 in Grid 13. Note the distinction between the south half and the north half of this profile. The abundant nodes in the south half may be tree roots.*




*Above: File 384 in Grid 13, showing pockets of roots.*

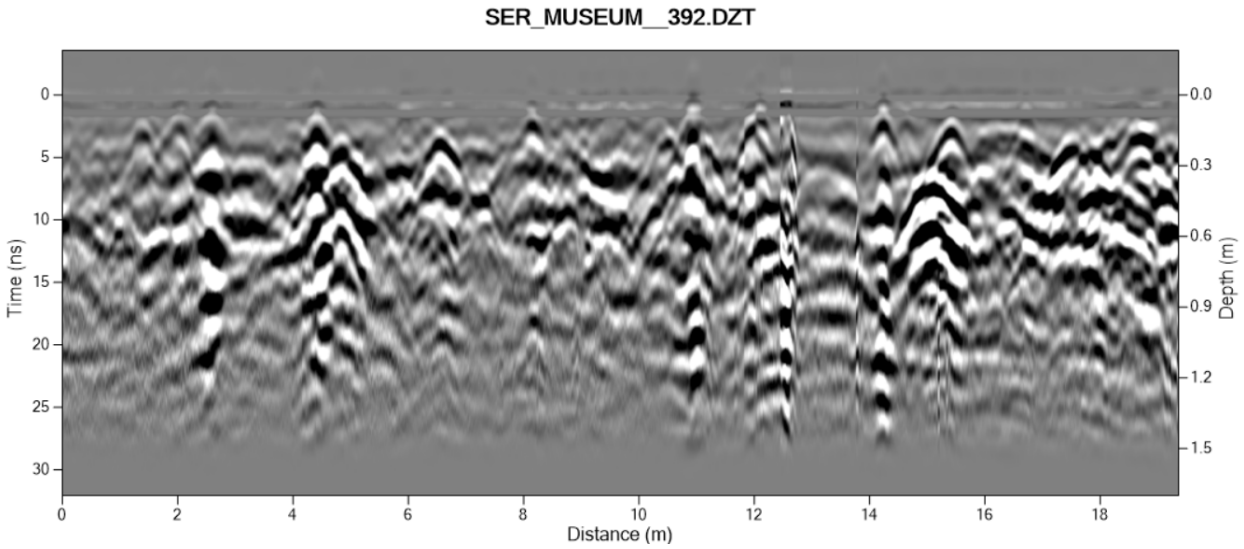
## Grid 14

This grid is located west of Grid 8 and at the slope break descending toward the paved road that borders the project area on the west. Grid 14 is an area of numerous large surface tree roots, which likely account for the large, curvilinear reflection features in the slice maps. Layering in the upper 60 cm is more distinct in this grid than in most other parts of the project area.

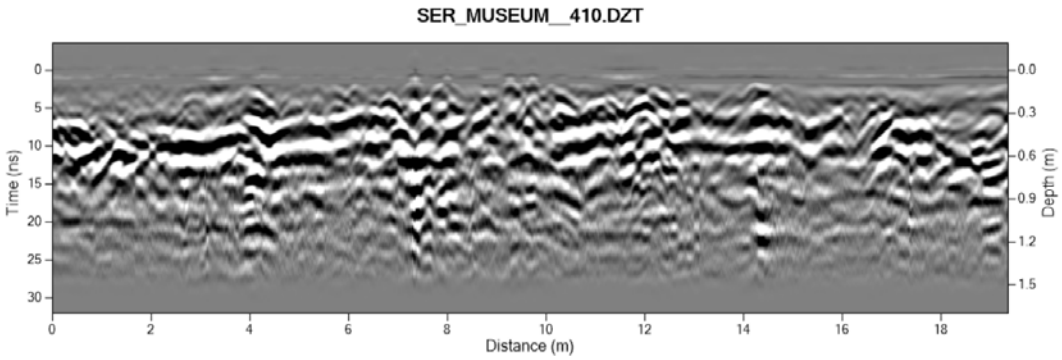


10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Grid 14 slice maps, showing numerous large roots that are also emergent. Buried water lines may account for some of these features as well.*



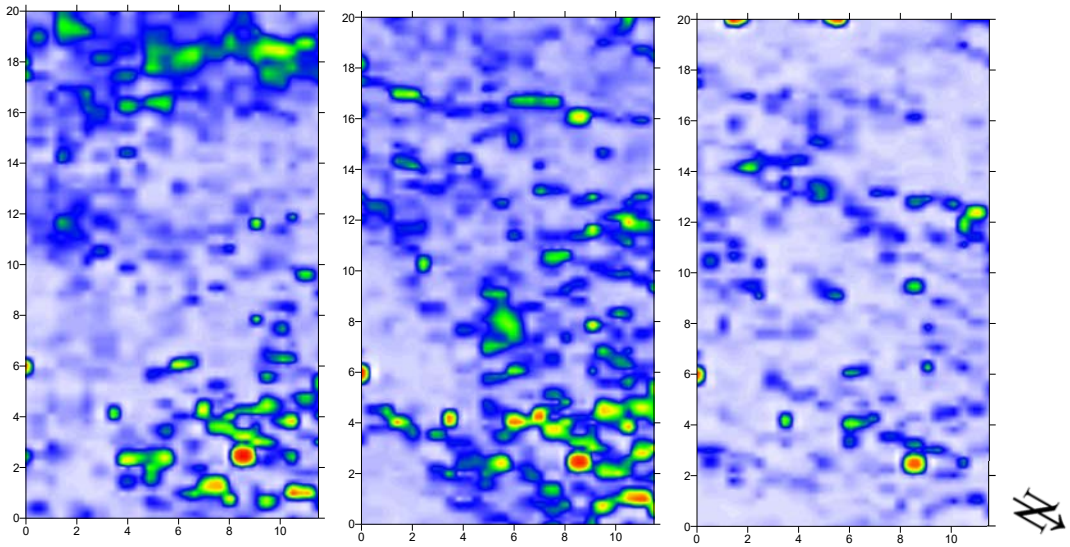

*Above: File number 392 from Grid 14, showing numerous high amplitude reflections of varying depths. Several may be roots, but metal may account for some of the taller stacked "multiple" reflections.*




*Above: File 410 from Grid 14, showing inclined laminated strata. Facing east. These laminated strata are more distinct than in other parts of the project area, and they could represent multiple stable surfaces. However no artifacts were noted on the surface to suggest this as a possible site deposit. Colluvial layers may be present, but these layers slope up to the south.*

## Grid 15

This grid is located in the center of the northwest slope within the project area. Transects were run from the east corner toward the southwest because of the slope. Large roots from a tree that is now a stump were present in the southwest corner but radiated out through much of the grid. Other linear features trending in a northward direction are likely drainage related, and some may be water lines.

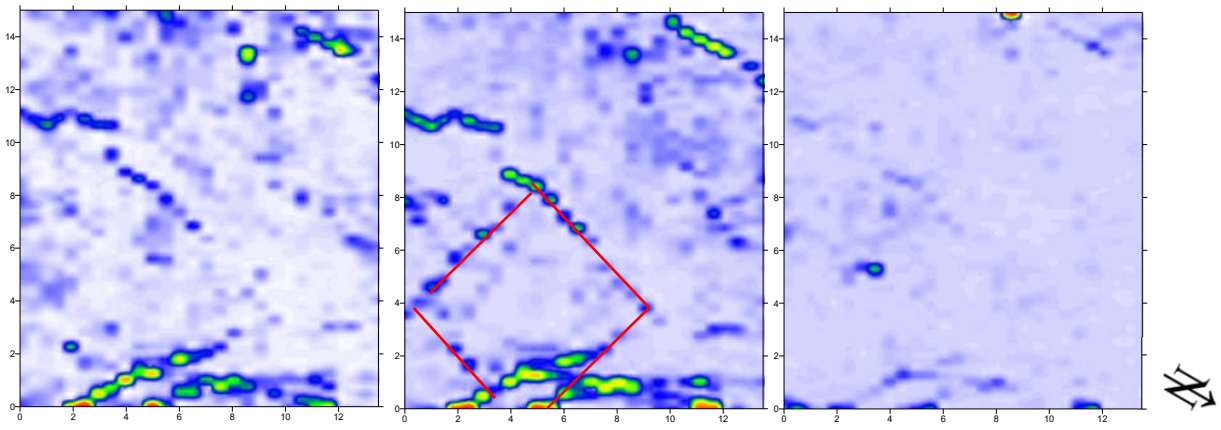


10-35 cm 35-60 cm 60-85 cm

*Above: Slice maps 1-3 for Grid 15. Both roots and water lines appear to account for the linear features visible in slice maps on this northwest slope within the project area.*

## Grid 16

This grid holds numerous narrow linear features. While most are likely irrigation related water lines, one set forms a trapezoid that could have been a rectilinear structure. Surface artifacts including shell and glass were noted in places on this northwest slope, and the possibility of a post-constructed structure should be considered.

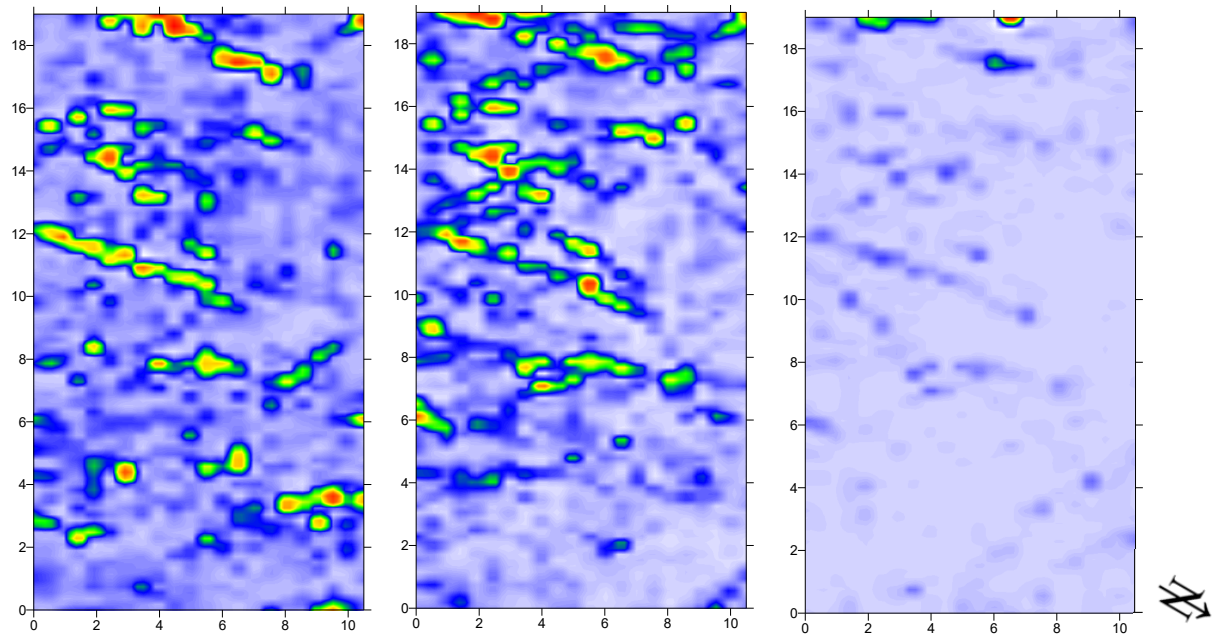


10-35 cm 35-60 cm 60-85 cm

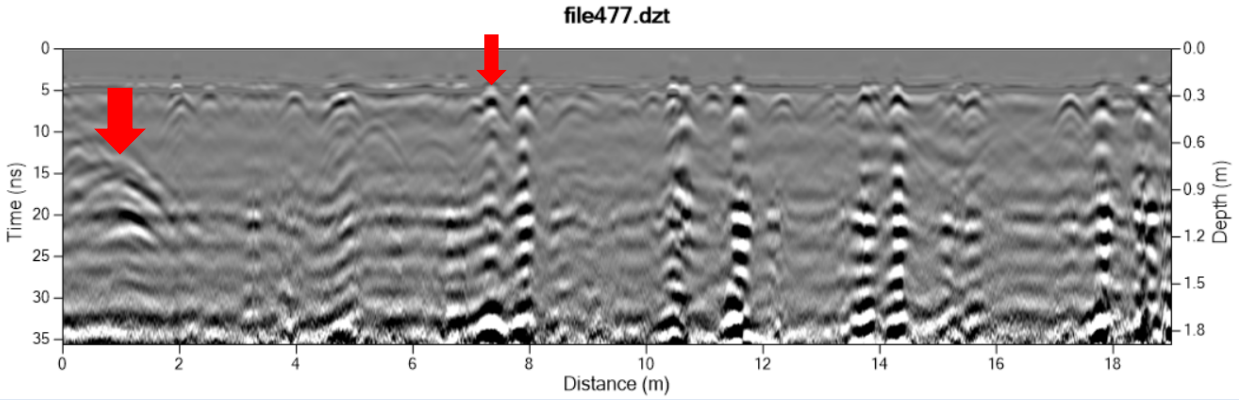
*Above: Slices 1 through 3 for Grid 16. Red lines outline the rectilinear feature, which may be intersecting pipes or the foundation of a post-constructed structure.*

## Grid 17

Located on the lower portion of the broad, open slope southeast of the museum grounds, this grid shows signs of park landscaping. Several north-south trending linear features are evident, especially at a depth of 30 cm. These are likely irrigation-related features. The surface of the grid holds plants indicative of greater moisture, possible seasonal flower beds are present or were in the past. One deeper linear feature is present in the east, and appears to be a large water line connected to the main water station northeast of the grid.



*Above: Slices 1 through 3 for Grid 17*

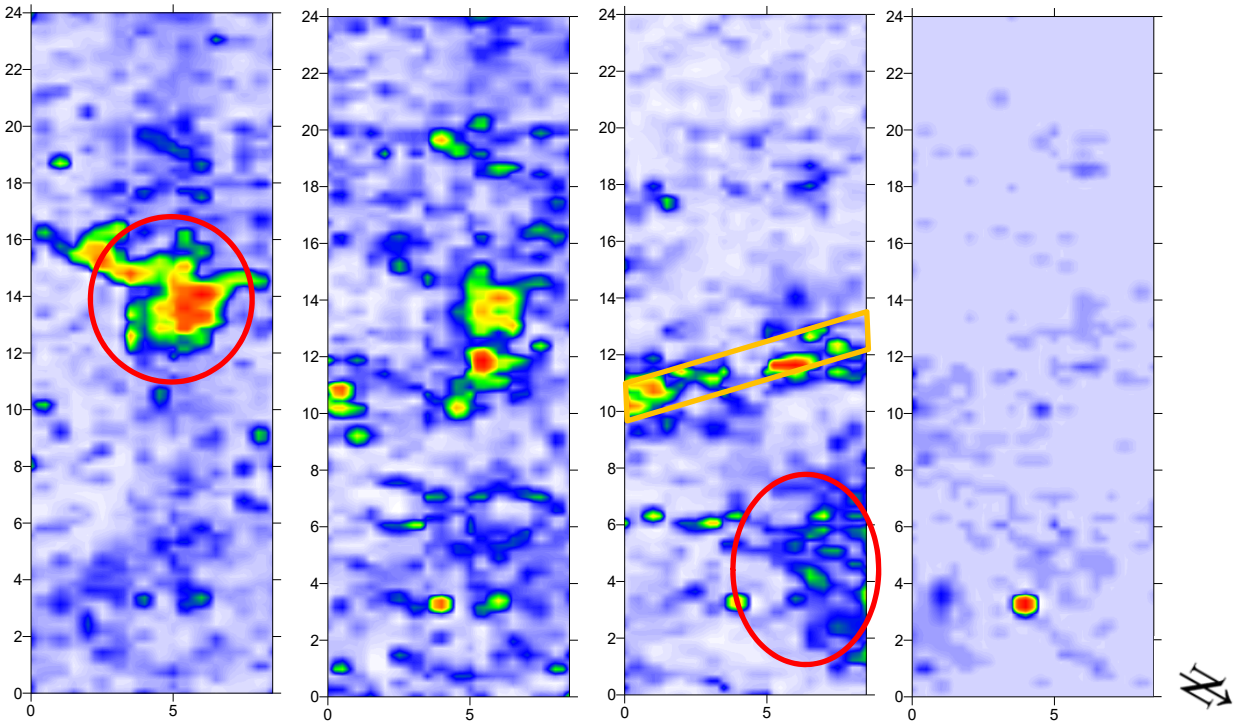



*Above: Transect 477 in Grid 17, facing south. The large feature at 60 cm depth at left, marked by the larger red arrow, appears to be a large water supply line. The smaller arrow marks potential linear feature such as a near surface pipe or root. Several shallow linear features such as this are present in Grid 17.*

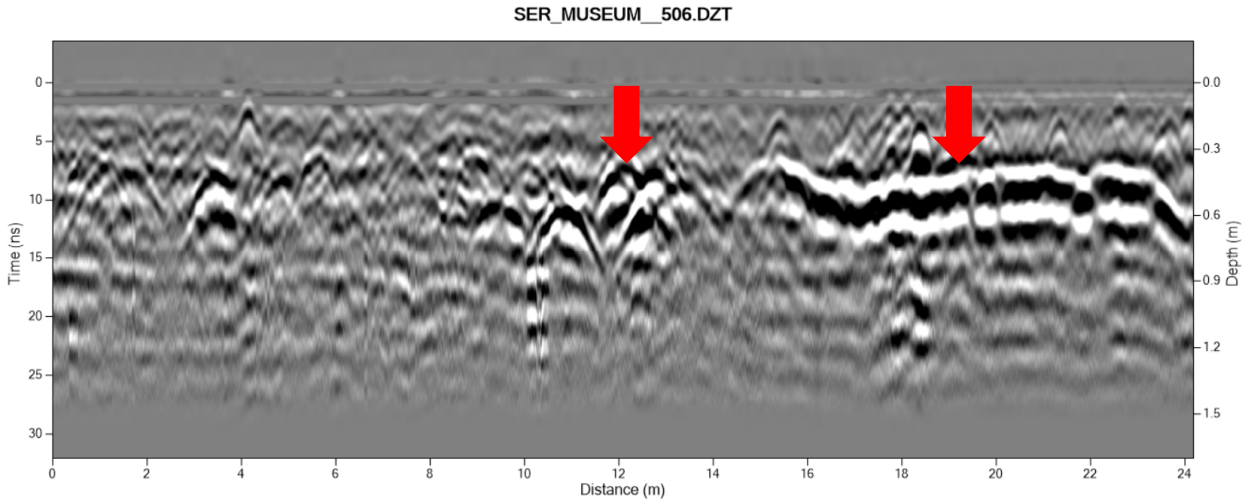
## Grid 18

This is the last grid that was surveyed on the northern slope area, and closest to the Serra Museum and historic Presidio San Diego. Grid 18 is narrow, with long transects, a shape chose to follow the planned path construction in this area. It ends a few meters southwest of a water line access point where multiple large pipes come together. This nexus for the water pipe system was exposed at the time of survey.

Planar features (red outline)) of potential archaeological interest are evident in Grid 18, though these may be of later origin, relating to landscaping horticulture. The planar feature in the center of the grid is most evident in the slice maps, and the one in the northeastern part of the grid is more evident in transect profiles such as file 506, shown below. A trench feature (orange outline) possibly filled with cobbles or other large clasts crossed the grid from north to south. These features could be related to historic structures, though no related artifacts were noted on the surface. It is worth noting that mineral soil is visible on this surface, and the features are not deep.




*Above: Grid 18 slice maps showing planar (red) and linear (orange) features.*

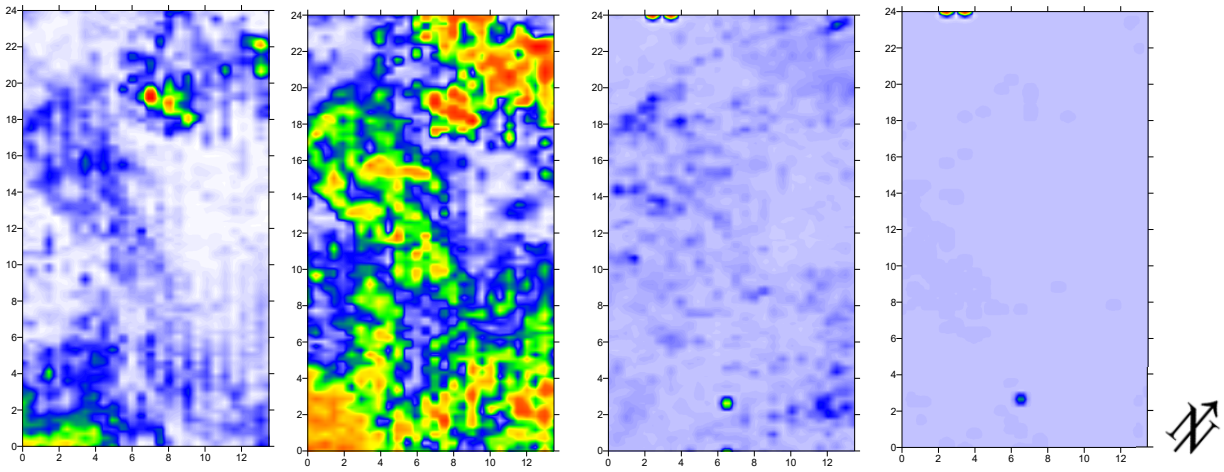


*Above: File 506 in Grid 18 shows possible cobble fill in a linear trench-like feature (marked by left arrow), and a distinct planar surface not seen in most grids (marked by arrow at right)*

## Grid 19

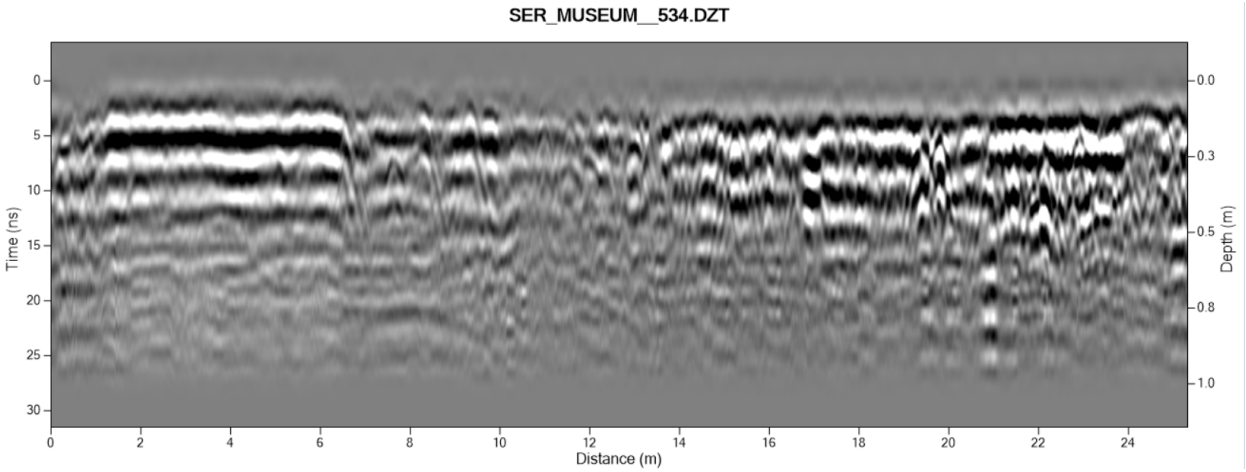
For grids 19-21 the dielectric is changed to 17.

Grid 19 shows a distinct stratigraphic change at roughly 25cm depth. This may be a more compact, buried surface, or the base of the root mass of grass. Given the groomed landscape of this portion of the park, it could be a distinction between prepared lawn soil and a subsoil. Pine needles are abundant in the southern portion of this grid.



10-22 cm | 22-44 m | 44-64cm | 64-90cm

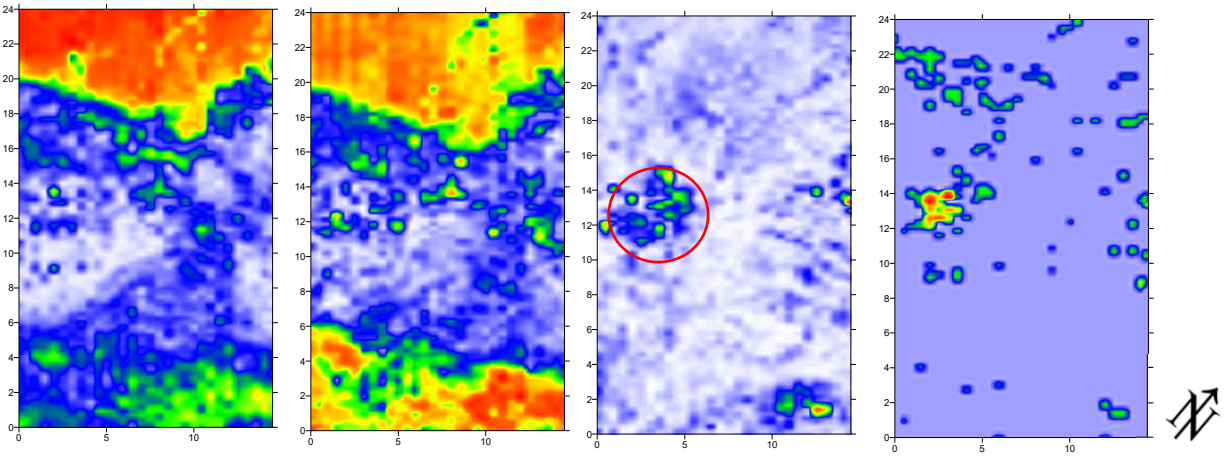
*Above: Slice maps for Grid 19. Slice 2 shows the varying extent of the planar phenomena in slice 2 that correspond to the stratigraphic change scene in transect profiles, at roughly 25-30 cm depth. Linear borders in these patterns suggest a cultural origin, but park landscaping may account for this.*




*Above: Profile 534 in Grid 19, facing east. The distinct stratigraphic transition appears at 15-20 cm, and may consist of a pavement of like sized objects such as bricks (especially in the south half of the grid). Note that pine needles are on the surface in this southern part of the grid, and the effects of this material on radar data are not known for this setting. The stratum transition a the left (north) is more continuous, from 1-7 meters in this profile.*

## Grid 20

Dielectric changed to 12, as this grid is more uphill than grid 19, so only partially in the watered lawn area. A tree accounts for the cluster of high amplitude reflections at 14 meters in the western (left) side of the grid, most evident in slices 3 and 4.



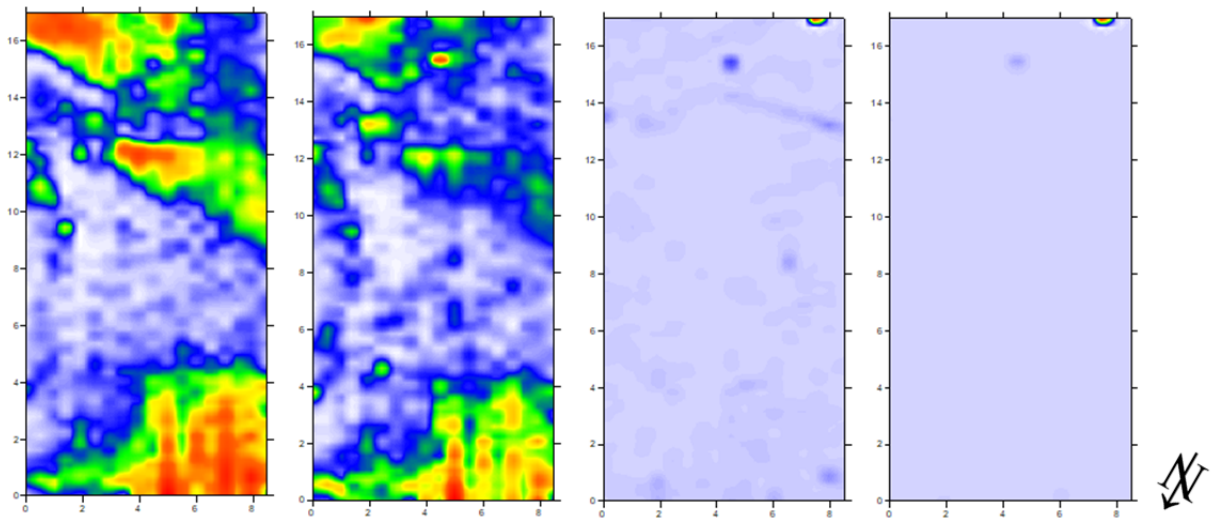
10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 for Grid 20. Roots of large tree circled in red. The high amplitude stratum change in the north likely relates to the transition to dryer, rocky soil on the slope in this area,*

*while the higher amplitude stratum in the south likely relates to the base of the lawn soil, root mass and irrigation.*

## Grid 21

Rectilinear planar feature in the southeast corner appears to be reinforced concrete or brick pavement, or other regularly patterned, planar feature. Approximately 30 cm in depth, and based on slice maps it is at least 4 meters square, extending to the margins of the grid in the east and south. The planar features in the northern half of the grid are at an oblique angle, and may consist of material more smooth in texture, such as compacted gravel, as they appear in slice 1. If any of these features is part of a building, there are no indications of deeper perimeter foundations. They may be slabs, gravel pads, or paving of some kind. They may simply be different types of horizontally spread fill, though the southeastern feature appears to hold patterned elements.



10-22 cm 22-44 m 44-64cm 64-90cm

*Above: Slices 1-4 (representing 2-22 nanoseconds or 0-90 cm depth) for Grid 21. Scale in meters*

## Non-Grid Transects

The area between Grid 11 and Grid 20 was not surveyed with grids because its southern half is brush covered and slopes steeply, while its northern half is in the vicinity of a large and active bee hive. Individual transects were run across this area, and nothing of potential significance was noted in these.

Transects were also run north of Grid 6 and east of Grid 17, where the existing groomed path leads to the museum. A single feature was observed on the surface in this path, consisting of a gravel concentration that appears to have depth. This may be a filled drain field of some kind, and the standard gravel on the surface suggests a modern quarry origin, in contrast with the mixed sized gravel and cobbles common through much of the project area.

## Summary of Findings

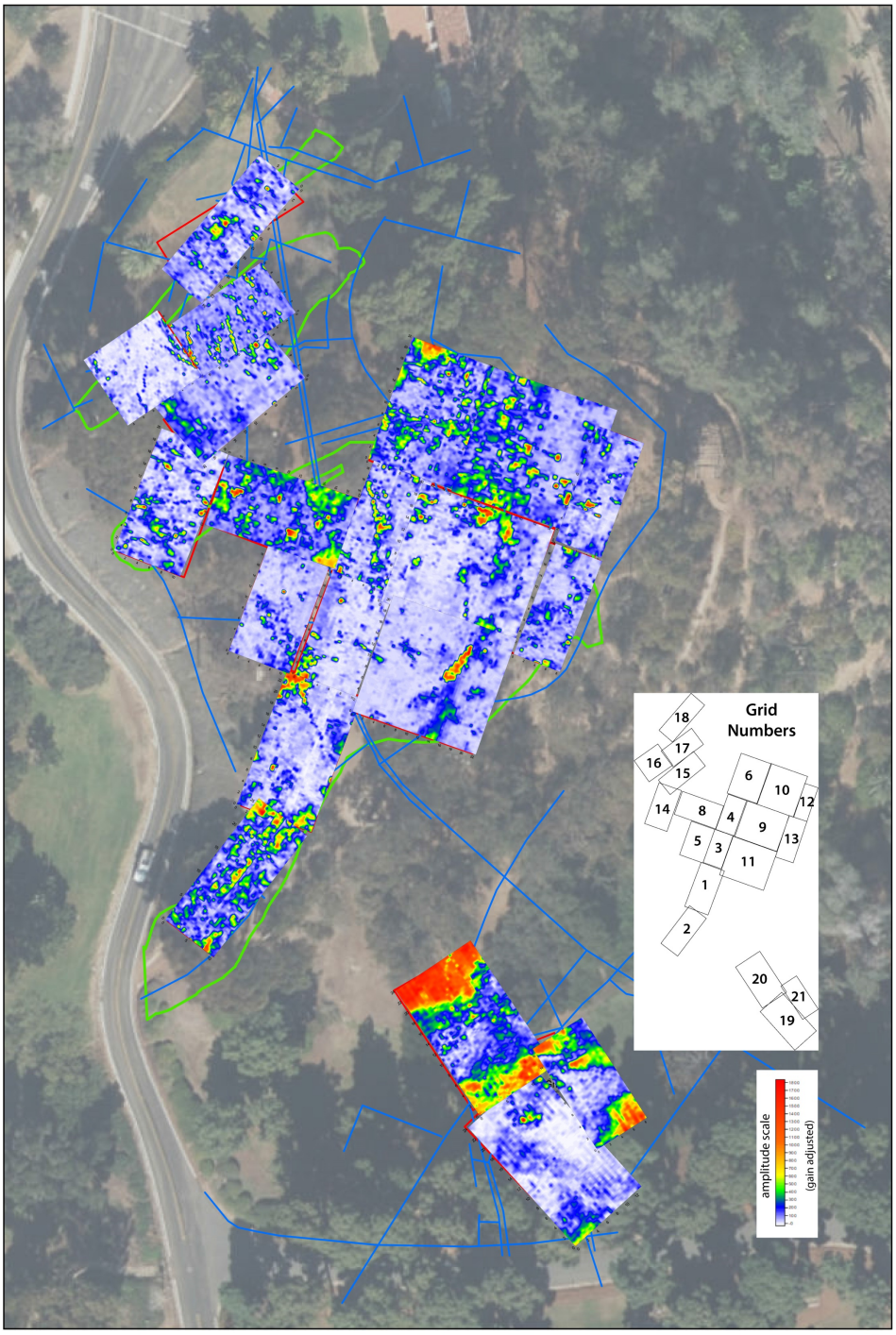
Most linear features appear to be utility pipes or related trenches. Curvilinear parallel lines in Grid 4 may be a bordered path or ruts from a vehicle or wagon track. Ditch-like pathways or channelization were noted in Grid 1 and possibly Grid 11. Planar features primarily in Grids 19-21 may relate to park landscaping. The planar feature in the northeast portion of Grid 18 is not explained, but its proximity to irrigation facilities suggest it may be garden related. Concrete on the surface relates to patterns in portions of Grid 8 and Grid 10, and is not treated further in this discussion due to its modern origin. Clusters of high amplitude nodes are often associated with tree roots. Concentrations of metal artifacts appear to be present in Grid 6.

## References Cited

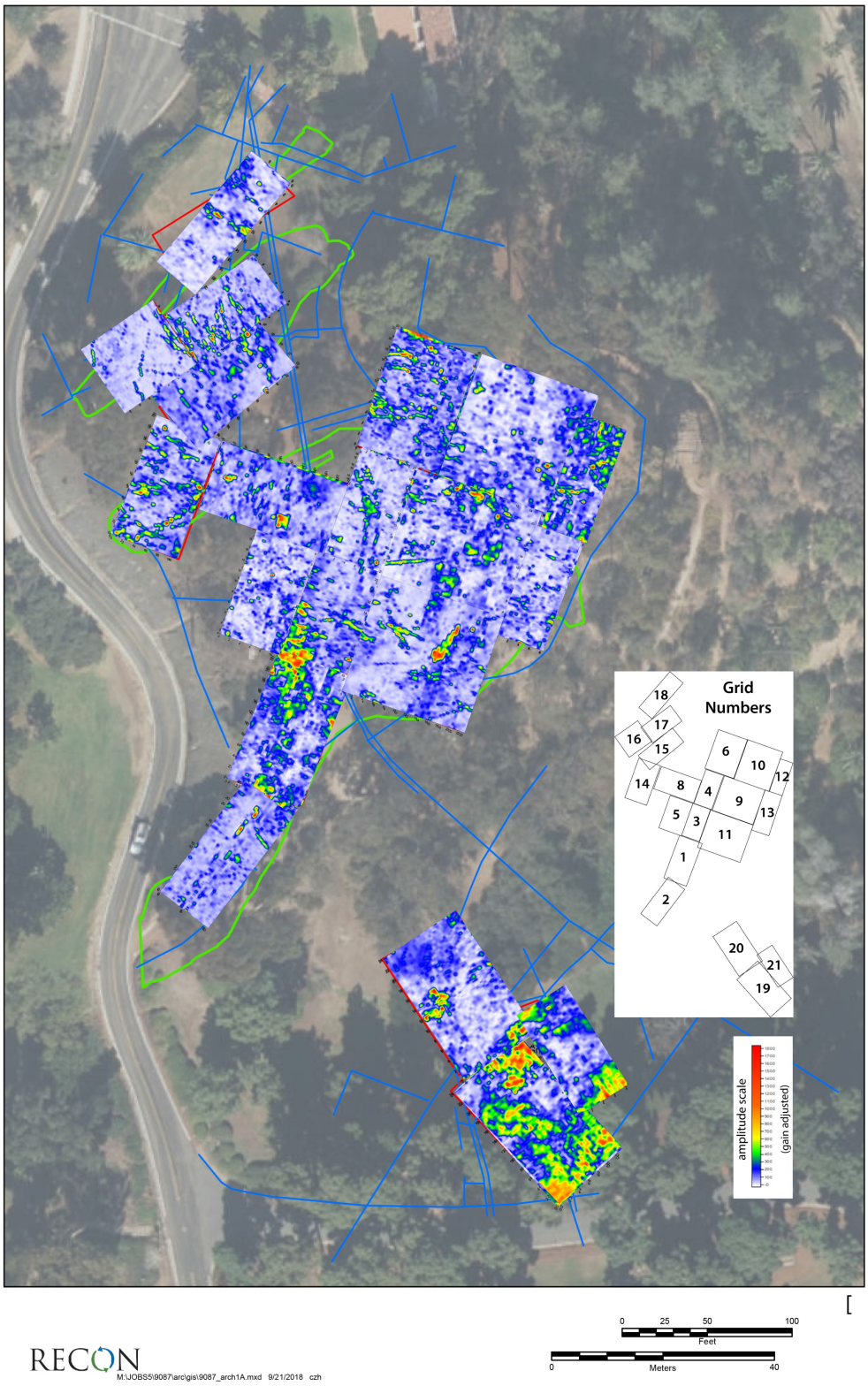
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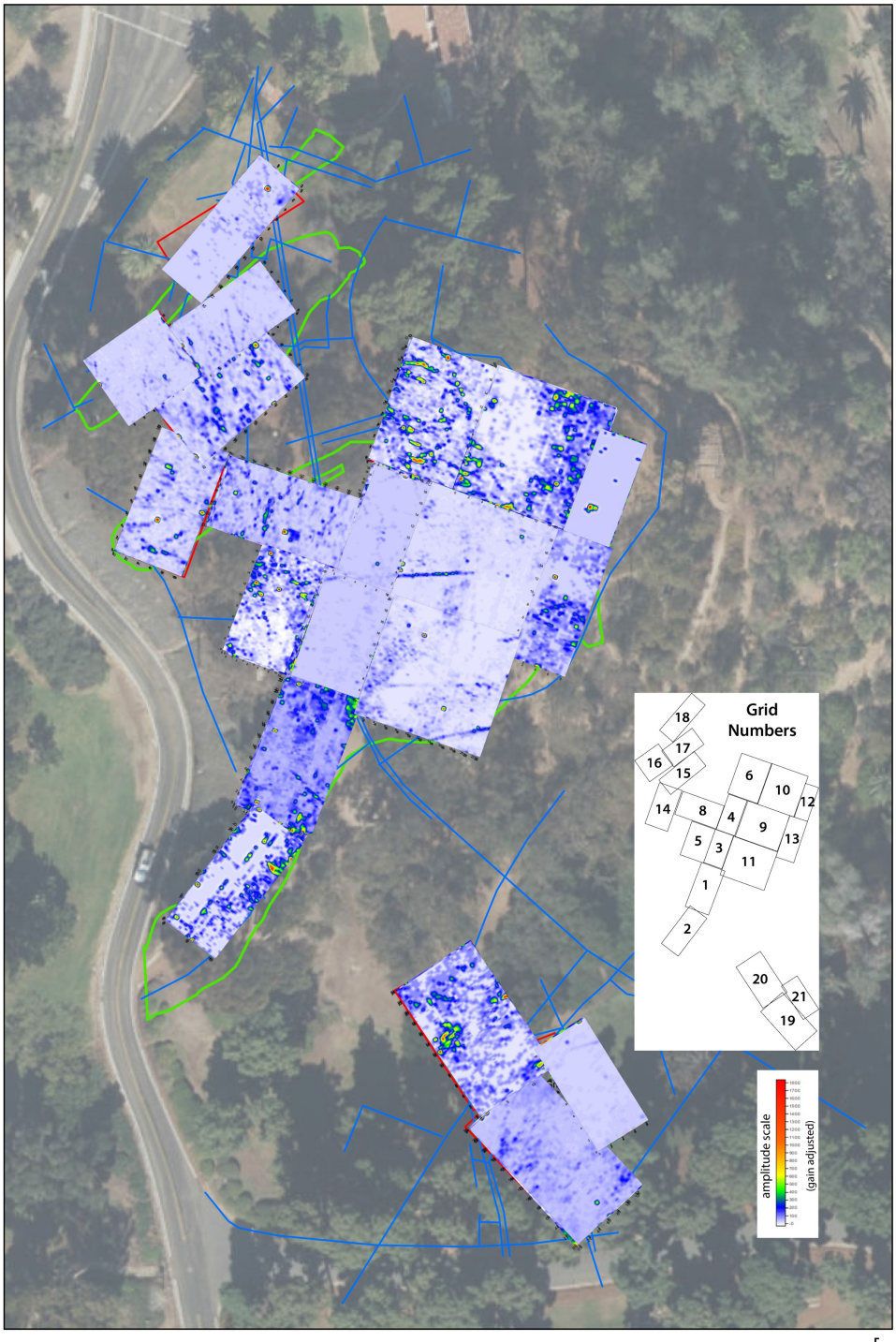
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*Above: Composite of shallow slice maps for all 21 grids.*




*Above: Composite of middle-depth slice maps for all 21 grids.*




*Above: Composite of deep slice maps for all 21 grids.*

# CONFIDENTIAL ATTACHMENTS

## Are not for public review

# ATTACHMENT 3

## Results of Excavation of CA-SDI-38: Addendum Letter to Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements

RECON

*An Employee-Owned Company*

March 9, 2021

Ms. Gretchen Eichar
City of San Diego
Public Works Department
525 B Street, Suite 750, MS 908A
San Diego, CA 92101

Reference: Results of Excavation at CA-SDI-38: Addendum Letter to Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements, San Diego, California (RECON Number 9087)

Dear Ms. Eichar:

This letter serves as an addendum to the Geoarchaeological Assessment for Junípero Serra Museum ADA Improvements, San Diego, California prepared by RECON in November 2020. The letter describes the methods and results of the excavations of two anomalies identified in the original report.

The City of San Diego (City) proposes to provide a new parking lot located on the knoll south of the museum, a new Americans with Disabilities (ADA) compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 24-foot-wide driveway constructed between Presidio Drive and the new parking lot (Figure 1).

The project is located within Presidio Park (P-37-000038/CA-SDI-38), an area with both prehistoric and historic uses. The archaeological remains are listed as California Historical Landmark and on the National Register of Historic Places under criterion A for its association with exploration and settlement of San Diego with a significance period of 1769–1799. Because of this significant resource, a testing program was developed to guide design plans to minimize direct impacts to significant cultural deposits and features. Prior to the implementation of the testing program, the project area was surveyed using pedestrian and ground-penetrating radar (GPR) methods. The testing plan consisted of twenty 2.5-inch diameter cores (Cores 1 to 20) within the project area and an alternative driveway connecting to Cosoy Way. Locations for cores were selected in spots where possible cultural features were identified by the GPR results, as well as three landscape positions including summits, shoulders, and backslopes (Figure 2).

No artifacts or cultural features were found in the core samples. The soil stratigraphy retains good integrity with minimal bioturbation. Based on a buried site model described in the above report, soils within the area of potential effect (APE) have a low potential for buried or subsurface cultural deposits. The soil stratigraphy on the knoll indicates that sandstone bedrock is usually within a meter of the surface. Most possible cultural features identified by the GPR survey could be ruled out as being cultural features. However, there were three anomalies that could not be ruled out as being cultural features: Core 7 (GPR Grid 2), Core 11 (GPR Grid 12), and Core 14 (GPR Grid 16) (Figure 3). Test excavation units were excavated to explore the anomalies near Cores 7 and 14. The location of Core 11 is no longer within the APE and, therefore, was not further explored.

**Excavation and Laboratory Methods**

Two 1x1-meter units were hand excavated in 10 centimeter (cm) contour levels with shovels, trowels, and heavier tools as soil conditions dictated. Units were excavated with the goal of reaching the target depth of each anomaly. For unit 1 in GPR Grid 2, the anomaly was noted between 64 and 90 cm. The geoarchaeological core (#7) was terminated at 37 cm due to a large cobble blocking further drilling (Homburg

and Zepeda-Herman 2020). The anomaly was thought to represent cobbles, brick, or tile. Exposed cobbles were noted east of the grid that may be part of a marine terrace deposit (Byram 2018). For unit 2 in GPR Grid 16, the anomaly was noted between 35 and 60 cm. The geoarchaeological core (#14) was drilled down to 96 cm (Homburg and Zepeda-Herman 2020). The anomaly was thought to represent a rectilineal feature, quite possibly a foundation or intersecting pipes (Byram 2018).

Excavated soils were dry-screened through an 1/8-inch mesh where artifacts and ecofacts were removed and placed in appropriately labeled bags to be cleaned, analyzed, and cataloged. Observations concerning soil characteristics, cultural material content, disturbance, and depth were recorded on field forms for each 10 cm level. A minimum of one sidewall of each unit was profiled to document soil color and changes in stratigraphy. Photographs were taken of each unit.

All of the recovered artifacts and ecofacts were returned to RECON's archaeological laboratory. Laboratory tasks included washing, sorting, and cataloging the collected data as recommended by the San Diego Archaeological Center. All items were counted, weighed, and cataloged according to class, type, and material, and the data was entered into a Microsoft Access database and then exported to a Microsoft Excel spreadsheet. The complete catalog is provided as Attachment 1.

The artifact classes and their definitions are presented in the following sections.

### *Debitage*

Debitage consists of flakes and angular waste or the stone byproducts of stone tool manufacture and maintenance. The items in this category were organized by sample unit and level within the unit and sorted by stone material type into nine reduction type choices (Table 1).

**Table 1**
**Standard Flake Typology for Small Assemblages**

| Bulb | Platform | Relative Length | Cortex | Dorsal Scars | Other | Assumed Process/ Type | Reduction Stage |
|---|---|---|---|---|---|---|---|
| Present | Present | 2x width | None | 2+ | Parallel | "Blade" type flake | Tertiary |
| Present | Present | | None | | Diverging, thin | Biface thinning flake | Tertiary |
| Present | Present | 2+ cm | 80%+ | None | | Platform creation, cortex removal | Primary |
| Present | Present | 2+ cm | 30%–80% | 0–1 | | Cortex removal | Primary |
| Present | Present | 2+ cm | -30% | 1+ | | Core reduction, basic shaping | Secondary |
| Present | Present | -2 cm | 0% | 1+ | | Finishing, resharpening | Tertiary |
| Present | Present | -2 cm | Present | 1+ | | Trimming | Tertiary |
| Absent | Absent | | Present | | | Shatter during primary reduction | Primary |
| Absent | Absent | | Absent | | | Shatter during secondary reduction | Shatter |

SOURCE: Norwood et al. 1981.
cm = centimeter; % = percent

The flaked lithic debris analysis followed a series of steps that were originally proposed by Jane Rosenthal (Norwood et al. 1981) and geared towards reconstructing the stages of stone tool manufacture. For the current study, the definition of a flake is a stone that has been removed from a larger stone (core) by human activity and that retains evidence of this removal in the form of a striking platform and a bulb of percussion. Angular waste includes shatter and items that are probably flake fragments with no bulb or the striking platform present. In addition, the angular waste group includes broken stone fragments that can be produced during hard hammer percussion where a strike can result in pieces breaking off the parent stone that do not have the attributes of a flake.

### *Marine Shellfish*

Marine shell was identified, weighed, and cataloged according to genus and species, if possible. All marine shell was examined for evidence of burning and/or modifications. For shell species, only the bivalve hinges or gastropod apices were counted and the remainder fragments were weighed with the hinges and/or apices.

### *Non-Human Bone Remains*

The class categories used for the bone analysis were mammal, bird, reptile, amphibian, and fish, with distinctions made between large, medium, and small mammals, when possible. Non-human bone groups were examined for evidence of burning and butchering.

## Results

RECON archaeologists Nathanial Yerka and Ariana Yanez accompanied by Shuluuk Linton of Red Tail Environmental excavated two 1x1-meter units at CA-SDI-38 between February 23 and 25, 2021. Unit 1 was located within Grid 2 near the location of Core 7; unit 2 was located within Grid 16 near the location of Core 14.

Unit 1 was excavated down to approximately 55-60 cm. This unit was terminated before the target depth of 64 to 90 cm because of the observed lack of disturbance below 30 cm and the high number of cobbles, suggesting that no cultural features could be below 30 cm. The soil stratigraphy of unit 1 consisted of two soil horizons. The A Horizon was approximately 5 to 7 cm thick below wood clippings and consisted of brown compact silt (10YR5/3) with cobbles followed by the C Horizon starting at approximately 15 cm below ground surface down to 60 cm. The C Horizon consisted of compacted, dark yellowish-brown clayey loam with cobbles (Photograph 1 and Figure 4). The presence of gravel, bottle glass, assorted plastics, and rodent burrows in the 0-10 cm level is evidence of modern disturbance. Cobbles increased exponentially in the 10-20 cm level and continued down to the 55-60 cm level where the unit was terminated. All artifacts were located in the upper 30 cm.

The soil stratigraphy is consistent with the Olivenhain soil series mapped within the southern part of the APE. Olivenhain soil with 9-30 percent slope consists of brown very cobbly loam over reddish-brown cobbly clay grading to pinkish-white cobbly loam. This soil type formed in Quaternary cobbly and dissected alluvial fan remnants of the Pleistocene age (U.S. Department of Agriculture 1973).

Unit 2 was excavated down to 60 cm and reached its target depth of 60 cm. The soil stratigraphy of unit 2 consisted of three soil strata. The A horizon extended between 10 and 18 cm and consisted of dark-brown loosely compact silty sand with organics (10 YR 4/3); the B horizon extended between 10 and 18 cm to 40-43 cm and was dark yellowish-brown finely sorted to coarse sand with increased cobbles (10 YR 3/4); and the C horizon extended from approximately 43 cm down to 60 cm and consisted of dark reddish-brown highly compacted coarse decomposing granitic sand with few cobbles (5 YR 3/4) (Photograph 2 and Figure 5) Disturbances included surface turf, roots, tree roots, modern glass bottle fragments, aluminum pull tabs, and metal fragments in the 0-10 cm level. Pebbles were noted in the 10-20 cm level. Cobbles increased in the 30-40 cm level. Cobbles decreased below this level; subsoil was noted in the northern half at the 50 cm level. A polyvinyl chloride (PVC) utility pipe running southwest/northeast was noted in the northwestern corner of the unit at the 40 cm level. Artifacts were found in the upper 30 cm.

This soil stratigraphy is consistent with the Gaviota soil series mapped within the northwestern part of the APE. Gaviota sandy loam soil with 30-50 percent slope consists of brown gravelly loam with a shallow to very shallow lithic contact of hard sandstone bedrock. These soils are well drained, residual soils that formed in material weathered from sandstone or meta-sandstone (U.S. Department of Agriculture 1973).

Table 2 provides the summary of the materials recovered during the excavation program at CA-SDI-38 (for a complete catalog, see Attachment 1). A total of 5 debitage pieces, 1.68 grams of shellfish, 7 undifferentiated fish bone fragments, and 29 fragments of historic artifacts (11 of which are iron fragments, 15 are bottle

glass fragments, 2 pieces of aluminum, and 1 piece of plastic) were recovered from the units. Both units yielded debitage and historic artifacts. The shellfish was only recovered from unit 2.

**Table 2**
**Summary of Artifacts Recovered**

| Unit, Level | Debitage | Historic | Non-Human Bone | Shell | Total |
|---|---|---|---|---|---|
| Unit 1 | | | | | |
| 0-10 cm | | | | | |
| Count | 3 | | | | 3 |
| Weight (g) | 4.9 | | | | 4.9 |
| 10-20 cm | | | | | |
| Count | | 5 | 1 | | 6 |
| Weight (g) | | 3.21 | 0.42 | | 3.63 |
| 20-30 cm | | | | | |
| Count | | 6 | 5 | | 11 |
| Weight (g) | | 2.43 | 3.94 | | 6.37 |
| *Unit 1 Count* | *3* | *11* | *6* | | *20* |
| *Unit 1 Weight (g)* | *4.9* | *5.64* | *4.36* | | *14.9* |
| Unit 2 | | | | | |
| 0-10 cm | | | | | |
| Count | | 18 | 1 | 0 | 19 |
| Weight (g) | | 17.06 | 0.09 | 0.67 | 17.82 |
| 10-20 cm | | | | | |
| Count | 1 | | | 1 | 2 |
| Weight (g) | 5.58 | | | 1.01 | 6.59 |
| 20-30 cm | | | | | |
| Count | 1 | | | | 1 |
| Weight (g) | 20.89 | | | | 20.89 |
| *Unit 2 Count* | *2* | *18* | *1* | *1* | *22* |
| *Unit 2 Weight (g)* | *26.47* | *17.06* | *0.09* | *1.68* | *45.3* |
| **Total Count** | **5** | **29** | **7** | **1** | **42** |
| **Total Weight (g)** | **31.37** | **22.7** | **4.45** | **1.68** | **60.2** |

cm = centimeter; g = grams

**Discussion**

The excavation results reveal that the GPR anomalies at the two locations are not cultural features. The GPR anomaly that was identified as being possible cobble, brick, or tile at the 64-90 cm level likely represented a dense cobble lens associated with the old marine terrace. There was no evidence of brick or tile having been placed at this location given the lack of disturbance noted during excavation of unit 1. The GPR anomaly that was identified as possibly being a rectilineal feature or intersecting pipes likely represents intersecting pipes since a southwest/northeast trending PVC pipe was noted in unit 2 at the 40 cm level.

The small amount of debitage, fish bone, and shellfish remains recovered suggests that the area had light use during prehistoric and protohistoric times by Native Americans. This makes sense given that the area was close to the San Diego Presidio and the Native American village of *Cosoy/Kosai/Kosa'aay*, where there was heavy use as a permanent habitation. The historic artifact fragments are likely not from the Presidio era but rather more recent. The aluminum beer can ring found in the unit 2 0-10 cm level was used from 1965 through 1975 and likely left behind by a park visitor.

**Management Recommendations**

The unit excavation corroborates the findings of no cultural resources during analysis of the geoarchaeological coring samples. If the APE was heavily used in prehistory or during the occupation of the Presidio, there is no clear indication of that. Artifacts are present in sparse densities and are limited to the upper levels and may have been moved downward from the surface by animal burrowing or some other type of disturbance. Although the potential for buried cultural features is considered low within the APE, the archaeological and historic significance of the San Diego Presidio with its proximity to the APE, combined with its importance as a tribal cultural resource for Native Americans, RECON recommends the presence of qualified archaeological and Native American monitors during earth-moving activities.

Please call 619-308-9333 extension 133 if you have any questions.

Sincerely,

Carmen Zepeda-Herman

Carmen Zepeda-Herman
Project Archaeologist

CZH:sh

Attachment

cc/att: James Arnhart, City of San Diego
Tom Park, City of San Diego

**References Cited**

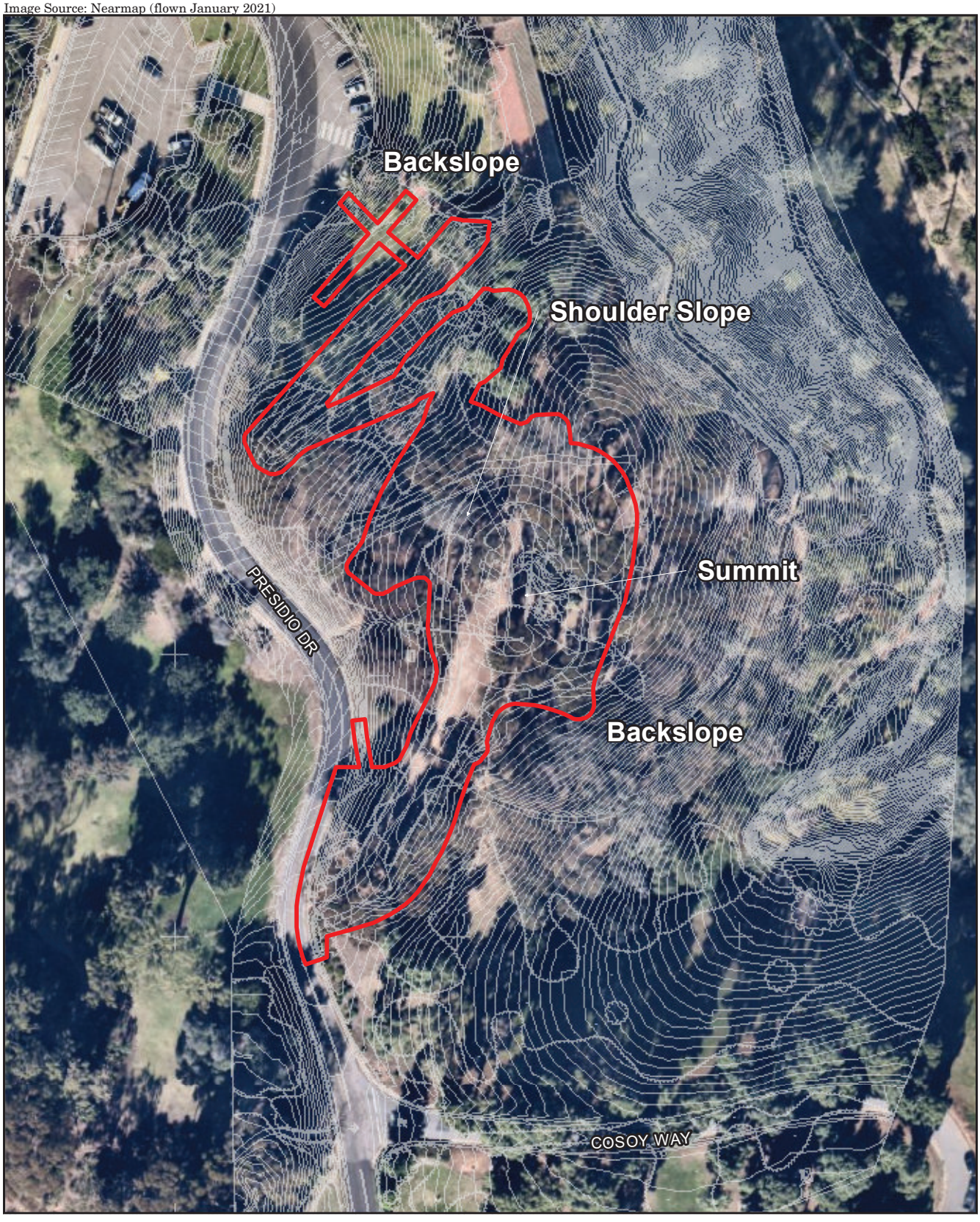
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Image Source: Nearmap (flown January 2021)



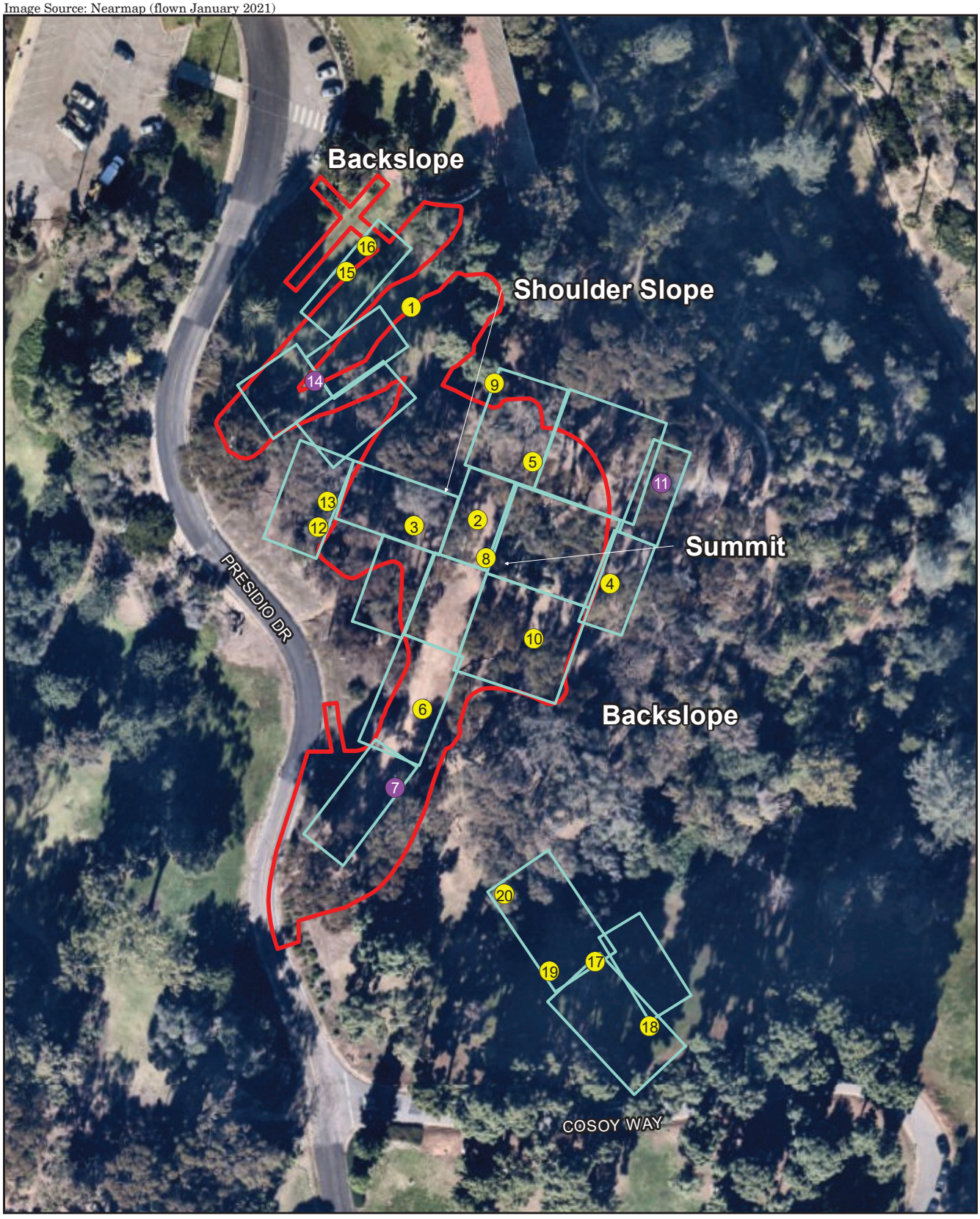

Project Boundary

FIGURE 1
Project Location on Aerial Photograph

RECON

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Image Source: Nearmap (flown January 2021)




Test Core

Test Core Anomally

Grid

Project Boundary

0 Meters 30

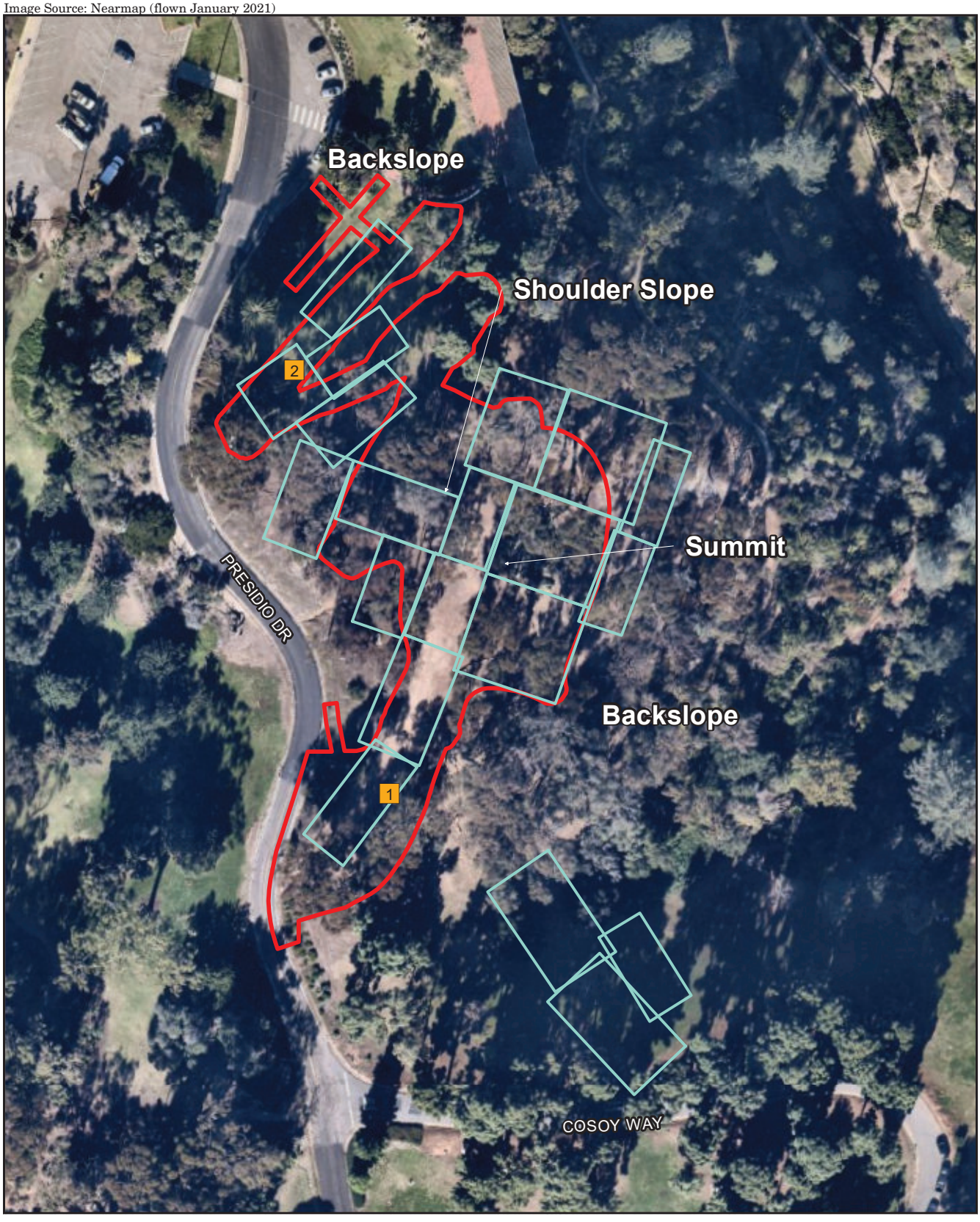
RECON

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FIGURE 2

Geoarchaeological Coring Locations

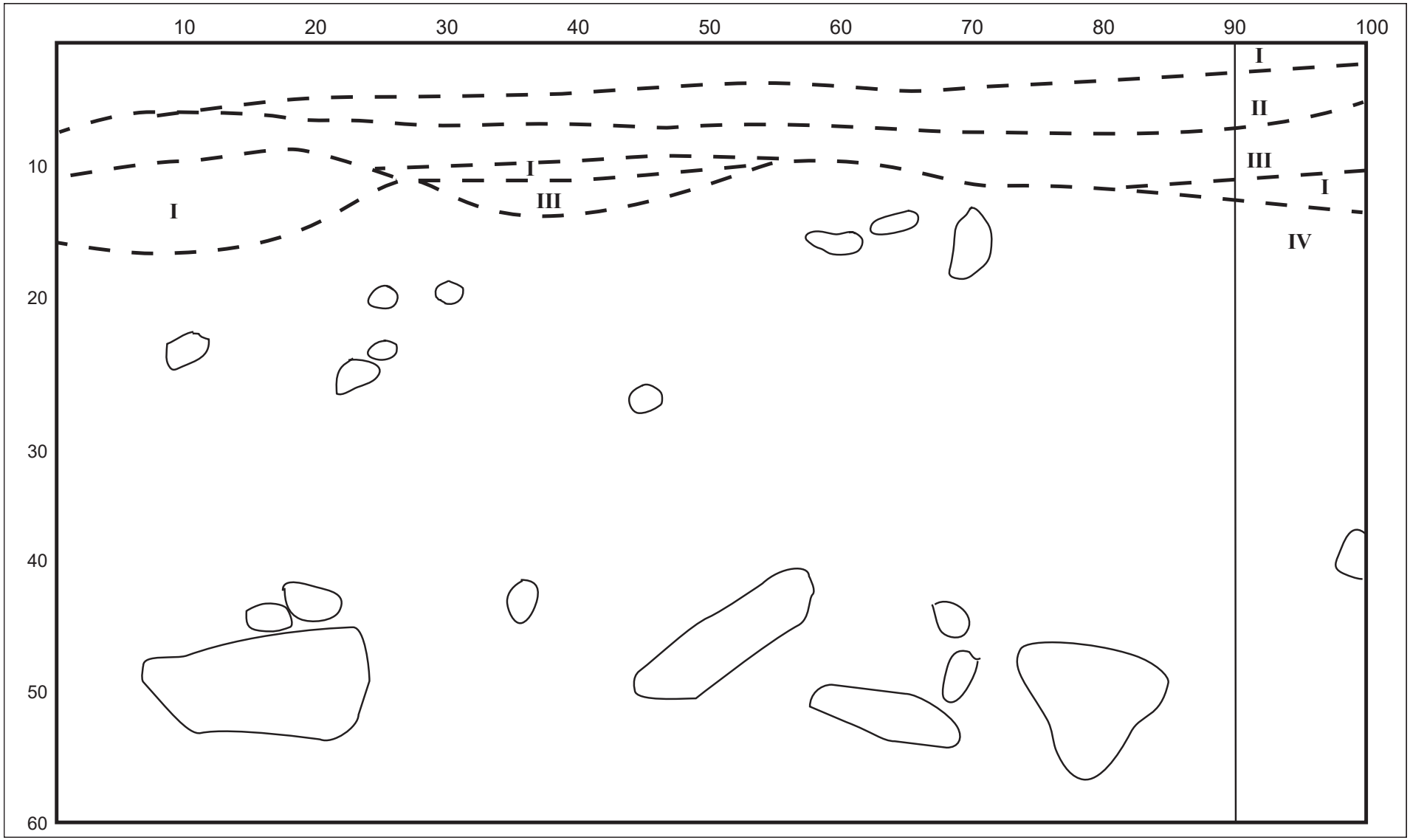
Image Source: Nearmap (flown January 2021)




RECON

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FIGURE 3
Locations of One Meter Units




Rock

I Wood Chippings

II 5 YR 3/3 Dark Reddish Brown Organic Loamy Layer; Brown Wood Chippings

III 10 YR 5/3 Brown Compact Silt

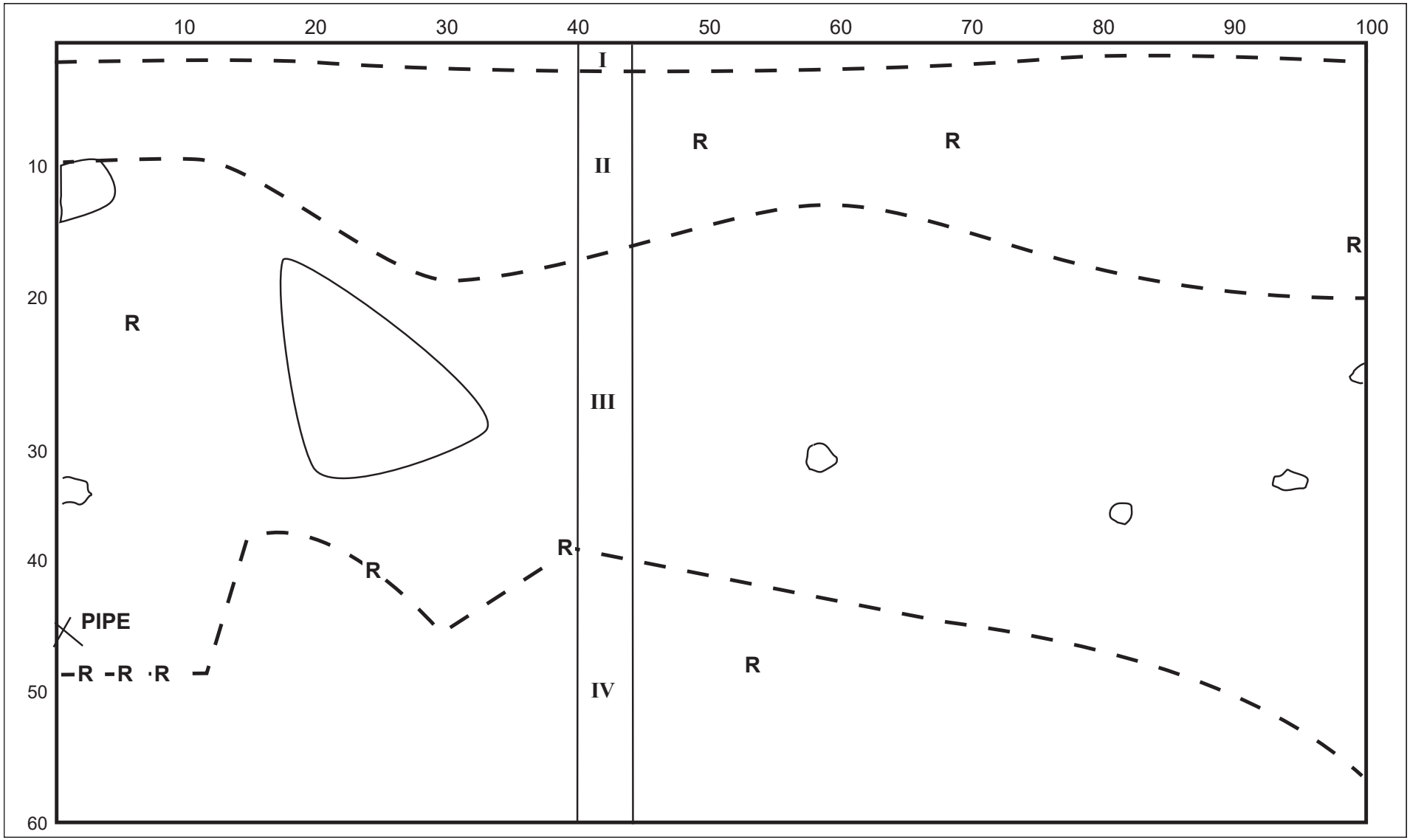
IV 10 YR 4/6 Dark Yellowish Brown Cobble Layer; Heavy Compaction Silt with Coarse Sands/Decomposed Granite

0 cm 10

RECON

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# FIGURE 4
## CA-SDI-38, Unit 1
## South Wall Profile




Rock
R Root
Pipe
I Layer/Stratum

I 5YR 2.5/1 Black to Greenish Black
Sandy Loam Associated with the Turf

II 10YR 4/3 Brown to Dark Brown
Loosely Compact Silty Sand with Organics

III 10YR 3/4 Dark Yellowish Brown
Finely Sorted to Coarse Sand with Loam
Low Organics; Cobble Layer Incresed

IV 5YR 3/4 Dark Reddish Brown Highly
Compacted Decomposed Granite Sand;
Few Cobbles

0 cm 10

RECON

M:\JOBS5\9087\arc\UnitLevelRecord\CA-SDI-38_NorthWall.ai 03/08/21 jg

# FIGURE 5
## CA-SDI-38, Unit 2
## North Wall Profile




PHOTOGRAPH 1
Plan View of Unit 1 60 cm Level



PHOTOGRAPH 2
South Wall Profile of Unit 2 at 60 cm Level

# ATTACHMENT 1

| CAT . | CLASS | TYPE | MATERIAL | COUNT | WEIGHT | CONDITION | STATUS | COMMENTS | LEVEL | TASK # |
|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | Debitage | Core reduction, basic shaping | FGPM (fine grained, porphyritic metavolcanic) | 2 | 3.24 | | | | 0-10 | Unit 1 |
| 1001 | Debitage | Secondar shatter | Quartzite | 1 | 1.66 | | | | 0-10 | Unit 1 |
| 1002 | Debitage | Core reduction, basic shaping | Quartzite | 1 | 5.58 | | | | 10-20 | Unit 2 |
| 1003 | Debitage | Core reduction, basic shaping | Quartz | 1 | 20.89 | | | | 20-30 | Unit 2 |
| 7000 | Historic | Consumer Group Item | Iron | 5 | 3.21 | Broken | | Could be consumer can fragments; two fragments exhibit a pinched/folded rim | 10-20 | Unit 1 |
| 7001 | Historic | Consumer Group Item | Iron | 6 | 2.43 | Broken | | Could be part of same can; no diagnostic pieces | 20-30 | Unit 1 |
| 7002 | Historic | Consumer Group Item | Clear | 12 | 12.1 | Broken | | Includes 2 finish frags (possibly jar); possible multiple specimens | 0-10 | Unit 2 |
| 7003 | Historic | Consumer Group Item | Dark green | 2 | 0.17 | Broken | | Possible base frag; 1 item "… sher" | 0-10 | Unit 2 |
| 7004 | Historic | Consumer Group Item | Green, medium to light | 1 | 4.32 | Broken | | | 0-10 | Unit 2 |
| 7005 | Historic | Consumer Group Item | Aluminum | 2 | 0.43 | Broken | | Includes 1 beer can ring tab 1965-1975 | 0-10 | Unit 2 |
| 7006 | Historic | Consumer Group Item | Plastic | 1 | 0.04 | Broken | | White | 0-10 | Unit 2 |
| 5000 | Non-Human Bone | Undifferentiated fish | Bone | 1 | 0.42 | | | | 10-20 | Unit 1 |
| 5001 | Non-Human Bone | Undifferentiated fish | Bone | 5 | 3.94 | | | | 20-30 | Unit 1 |
| 5002 | Non-Human Bone | Undifferentiated fish | Bone | 1 | 0.09 | | | | 0-10 | Unit 2 |
| 2000 | Shell | Chione undatella | Shell | 0 | 0.54 | | | | 0-10 | Unit 2 |
| 2001 | Shell | Tagelus sp. | Shell | 0 | 0.13 | | | | 0-10 | Unit 2 |
| 2002 | Shell | Tivela stultorum | Shell | 0 | 0.84 | | | | 10-20 | Unit 2 |
| 2003 | Shell | Ostrea lurida | Shell | 1 | 0.17 | | | | 10-20 | Unit 2 |

# ATTACHMENT 4

## Native American Heritage Commission

# NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
**Reginald Pagaling**
*Chumash*

VICE-CHAIRPERSON
**Buffy McQuillen**
*Yokayo Pomo, Yuki, Nomlaki*

SECRETARY
**Sara Dutschke**
*Miwok*

PARLIAMENTARIAN
**Wayne Nelson**
*Luiseño*

COMMISSIONER
**Isaac Bojorquez**
*Ohlone-Costanoan*

COMMISSIONER
**Stanley Rodriguez**
*Kumeyaay*

COMMISSIONER
**Laurena Bolden**
*Serrano*

COMMISSIONER
**Reid Milanovich**
*Cahuilla*

COMMISSIONER
**Bennae Calac**
*Pauma-Yuima Band of Luiseño Indians*

EXECUTIVE SECRETARY
**Raymond C. Hitchcock**
*Miwok, Nisenan*

**NAHC HEADQUARTERS**
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

April 12, 2024

Nathanial Yerka
RECON Environmental, Inc.

*Via Email to: nyerka@reconenvironmental.com*

**Re: Junipero Serra Museum ADA Improvements/9087.1 Project, San Diego County**

To Whom It May Concern:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information submitted for the above referenced project. The results were positive. Please contact the Viejas Band of Kumeyaay Indians on the attached list for information. Please also contact the Kumeyaay Cultural Repatriation Committee via phone at (760) 803-5694 for information. Please note that tribes do not always record their sacred sites in the SLF, nor are they required to do so. A SLF search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with a project's geographic area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites, such as the appropriate regional California Historical Research Information System (CHRIS) archaeological Information Center for the presence of recorded archaeological sites.

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

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

If you have any questions or need additional information, please contact me at my email address: Murphy.Donahue@NAHC.ca.gov

Sincerely,

Murphy Donahue

Murphy Donahue
*Cultural Resources Analyst*

Attachment

**Native American Heritage Commission**
**Native American Contact List**
**San Diego County**
**4/12/2024**

| County | Tribe Name | Fed (F) Non-Fed (N) | Contact Person | Contact Address | Phone # | Fax # | Email Address | Cultural Affiliation | Counties | Last Updated |
|---|---|---|---|---|---|---|---|---|---|---|
| San Diego | Barona Group of the Capitan Grande | F | Art Bunce, Attorney | | (760) 489-0329 | | buncelaw@aol.com | Diegueno | Imperial,San Diego | 7/25/2023 |
| | Campo Band of Diegueno Mission Indians | F | Ralph Goff, Chairperson | 36190 Church Road, Suite 1<br>Campo, CA, 91906 | (619) 478-9046 | (619) 478-5818 | rgoff@campo-nsn.gov | Diegueno | Imperial,San Diego | |
| | Ewiiaapaayp Band of Kumeyaay Indians | F | Michael Garcia, Vice Chairperson | 4054 Willows Road<br>Alpine, CA, 91901 | (619) 933-2200 | (619) 445-9126 | michaelg@leaningrock.net | Diegueno | Imperial,San Diego | |
| | Ewiiaapaayp Band of Kumeyaay Indians | F | Robert Pinto, Chairperson | 4054 Willows Road<br>Alpine, CA, 91901 | (619) 368-4382 | (619) 445-9126 | ceo@ebki-nsn.gov | Diegueno | Imperial,San Diego | |
| | Iipay Nation of Santa Ysabel | F | Clint Linton, Director of Cultural Resources | P.O. Box 507<br>Santa Ysabel, CA, 92070 | (760) 803-5694 | | clinton@redtailenvironmental.com | Diegueno | Imperial,San Diego | 11/30/2023 |
| | Inaja-Cosmit Band of Indians | F | Rebecca Osuna, Chairperson | 2005 S. Escondido Blvd.<br>Escondido, CA, 92025 | (760) 737-7628 | (760) 747-8568 | | Diegueno | Imperial,San Diego | |
| | Jamul Indian Village | F | Erica Pinto, Chairperson | P.O. Box 612<br>Jamul, CA, 91935 | (619) 669-4785 | (619) 669-4817 | epinto@jiv-nsn.gov | Diegueno | Imperial,San Diego | |
| | Jamul Indian Village | F | Lisa Cumper, Tribal Historic Preservation Officer | P.O. Box 612<br>Jamul, CA, 91935 | (619) 669-4855 | | lcumper@jiv-nsn.gov | Diegueno | Imperial,San Diego | 9/5/2018 |
| | Kwaaymii Laguna Band of Mission Indians | N | Carmen Lucas, Chairperson | P.O. Box 775<br>Pine Valley, CA, 91962 | (619) 709-4207 | | | Kwaaymii<br>Diegueno | Imperial,San Diego | 6/20/2023 |
| | La Posta Band of Diegueno Mission Indians | F | Gwendolyn Parada, Chairperson | 8 Crestwood Road<br>Boulevard, CA, 91905 | (619) 478-2113 | (619) 478-2125 | LP13boots@aol.com | Diegueno | Imperial,San Diego | |
| | Manzanita Band of Kumeyaay Nation | F | Angela Elliott Santos, Chairperson | P.O. Box 1302<br>Boulevard, CA, 91905 | (619) 766-4930 | (619) 766-4957 | | Diegueno | Imperial,San Diego | |
| | Mesa Grande Band of Diegueno Mission Indians | F | Michael Linton, Chairperson | P.O Box 270<br>Santa Ysabel, CA, 92070 | (760) 782-3818 | (760) 782-9092 | mesagrandeband@msn.com | Diegueno | Imperial,San Diego | |
| | San Pasqual Band of Diegueno Mission Indians | F | Allen Lawson, Chairperson | P.O. Box 365<br>Valley Center, CA, 92082 | (760) 749-3200 | (760) 749-3876 | allenl@sanpasqualtribe.org | Diegueno | Imperial,San Diego | |
| | San Pasqual Band of Diegueno Mission Indians | F | John Flores, Environmental Coordinator | P. O. Box 365<br>Valley Center, CA, 92082 | (760) 749-3200 | (760) 749-3876 | johnf@sanpasqualtribe.org | Diegueno | Imperial,San Diego | 8/16/2016 |
| | Sycuan Band of the Kumeyaay Nation | F | Bernice Paipa, Cultural Resource Specialist | Sycuan Cultural Center: 910 Willow Glen Drive<br>El Cajon, CA, 92019 | (619) 445-6917 | | bpaipa2@sycuan-nsn.gov | Kumeyaay | Imperial,San Diego | 8/7/2023 |
| | Sycuan Band of the Kumeyaay Nation | F | Cody Martinez, Chairman | Sycuan Tribal Office: 1 Kwaaypaay Court<br>El Cajon, CA, 92019 | (619) 445-2613 | | cmartinez@sycuan-nsn.gov | Kumeyaay | Imperial,San Diego | 8/7/2023 |
| | Viejas Band of Kumeyaay Indians | F | Ernest Pingleton, THPO | 1 Viejas Grade Road<br>Alpine, CA, 91901 | (619) 445-3810 | | epingleton@viejas-nsn.gov | Kumeyaay | Imperial,San Diego | 6/29/2023 |
| | Viejas Band of Kumeyaay Indians | F | Ray Teran, Resource Management Director | 1 Viejas Grade Road<br>Alpine, CA, 91901 | (619) 659-2312 | | rteran@viejas-nsn.gov | Kumeyaay | Imperial,San Diego | 6/29/2023 |

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

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Junipero Serra Museum ADA Improvements/9087.1 Project, San Diego County.

Record: PROJ-2024-001973
Report Type: List of Tribes
Counties: San Diego
NAHC Group: All

# ATTACHMENT 5

## Viejas Band of Mission Indians Response

## Nathanial Yerka

**From:** Ray Teran <rteran@viejas-nsn.gov>
**Sent:** Friday, April 12, 2024 11:53 AM
**To:** Donahue, Murphy@NAHC; Nathanial Yerka
**Cc:** Ernest Pingleton
**Subject:** [External] RE: Junipero Serra Museum ADA Improvements/9087.1 Project

Please provide us with the project plan/description, specifically any anticipated ground disturbance activity(ies). THX

---

**From:** Donahue, Murphy@NAHC <Murphy.Donahue@nahc.ca.gov>
**Sent:** Friday, April 12, 2024 11:46 AM
**To:** nyerka@reconenvironmental.com
**Cc:** Ernest Pingleton <epingleton@viejas-nsn.gov>; Ray Teran <rteran@viejas-nsn.gov>
**Subject:** Junipero Serra Museum ADA Improvements/9087.1 Project

Good Afternoon,

Attached is the response to the project referenced above. If you have any additional questions, please feel free to contact our office email at nahc@nahc.ca.gov.

In our ongoing effort to enhance your user experience and increase functionality, we have transitioned from distributing data in PDF Format to Excel Format. This change allows you to take full advantage of features such as searching, filtering, and mail-merging, making it easier for you to handle and utilize the data provided. If you encounter any technical difficulties, or if you have any questions regarding this new format, please do not hesitate to reach out to me directly.

Thank you,

*Murphy Donahue (she/her)*
Native American Heritage Commission
*Cultural Resources Analyst*
Work Cell# (916)-268-1454
1550 Harbor Blvd., Ste 100
West Sacramento, CA 95691
STATE OF CALIFORNIA
NATIVE AMERICAN
HERITAGE COMMISSION

## Nathanial Yerka

**From:** Ray Teran <rteran@viejas-nsn.gov>
**Sent:** Wednesday, April 24, 2024 4:52 PM
**To:** Nathanial Yerka; Donahue, Murphy@NAHC
**Cc:** Ernest Pingleton; Carmen Zepeda-Herman
**Subject:** RE: [External] RE: Junipero Serra Museum ADA Improvements/9087.1 Project

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site has cultural significance or ties to Viejas. Cultural resources have been located within or adjacent to the APE-DE of the proposed project.

Viejas Band request that a Kumeyaay Cultural Monitor be on site for ground disturbing activities and to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains.

If you wish to utilize Viejas cultural monitors (Viejas rate is $54.15/hr. plus GSA mileage), please call Ernest Pingleton at 619-655-0410 or email, epingleton@viejas-nsn.gov, for contracting and scheduling. Thank you.

If a Tribe, having a closer proximity to the Project, requests to perform cultural monitoring, Viejas will differ to them.

---

**From:** Nathanial Yerka <nyerka@reconenvironmental.com>
**Sent:** Wednesday, April 24, 2024 3:46 PM
**To:** Ray Teran <rteran@viejas-nsn.gov>; Donahue, Murphy@NAHC <Murphy.Donahue@nahc.ca.gov>
**Cc:** Ernest Pingleton <epingleton@viejas-nsn.gov>; Carmen Zepeda-Herman <czepeda@reconenvironmental.com>
**Subject:** RE: [External] RE: Junipero Serra Museum ADA Improvements/9087.1 Project

Hi Ray,
See below for Project Description. See attached Figure for APE.

The City of San Diego (City) proposes to provide ADA improvements at the Junípero Serra Museum. The key project features include a new parking lot located on the knoll south of the museum, a new ADA compliant path of travel connecting the parking lot to the main terrace of the museum, and a new 24-foot-wide driveway, constructed between Presidio Drive and the new parking lot. The new parking lot would have 9 total spaces, including 5 ADA spaces and 4 non-ADA spaces. Other project features include a green waste area for maintenance, storm water and drainage improvements, and lighting. Approximately 120 linear feet of retaining wall with a maximum height of 3 feet is proposed along portions of the ADA compliant path of travel to minimize grading. The storm water improvements would include a lined bioretention basin, approximately 600 square feet of which would discharge to an existing rock swale located adjacent to Presidio Drive, and pervious pavers for portions of the walkways. The proposed project would impact a total area of approximately 1.37 acres. Excavation would include a total of approximately 4,000 cubic yards and have maximum depths of 10 feet below ground surface (BGS) for the new parking lot and 5 feet BGS for the new ADA compliant path. The total net new 2 impermeable area would be approximately 23,000 square feet. The project will be completed in accordance with the Secretary of the Interior's Standards for Rehabilitation.

Thanks,
Nate

**From:** Ray Teran <rteran@viejas-nsn.gov>
**Sent:** Friday, April 12, 2024 11:53 AM
**To:** Donahue, Murphy@NAHC <Murphy.Donahue@nahc.ca.gov>; Nathanial Yerka <nyerka@reconenvironmental.com>
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**Subject:** [External] RE: Junipero Serra Museum ADA Improvements/9087.1 Project

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**To:** nyerka@reconenvironmental.com
**Cc:** Ernest Pingleton <epingleton@viejas-nsn.gov>; Ray Teran <rteran@viejas-nsn.gov>
**Subject:** Junipero Serra Museum ADA Improvements/9087.1 Project

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Thank you,

*Murphy Donahue* (she/her)
Native American Heritage Commission
*Cultural Resources Analyst*
Work Cell# (916)-268-1454
1550 Harbor Blvd., Ste 100
West Sacramento, CA 95691



# CONFIDENTIAL ATTACHMENT

(Under Separate Cover)