FINAL

Historic Context, Architectural and Archaeological Survey Report

For the Proposed

Lower Crystal Springs Dam Improvements Project

San Mateo County, California

Prepared for

The San Francisco
Public Utilities Commission
and the San Francisco Planning Department
Major Environmental Analysis Division

Prepared by

ENTRIX, Inc. / MSE Joint Venture

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1.0 INTRODUCTION

This Historic Context, Architectural and Archaeological Survey Report (HCAAS) documents efforts to identify cultural resources within the Area of Potential Effects (APE) of the proposed Lower Crystal Springs Dam Improvements Project (the Project), located in San Mateo County, California. This investigation was conducted to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and with the California Environmental Quality Act (CEQA), as amended. This report includes background research and results of an archaeological field survey conducted for Section 106 and CEQA compliance. This report also includes descriptions and evaluations of the built environment under National Register of Historic Places (NRHP) evaluation criteria, as well as assessments of project impacts.

1.1 Project Location

Lower Crystal Springs Dam is located on San Mateo Creek in the Santa Cruz Mountains in San Mateo County, California; about 12 miles south of the City of San Francisco, 3 miles west of the City of San Mateo, and in unincorporated San Mateo County just west of the town limits of Hillsborough (Figure 1). Lower Crystal Springs Dam forms Lower Crystal Springs and Upper Crystal Springs Reservoirs, which are situated to the west of the alignment of Interstate 280 (I-280). Lower Crystal Springs Dam is located at the northerly portion of the reservoirs on the east side of Lower Crystal Springs Reservoir. State Route 92 (SR 92) crosses over the old Upper Crystal Springs Dam, which bisects the two reservoirs. The two reservoirs are connected by culverts under SR 92, which allow equalization of water surfaces between the reservoirs. Skyline Boulevard crosses over the top of the Lower Crystal Springs Dam approximately 0.2 mile upstream from the confluence of Polhemus and San Mateo creeks. The two reservoirs, the dam, and much of the San Mateo Creek/Peninsula watersheds are owned by and under the jurisdiction of the San Francisco Public Utilities Commission (SFPUC).

1.2 Project Description

The San Francisco Public Utilities Commission (SFPUC) is proposing to implement the Lower Crystal Springs Dam Improvements project (LCSDI or project) to lift the 1983 restrictions of the California Department of Water Resources, Division of Safety of Dams (DSOD) on Lower Crystal Springs Dam and to restore the historical storage capacity of Crystal Springs Reservoir. The DSOD requires that the SFPUC makes structural improvements to Lower Crystal Springs Dam that would enable safe passage of the Probable Maximum Flood (PMF).

Located in unincorporated San Mateo County, Lower Crystal Springs Dam is owned and operated by the SFPUC and it forms Crystal Springs Reservoir, one of the local reservoirs providing water supply storage that serves San Francisco, the Peninsula, and South Bay. The proposed project would include the following improvements: (1) raising the parapet wall along the top of the dam by about 9 feet, (2) widening the spillway of the dam from 88 to 208 feet, (3) reshaping the crest of the dam, (4) replacing the stilling basin at the base of the dam with a larger basin; (5) placing riprap in the San Mateo Creek channel immediately downstream of the stilling basin; and (6) raising an existing water quality sampling station to accommodate the higher reservoir operating levels. Construction of the proposed improvements would allow the SFPUC to raise the

maximum operating levels of Crystal Springs Reservoir four feet higher than the current level and restore the historical capacity of the reservoir from 18.5 to 22.2 billion gallons.

Lower Crystal Springs Dam includes supporting structures for Skyline Boulevard Bridge, also known as Crystal Springs Dam Bridge, which is located directly on the top of the dam. San Mateo County owns easement rights for the bridge, and as an independent project, is currently proposing to demolish the existing bridge and replace it with a new, seismically and structurally sound bridge. The SFPUC is coordinating the design and construction of the dam improvements with San Mateo County's plans for replacing Skyline Boulevard Bridge.

1.3 Regulatory Setting

This report was organized to satisfy the requirements of the National Environmental Policy Act (NEPA); Section 106 of the NHPA and its implementing regulations; CEQA, including the CEQA Guidelines; the San Francisco Administrative Code Chapter 31; and applicable local requirements.

1.3.1 Federal

Under NEPA, federal agencies must take into account potential effects on historic properties and other cultural resources (40 CFR 1508.8), including those resources that are eligible for the National Register of Historic Places (NRHP), before an undertaking may be approved.

Section 106 of the NHPA, as amended, and its implementing regulations at 36 CFR Part 800, require that any federal or federally-assisted undertaking or any undertaking requiring federal licensing or permitting consider the effect of the action on historic properties (i.e., cultural resources listed in or eligible for the NRHP). Under 36 CFR Part 800.8, federal agencies are specifically encouraged to coordinate compliance with Section 106 and the NEPA process. Implementation of the Project includes a Section 404 permit from the U.S. Army Corps of Engineers; therefore the project is required to comply with federal environmental laws, including Section 106 of the National Historic Preservation Act (NHPA), as amended.

The NRHP, created under the NHPA, is the federal list of historic, archaeological, and cultural resources worthy of preservation. Resources listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP is maintained and expanded by the National Park Service on behalf of the Secretary of the Interior. The Office of Historic Preservation (in Sacramento, California) administers the statewide NRHP program under the direction of the State Historic Preservation Officer (SHPO). To guide the selection of properties included in the NRHP, the National Park Service has developed the NRHP Criteria for Evaluation. The criteria are standards by which every property evaluated for inclusion on the NRHP is judged. The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association, and meet one of the following criteria:

- **Criterion A**: are associated with events that have made a significant contribution to the broad patterns of our history;
- **Criterion B**: are associated with the lives of persons significant in our past;

Figure 1

Project Vicinity Map

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- **Criterion C**: embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- **Criterion D**: have yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60).

1.3.2 State

State regulatory compliance in relation to cultural resources is governed by CEQA. The CEQA guidelines define a significant cultural resource, or *historical resource*, as "a resource listed in or eligible for listing on the California Register of Historical Resources (CRHR [Public Resources Code section 5024.1]). Under the provisions of CEQA, "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (CCR Title 14(3) Section 15064.5[b]).

If a project has the potential to impact an identified historical resource, measures must be taken to reduce or control project impacts to identified historical resources to a less-than-significant level.

The lead agency can determine that a resource is potentially eligible for listing in the CRHR for the purposes of determining whether a significant impact would occur. A resource may be eligible for inclusion in the CRHR if it meets at least one of the evaluation criteria below:

1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. is associated with the lives of persons important in our past;
3. embodies the distinctive characteristics of a type, period, region, or method of construction, represents the work of an important creative individual, or possesses high artistic values; or
4. has yielded, or may be likely to yield, information important to prehistory or history (CEQA Section 15064.5 [a][3]).

Even if the resource is not listed in the CRHR and is not included in a local register of historical resources, it does not preclude an agency from determining whether a resource may be a historical resource for the purposes of CEQA. The CEQA Guidelines (14 CCR 15064.5[c]) specify that the lead agency must treat an archaeological resource that meets the definition of a historical resource according to the provisions of PRC 21084.1, 14 CCR 15064.5, and 14 CCR 15126.4.

If an archaeological resource does not meet the requirements for a historical resource, it may still be considered under CEQA if it meets the requirements for a unique archaeological resource. An archaeological resource is considered "unique" if it

> contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

has a special and particular quality such as being the oldest of its type or the best available example of its type;

is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC 21083.2[g]).

If an archaeological resource does not meet the definition of a historical resource, but does meet the definition of a "unique" archaeological resource, then the lead agency is obligated to treat the resource according to the provisions of PRC 21083.2 (14 CCR 15064.5[c][3]).

1.4 Definition of the Area of Potential Effects (APE)

The APE for the proposed Project includes all areas affected by construction activities associated with dam improvements, as well as operations involving the entire shoreline of the upper and lower reservoirs affected by higher post-project water levels. The current permissible water level maximum per the DSOD is 283.8 feet above mean sea level. The post-project water level, measured on a monthly basis, would not likely exceed 287.8 feet in elevation. Two to three times per year, elevations could range up to 290 feet for a period of fourteen days, although water would not be held continuously at any level. Elevations above 290 feet would be extremely rare, resulting from storms occurring in the 50 to 100 year storm interval. The area along the shoreline between 283.8 feet and 290 feet (and above) could potentially be affected by the rising water level, as well as by seasonal fluctuations in water level. A 50-foot buffer around the post-project water level is included in the APE. As shown on Figure 2, the APE Overview Map, and Figures 3 through 6, the APE maps, the proposed Project's APE includes Lower Crystal Springs Dam, the construction and staging area immediately below the dam, and the entire shore of Crystal Springs Reservoir from the current high-water mark to the post-project high-water mark. After reviewing the APE description and maps, the State Historic Preservation Officer has concurred with the APE (Appendix A).

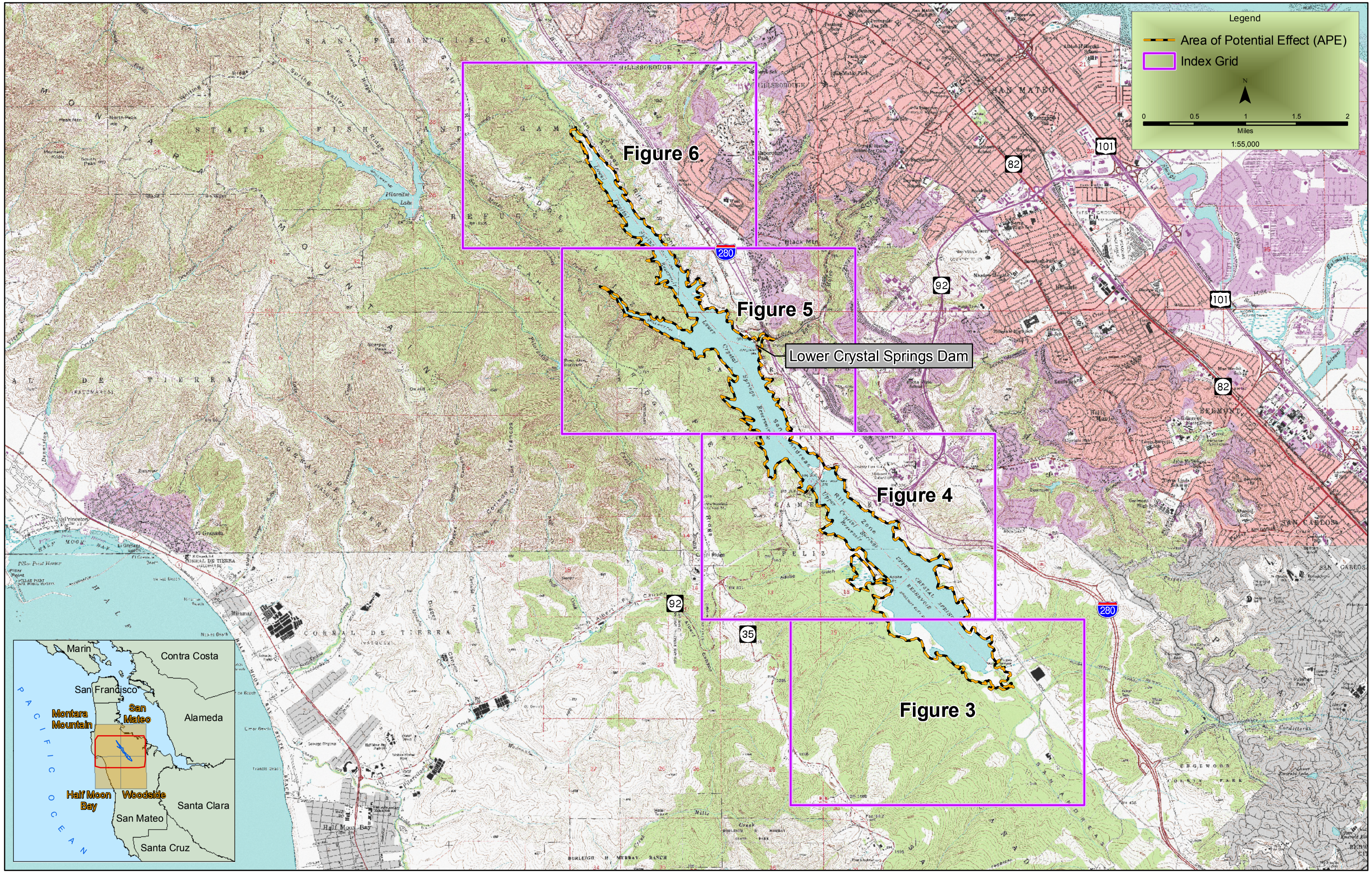

Figure 2

Area of Potential Effect, Overview Map

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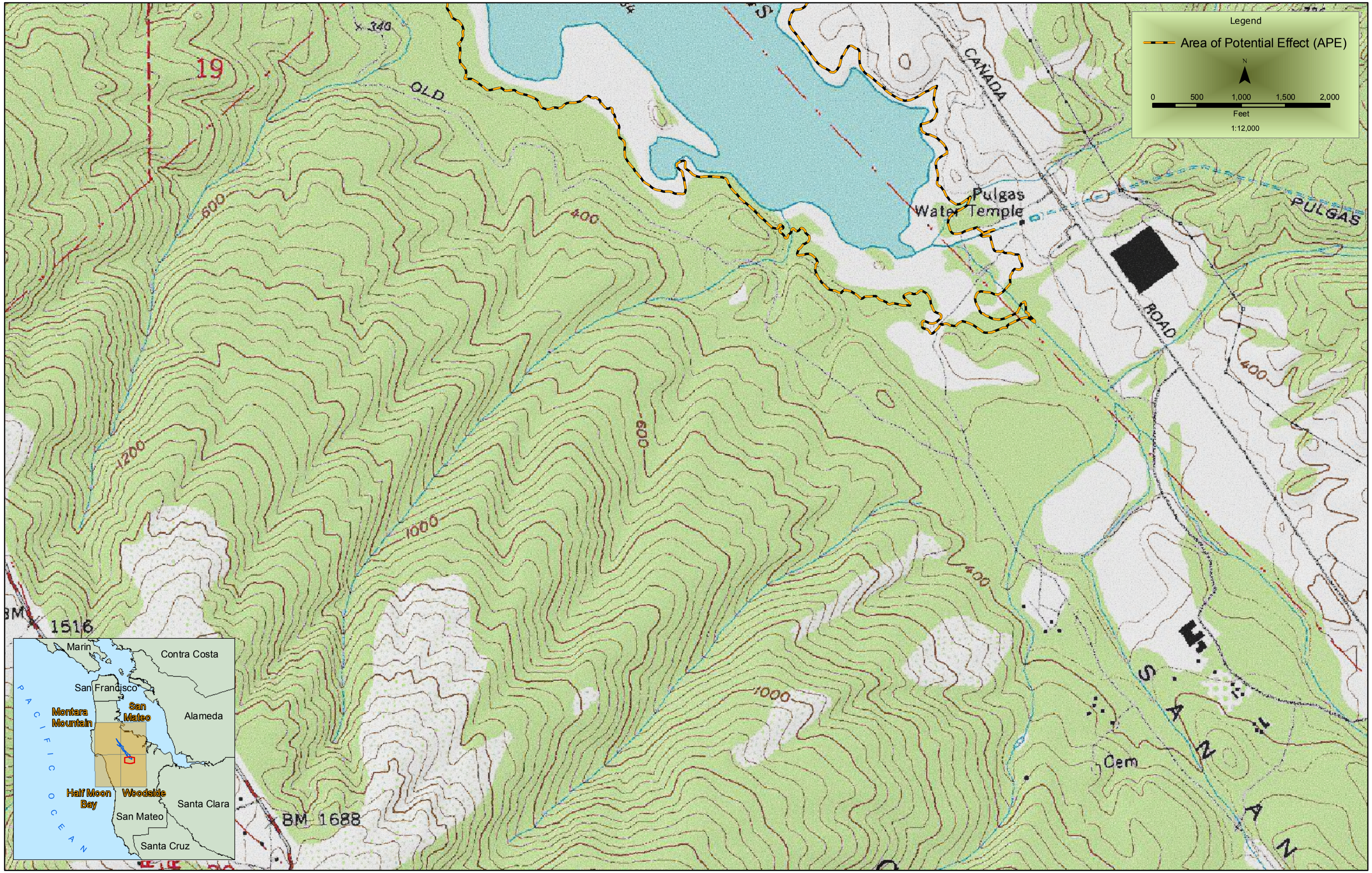

Figure 3

Area of Potential Effect Map, Southern Tip

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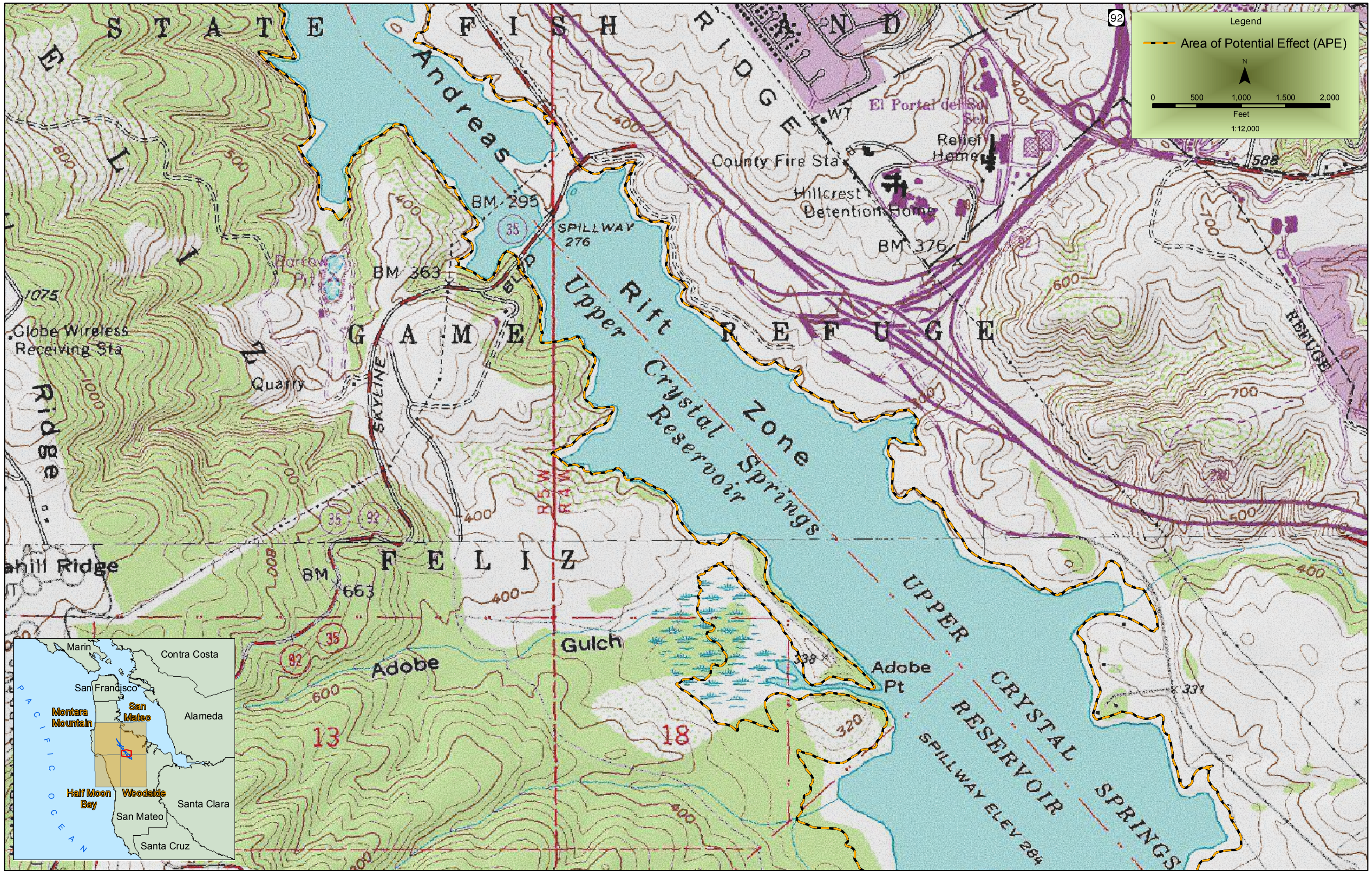

Figure 4

Area of Potential Effect Map, Mid-Southern Area

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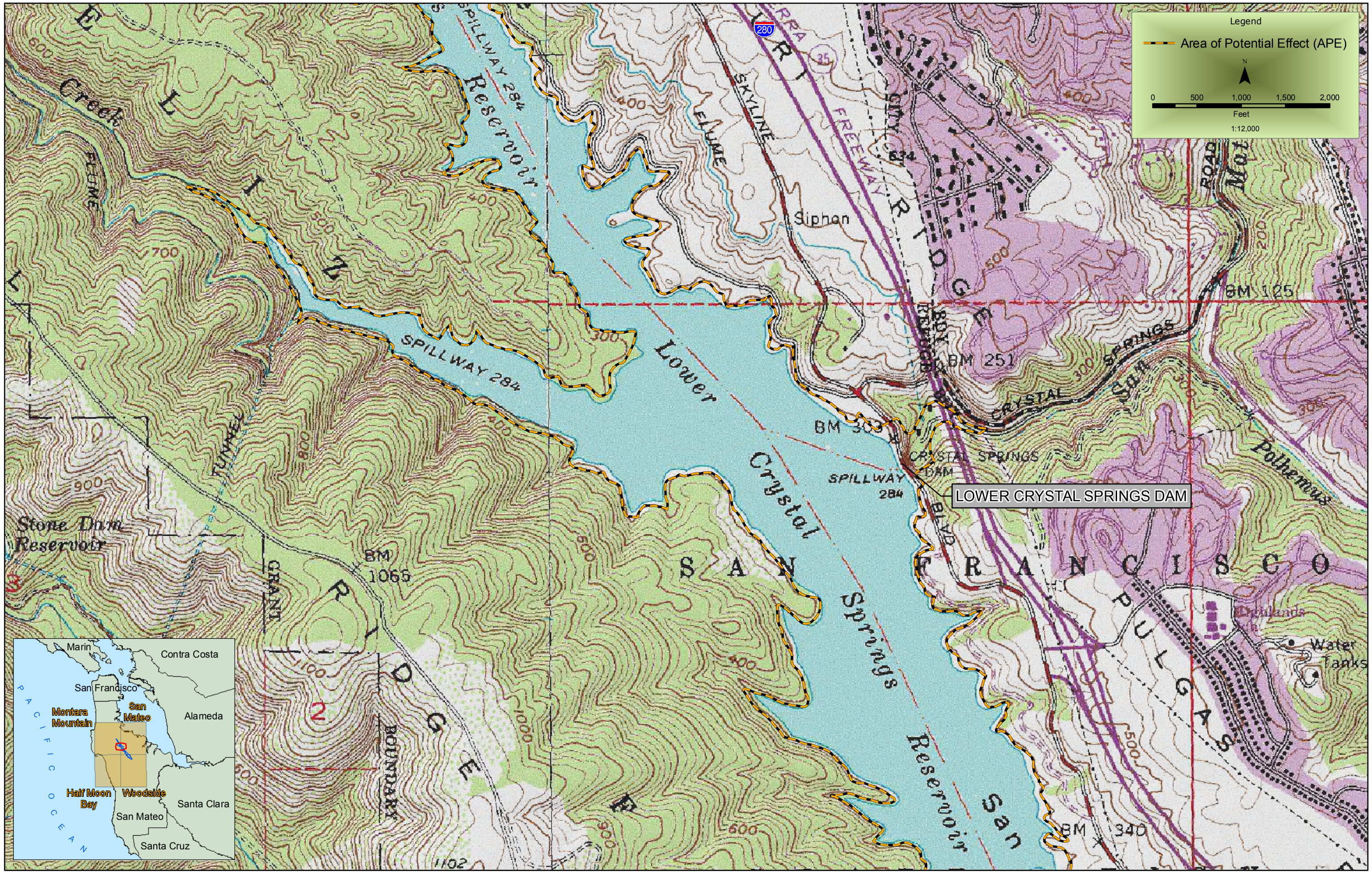

Figure 5

Area of Potential Effect Map, Mid-Northern Area

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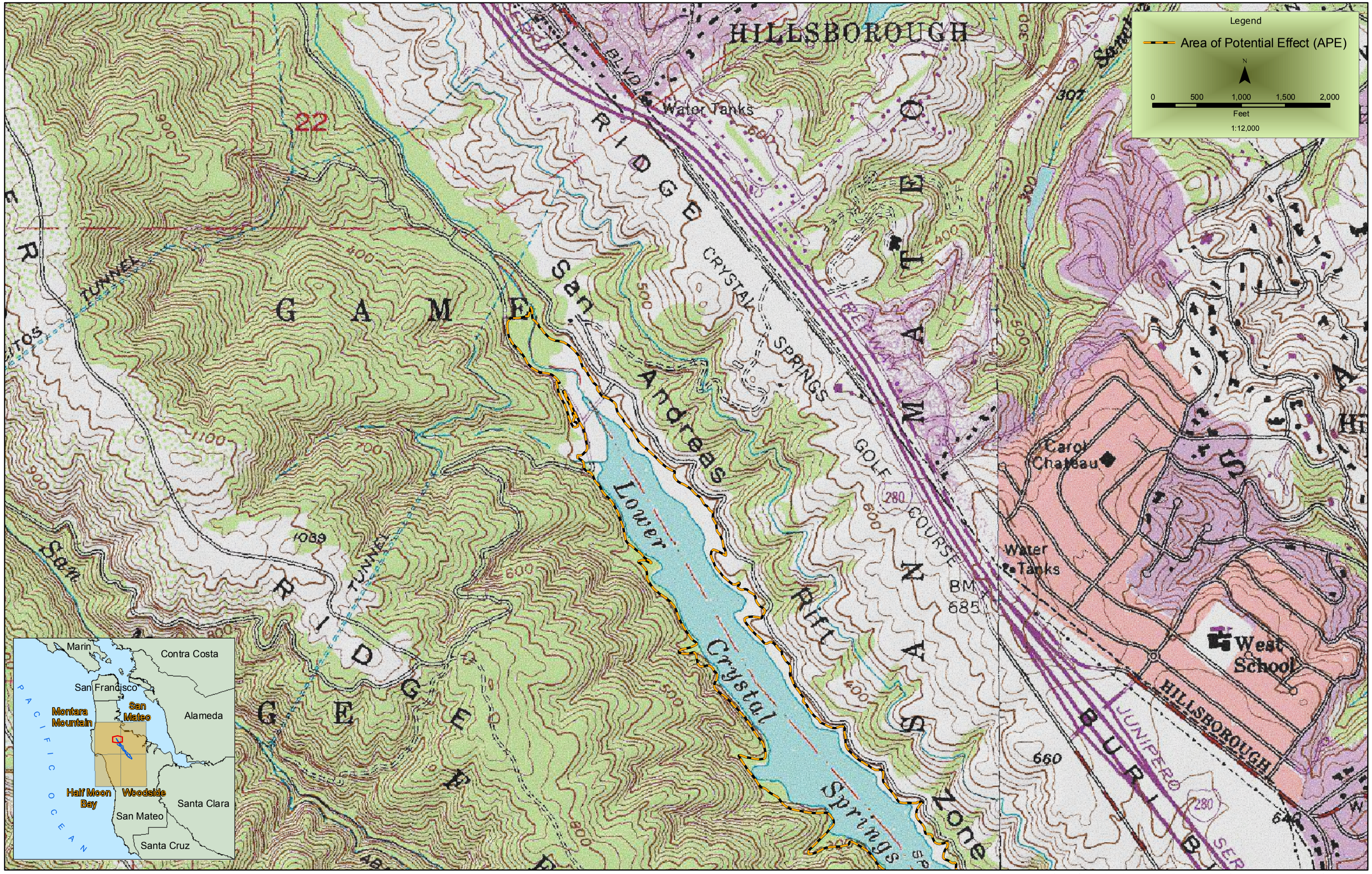

Figure 6

Area of Potential Effect Map, Northern Tip

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2.0 ENVIRONMENTAL CONTEXT

Upper and Lower Crystal Springs reservoirs occupy a valley in the San Andreas Rift Zone of the Coast Ranges between Sawyer and Cahill Ridges on the west and Buri Buri and Pulgas Ridges on the east. San Mateo and Laguna Creeks ran along the valley floor prior to construction of the dam. These creeks have since been inundated by Upper and Lower Crystal Springs reservoirs.

In general, vegetation in the study area is dominated by mixed hardwood forest, oak woodland, and chaparral on the western side, and oak woodland and non-native annual grassland (historically used for agriculture) on the moderate slopes of the east side. The southern end of Upper Crystal Springs Reservoir is dominated by mixed willow forest, while the reservoir margins and inlets are vegetated by freshwater marsh and seasonal wetlands.

2.1 Cultural Context

2.1.1 Prehistoric and Historic Indigenous Peoples

Early systematic archaeological research along the San Francisco Bay shore began in 1902 with Max Uhle's investigations of the Emeryville Shellmound (CA-ALA-309) (Uhle 1907). Under the auspices of the newly founded Department of Anthropology at the University of California, Berkeley, Uhle excavated a trench along the western side of the mound closest to the Bay shore. Uhle recognized changes over time in artifact types, dietary refuse, and human internment in ten distinct stratigraphic alluvial layers at the site. Despite the data, scholars were reluctant to accept Uhle's evidence for diachronic changes in prehistoric adaptations along the Alameda County Bay shore (Moratto 1984).

Nels Nelson expanded archaeological research in the San Francisco Bay region between 1906 and 1908, conducting excavations at the Ellis Landing site near Richmond (CA-CCO-295) and additional work at the Emeryville Shellmound. Nelson's work at the Emeryville site included a 6-square-foot exposure on the eastern and opposite side of the mound from where Uhle worked in 1902 (Nelson 1909). A total of 774 cubic feet of soil was excavated, containing over 2,000 animal bones, four human burials, and several artifacts, including mortar fragments, pestles, bone awls, and a "saw-like" bone. Although Nelson made no attempt to date the Emeryville Shellmound, he essentially confirmed Uhle's earlier suggestion of a cultural succession represented by ten cultural strata. Schenck (1926) later suggests a conservative—and inaccurate—age of 1,000 years for the Emeryville Shellmound. Extensive excavations at Ellis Landing further support the impression of diachronic cultural change along the Bay shore (Nelson 1910). Distinct artifact types of shell, bone, groundstone, and projectile points reveal two cultural components at the Ellis Landing site. Based on the estimated accumulated volume of the Ellis Landing deposit, Nelson (1909:346) suggested a time depth of 3,500 years for the site.

In addition to his important excavations of Bay shore sites along the Peninsula and East Bay shorelines, Nelson conducted the first significant archaeological survey of the San Francisco, San Pablo, and Suisun Bay shores. Through his efforts, Nelson documented 425 Native American "shell heaps" on San Francisco Bay and the adjacent coast (1909:322). The

significance of Nelson's survey effort lies in part with his recognition of the San Francisco Bay as a distinct archaeological region and his documentation of several significant Bay shore shellmounds. Sadly, the use of many, if not all, of these sites for such things as road ballast and fertilizer (Nelson 1909:323, 327) has destroyed or severely compromised their research value.

Archaeological research in the San Francisco Bay region during the early 20th century was primarily concerned with the following three issues:

- identifying the physical structure and composition of major Bay shore shellmounds;
- delineating cultural successions at these sites; and
- salvaging important information from these types of sites prior to their destruction as a result of urban development.

Around the time of World War II, however, research concerns shifted to development of regional and cultural classifications of prehistoric cultures in central California (Moratto 1984). The significant model to this end would come to be known as the Central California Taxonomic System (CCTS). The CCTS, based on artifact and burial data recovered from sites in the Delta and lower Sacramento Valley areas, posited three successive cultural periods: the Early, Transitional (Middle), and Late Horizons (Heizer 1949; Lillard, Heizer; Fenenga 1939). The Early Horizon, lasting from approximately 2500 to 500 B.C. (Heizer 1949), was defined on the basis of burial associations at four Delta sites. Ventrally extended burials with westerly orientations and grave associations are common at these sites.

Artifacts associated with Early Horizon burials include distinctive olive shell (*Olivella* spp.) and rectangular Abalone (*Haliotis* spp.) ornaments; large stemmed and foliate projectile points made mostly from obsidian and chert; quartz crystals; numerous "charmstones"; and infrequent baked clay artifacts and bone tools. The paucity of groundstone implements (e.g., mortars, pestles, metates), and the high frequency of projectile points implies a hunting emphasis for the early central California culture.

The subsequent Transitional (later referred to as Middle) Horizon dates from 500 B.C. to A.D. 500, and is distinguished from the antecedent cultural period on the basis of such elements as a predominance of tightly flexed burials of variable orientation; fewer burials associated with quartz crystals and charmstones; extensive use of bone tools; and evidence of the mortar and pestle.

Finally, the Late Horizon, which lasted until the period of Euro-American contact, includes sites with flexed and extended burials as well as cremations; clamshell disc beads (used for currency); increased use of the mortar and pestle; numerous baked clay artifacts; and implied use of the bow and arrow based on the presence of small projectile points.

Richard Beardsley (1954) was the first to expand the CCTS to the San Francisco Bay region. Beardsley postulated three "facies" based on excavation data from sites in Marin County, the San Francisco peninsula, and the East Bay. These facies, defined on the basis of contemporaneous occupations within a geographic area, include the Ellis Landing—assigned to the Middle Horizon—and subsequent Emeryville and Fernandez facies assigned to the Late Horizon.

Although concrete evidence for Early Horizon occupation in the San Francisco Bay Area was not yet identified, Beardsley (1954[II]:84) recognized possible Early Horizon traits at several sites.

There were problems, however, with applying the CCTS to interpret the archaeological record of the Bay Area. Evidence emerged from San Francisco Bay region site assemblages that were in part coeval with, but dissimilar to, Early Horizon Delta sites. At the Stone Valley site (CA-CCO-308) in Contra Costa County, for example, David Fredrickson recovered an early component that was contemporaneous with the Early Horizon yet contained traits typically associated with Middle period sites, including flexed burials, mortars, and cobble pestles (Fredrickson 1966, 1974; Moratto 1984). Stanford University archaeologist Bert Gerow also recovered an "Early" assemblage from the University Village site (CA-SMA-77) near the study area in Menlo Park that contrasted with the Early Horizon of the CCTS (Gerow and Force 1968). In short, Gerow argued that the CCTS did not account for the cultural differences that existed between early prehistoric populations of the Delta and San Francisco Bay regions.

David Fredrickson's dissertation (1973), largely a response to growing dissatisfaction with the CCTS, introduced a new system for ordering the prehistoric cultural diversity of Northern California. Notable in this regard is his concept of the "pattern," which has been widely adopted in Central California archaeology (e.g., Moratto 1984). Patterns are characterized on the basis of common cultural adaptations, particular economic modes, skills, devices, and mortuary practices (Fredrickson 1973). Significantly, the pattern concept eschews the temporal pigeonholes inherent in the tripartite Early, Middle, and Late sequence of the CCTS. By separating the domains of time and culture, Fredrickson's taxonomy allows for the manifestation of the same cultural pattern through time and space, as well as the co-occurrence of different cultural patterns within a given area.

Two cultural patterns are recognized in the archaeological record of the San Francisco Bay region: the Berkeley and Augustine patterns (Fredrickson 1973, 1974; Moratto 1984). Briefly, the Berkeley Pattern emerged circa 2000 B.C. along San Francisco Bay. Characteristic Berkeley Pattern assemblages indicate an emphasis on acorn processing as evidenced by the mortar and pestle; a predominance of non-stemmed lanceolate projectile points over stemmed ones; increased emphasis on the use of bone tools through the temporal span of the pattern; a preference for local materials over imported ones, suggesting weak, nascent trade networks; and common flexed burials with few grave goods relative to Windmiller Pattern (Early Horizon) sites.

The Augustine Pattern includes assemblages previously assigned to the Late Horizon of the CCTS. It is believed that the Augustine Pattern spread across Central California, coinciding with the southward expansion of Wintuan groups through the Sacramento Valley. Augustine Pattern sites indicate increased socio-cultural complexity as evidenced by dense populations, more intensive use of resources, established exchange networks, and variable mortuary items, suggesting social stratification. Artifact and burial traits commonly associated with Augustine Pattern components include small projectile points, indicating use of the bow and arrow, the harpoon, bone awls (for such things as basketry), polished tubular pipes, charmstones, mortar and pestles, cremation, and pre-interment grave pit burning.

The archaeological record of the San Francisco Peninsula indicates that the area was intensively occupied during prehistoric times (ESA 1994; Salzman 1984). The prehistoric inhabitants used and occupied all three of the environmental zones: the Pacific coast, the interior foothill and valleys, and the San Francisco Bay shore. Each zone contains resources that would have been important to the prehistoric subsistence. The Pacific coast would have provided abundant shellfish, grass seeds, sea mammals, ocean fish, *Olivella*, and abalone shell. The inland zone had acorns, forest products, mammals, and waterfowl along the San Andreas Valley. The bayside would have had access to most important resources. These zones and their resources were all within an easy one day walk of each other and resources in all zones could have been exploited from settlements in any zone. Excavated bayside and inland archaeological sites contain evidence of resources from all three zones.

Excavated sites in each of these zones provide some information on the prehistoric use of the peninsula in the San Mateo County area. One of the more important excavated bayside sites is CA-SMA-77, or the University Valley site. The site consists of a buried shell midden and dates between 3400 and 3050 years ago. The excavated assemblage represents a generalized economy of acorn and shellfish collecting, fishing with nets, and some hunting. Another excavated bayside site is CA-SMA-111, dating from 2400 to 1400 years ago. The excavations encountered two flexed burials and only 77 artifacts including only three formed artifacts, an obsidian projectile point, three bird bone tubes, and a serrated deer scapula.

Information on the prehistoric use of the inland areas comes from excavated sites CA-SMA-147 and CA-SMA-125. Site CA-SMA-147 is a shell midden located just south of Upper Springs Reservoir. The results of the excavation indicated that the prehistoric inhabitants followed generalized subsistence practices with reliance on plant foods including acorns, ocean and bay shellfish, large and small game and birds. Fish appears not to have been an important resource. The site contained a high proportion of informal relative to formal tools, tightly flexed burials, and two possible house floors. The site was not radiocarbon dated, but comparisons with other sites suggest a “Middle Horizon” or “Late Horizon Phase I” age for the site. Another excavated inland site, CA-SMA-125, a large shell midden site, dates from 1055 to 500 years ago and yielded flexed burials, large quantities of *Olivella* beads, incised abalone shell ornaments, mammal and bird bone whistles, chert and obsidian tools, stingray spines, finished mortars and small triangular projectile points.

An important excavated coastal site is CA-SMA-72, an extensive partially-buried midden deposit located on an ocean terrace north of Half Moon Bay. Excavations revealed the remains of a variety of shellfish; sea mammals including sea lion, seals, sea otter, and elephant seal; and land mammals including tule elk, deer, and fox. Three loosely flexed burials were also encountered. A radiocarbon date of 440 years ago was obtained for the site.

Contact-Period Native American Populations

The Lower Crystal Springs Reservoir is situated within territory occupied by people who spoke one of the languages within the Costanoan—also commonly referred to as Ohlone—language group. Eight mutually unintelligible Costanoan languages (Levy 1978:485; cf. Milliken 1995:26) were spoken in an area extending from the southern edge of the Carquinez Strait to portions of the Sur and Salinas Rivers south of Monterey Bay. At the time of Portola's expedition in 1769, Ramaytush speakers occupied the San Francisco peninsula.

Costanoan territories were composed of one or more landholding groups called "tribelets." The tribelet is a nearly universal characteristic throughout Native California, consisting of a principal village, which was occupied year round, and a series of smaller hamlets occupied intermittently or seasonally (Kroeber 1955). Tribelet territories were approximately 8 to 12 miles across, and were generally defined on the basis of physiographic features, i.e., river drainage systems. Population densities within tribelets ranged from 50 to 500 persons, and were largely determined by the carrying capacity of a tribelet's territory.

The tribelet political organization included the position of chief. The tribelet chief inherited his or her office patrilineally and required the community's approval to assume the role. Although the chief had little coercive power over the population, administrative responsibilities and influence did accompany the position. The chief's responsibilities involved directing ceremonial activities and dances, caring for captive animals (including grizzly bears and coyotes), feeding visiting members from other villages, and hunting and gathering activities.

The shaman or doctor was also an important figure in the community. Shamans were responsible for ensuring the health of individuals and the community through sacred dances and other rituals. An individual who became ill could hire a shaman to diagnose and cure his or her sickness. As throughout much of tribal California, shamans participated in and often oversaw communal dances, which served a variety of purposes. These communal ceremonies typically involved spirit impersonations, healing of individual and communal sickness, and world-renewal type rituals to ensure an abundant supply of important foods.

Costanoan groups employed a sexual division of labor to hunt and gather food. Women gathered and processed a variety of nuts, seeds, and berries. Important food staples included acorns gathered from different oak species (*Quercus* spp. and *Lithocarpus densiflora*); nuts from the buckeye tree; hazelnuts; grassland and plant seeds from buttercup, chia, redmaids, and tarweed, wild strawberries, elderberries, madrone berries, and wild grapes. Men supplemented the diet with hunting and gathering numerous shore and terrestrial species. Groups with access to Bay shore and estuarine resources acquired shellfish, waterfowl, salmon, sturgeon, and lamprey eels. Larger terrestrial mammals (e.g., grizzly bear, Roosevelt elk, and black tailed deer) were hunted with bow and arrow, while communal drives and nets were used to capture smaller game (e.g., rabbits, mice, and rats).

Resources were distributed via trade networks between Costanoan and neighboring groups. Costanoans traded abalone, mussels, salt, olivella shells, and bows to the Plains Miwok, Sierra Miwok, and Yokuts groups to the east. Piñon nuts obtained from the Yokuts are the only

ethnographically documented import of Costanoan groups, although undoubtedly obsidian, clamshell disc beads, and other significant economic items were imported as well.

The establishment of Spanish missions and outposts between 1770 and 1797 in Costanoan territory effectively ended traditional tribal lifeways. By 1810, Costanoan tribelets had virtually disintegrated from the introduction of diseases, declining birth rates, Spanish military incursions, and members entering the missions (Levy 1978).

2.2 Historic Period

In historic times, the valley that now holds Crystal Springs Reservoir experienced a rapid transition from wilderness used by local Indian tribes, to ranching and agriculture, and then to use as a municipal water storage facility.

2.2.1 Spanish Exploration (1769-1774)

Crystal Springs Valley is significant for its role as an early route used by Spanish explorers and colonists in their efforts to establish control over coastal California and the San Francisco Bay area. In 1769, the first overland expedition by Europeans reached the San Francisco peninsula. Led by Gaspar de Portola, who had been appointed governor of the new province of California, the expedition was intended to assert Spanish control over upper California by establishing a Presidio at Monterey Bay. The expedition consisted of 64 men, including 27 soldiers, 2 priests, and 15 Native American Christians from the missions of lower California (Eldredge 1909).

Portola's expedition departed San Diego on July 14, 1769. Confused by the rugged terrain, the party passed Monterey Bay and proceeded into the Santa Cruz Mountains, reaching the San Francisco Peninsula in late October. As they reached the San Pedro Valley, the party spotted the Farallon Islands and realized that they had come too far north. After men dispatched to hunt game reported the presence of a giant estuary to the east, the entire expedition climbed Sweeney Ridge on November 4, marking the European discovery of San Francisco Bay. Miguel Constanso, the party's engineer, reported that that evening the party descended the ridge into the valley below, now beneath the San Andreas Reservoir (Babal 1990:11). On November 6, the Portola expedition moved south-southeast along the valley. Crespi describes the area now covered by Crystal Springs Reservoir:

> We traveled in a southerly direction along the edge of the estuary (San Francisco Bay), but without seeing it, as we were prevented by the hills of the valley which we were following. On the right hand we had delightful mountains, with many groves of live oaks and redwoods. We... halted near a lake formed by an arroyo of good water with unlimited pasture and numberless geese in the same valley, in which there have been seen many tracks of large animals [Bolton 1927:232].

Their campsite the night of November 6, 1769 was within the project area, near the current alignment of Upper Crystal Springs Dam and Highway 92. A party of scouts spent four days exploring the western shore of the Bay. The party retraced their path through the valley on their way south, returning to San Diego in January 1770 (Babal 1990:11).

In 1774, Rivera's expedition to the Peninsula brought Spanish explorers back to the project area. Charged to explore the San Francisco peninsula and select sites for Spanish settlement, the party passed through the valley on November 31, the feast day of Saint Andrew, which inspired the expedition to name the portion of the valley north of the current reservoir "San Andres." Eighteen months later, Juan Bautista de Anza led a group of settlers to establish the mission at San Francisco. His advance party of soldiers, led by Jose Moraga, camped at San Mateo Creek, just below and to the east of the APE (Babal 1990:12-13).

2.2.2 Mission San Francisco (1776-1833)

After the establishment of Mission San Francisco in 1776, the lands of the San Francisco peninsula came under control of the church. In the San Pedro Valley, west of the APE, an agricultural and ranching outpost was established in 1786 on a former indigenous village site. Such enterprises were operated by Native American "neophytes," who were brought to the missions by a combination of attraction techniques and the frequent use of violence by Spanish soldiers to keep rebellious tendencies under control. The techniques used to attract the Indians (new foods, new animals, new technology, new religious rites, grand buildings and new clothes, beads and other personal items), were important, but so was the coercion. The resulting mission system was a combination of feudal religious commune and slavery, whose Indian inmates were the slave laborers and the Spanish were the ruling class. Poor working conditions and lack of resistance to European diseases led to frequent epidemics, which struck the San Pedro settlement in 1791 and led to its abandonment soon thereafter. A new outpost was built on San Mateo Creek, to the east of the APE, in 1793. Throughout the Mission period, the project area was used primarily for pasturing the large herds of cattle and sheep owned by the Presidio and the Mission, which were tended by the Native Americans (Hynding 1982:19-22).

2.2.3 Land Grants in the Mexican Period (1822-1848)

In the wake of Mexican independence in 1822, the new government began issuing large land grants on former Mission lands in many parts of California. The process accelerated after 1833, when the former mission lands were secularized and seized by the government. The general project area forms the intersection between five such grants: Ranchos Feliz and Cañada Raymundo to the west, and Ranchos San Mateo, Buri Buri and Las Pulgas to the east (Beck and Haase 1988).

Rancho de las Pulgas was the largest and oldest of these. A 1795 verbal grant to Jose Arguello, a former commander of the San Francisco Presidio, was confirmed by the Spanish government to his heirs in 1820, making it the only grant in the area conferred under Spanish Rule. The 35,000 acre rancho stretched from the Bay estuary to the Crystal Springs Reservoir Valley and from San Mateo Creek in the north to the Santa Clara county line in the south (Stanger 1938:40). The Arguello family was prominent in the government of California up to the American takeover, and lived mostly in San Francisco and Monterey. For this reason, and because they had large landholdings elsewhere, few improvements were made to Las Pulgas beyond a few huts for shepherds (Babal 1990:19).

The other ranchos in the area were granted in the 1840s. The 6,000 acre Rancho San Mateo, in the northwest portion of the project area, had previously been held in reserve by the government as a potential zone for resettlement of Native Americans. Finally granted to Cayetano Arenas of Los Angeles in 1845, it was soon sold to American immigrants William Howard and Henry Mellus (Babal 1990:18). Howard purchased Mellus's share, drove the remaining Indians off the land and established a large estate (Stanger 1963:93). Cañada Raymundo, which extended to the southwest portion of the project area, was granted in 1840 to John Coppinger, one of the earliest Anglo immigrants to the San Francisco Peninsula. Rancho Cañada Raymundo was known for its rich timber resources and was an early center of logging and milling in the Peninsula (Babal 1990:18). Rancho Feliz, located to the north of Cañada Raymundo, was granted in 1844 to Domingo Feliz, a relative of the Sanchez family who owned the adjacent Ranchos Buri Buri and San Pedro. Feliz' 4,400-acre holding was used for ranching and farming, and the site of his adobe lies along the western shore of Upper Crystal Springs Reservoir, within the APE for this project (ESA 1994).

2.2.4 The Early American Period (1849-1870s)

The trickle of Anglo-American immigrants to California during the mid-1840s became a flood after the two key events in early 1848. These were the Treaty of Guadalupe Hidalgo, which ceded California to the United States, and John Marshall's discovery of gold on the South Fork of the American River. The subsequent gold rush of 1849 brought thousands of people, mostly men, to the Bay Area. Many who did not find success in the gold fields decided to appropriate what they saw as empty land on ranchos around the Bay (ESA 1994). On Rancho de las Pulgas, for instance, at least 23 squatters were occupying land in 1853 (Hynding 1982).

Mexican landowners were faced with a new legal system that took an average of seventeen years to resolve claims. During the long legal process, many landowners were forced to sell off portions of their land to pay legal fees. Apparently the only one of the Mexican landowners to retain property in the APE was Domingo Feliz, who continued living at his adobe until at least 1859, though on a much reduced parcel of only 270 acres (Babal 1990:57).

From the 1850s to the 1887 beginning of the construction of Lower Crystal Springs Dam, the Crystal Springs Valley and its surroundings were home to a community of farmers, loggers, and tradesmen, as well as a summer home to wealthy urbanites. Land use in the project area and its surroundings during the 1850s and 1860s was characterized by logging on the surrounding hills and farming, transportation, and recreation in the valleys.

Logging of oak and redwood in the Peninsula began as early as the 1830s, and accelerated after 1849, when dozens of small water or steam-powered sawmills were established along peninsula creeks. Four of these operated in the 1850s on West Union Creek: Willard Whipple operated two mills, while the Pickney and Smith Sawmills competed with each other in shingle production. The remains of these sawmills are south of and outside of the APE (Hynding 1982; Babal 1990:46). A.L.C Potter, who had farmed land in the area later flooded by the Crystal Springs Reservoir, noted the lasting changes that logging caused to the area:

> There were old sled roads entering the hills from most of these flats, where wood had been cut and sledded down the side-hills... [and] loaded on immense wagons and hauled to San Francisco by six and eight-animal teams [Potter 1923].

The Crystal Springs Valley was a transportation hub for the area. By the mid-1850s, the predecessor to State Route 92 was graded between Burlingame and Half Moon Bay. The portion of the road from San Mateo to Crystal Springs climbed up San Mateo Creek and was completed in 1860 (ESA 1994). This road intersected a local route that passed north-south through the valley. Daily stagecoach service was provided by 1865 by the San Mateo, Pescadero, and Santa Cruz Stage Company, which stopped at Crystal Springs, San Feliz Station, and Byrnes' Store, all within or near the project APE. The road was improved in 1866 by local contractor Bowman and a crew of Chinese-American workers (Babal 1990:25).

Homesteads in the area spread out along the north-south road from San Andreas to Cañada Raymundo. The northern part of the valley was occupied by Domingo Feliz, and had several houses built on it in the 1860s (Babal 1990:44-45). Feliz' neighbor to the south was Agoston Haraszthy, a Hungarian immigrant who moved to the valley in the early 1850s. Haraszthy planted 25 acres of grapes on the portion of his property near what was later the site of Lower Crystal Springs Dam, making it one of the earliest vineyards in the Bay Area. He moved to Sonoma County in 1861, and sold acreage including the vineyard to Robert Sherwood, a San Francisco jeweler. Sherwood's residence was on what is now known as 'Sherwood Point', within the APE on a rise between the San Mateo and San Andreas forks of the Lower Crystal Springs Reservoir (Babal 1990:59).

The central part of the valley was defined by its proximity to the road between Burlingame and Half Moon Bay. The Crystal Springs Hotel was built in 1856 and was long a center of activity for the community. It stood within the project area, just west of the Lower Crystal Springs Dam and along the road from San Mateo. Located at the edge of San Mateo Creek, it could sleep six families in 1860 (Babal 1990:47). Management was taken over by Lewis Whittingham that year and substantially expanded. The new facilities included ten family cottages, a dining hall and ballroom, and a creek side promenade. Whittingham was a subtenant, for later in 1860 the Spring Valley Water Company leased the parcel on which the hotel stood in order to secure water rights to San Mateo Creek (Lawrence 1922). The hotel was further expanded in 1869. When plans to build the Upper Crystal Springs Dam developed in 1873, Spring Valley Water Company bought the parcel outright and closed the hotel, although the buildings continued in use temporarily for social events and the site was used as housing for workmen building the Upper Crystal Springs Dam (Babal 1990:48-50; *Redwood City Times-Gazette* 1876a).

Just south of the Crystal Springs Hotel, wealthy banker Antoine Borel owned a large parcel in the 1860s, where he maintained what was likely a country home (Babal 1990:60). The presence of the road through the valley also stimulated other businesses. On part of the old Feliz property, about a mile south of the hotel, Michael Carey opened the San Feliz Station in 1869. A roadhouse with lodging, food, and livery services, the property included a dwelling, outbuildings, and stables on 23 acres (Babal 1990:50-52). A former patron described the site:

> To the north were fine farms and country estates... To the south was a long stretch of hayfields and pastures in which dairy herds grazed... Twice a day the stage rattled in, changed horses, and rattled out again, once on its way to Half Moon Bay and again on the return to San Mateo. It was a restful, hospitable, shut-in sort of place, beautiful in its setting among the hills [Burke 1926:12-13].

San Feliz Station apparently remained in operation until the construction of Lower Crystal Springs Reservoir. Babal notes that it is mentioned in the local directory as late as 1883 (Babal 1990:52). The location is within the APE.

West of San Feliz Station, and near but outside the APE, stood Byrnes' Store, a two-story establishment that served the largely Irish-American farmers of the area. Opened by 1859, a saloon was among its attractions. According to the 1875 volume of Dun's credit reference book, James Byrnes supplied "liquors" at this location. During the early and mid-1880s, it was T. Fitzgerald who had a saloon at Byrnes' Store, and by 1901 John Rand had the saloon there (Dun and Company 1875, 1880, 1885, 1901). The store, saloon, and its successor restaurant, reportedly continued in business until 1936. Near Byrnes' Store was Laguna School, which served the children of the valley from 1861 until 1894, by which time most residents of the area had been bought out by the Spring Valley Water Company (Babal 1990:55-56).

As the quote above suggests, the southern end of the valley—often called the Cañada Raymundo—was primarily occupied by dairy farms. On the east shore of Laguna Grande, the small lake along Laguna Creek now under the Upper Crystal Springs Reservoir, Christian Bollinger established a dairy farm after his arrival in San Mateo County in 1854. He owned 628 acres in 1868, but expanded enough that he could sell 1,100 acres to Spring Valley Water Company in 1874. Bollinger's dairy products were sold in San Francisco, most notably to the Palace Hotel (Babal 1990:60).

Bollinger's neighbor to the south was Michael Wolff, who owned a 533-acre parcel with several homesteads. Further up the valley, near the southern end of Laguna Grande, parts of the APE were owned by Colonel W.D. Harrington, who had his homestead to the east of Domingo Feliz. An early Anglo arrival to the area in 1851, Harrington acquired substantial land in the region. Near Harrington's house was a parcel owned by wealthy San Mateo lawyer, banker and mine owner Alvinza Hayward, which likely had a cottage on it. Hayward also developed an early water system, whose elements are now apparently all under the waters of Crystal Springs Reservoir. The area also was home to a group of Irish residents, including a dairyman named B. McNamara, farmers Conder McCreary and M. Condon, and Michael Casey, who owned a ranch west of Byrnes' Store. Other valley residents included ranches owned by J.G. Maynard and a Mr. Peyton, and a large tract owned by John Claffey (Babal 1990:63). All of these men appear to have owned parts of the land within the APE.

The rustic setting of the Crystal Springs Valley, land of country homes and profitable ranches, was short-lived. By the mid-1860s, the Spring Valley Water Company had begun to acquire land on a large scale, a development that would soon replace the residential character of the valley with large reservoirs.

2.2.5 Spring Valley Water Company

As the population of San Francisco grew, reliable water supply to the arid city became an important concern. Reliance on groundwater, the small local creeks, and imports of water in barrels from Marin County proved inadequate by the late 1850s. In 1858, a group of San Francisco businessmen formed Spring Valley Water Company and quickly absorbed their competitors (ESA 1994). To solve the water supply problem, Spring Valley began acquiring land to build reservoirs in the steep valleys of northern San Mateo County, and began a program of almost continuous dam building in the area that lasted into the 1880s. Spring Valley's first dam, across Pilarcitos Creek, was begun in 1860 and began operation in July 1862. The 36-foot high earth dam quickly proved inadequate, however, and work was begun on a larger Pilarcitos Dam in 1864, completed in 1867. These dams supplied water via tunnels through Cahill and Sawyer Ridges, which emptied into a flume and pipe network that continued to San Francisco. Spring Valley's attention then turned to the San Andreas Valley, north of the APE, where German born engineer Hermann Schussler designed a dam. Begun in 1868, the San Andreas Dam entered service in November 1870 (Babal 1990:80).

Spring Valley Water was aware of Crystal Springs Valley's potential as a reservoir site as early as the 1860s, when the Company purchased the Crystal Springs Hotel to secure its land and the water rights to San Mateo Creek. Through the 1860s and early 1870s, agents of the company began to acquire the whole of Crystal Springs Canyon, often under their own names to mask company involvement. To assemble the final parcels needed for the construction of the dams, Spring Valley also persuaded the San Mateo Board of Supervisors to use their power of condemnation (Hynding 1982). This reflected the political power of the owners and directors of the Spring Valley Water Company, which included many wealthy and prominent San Franciscans.

Peninsula residents were concerned about the effects of Spring Valley's plans on the local economy. The local newspaper editorialized as early as 1860:

> Should these companies acquire the right to carry away the water they ask for, and then attempt to do it, they could never get enough to be an object to them without robbing a large portion of our most valuable lands of all those beautiful streams with which nature has interspersed them, making them an arid desert, rendering them perfectly useless for grazing purposes and thus taking from the lands a great portion of their present value (*San Mateo County Gazette* 1860).

Some of this opposition may have arisen from the fact that Spring Valley had no interest in providing water service to residents of the peninsula itself (Babal 1990:34). Rather, water from San Mateo County would be diverted to meet the needs of the great metropolis to the north (*Ibid*).

By the mid-1870s, Spring Valley had acquired enough land to begin construction of the Upper Crystal Springs Dam (known as "Laguna Dam" in the local press). Designed by Schussler, the German engineer who also supervised the Pilarcitos and San Andreas Dams, Upper Crystal Springs Dam was 70 feet high and 520 feet wide when completed in 1876. It stretched across the valley along the current alignment of SR 92, near the site of Byrnes' Store. The dam was

constructed of earth around a clay 'puddle' core. The *Redwood City Times-Gazette* described the progress of the work in August 1876:

> After the formation of a good surface, the dirt is laid on, one layer at a time, evenly over the entire surface or top of the work, about one foot in depth. This is kept sprinkled thoroughly, dropped from the carts, and constantly kept in a condition to pack well... a two ton roller is drawn over all again and again, until the surface is as hard as earth can be made… In a line drawn lengthwise of the dam through the center, is made a wall of clay several feet in thickness, tamped slowly and carefully as solid as possible... A puddle pit was sunk ninety feet, and no bedrock being found, the clay wall was started from that depth beneath the surface. It also extends into the hill on either side to the bedrock. This is done to render the dam impervious to water and to prevent seepage (*Redwood City Times-Gazette* 1876b).

As many as 250 men were working on the dam in 1876, and the dam's projected capacity was 8 billion gallons. Water from the dam flowed through a brick-lined tunnel into a pipeline that carried it to a pumping station near the Crystal Springs Hotel. From there, it was moved uphill into the Pilarcitos pipeline, then on to San Francisco (Babal 1990:37; *Redwood City Times-Gazette* 1876b).

Continuing growth in San Francisco's demand for water led engineer Schussler to design a second dam in the valley, this one to stretch across San Mateo Creek at the point where it turned east and flowed down out of the Crystal Springs/San Andreas Valley. The Lower Crystal Springs Dam was architecturally innovative, and marked a high point in Schussler's career. At 145 feet in height when completed, Lower Crystal Springs was the largest concrete dam in the United States at the time (Shoup 1989; see also Mermel 1963).

Work commenced in summer 1886, as teams of men and horses cleared the site and identified bedrock anchors for the dam. Construction began in 1887 with over a hundred men, a number that would grow to almost 1,000 over the course of the project. Men cut a 6-foot foundation trench into bedrock with hand tools, worried that using explosives would weaken the surrounding stone. Schussler devised an innovative system of interlocking concrete blocks to ensure the strength of the dam. Concrete was mixed in six steam-powered mixers set on a three-story platform above the dam, then carried by hand to pipes which were used to fill wooden forms. The resulting blocks were alternately set and had irregular projections on their sides which locked them into their neighbors, jigsaw-fashion. The resulting dam surface had no continuous seams that might form a weak point in the concrete (Shoup 1989).

Lower Crystal Springs Dam reached a height of 115 feet in 1888, and was raised to its final height of 145 feet by 1890. When completed, the dam impounded 22 billion gallons of water over 1,483 acres. The outlet tunnel of the dam was fed by three feeder tunnels at different depths, and was set low in the hill to allow water to be drawn even in dry years. The water was pumped to San Francisco via a 44-inch pipeline that followed the Bay shore (Shoup 1989; Babal 1990:95). On its completion, Lower Crystal Springs Dam made the Upper Crystal Springs Dam and its system of pumping water up to Pilarcitos pipeline obsolete.

Since the new dam flooded the San Mateo-Half Moon Bay highway that had passed through Crystal Springs, the level of Upper Crystal Springs Dam was later raised 20 feet to serve as a replacement bed for the county road. This serves as the current alignment of SR 92 (Babal 1990:91). A number of cottages for Spring Valley Water Company employees were also constructed in the 1880s and 1890s, including Lower Crystal Springs Cottage, just north of the dam (constructed in 1898), Upper Crystal Springs Cottage, west of the Upper Crystal Springs Dam (constructed in 1886), and the South Crystal Springs Cottage, on the east shore of the Upper Crystal Springs Reservoir (constructed in 1891 [(Babal 1990:105]). Of these, only South Crystal Springs cottage is currently extant and in the APE. The others were replaced in the 1950s and these newer facilities are outside the Project APE.

The construction of Lower Crystal Springs Dam was a stirring success from Spring Valley Water Company's point of view, but did not solve its growing problems with the City of San Francisco, which resented Spring Valley's monopoly control of its water supply. The City filed a series of suits over water rates, and adopted a charter that allowed for municipal ownership of the water system (Babal 1990:41-42; Stanger 1938). A City commission turned to the Sierra Nevada for potential reservoir sites, and identified the Hetch Hetchy Valley on the Tuolumne River as their preferred site. After the passage of the 1913 Raker Act over the objections of environmentalists, San Francisco was allowed to begin planning the Hetch Hetchy reservoir (Babal 1990:42).

The completion of the O'Shaughnessy Dam that created Hetch Hetchy Reservoir in 1924 took away not just Spring Valley's monopoly power, but its only market.

2.2.6 The Project Area since 1930

In 1930 the City of San Francisco purchased Spring Valley's watershed lands and soon placed them under the administration of the newly formed San Francisco Water Department. Crystal Springs Reservoir was selected to be the terminus of the pipeline system that brought water from the Sierra Nevada across the central valley and under San Francisco Bay. The first Hetch Hetchy water began flowing into Crystal Springs Reservoir on October 24, 1934 (Babal 1990:42, ESA 1994). To memorialize the event, a classically inspired temple was constructed in 1938. Sixty feet high and 25 feet in diameter, the Pulgas Water Temple stands above a weir that was the original terminus of the Hetch Hetchy Aqueduct (Babal 1990:107). Hetch Hetchy water can either go directly to San Francisco or to Crystal Springs. The water to Crystal Springs goes through the chlorination station now as opposed to the Pulgas Water Temple.

Since 1938, the project area has been operated by the SFPUC as a reservoir site. Only minor changes in land use are attested. Replacements for the original North, Lower, and Upper Crystal Springs Cottages were built between 1954 and 1959; these facilities are all outside of the Project APE (Babal 1990:105-106).

Since the 1940s, interior and eastern San Mateo County has been transformed from a rural and agricultural region to a series of suburban bedroom communities. The project area, as part of the SFPUC's Peninsula Watershed lands, forms the largest open space area for the communities of the peninsula. The watershed's 6-mile Sawyer Camp Trail provides for hiking, biking and running. The APE is also at the nexus of two major transportation corridors: SR 92 has become a

major route for commuters from the coastal communities, while I-280 forms one of the most important north-south transportation routes into San Francisco.

The project area has had an interesting past, one which illustrates several key themes of San Francisco Bay area history, among them especially the grand story of the water supply development of one of the great metropolitan regions of the world.

3.0 PREFIELD RESEARCH AND NATIVE AMERICAN CONSULTATION

Prior to fieldwork, a records and information search was conducted by the staff at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on February 23, 2006. The database was searched for archaeological sites and studies within a 1.25-mile radius of the Project APE. In addition to reviewing site records and study reports, the search consisted of a review of the following:

- Historic Properties Directory (OHP 2008)
- National Register of Historic Places, Directory of Determinations of Eligibility, California (National Park Service 1988)
- California Register of Historical Resources (State of California 2002a)
- California Historical Landmarks (DPR 1996)
- California Points of Historical Interest (DPR 1992)
- California Inventory of Historical Resources (DPR 1976)
- SFPUC Peninsula Watershed Management Plan and EIR (ESA 1994)

The records search also included examination of the following historic and modern maps: 1909 Official Map of San Mateo County, 1886 Official Map of the County of San Mateo, modern San Mateo County planning maps, 1906 General Land Office Plat maps from 1854, 1856, 1857, 1858, 1861, and 1856, and U.S. Geological Survey (USGS) 15-minute topographic quadrangles maps from 1896, 1902, and 1942. The Historic Properties Directory for San Mateo County was also reviewed for updates. The records search indicated that two previous studies (S-10740 and S-5407) had been conducted within the APE, and six previous studies (S-10821, S-27930, S-25309, S-13845, S-12989, and S-25527) had been conducted within a 0.25-mile radius of the APE (see Table 1 for a list of previous studies).

Table 1: Previous Cultural Resource Studies within or adjacent to the APE

Study No.	Study type	Location	Sites within APE
S-5407	Emergency pipeline alignment	Within APE on northwest shore of Upper Crystal Springs Reservoir	No sites
S-10740	Historic Property Survey Report	Within APE, Lower Crystal Springs Dam and Skyline Boulevard Highway Bridge	No sites
S-10821	Roadway survey	Outside APE, west of Upper Crystal Springs Dam	No sites
S-12989	Sedimentation basin project	Outside APE, south of reservoir	No sites
S-13845	Master's thesis	Outside APE, south of reservoir	No sites
S-25309	Sprint PCS facility	Outside APE, east of reservoir	No sites
S-25527	Chloramine conversion	Outside APE, south of reservoir	No sites
S-27930	Transmission line	Outside APE, south of reservoir	No sites

The Peninsula Watershed Management Plan (ESA 1994) presents one of the more comprehensive resources for understanding the local cultural context and much of the following discussion derives from this overview. All of the previous studies had been conducted for roadway or power-line work, and none of those surveys located archaeological resources within the current APE.

Research for the Lower and Upper Crystal Springs dams was undertaken by ENTRIX/MSE JV at the following locations:

- Bancroft, Map, Periodicals and Water Resources Libraries, University of California, Berkeley
- California State Archives and California State Library, Sacramento
- San Mateo County Historical Association Library, Redwood City

In 1989, as part of a planned bridge replacement project, the San Mateo County Department of Public Works commissioned a study of the Lower Crystal Springs Dam and the 1920s-era bridge that currently rests on the dam. The "Historic Property Survey Report for Lower Crystal Springs Dam and Skyline Boulevard Highway Bridge" (#35C0043), San Mateo County, California (Shoup 1989) has been referenced for the current dam Project. The 1989 evaluation of the bridge indicated that it does not appear eligible for listing in the National Register of Historic Places (Shoup, 1989). The bridge is not listed on the California Inventory of Historic Resources or California Register of Historic Resources. An Initial Study and Proposed Mitigated Negative Declaration (IS/MND) by San Mateo County for the Crystal Springs Dam Bridge Replacement Project (County of San Mateo, 2009), states that Caltrans transmitted a Historic Property Survey Report (HPSR) and Finding of Effect report for the Bridge Replacement Project to the SHPO on September 26, 2008. The HPSR reported that the bridge was determined not eligible for listing on the NRHP. Caltrans requested the SHPO's review and concurrence with this determination and with the finding of no adverse effect to historic properties as a result of the proposed Bridge Replacement Project. As no reply was received by December 8, 2008, SHPO concurrence was assumed for the Bridge Replacement Project. The IS/MND found that the Bridge Replacement Project would not affect the historic integrity of the LCSD, as the planned construction would not affect the core characteristics that make the dam significant (County of San Mateo, 2009). The DPR forms for the bridge are provided in Appendix B.

Other SFPUC Water System Improvement Plan (WSIP) reports reviewed and used as resources in the APE include the following:

- Final Crystal Springs/San Andreas Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report for CEQA Compliance (Jones and Stokes, September, 2009)
- Final Historic Resources Inventory for the San Francisco Public Utilities Commission Crystal Springs Pipeline No. 2 Replacement Project. (Circa Historic Property Development, March, 2009)
- Historic Resources Study for the Pulgas Discharge Channel Improvements Project (Carey & Co., 2007).

3.1 Previously Identified and Expected Prehistoric Resources

The research identified one prehistoric cultural resource, Site CA-SMA-126, within the APE. This site was recorded in 1970 near the southwest corner of Upper Crystal Springs Reservoir as a small artifact scatter with associated midden. The only artifacts mentioned on the site form were an *Olivella* spire-lopped bead and a possible mortar fragment. Archaeological overviews of the surrounding area (Babal 1990:120-122; Moratto 1984) suggest that in addition to site CA-SMA-126, expected prehistoric resources within the APE may range from isolated artifacts to logistical resource procurement camps. Such resources would likely be associated with seasonal use by groups from the bay shore or coast, exploiting resources within the hills and valley of the peninsula, as well as with travel from bay to ocean to exploit specialized resources. Flaking debris from tool sharpening and food processing tools would characterize such locations, and site density would be light. Although the APE contains few settings capable of supporting a large population, larger village sites were considered possible. In fact, CA-SMA-147 (Salzmann 1983), located nearby but outside the APE, is one such village site, indicating that similar or associated resources are a possibility within the APE. Given the potential variability in site types that might be encountered within the APE, prehistoric archaeological sites in the project area could provide important data on the settlement and subsistence patterns of the prehistoric inhabitants of the peninsula, suggesting that NRHP-eligible sites may be present.

3.2 Expected Historic-era Resources

Two historic-era resources that occur within the APE are the Lower and Upper Crystal Springs Dams. To identify other potential historic-era cultural resources within the APE, a literature search was conducted which included cultural resource overviews (Babal 1990; ESA 1994), and digital images available through Google Earth™. This review suggested that historic-era resources within the APE could vary from sites representing early Spanish settlement to turn-of-the-century dam building activities. With the inundation of the valley by the reservoir, many of the resources associated with the early history of the area are likely under water. But the historical activity in the area since the late-18th-century indicates the potential for archaeological deposits of a domestic, agricultural, or industrial nature.

Specifically, the records search and map inspections suggested that road and building remains and archaeological deposits associated with the following five historic-era properties, in addition to the Lower and Upper Crystal Springs dams, may lie within the APE (Figures 7 through 9). The sources of each of these properties are cited in the DPR forms prepared by ENTRIX/MSE JV (see Appendix B).

1. San Mateo to Crystal Springs Road
2. West Union to Byrnes Store Road
3. San Mateo to Half Moon Bay Toll Road and Culvert
4. South Crystal Springs Cottage
5. Pulgas Discharge Channel

The records search identified the following six historic-era properties that are located outside of, but adjacent to, the APE:

1. Belmont to Cañada del Raymundo Road
2. Domingo Feliz Adobe
3. San Feliz Station
4. An unnamed structure in a drainage along the northeast shore of the reservoir
5. Sherwood Homestead
6. Pulgas Water Temple

As they are outside of the APE, these six resources will not be affected by the project and were not inventoried or evaluated for this project.

Within the context of potential historic resources, the ENTRIX/MSE JV survey focused on relocating and documenting the properties identified above, in addition to examining the APE for evidence of any previously undocumented resources. The results are detailed below in Section 5.0.

3.3 Native American Consultation

Consultation with local Native American groups was initiated on February 7, 2006, with an inquiry letter sent to the Native American Heritage Commission (the Commission). The Commission responded that no previously recorded Native American cultural or ritual sites in their data bases were located within one quarter mile of the APE. The Commission provided a list of individuals with possible knowledge of or concerns about the APE. Letters have been sent to the individuals on the list, but no responses have been received to date.

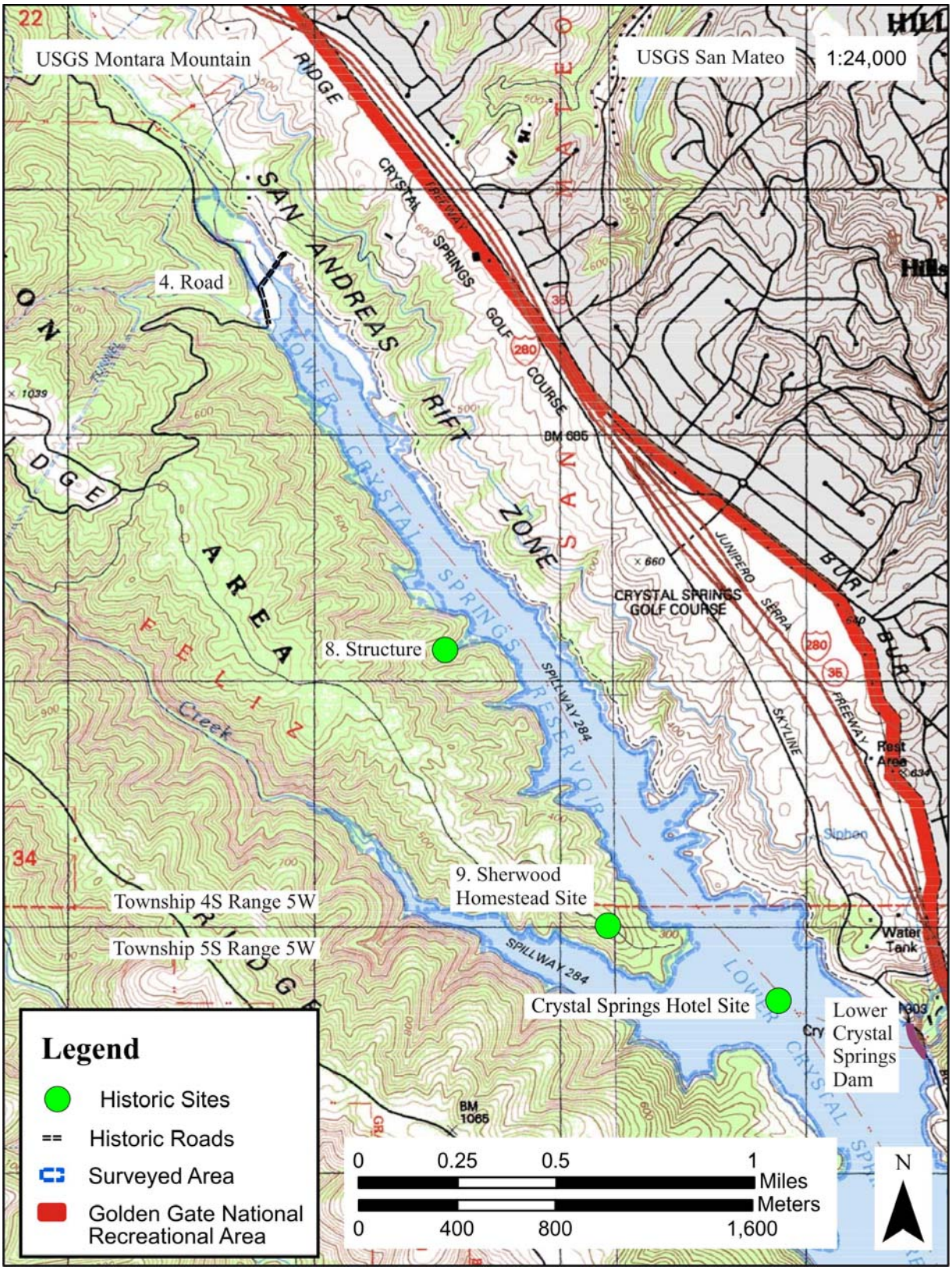

Figure 7: Cultural Resources Potentially within the APE

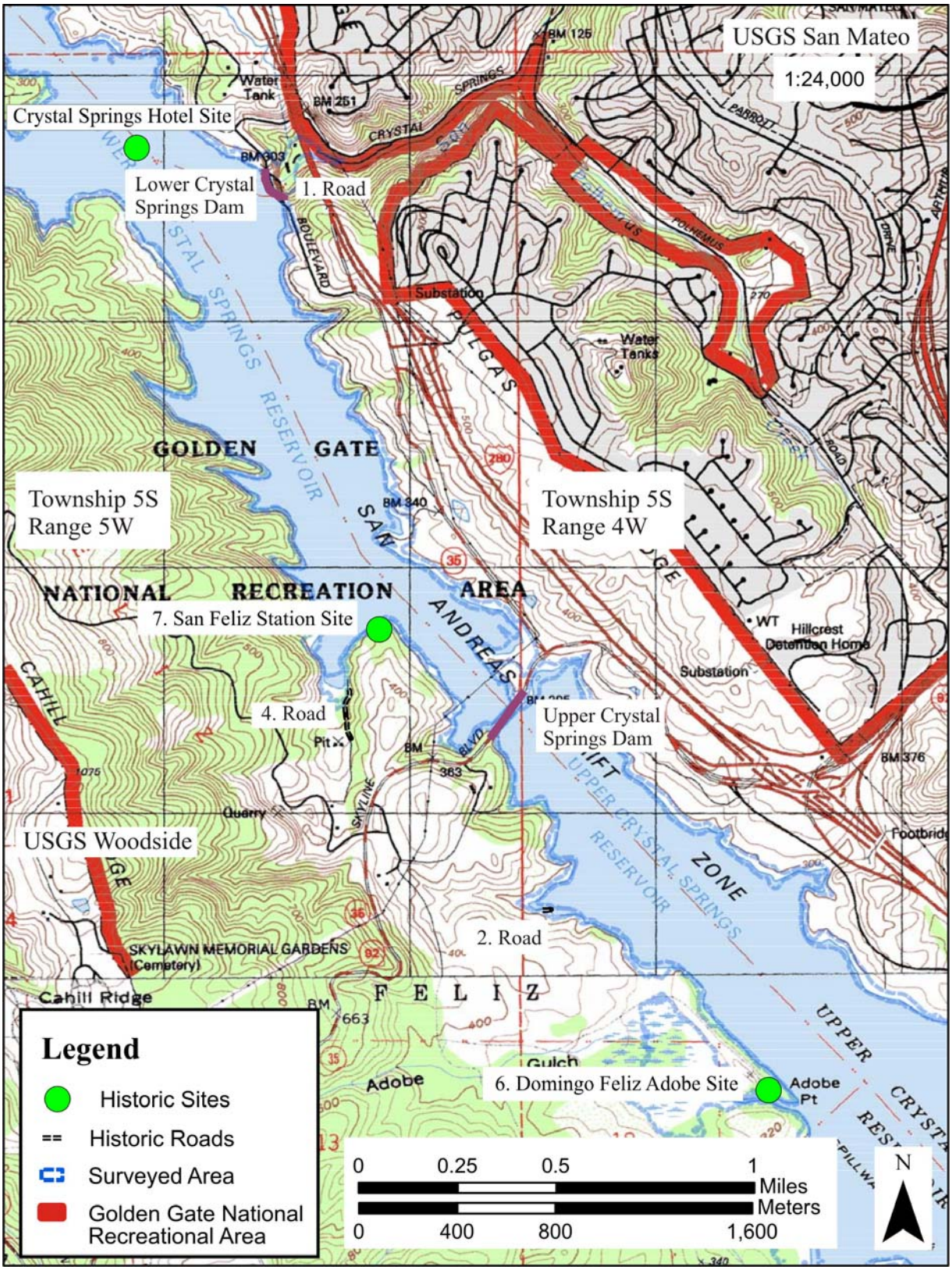

Figure 8: Cultural Resources Potentially within the APE

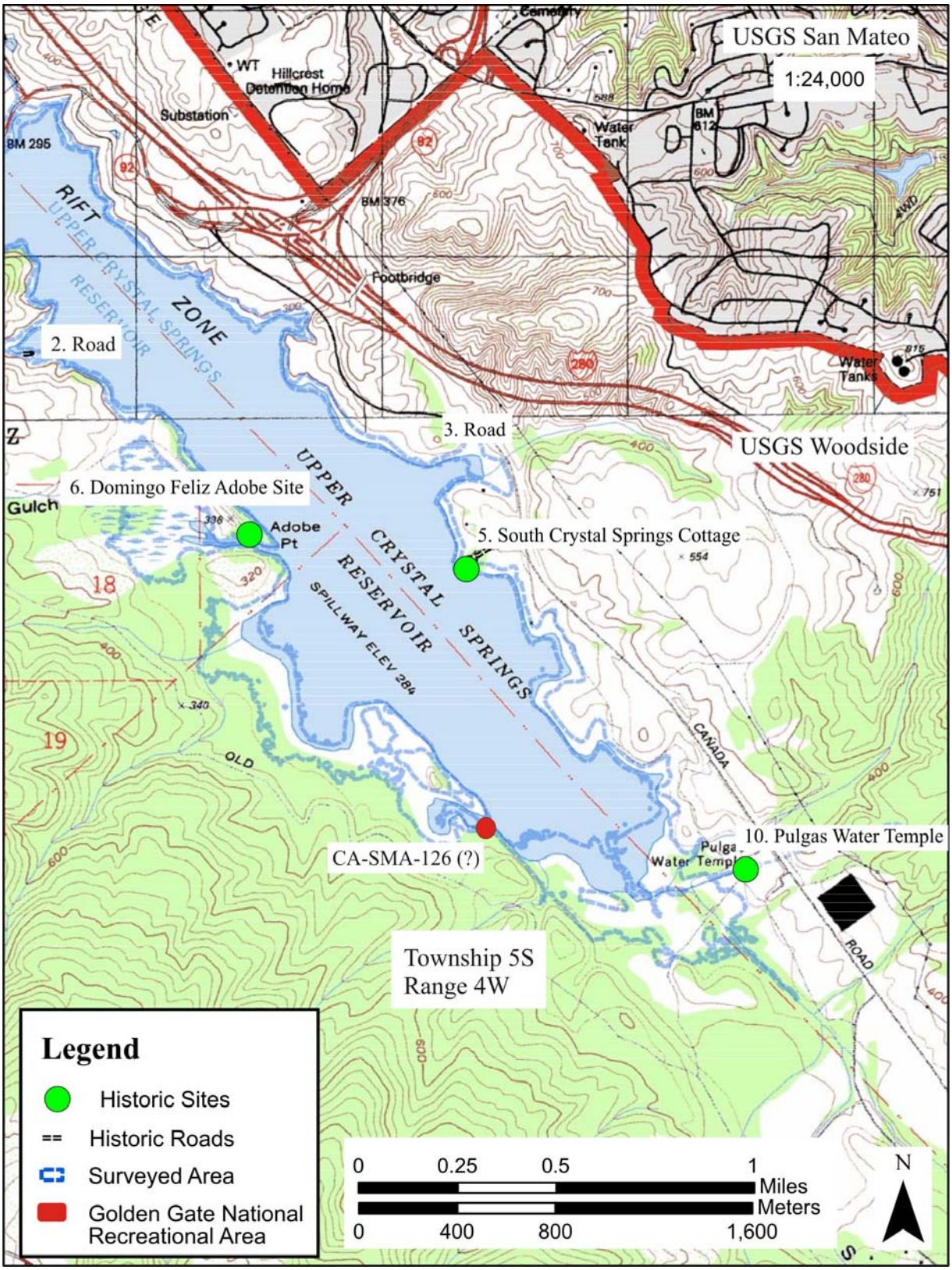

Figure 9: Cultural Resources Potentially within the APE

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4.0 FIELD METHODS

An intensive cultural resources field survey of the APE was conducted between September 8 through September 23, 2006, by Brett Rushing and Don Craig, of ENTRIX. The initial pedestrian survey consisted of 10-meter-wide transects walked parallel to the reservoir shoreline, from the current low-water mark (approximately 284 feet in elevation) to the anticipated post-project high-water mark (approximately 292 feet in elevation). Access to the survey area was by motor vehicle, where possible, and by boat when needed. The area north of the dam, where ground-disturbing construction activities would take place in connection with the Project, was also surveyed using 10-meter-wide transects. An extended survey, tasked specifically with attempting to relocate CA-SMA-126, was conducted on October 30, 2007 by Craig Smith and Don Craig of ENTRIX. A hand-augering program was conducted, with auger holes placed on a 5-meter grid to test for buried deposits across the landform that was deemed the best candidate for the location of CA-SMA-126. A third field effort was conducted from January 23 to 25, 2008 by Zachary Nelson and Allen Denoyer of ENTRIX to more thoroughly document architectural/structural resources within or adjacent to the APE.

Much of the APE consists of relatively steep land representing the steep upper slopes of a narrow valley before inundation of the reservoir. These areas were surveyed by foot when possible and by boat when not possible. About 20 to 25 percent of the APE consists of steep shoreline (greater than 30 degrees). Large marsh areas with deep mud or heavy vegetation hindered the survey of several other portions of the APE. These areas were either accessed by boat or were not surveyed. In total, 5 to 10 percent of the APE was inaccessible and not surveyed. Approximately 50 to 60 percent of the shoreline was accessible by foot. Special attention was given to flat areas (less than 10 degrees of slope) located on or near a stream channel leading into the reservoir. Areas with possible cultural resources indicated by prefield research (i.e., the locations of CA-SMA-126, the Domingo Feliz Adobe Site, and San Feliz Station) were given special attention.

In terms of field methods for surveying architectural / engineering resources in the APE, Laurence Shoup for ENTRIX/MSE JV conducted a pedestrian survey of the Upper Crystal Springs Dam on November 1, 2006. Dr. Shoup also prepared an historic resources evaluation report for the LCSD in 1989 (Shoup, 1989). Visible attributes of the dam were recorded and photos of the dam were taken. The reservoir elevation at the time of the survey was 276.85 feet. David Harvey for ENTRIX/MSE JV conducted a pedestrian survey and evaluation of the South Crystal Springs Cottage and the San Mateo to Half Moon Bay Toll Road Culvert in September, 2009. Please also see Appendix B.

The preparers' qualifications are provided in resumes in Appendix C.

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5.0 RESULTS

Seven historic-era resources and the possible location of one previously recorded prehistoric resource were identified within the project APE during these investigations (Table 2). The prehistoric resource (Site CA-SMA-126) is discussed in Section 5.1. The Lower Crystal Springs Dam is discussed in Section 5.2 and the Upper Crystal Springs Dam is detailed in Section 5.3. The other historic resources are summarized in Section 5.4.

Table 2: Cultural Resources within the Project APE

Name of Resource	NRHP/CRHR Eligibility
Prehistoric CA-SMA-126	N/A*
Lower Crystal Springs Dam	Eligible
Upper Crystal Springs Dam	Not Eligible
1859 San Mateo–Crystal Springs Road	Not Eligible
1921 West Union–Byrnes Store Road	Not Eligible
1883 San Mateo–Half Moon Bay Toll Road	Not Eligible
South Crystal Springs Cottage	Eligible
Pulgas Discharge Channel	Not Eligible

*Site CA-SMA-126 is not located where the site record form indicates.

5.1 Prehistoric Resources

The September 2006 ENTRIX survey did not locate any previously unrecorded prehistoric archaeological sites or isolated resources. The survey also failed to relocate CA-SMA-126, recorded in 1970 near the southwest corner of Upper Crystal Springs Reservoir (Figure 9). On October 30, 2007, ENTRIX archaeologists performed an extended survey for the site. The archaeological site record states that the site is located just north of the first intermittent stream dumping into the reservoir, that it begins at the base of a small tree-covered hill and extends northwest to reservoir edge, and that it consists of an earth midden on a low rise above reservoir and swampy area.

To relocate site CA-SMA-126, ENTRIX archaeologists first plotted the February 21, 1970 reservoir level (282 feet) on large scale maps. Using these maps, the description on the site record, and the site sketch map, two archaeologists walked adjacent 10-meter-wide transects parallel to the reservoir shoreline and extensively examined the southwest portion of the reservoir for evidence of the site and a topographic setting similar to that recorded on the site form. The results of the search indicated that only one location matched the original description of the site location (Figures 10 and 11).

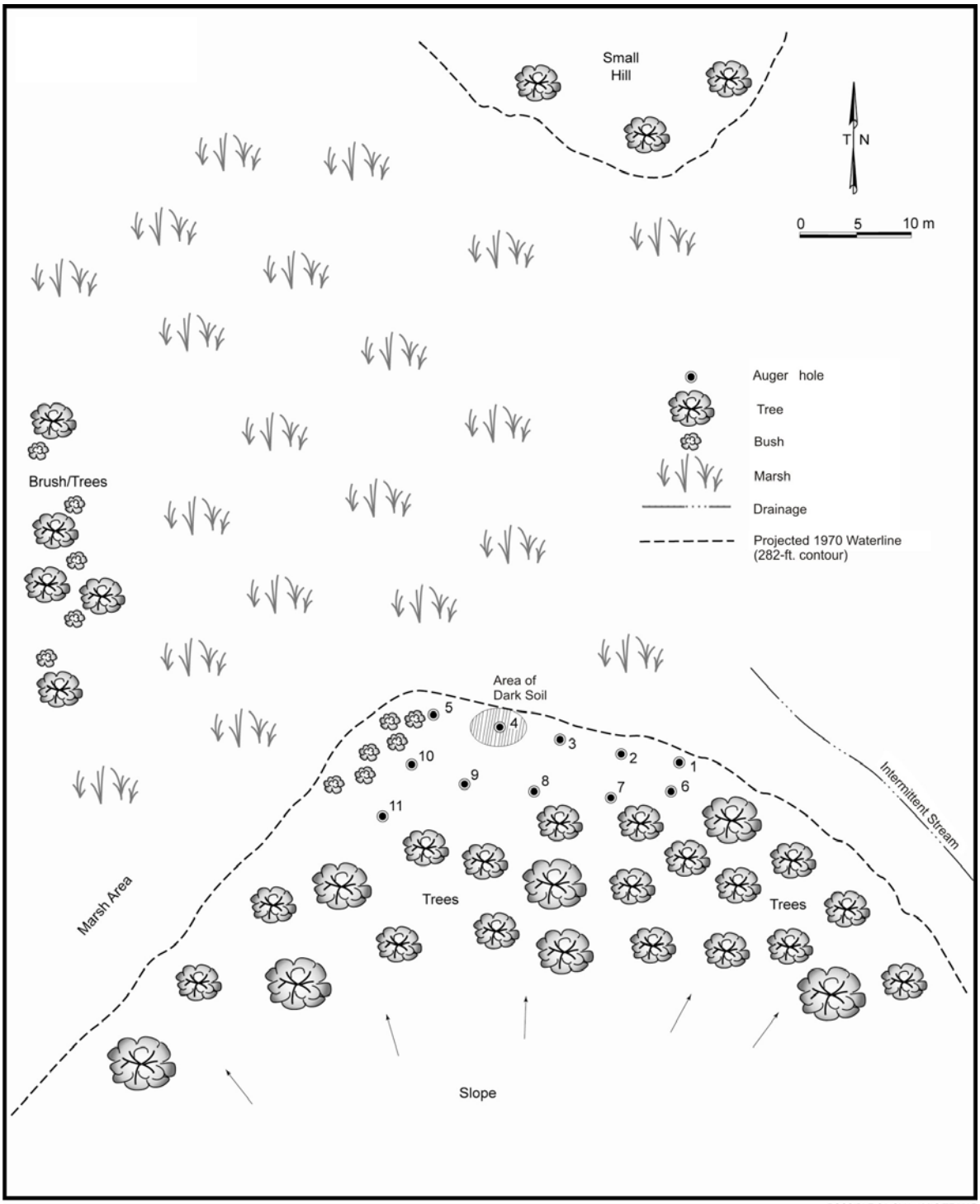


Figure 10: Possible Location of Site CA-SMA-126 Showing Auger-hole Locations

Figure 11: Possible Location of Site CA-SMA-126, View West
Photo by Craig Smith, October 30, 2007

This location was intensively examined for surface cultural material. The only artifacts mentioned on the site record are an *Olivella* shell bead and a possible mortar fragment. An earth midden on a low rise is also noted on the record. During the current investigation, no artifacts were observed on the surface, though surface visibility was poor. Some dark soil was observed in a slightly eroded area, but these sediments lacked any cultural material on the surface. Due to the relatively dense ground cover and resultant low ground visibility, 7.6-centimeter (3-inch) diameter auger holes were excavated at 5 meter intervals to depths of 40 centimeters (15.7 inches) across the landform to test for buried archaeological deposits. Gravels were encountered at 40 cm. Soils were screened through ¼-inch mesh screen. None of these subsurface probes encountered any cultural materials. Likewise, the area with the dark soil (the possible earth midden) lacked any evidence of cultural material and appears to be just dark humus soil.

The results of the investigation indicate that this location appears to lack cultural material both in surface and subsurface contexts. No culturally deposited midden deposits were observed. The location appears to be the best candidate for the originally recorded location of site CA-SMA-126, since it is the only landform along the southwest portion of the reservoir that exhibits all of the topographic features identified on the 1970 Site Form. CA-SMA-126 is not located within the APE.

5.2 Lower Crystal Springs Dam

5.2.1 Description of Dam

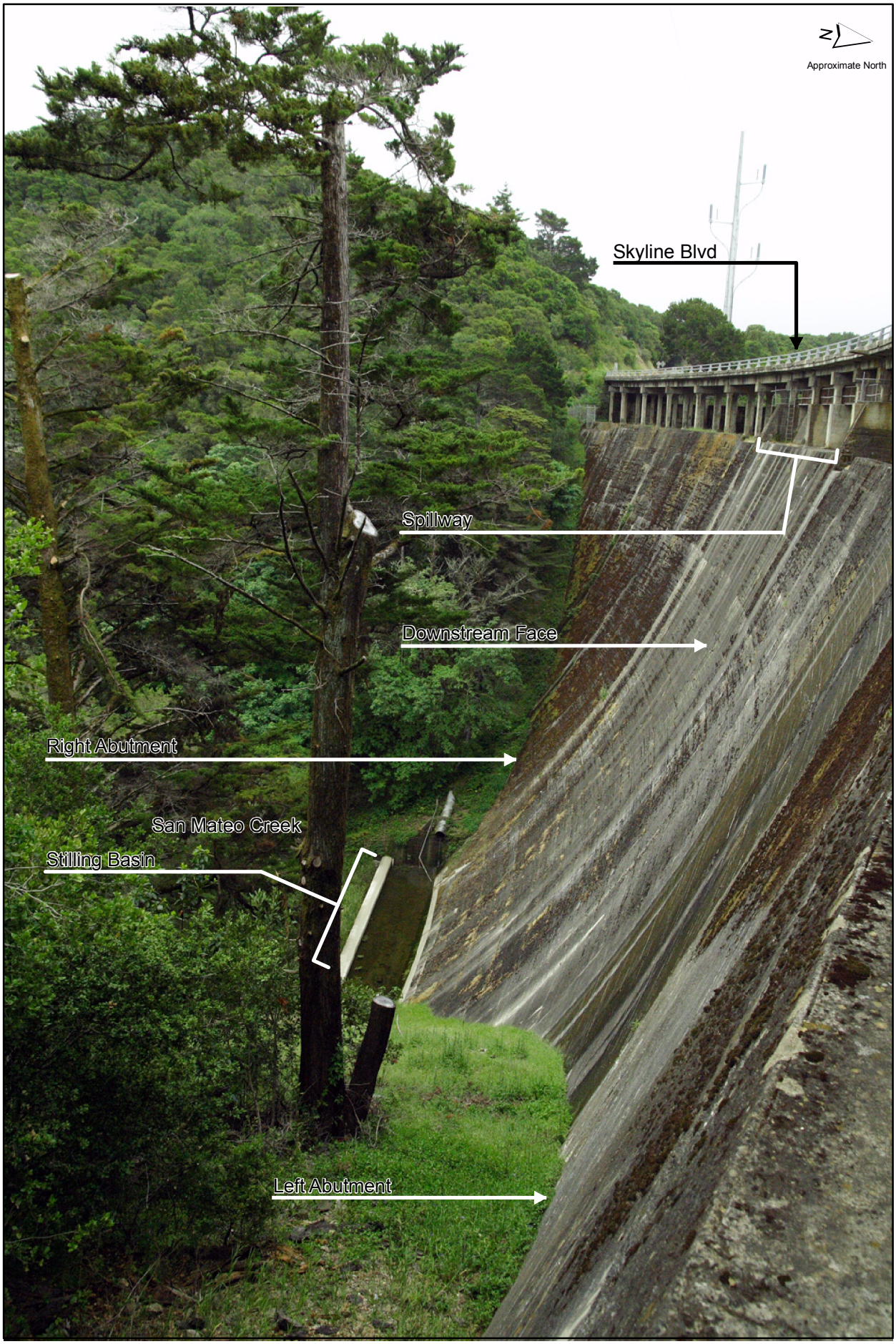
Much of the description and history of the LCSD provided below originates from Laurence Shoup's historic resources evaluation report, which was completed in 1989 (Shoup, 1989). Built from 1886 to 1890, Lower Crystal Springs Dam is one of the world's great dams of the 19th century (Shoup 1989) (Figures 12 and 13). Employing an unusual and creative design, as well as innovative construction techniques, this massive concrete gravity dam required about 157,000 cubic yards of concrete to complete (*Ibid.*). It is still a central part of San Francisco's municipal water supply system. Its original height was 145 feet, with a crest length of about 600 feet (*Ibid.*). A nine foot tall concrete parapet wall added to the top of the dam in 1911. Its gross capacity is 57,910 Acres-Feet (DWR 2009).

5.2.2 History of the Dam

The Spring Valley Water Company constructed the Lower Crystal Springs Dam from 1886 to 1890 as a key part of the water system supplying the city and county of San Francisco. It was built during the era when San Francisco was the dominant city of the entire western United States. San Francisco's population had grown rapidly during the decades following the beginning of the Gold Rush in 1848, creating periodic water storages. The Spring Valley Water Company was established as a regulated monopoly owned and operated by prominent San Franciscans, and it gradually built up a large-scale system of water storage and delivery. From an early date, this system was centered on the peninsula located to the south of the city, in and around Crystal Springs Valley, at elevations higher than San Francisco. Gravity could then be used to deliver water stored at Crystal Springs.

The Spring Valley Water Company built several dams in the Crystal Springs area and adjacent watersheds prior to the 1880s, but the city's increasing population during the late 19th century required more water storage. Therefore Hermann Schussler, the Spring Valley Water Company Chief Engineer, was instructed to develop a plan for a large dam at a narrow place on San Mateo Creek, the stream which ran through Crystal Springs Valley. Schussler's planning had to take account of the fact that the San Andreas earthquake fault, one of the world's major earthquake faults, ran through the Crystal Springs Valley. This fact, plus the difficulty in acquiring the huge quantities of high quality rock needed to build an earth/rock dam, influenced Schussler in his decision to build a concrete dam.

With an understanding that a very strong dam was needed and after a thorough study of the problems encountered in building other concrete dams, Schussler decided upon a novel dam design and innovative construction techniques. In the mid and late 1880s, concrete dam construction techniques were still in an early stage of development. The usual practice was to employ masons and derricks to set large rough stones in concrete to make up the bulk of the dam. The dam was then faced with cut stone, again set in concrete by masons. For example, this was the technique used to build the first concrete dam in the United States, the Boyd's Corners Dam (for the city of New York in 1866-1872), and for the large Sweetwater Dam in San Diego County in 1886-1888 (Wegmann 1927:128-129; Smith 1915:66-69; Schuyler 1888).



Source: Entrix, 2006

Lower Crystal Springs Dam Improvements Project

Figure 12

Existing Downstream Face

Source: Entrix, 2006

Lower Crystal Springs Dam Improvements Project

Figure 13

Existing Upstream Face

In contrast, the Lower Crystal Springs Dam was built piece by piece as a set of irregularly shaped interlocking concrete blocks. Each unique block would be poured, rammed, and allowed to set individually, initially separated from each other like the spaces between alternate squares of a checkerboard. Once fully set, the spaces would be filled in by another block. Most of the blocks were keystone shaped except for recesses and projections on all sides, allowing the blocks to be dovetailed together. Once one level was completed, the blocks of the next level were placed so that the center of each was approximately over the place where four of the blocks beneath it joined. This assured that there would be no continuous horizontal or vertical joints through the dam, a large amount of friction between elements and therefore great strength.

The construction techniques designed by Schussler were also creative. Foundation work, cutting into solid bedrock, was done with hand tools such as picks and chisels so that no blasting powder had to be used. This created a solid base for the dam while avoiding cracking the bedrock. The Portland cement for the dam was the highest quality available, imported from England and Germany. Sand came from the San Francisco's North Beach and rock from a nearby quarry. Rock from this quarry was thoroughly washed, sorted, crushed, and washed again before being mixed with the sand and concrete. Surfaces where new concrete was to be applied were first roughed up with picks and thoroughly swept down. The concrete was then spread in thin layers and then rapidly and thoroughly rammed by a large group of workers. Each block was allowed to set slowly by spraying water on it.

Other aspects of the Lower Crystal Springs Dam included an outlet system, tower, shaft, and several tunnels, which were built through the hill on the north side of the dam. Upon completion, the dam was 145 feet high with a crest length of about 600 feet. It had used about 157,000 cubic yards of concrete and cost about $2.2 million dollars, a vast sum for that period. It was recognized at an early date as a masterpiece of engineering, one of the great dams of the world. This was verified in a sense, by major earthquakes which occurred in 1906 and 1989, neither of which had any effect on this structure—there were no leaks and no water lost.

In 1911, due to a continued need to store more water, a parapet wall was built along the upstream face of the dam. The top of the dam remained at 145 feet high, but the new wall reached to about 154 feet.

Following decades of conflict over the price of water and the virtues of public versus private ownership, in 1930 the City and County of San Francisco purchased all of the Spring Valley Water Company system, including the Lower Crystal Springs Dam, which continues to be an important part of the city's water system today.

This property is important in engineering and technological history. It represented path-breaking techniques for building large concrete dams and was the highest concrete dam with the largest gross capacity in California for two decades following its completion. In 1976, it was recognized as a California Historic Civil Engineering Landmark by the American Society of Civil Engineers. This dam appears to qualify for the NRHP under Criterion A (Event) and Criterion C (Design/Construction) of the NRHP Criteria for Evaluation. The Event in this case was a pattern of events, the series of technological innovations that allowed large water storage dams to be erected to encourage the expansion of urban areas. The dam also appears to qualify under

Design/Construction criteria, since the dam's form, structure, plan, and materials embody the distinctive characteristics of a type, period, and method of construction. This was the work of a master. The Lower Crystal Springs Dam illustrates the pattern of features common to its class of resources, the individuality that occurs within the class, and, when compared to other dams, the evolution of that class. It is an important and significant example of building practices of a particular historic period. The Lower Crystal Springs Dam was a key turning point in establishing a trend away from gravity dams built of rock and concrete toward all concrete dams. The interlocking block technique gradually became standard practice in dam construction, and so this dam was not unique (McGraw-Hill 2007[5]:228-229). The complex irregular shapes of the concrete blocks used to create the dam did not become general construction practice however, and only one other dam, the Searsville Dam now owned by Sanford University, is known to have been built in this way. This latter dam was also designed by Hermann Schussler and was constructed at the same time as the Lower Crystal Springs Dam (Mermel 1963: 3). As of 1997, there were 6,389 dams of a height of 50 feet or more in the United States, it is very difficult to know exactly how many dams have been built using various construction techniques (McGraw-Hill 2007 Vol. 5: 223).

A list of character-defining features for the Lower Crystal Springs Dam would include the irregular, concrete block construction in a large, gravity curved concrete dam built for water supply purposes during the 1880s, with a relatively narrow spillway located at the top of the dam. The Crystal Springs Outlet Structure No. 1 is also considered a character-defining feature of the Dam (see discussion below).

The Crystal Springs Outlet Structures 1 and 2 (CS OS-1 and CS OS-2), located immediately north of the Dam, were completed in 1889 and 1937 respectively. Both structures were evaluated for their historic significance by Jones & Stokes in 2009, as part of the SFPUC's Crystal Springs/San Andreas (CSSA) Transmission Upgrade Project (Jones & Stokes, 2009). The Jones & Stokes evaluation noted that Crystal Springs OS 1 appears historically significant under CRHR Criterion 3 as a contributor to Lower Crystal Springs Dam, while CS OS-2 does not. The DPR 523 forms for OS-1 and OS-2 from this report are provided in Appendix B.

The 1920s-era bridge that currently rests on the dam has been determined not eligible for the NRHP. An Initial Study and Proposed Mitigated Negative Declaration (IS/MND) by San Mateo County for the Crystal Springs Dam Bridge Replacement Project (County of San Mateo, 2009), states that Caltrans transmitted a Historic Property Survey Report (HPSR) and Finding of Effect report for the Bridge Replacement Project to the SHPO on September 26, 2008. The HPSR reported that the bridge was determined not eligible for listing on the NRHP.

5.2.3 Eligibility Recommendation

Following Laurence Shoup's investigations of the dam in 1989 (Shoup 1989), SHPO concurred with the recommendation that the dam is eligible for the NRHP. The Lower Crystal Springs Dam retains a high degree of historic integrity, it continues to convey its significance, and it represents an authentic historic property. The following is a description of the NRHP integrity attributes for the Lower Crystal Springs Dam:

- **Location**. The dam is at its original location.

- **Design**. The dam retains the original features of its design as a concrete gravity dam. The only real change so far is the concrete parapet wall added onto the top of the dam along its upstream face in 1911. This wall occupies only the western edge of the dam and is only a few feet wide.
- **Setting**. The dam and its immediate surroundings have seen some changes, such as the 1923 highway bridge over the dam and nearby I- 280 Bridge over San Mateo Creek (built 1967). The area still largely retains its rural ambience and is still used for water storage.
- **Materials and Workmanship**. The dam retains a high degree of integrity of workmanship and materials. The jigsaw puzzle block arrangement can still be seen under the 1923 highway bridge at the top of the dam, illustrating how the dam was constructed. The original concrete used to build the dam has not been covered and is still exposed to view. The spillway is also still original.
- **Feeling and Association**. The five integrity attributes discussed above are all present to a reasonably high degree, therefore this property has retained the feeling and association characteristic of an earlier era in California history. Anyone who visits the site today will find that this is a property that retains the integrity and identity needed to convey its historic character and significance.

Based on the evaluation that the LCSD is eligible for listing in the NRHP under Criterion A and C, the resource also is considered to be eligible for listing in the CRHR under Criterion 1 and 3, and is considered a historical resource for the purposes of CEQA.

5.2.4 Project Impacts

The proposed Project would modify the existing Lower Crystal Springs Dam as outlined below.

- The central part of the existing parapet wall (60 feet on each side of the existing spillway) will be partly removed to allow spillway expansion, then the section outside the spillway zone (196 feet on each side of the new spillway) will be raised by as much as 9 feet to an elevation of 301 feet (NGVD 1929).[1]
- The spillway would be widened from the existing 88 feet to about 208 feet. Two new spillway bays, including sidewalls and spillway floors, would be constructed on the north and south sides of the existing spillway. A more efficient ogee-shaped spillway crest would be constructed, and the control section of the spillway would be moved to the upstream edge of the dam.
- The proposed Project would not include a stop log weir system, as used prior to the DSOD restrictions,[2] to raise the water storage elevation above the spillway. The ogee spillway is a configuration of overflow spillway crest shape that provides a predictable, highly-efficient and uniform flow through the spillway of the dam. The weir stop log weir system will no longer be necessary, as the ogee-weir spillway will function in the same capacity.

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[1] The National Geodetic Vertical Datum of 1929: A vertical control datum established for vertical control in the United States by the general adjustment of 1929.

[2] This project would adopt the standard ogee crest shape as defined in the U.S. Army Corps of Engineers, Hydraulic Design Criteria, Sheet 111-1 and 111-2/1, revised 1987.

- To accommodate the new PMF, the proposed Project includes construction of a new stilling basin at the downstream toe of LCSD, including a new 10.5-foot-thick concrete floor and new concrete side walls. The new stilling basin of the LCSD would be 105 feet long by 138 feet wide with a 5-foot thick by 45-foot long rip-rap apron at the downstream edge. The side walls would be 32.5 feet high. Rock anchors drilled 20-feet into bedrock would secure the floor slab. Soil nails and shotcrete would anchor the shoring system to the sides of the temporary excavation and remain in place behind the permanent concrete side walls.
- To prevent ponding on the top of the dam, the proposed Project would include drainage improvements. Drainage improvements could be accomplished by one of the following three various methods: (1) cutting small notches on the downstream face, (2) coring a few holes in the side of the downstream face, or (3) filling the ponded areas with concrete.

Project construction activities include: site clearing where appropriate and dewatering of the stilling basin. Demolition, such as the removal of the old spillway and sections of the parapet wall, other old concrete, drain pipe, and steel walkway will also be necessary. Modern earthmoving and construction equipment and vehicles will be used to facilitate the efficient completion of these tasks. The outlet structures would not be affected by the proposed project.

The Lower Crystal Springs Dam is a highly significant early concrete dam with good historic integrity. It is also a facility of great ongoing use value to the wider community. As the Lower Crystal Springs Dam must be maintained to the highest standards due to safety issues, the concept of "continuity of use" becomes relevant. This concept argues that since the property is a product of historically changeable technology and human needs, continuity of use becomes an important part of any historic property's integrity, the maintenance of its historic authenticity. Therefore, some alteration of the dam is both understandable and justifiable.

At the same time however, it is clear that the proposed changes, especially to the spillway, do significantly alter the dam and introduce modern elements that are out of character with it as a historic property. As stated above in the description of the undertaking, the existing spillway will be widened from 88 feet to about 208 feet, and two new spillway bays including sidewalls and spillway floors will be built on either side of the existing spillway. The dam crest will also be modified. The spillway walls will be raised to 301 feet on both sides, with new hydraulic equipment installed on a pad on top of the dam, including the installation of a new integral ogee weir. The integrity of design (new spillway, stilling basin, erosion control measures), setting (stilling basin), materials and workmanship (new spillway, reconstructed parapet wall, stilling basin, erosion control measures) feeling and association (all of the above) of the Lower Crystal Springs Dam are all impacted by this undertaking. Therefore a number of the characteristics that contribute to the eligibility of this property will be altered, and its integrity diminished.

For the purposes of Section 106 compliance, the proposed partial demolition and alterations to the Lower Crystal Springs Dam will cause an Adverse Effect to a historic property. Under CEQA Guidelines, this project will cause a substantial adverse change because the project will materially impair the Lower Crystal Springs Dam in a manner that will diminish it characteristics that justify its inclusion in the CRHR. Under both Section 106 and CEQA, the project will

require mitigation measures to reduce the effect the project will have on the Lower Crystal Springs Dam.

5.2.5 Proposed Mitigation Measures

Implementation of the proposed Project will have an Adverse Effect on a property potentially that is eligible for listing in the NRHP. Therefore, mitigation measures are necessary. Specific mitigation measures will be established in a Memorandum of Agreement (MOA) between the U.S. Army Corps of Engineers, SHPO, Advisory Council on Historic Preservation (if they wish to be involved) and the City and County of San Francisco as a concurring party. Other parties, such as the San Mateo Historical Association, may be invited to participate as a consulting party. An HAER for the Lower Crystal Springs Dam will be prepared as a baseline, minimum mitigation measure. HAER documentation for this historic property will consist of drawings, large format photography and written data meeting HAER Guidelines. These Guidelines assure that the content, quality, materials and presentation of a given HAER documentation is acceptable. There are four possible Levels of HAER documentation. The first three Levels all require large format photography and written data. Level I guidelines require as-built measured drawings of pre-project conditions. Level II, on the other hand, requires only reproduction of existing drawings, such as those produced as part of the original construction effort. Level III documentation requires only drawings and a sketch plan. Level IV is the simplest, and requires only an inventory card. In this case, Level II is most appropriate for the HAER documentation of the Lower Crystal Springs Dam. Due to the nature of this historic property, existing construction drawings, if they can be located, will be more enlightening than modern measured drawings because the former can better illustrate the construction techniques which are a central part of the property's significance. The full requirements for Level II HAER documentation include the following:

> **Drawings**: select existing drawings, where available, should be photographed with large-format negatives or photographically reproduced on Mylar paper stock.
>
> **Photographs**: photographs with large format negatives of exterior and interior views, or historic views, where available.
>
> **Written data**: history and description (National Park Service 1990:4)

The MOA will specify distribution of the HAER report. The National Park Service no longer submits HAER documentation to the collections in the Library of Congress in Washington, D.C., unless the resource is significant at the national level. Distribution of copies would also be made to appropriate state and local archives and libraries.

After construction is complete, the SFPUC will place an informational kiosk about Lower Crystal Springs Dam at Vista Point, prepare a booklet on the history of the Lower Crystal Springs Dam and upload Lower Crystal Springs Dam historical information to the SFPUC website, under Historic Preservation page, as appropriate.

Implementation of the proposed mitigation measures, described above, would not reduce the level of impact to the dam to a less-than-significant level under CEQA. CEQA Guidelines Section 15126.4(b)(2) states that, "In some circumstances, documentation of a historical

resource, by way of historic narrative, photographs, or architectural drawings as mitigation for the effects of demolition of the resources will not mitigate the effects to a point where clearly no significant effect on the environment would occur." The partial demolition and substantial alteration of the dam would materially impair this resource in a manner that will diminish the characteristics which justify its inclusion in the CRHR. The proposed measures would reduce, but not fully avoid, the impact of the proposed project to a less than significant level, because the dam would remain materially impaired after implementation of the historical documentation and interpretive efforts has been completed. Therefore, the project impact would have a significant and unavoidable impact under CEQA.

5.3 Upper Crystal Springs Dam

The Upper Crystal Springs Dam was investigated by Lawrence H. Shoup in 2007. The following sections include portions of his report (2007a) relating to the history and eligibility of the Upper Crystal Springs Dam.

5.3.1 Description of the Dam

Built as a part of San Francisco's water supply system, Upper Crystal Springs Dam was an average sized earth fill dam with a hard clay core and stone rip-rap on its the upper side (Figures 14 and 15). It was constructed between 1875 and 1877 as part of Spring Valley Water Company's system of reservoirs serving the city of San Francisco. The dam was raised to its final height of 83 feet in 1891. It was about 500 feet long and about 30 feet wide at its crest, with a storage capacity of about 9.4 billion gallons. It used about 195,940 cubic yards of earth, 40,000 cubic yards of clay, and 119,000 cubic yards of rip-rap surface, according to available sources.

The original rip-rap dam face, which was made up of rocks 1 to 2 feet in diameter, was exposed for approximately 2 meters above the observed waterline on the south side of the dam. The rip-rap could be seen extending into the water for the entire length of the dam. The rip-rap face had approximately the same exposure on the north side of the dam. On top of that, there was approximately 20 feet of deposit made up of 3- to 4-foot boulders, which serves as a causeway for SR 92 connecting the City of San Mateo to Half Moon Bay on the Pacific Coast.

A flat concrete pad was located 1 to 2 feet under the observed water level on the south side of the dam near its western end. Large bolts protruded out of the concrete around the edges. The pad was approximately 5 by 10 meters. The pad could be part of the concrete culvert constructed in 1924 to replace the wooden spillway that was damaged in the 1906 earthquake. No other attributes of the dam could be seen above the waterline.

5.3.2 History of the Dam

Upper Crystal Springs Dam was built as a result of a compromise. While a report of the February 1872 survey of the Upper Crystal Springs area was positive about a dam in the Cañada Raymundo, Hermann Schussler initially preferred to build a much larger reservoir by placing a dam across San Mateo Creek, at the site later used for Lower Crystal Springs Dam. This proposed dam was to be earth, and would serve the city by means of a pipeline. Schussler

Figure 14: Upper Crystal Springs Dam, View Northeast
Photo Credit: ENTRIX, Inc., November 1, 2006

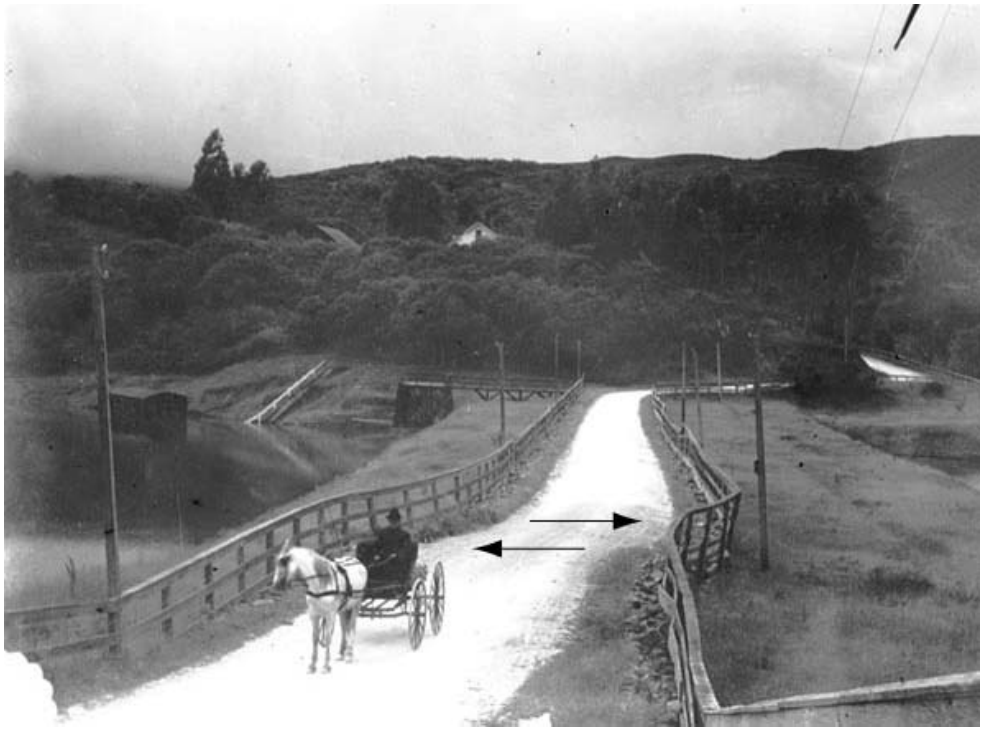

Figure 15: Historic Photo of the Upper Crystal Springs Dam
Photo Credit: Bancroft Library Picture 1957.0007 Ser 2:081

estimated the cost of Spring Valley's entire water plan as of 1872 at $16.5 million. The dam was to cost $250,000, with the balance to be spent on a pipeline system, purchase of land, and the construction of other dams (Spring Valley Water Company 1872).

In May 1874, Spring Valley commissioned a detailed survey to identify possible dam locations (Spring Valley Water Company 1874a). It seems that the plans to build a dam at the Lower Crystal Springs site continued at least until that September, when the San Mateo Times Gazette reported the company's intention to build a dam "at a point one-half mile below Crystal Springs, between two high hills, through which at present passes the San Mateo Creek." At that date, the dam was estimated to cost the more formidable sum of $1.5 million (San Mateo Times 1874a).

The *San Mateo Times* explained the reason for the change on April 24, 1875:

> The site upon which the dam is to be erected has been materially changed. Instead of building it as it was originally intended, below the Crystal Springs and on the line of the San Mateo and Half Moon Bay toll-road, it will now be erected at a point about opposite Byrnes' store. The change was rendered necessary in consequence of the Company's inability to procure the whole of the lands in the Cañada [Raymundo] (875a).

Schussler (1880) had offered the final plans for the dam at the new location just over a week before, explaining that

> Instead of construction the large proposed Dam [*sic*] in the valley just below Crystal Springs, I propose to abandon this location for the present and instead, build a dam 80 feet high, about 1.25 miles up the Cañada Raymundo (Spring Valley Water Company 1874b).

The proposed dam was to be 550 feet long, 30 feet thick at the top, containing about 200,000 cubic yards, and having a high water mark at 300 feet above the city base. It was projected to cost only $125,000. In his presentation to the Spring Valley trustees, Schussler noted that this dam site was advantageous because, "as I understand, all or nearly all of the land covered by this lake is owned by the Company at present," while building a dam at the original location below Crystal Springs would require acquisition of the Hayward Water Works and other interests costing much more (Spring Valley Water Company 1874b).

Building the Dam

Work on the Upper Crystal Springs Dam began on Monday, April 19, 1875. The *San Mateo Times Gazette* reported on the preparatory work:

> On Monday last, the work of clearing out the Cañada Raymundo, preparatory to erecting the dam for the new reservoir, was commenced by Mr. Kelso, of the firm of Hancock and Kelso, who have the contract for building the new dam. The present lake in the Cañada is to be drained by means of a ditch connecting it with the San Mateo Creek, and the rank vegetation and trees which surround it are to be cleared away...
>
> The work of building the dam will be commenced as soon as the lands are cleared. It will take about eight months to construct the dam, and it will take about 400 men and

> 200 teams constantly employed during the whole time. The estimated [*sic*] of the construction is in the neighborhood of $400,000. The work will be done under the general supervision of Engineer Schussler of the Spring Valley Water Company, with Mr. W.H. Lawrence as the resident engineer (*San Mateo Times Gazette* 1875a).

Upper Crystal Springs Dam was built of earth surrounding a hard clay core. Once the reservoir area was cleared, a deep trench was sunk along the line of the dam so that the clay wall could be extended below ground surface. The *Redwood City Times-Gazette* reports on this phase of construction:

> In a line drawn lengthwise of the dam through the center, is made a wall of clay several feet in thickness, tamped slowly and carefully as solid as possible... A puddle pit was sunk ninety feet, and no bedrock being found, the clay wall was started from that depth beneath the surface. It also extends into the hill on either side to the bedrock. This is done to render the dam impervious to water and to prevent seepage (*Redwood City Times-Gazette* 1876b).

The process of laying and tamping the clay wall was known as "puddling." An earth dam with a puddle clay core was at that time a modern design that had become standard in Britain (Schnitter 1994). Schussler had previously used this technique in the construction of the San Andreas Dam in 1870, and estimated that it cost about $2 per cubic yard at Upper Crystal Springs (Lowe 1988; Spring Valley Water Company n.d.).

At Upper Crystal Springs, sinking the puddling pit to such a great depth caused problems with seepage, as the *San Mateo Times Gazette* reported in July 1875:

> The puddling pit at the Spring Valley Company's dam is progressing most unsatisfactorily. On Tuesday, the water gained to such an extent that work had to be suspended, and it was feared that at least a portion of the water arose from leakage. Before evening there were upwards of 1 feet of water in the pit, and the engine was utterly powerless to force the pumps to discharge this increased weight. A new pump of Knowles' patent, was brought down on the last train, and immediately carried off to the works. The sinking of this puddle pit has involved an altogether unexpected amount of trouble and expense. A new engine of increased strength is now at work, and at last accounts the water was being ejected at a rapid rate (*San Mateo Times Gazette* 1875b).

The challenge of completing the deep puddling pits occupied much of the time required to build the dam. Work paused on January 1, 1876 for the duration of the rainy season (*Redwood City Times-Gazette* 1876a). By late April, work was continuing, with 60 men working on site as of April 29 (*Redwood City Times-Gazette* 1876b). The work force increased by another 50 men in early June (*Redwood City Times-Gazette* 1876d). That month, the *San Mateo Times* reported that puddling work was nearing completion: the 90-foot depth had been reached on one side of the dam, but not on the other. By then, the workforce included 160 men, 100 white and 60 Chinese (*San Mateo Times Gazette* 1876).

The deep puddling was completed by July 22, when 250 men and 100 teams were reported at work raising the earth embankment for the dam. The *Redwood City Times-Gazette* (1876f) described the process:

> The work of building the dam is very simple, established entirely upon philosophical principles tested by long experience. After the formation of a good surface, the dirt is laid on, one layer at a time, evenly over the entire surface or top of the work, about one foot in depth. This is kept sprinkled thoroughly, dropped from the carts, and constantly kept in a condition to pack well. The deposit is always begun on the side from which the material is brought, so that the teams haul over it as much as possible, to add to the work of packing solidly. Besides this means of pounding down, a two ton roller is drawn over all again and again, until the surface is as hard as earth can be made, when another foot is added in the same manner. The surface is not kept level, but slopes a little from the outer edges towards the center line, so that in settling the body of the embankment will have a tendency to settle together.

The center of the embankment was occupied by the clay wall, which continued to be raised concurrently with the earth embankment (*Redwood City Times-Gazette* 1876f).

Outlets, Surfacing, Pumps, and Pipelines

Besides the dam itself, construction of Upper Crystal Springs Dam included a spillway, outlet tunnel, pumping station, pipelines, and surfacing work on the embankment.

At the September 1, 1876, trustees' meeting, the Spring Valley President said that the dam would be finished in about two weeks, and that the construction of the water weir, or spillway, would take about three or four weeks beyond that (Spring Valley Water Company 1876a). The spillway, described as a "substantial timber waste weir, having a heavy brick-work foundation for its crest" was located on the east side of the dam's face (Mendell 1877; Lawrence 1924).

On the other side of the dam was located the outlet tunnel, which

> consists of a mason-work tunnel, 780 feet in length, through the bluff on the east end of the dam, having a vertical brick inlet chimney 15 feet in height at its inlet, and a 0.25-inch wrought-iron pipe 52 inches in diameter, built in the mason-work in the upper 420 feet to the Center Gate Shaft, which goes to the surface, is 85 feet deep and lined with masonry, where the pipe can be shut off by a heavy cast-iron brass-faced 42-inch water gate. From here a pipe 355 feet in length and 42 inches and diameter leads through the balance of the tunnel, leaving a space between the outside of the pipe and the mason-work for a man to pass in and out of the tunnel (Mendell 1877).

This tunnel emptied at a point just below the west edge of the dam (Lawrence 1924).

While Schussler intended from the beginning to carry water from Upper Crystal Springs to San Francisco by pipeline, water was pumped into the San Andreas system for the first years of its operation. Water from the dam flowed through the outlet tunnel and down to a pumping station near the Crystal Springs Hotel. From there, it was pumped uphill into the Pilarcitos pipeline, then on to San Francisco. The pumps were in service by late February 1877 (Babal

1990; Spring Valley Water Company 1877). Schussler noted in an 1880 report that this system could deliver 3 million gallons of water per day but was inefficient and expensive, and consumed large quantities of firewood and coal (Schussler 1880). This problem was solved in 1885 with the construction of a 44-inch pipeline that connected the reservoir directly to University Mound Reservoir in San Francisco, using gravity to move the water and thus saving substantial money on pumping (San Francisco Water Company 1929).

To complete the structure, the sides of the dam were covered in rip-rap and vegetation:

> Upon the upper or water surface broken rock is carefully laid about on foot [*sic*] in depth to protect the soil from the action of the water while a strong greensward will be made upon the lower or outer surface to prevent washings by the rain (*Redwood City Times-Gazette* 1876f).

Hermann Schussler recalled in testimony in the proceeding entitled "Spring Valley Water Company vs. the City and County of San Francisco, et al." given after 1907, that "the rip-rap that is laid like masonry we call paving, and it costs a great deal more. There is some rip-rap on one side of the Crystal Springs Dam, which, I think, is paving" (Spring Valley Water Company n.d.). From this description, it seems that the rip-rap on the water side of the dam was laid with mortar to increase its strength.

By early 1877, the Upper Crystal Springs Dam was in operation. George Mendell, the Chief Engineer to the City of San Francisco Water commission, reported that "[t]he dam at the Upper Crystal Springs is now about 50 feet above the valley, and the reservoir can now store between three and four thousand millions of gallons" (Mendell 1877). He goes on to praise the dam and note its imminent completion in the 1877 dry season.

> It has been remarked that the dam is yet to be raised 32 feet. This can readily be done in one season. The dam is made of excellent material found in the vicinity, and the character of its construction is worthy of all commendation. Each detail of the work is attended to with care, and no expense seems to be spared to ensure efficiency and safety (Mendell 1877).

While Upper Crystal Springs Dam was operational in early 1877, the raising of the dam was not completed until 1891.

Workers on the Dam

The construction of Upper Crystal Springs employed between 60 and 400 men at a time, creating a large temporary population residing in the rural valley. Many of these men were probably residents of nearby communities. We are able to reconstruct some fragments of their accommodations and social life. During construction, many of the white workers lived at the boarding house established by Spring Valley near the construction site. The long separation from families was alleviated by social events, as the local newspaper reports in 1876:

> A Grand Calico Ball will be given at the boarding house of the Spring Valley Water Works near Crystal Springs, Friday evening, June 9, next. An excellent dancing Hall, good roads, fine moonlight, plenty of stable room for horses, a good supper, and good

> music are sufficient inducements to attend with assurance of having a pleasant and enjoyable time (*Redwood City Times-Gazette* 1876c).

The ball was apparently a success:

> A large and fashionable party assembled to enjoy the festivities... Good music and a good supper were supplied... The dance was kept up until a late hour in the morning and all departed perfectly satisfied with the enjoyment that had been afforded" (*Redwood City Times-Gazette* 1876e).

Given the presence of the dancing hall on site, it seems likely that the boarding house referred to is the former Crystal Springs Hotel, which had been a social center for the valley before the construction of the dam. In addition to the boarding house, a stable for 140 horses and a well-equipped blacksmith shop for the maintenance of tools were also located on site (Mendell 1877).

News clippings mention the contribution of Chinese-American workers to the construction of the dam. In the 1870s, Chinese-Americans were subject to substantial prejudice and discrimination from white workers who perceived them as willing to work cheap, depressing overall wages. Whites also resented the self-sufficiency of the Chinese community and its apparent unwillingness to assimilate into American culture. While the Chinese community depended on its own institutions, including the Six Companies, trade guilds, and village associations, it is not clear whether this dependence was by choice or a result of the discrimination they faced within American society (Chinn et al. 1984; Light 1972). Construction, along with restaurants, laundry, domestic service, and fishing, were among the few jobs available to Chinese workers. Many California Chinese had worked on the building of the transcontinental railroad during the late 1860s and had substantial experience in construction (Chinn et al. 1984).

Given these facts, it is likely that the Chinese workers on the dam lived separately from the white workers, with their own cooks, laundry, and other facilities. The location of this putative work camp is, however, unknown.

A Completed Dam

When completed to its final height of 83 feet, Upper Crystal Springs Dam was 30 feet wide at its crest and extended over 500 feet across the valley. It had a 3:1 slope on its dry side and a 3.5:1 slope on the water side. The dam had a capacity of over 9.4 billion gallons, and could supply 3 million gallons per day (Mendell 1877; Schussler 1880). Ultimately the dam used 195,940 cubic yards of earth, 40,000 cubic yards of clay in the foundation trench and in the dam's core, and 119,000 cubic yards of rip-rap surface (Metcalf 1914).

Upper Crystal Springs was a substantial dam built using modern techniques during a period of growth in earthfill dam construction. A total of 200 earthfill dams were built between 1870 and 1880, compared to 118 in 1860-1870 and 354 in 1880-1890 (Lowe 1988). However, it was not an especially large or unique example of its type. Across the bay in Oakland, Anthony Chabot's Temescal Dam was completed using the same technique in 1869 and stood 198 feet high, and his Chabot Dam, completed in 1875, stood 152 feet high—almost twice as tall as the Upper Crystal Springs Dam (Schnitter 1994).

In 1891, Spring Valley raised Upper Crystal Springs Dam from 70 to 90 feet with earthfill to provide a flood-proof roadbed for the route between San Mateo and Half Moon Bay (present-day State Route 92). Crews also replaced the wooden wasteway at the west end of the Upper Crystal Springs Dam with an additional 200-foot, dual-compartment concrete culvert, which provided for water flow from the Upper to the Lower Reservoir when Upper Reservoir levels exceeded 52 feet (Jones & Stokes, 2009). Even after being raised in 1891, it was only average in size compared to other dams constructed in the early 1890s (Mermel 1963).

5.3.3 Eligibility Recommendation

In the case of federal undertakings, determinations of eligibility are made by the federal lead agency and the SHPO. Therefore, the following is only considered a preliminary evaluation.

Upper Crystal Springs Dam is recommended as not eligible for inclusion on the NRHP or CRHR. The dam is a typical example of its type. With sufficient integrity it might be eligible under Criteria A/1 and C/3 because of its association with events and persons significant in San Francisco Bay area and California history. However, while the structure of the dam itself has changed little since its construction, it no longer serves its original function of water retention. The current use of the dam as a road bed, the concealment of its dry (downstream) face by the waters of the Lower Crystal Springs Reservoir, and the lack of a spillway make it difficult for the average observer to identify the structure as a dam or to associate it with the historical period of its construction. For these reasons it cannot be said to have sufficient integrity of setting, feeling, association, workmanship, or materials to be an authentic example of its theme and to convey its significance as a historic dam.

The following is a discussion of the historic theme and period of significance of the Upper Crystal Springs Dam. The eligibility of the dam is considered in relation to the four NRHP/CRHR evaluation criteria and an assessment of its integrity is detailed below.

The most important theme for the Upper Crystal Springs Dam is engineering and technological history. The period of its significance is 1874 to 1889, when it served as the single largest part of San Francisco’s water supply infrastructure. After 1889, the Lower Crystal Springs Dam took over this role. This dam is significant at both the state and local levels.

Upper Crystal Springs Dam is best classified an individual structure. It is potentially significant as a major puddle-core earthfill dam representative of up-to-date workmanship and materials in its period of significance. The most important theme for the Upper Crystal Springs Dam is engineering and technological history. The period of its significance is 1874 to 1889, when it served as the single largest part of San Francisco’s water supply infrastructure. After 1889, the Lower Crystal Springs Dam took over this role. This dam is significant at both the state and local levels.

Upper Crystal Springs Dam is potentially significant under Criterion A/1. It is associated with the formation of the San Francisco watershed lands and was built in response to the growing demand for water. Upper Crystal Springs Dam is not potentially eligible under Criterion B/2, because it is not associated with the lives of persons significant in our past. As an early work of Hermann Schussler, a prominent figure in American dam engineering, Upper Crystal Springs

Dam is associated with a prominent figure in local, state, and national engineering history. As such, it is potentially eligible under Criterion C/3, representative of the work of a master. The dam is unlikely to yield significant archeological or historic research to expand our current knowledge or theories of design, methods of construction, operation, or other information on dams. Therefore, the dam does not appear to meet Criterion D/4.

Any assessment of integrity involves a determination of how historically authentic a given property is, and if it can convey its significance. The Upper Crystal Springs Dam has integrity of location but is compromised in each of the other six elements.

Location. One side of the dam, located on the San Andreas Fault, was moved 5 feet in the 1906 earthquake. Otherwise, the dam is in its original location.

Design. The original design of the dam has been modified to accommodate its use as a roadway. In 1891, the dam was raised 20 feet in order to accommodate the precursor to SR 92. Only about a 6 foot high band of the inner rip-rap and outer earth face of the dam are now visible, while the rest is covered by reservoir waters. At the same time, a large concrete culvert replaced the spillway at the west end of the dam at an elevation of 52 feet, allowing water to be drawn from the upper part of the dam as well as the lower. Since water never needs to go over this dam, its spillway was removed. The construction of this culvert and the removal of its spillway changed the purpose of the dam, in that it was no longer able to retain water on its own above the level of the culvert. The 1891 and later changes to the dam involved fundamental changes to its design and function. As a composite of several distinct building and removal phases, and lacking the ability to hold water, this dam does not have good integrity of design.

Setting. The setting of the dam has changed significantly since its construction. The construction of the Lower Crystal Springs Dam raised water levels, making the older dam difficult to identify. More importantly, it changed the character of the whole valley. An area of farms and rural residences at the time of the construction of the Upper Crystal Springs Dam, 1.5 square miles of this area were submerged by the construction of the lower dam, radically changing the appearance of the surrounding valley. Additionally, the dam is now the base for a major highway, with streams of cars traveling over it day and night. The dam therefore has a relationship with its setting that is significantly different than when it was constructed.

Materials and Workmanship. The original dam materials are present underneath the waters of the Lower Crystal Springs Reservoir. They were supplemented in 1891, when 20 feet of new material was added to form a roadbed on top of the dam. This material showed different workmanship than the original dam: Hermann Schussler noted (1908) that the road embankment was of earth, and that if it were to be narrowed, it would require a rip-rap surface to be added to preserve its stability. In other words, the workmanship and materials of the addition are of a different appearance than the original rip-rap facing of the dam. The addition of the concrete spillway in 1891 also marked the introduction of new materials. Originally constructed of clay and earth, with a brick-lined outlet tunnel and wooden spillway, concrete had not previously been incorporated into the fabric of the dam. As noted above, later this concrete spillway was entirely removed and the outlet tunnel was damaged in 1906 and rebuilt in 1924. While it continues in use as the connection between the two halves of the reservoir, the original materials have been

substantially altered. For this reason, the tunnel cannot be said to have integrity of workmanship. In sum, changes to the materials and construction techniques used in Upper Crystal Springs Dam suggest that it does not retain a high level of integrity of materials and workmanship.

Feeling and Association. While the Upper Crystal Springs Dam retains some of its original attributes, none of them are visible to the casual observer. Most users of the dam drive across it on SR 92 without realizing that they are crossing a dam embankment. As a result, the dam cannot be said to have feelings or associations that suggest the period of its construction and early use.

Similar to the findings by ENTRIX Inc., Jones and Stokes also found that the Upper Crystal Springs Dam would not be a historic resource for CEQA purposes when it was evaluated as part of the SFPUC's CSSA Upgrade Project (Jones & Stokes, 2009).

5.3.4 Project Impacts

No impacts would results from the proposed Project and no further work is recommended.

5.4 Other Historic-era Resources Located within the APE

The ENTRIX/MSE JV survey did not locate any unanticipated or previously unidentified historic resources within the APE. In addition to the Lower and Upper Crystal Springs Dams, five of the other historic-era properties identified during the records search were encountered within the APE. The remaining properties identified in the records search as potentially in the APE were either found outside of the APE or could not be relocated. Only those properties within the APE are discussed here.

5.4.1 1859 San Mateo to Crystal Springs Road

Site Type: Historic Road

Site Description: The location of the 1859 San Mateo to Crystal Springs Road within the APE lies largely under the Lower Crystal Springs Dam (Figure 16). The dam's utility buildings lie along the built-up asphalt road that probably follows the contours of the original road. The area has been heavily disturbed and built up to accommodate the dam, its construction, and the nearby facilities (Figures 17 and 18). No trace of the original road was discovered.

Eligibility Recommendation: The segment of the 1859 San Mateo to Crystal Springs Road within the APE is recommended as not eligible for inclusion on the NHRP. While it has some historical association, it retains little of its integrity. The following is a description of the NRHP integrity attributes for the San Mateo to Crystal Springs Road.

- **Location.** The San Mateo to Crystal Springs Road was located in its original location within the APE.
- **Design.** Within the APE, the San Mateo to Crystal Springs Road does not retain any of its original design features. Recent development, including construction of the dam and newer road, as well as paving of the road alignment outside of the APE, has completely covered or obliterated the original roadbed and radically changed the surrounding environment and local associational context.

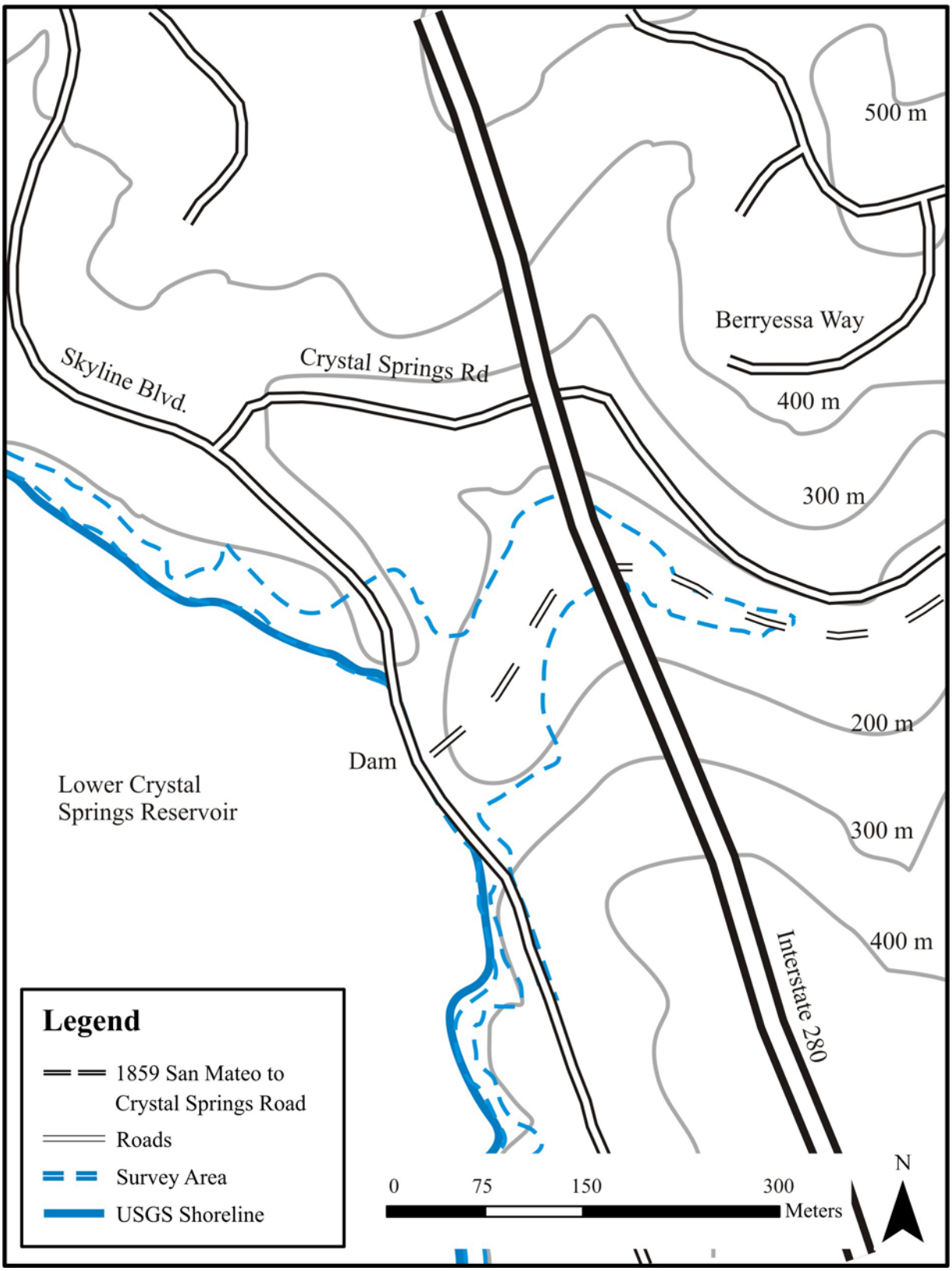

Figure 16: Map of the San Mateo to Crystal Springs Road located within the APE

Figure 17: Segment of the San Mateo to Crystal Springs Road located within the APE, View East,
Photo by Zachary Nelson January 24, 2008

Figure 18: Segment of the San Mateo to Crystal Springs Road located within the APE, View North
Photo by Zachary Nelson January 24, 2008

- **Setting.** The San Mateo to Crystal Springs Road and its immediate surroundings have changed dramatically since the road was first constructed in 1859. These changes include the building of the dam and filling of the reservoir which has inundated many of the properties originally serviced by the road.
- **Materials and Workmanship.** The original San Mateo to Crystal Springs Road now lies under the dam and retains none its integrity of workmanship and materials.
- **Feeling and Association.** Since the segment of the San Mateo to Crystal Springs Road in the APE has been obliterated or heavily altered and the surrounding physical and cultural environments have experienced notable changes, this property no longer retains the integrity of feeling or association needed to convey its historic character and significance.

The segment of the 1859 San Mateo to Crystal Springs Road within the APE is recommended as not eligible for inclusion on the NHRP. This property does not qualify under Criteria B, C, or D of the NHRP. The property is associated with the broad patterns of the local history (Criterion A). However, recent development, including construction of the dam and newer road, as well as paving of the road alignment outside of the APE, has completely covered or obliterated the original roadbed and radically changed the surrounding environment and local associational context. Consequently, the property no longer retains any integrity of location, integrity of design, integrity of setting, integrity of materials or integrity of association.

Based on the above evaluation that the 1859 San Mateo to Crystal Springs Road appears ineligible for listing in the NRHP, the resource also is considered to be ineligible for listing in the CRHR, and is not considered a historical resource for the purposes of CEQA.

Project Impacts: No impacts would results from the proposed Project and no further work is recommended.

5.4.2 1921 West Union to Byrnes' Store Road

Site Type: Historic Road

Site Description: The 1921 West Union to Byrnes' Store Road was relocated on the western shore of the reservoir, approximately 2,000 feet south of the Lower Crystal Springs Dam (Figure 19). The road bed is densely vegetated and road consists of a shallow, lightly graveled linear depression approximately 20 feet wide that trends from the waters edge upslope to the west (Figure 20). A cylindrical, 12-inch tall metal marker was encountered along the side of the roadbed (Figure 21). An intensive survey of the roadbed failed to identify any other artifacts or architectural/engineering features.

Eligibility Recommendation: The segment of the 1921 West Union to Byrnes' Store Road within the APE is recommended as not eligible for inclusion on the NHRP. While it has some historical associations, it retains little of its integrity. The following is a description of the NRHP integrity attributes for the West Union to Byrnes' Store Road:

- **Location.** The West Union to Byrnes' Store Road was located in its original location within the APE.
- **Design.** The West Union to Byrnes' Store Road has decayed and become overgrown with vegetation and subsequently its integrity of design has become severely compromised.

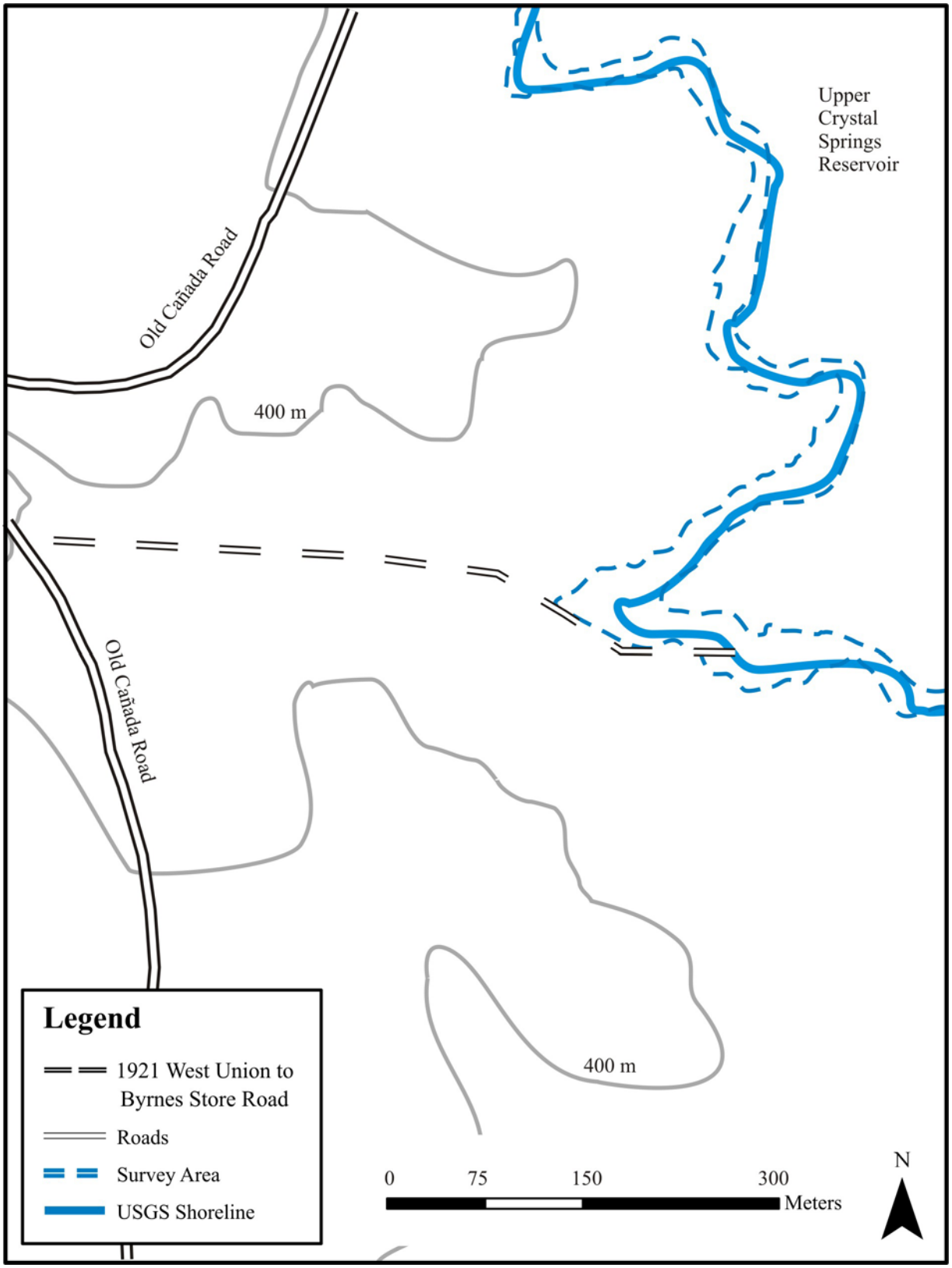

Figure 19: Map of the West Union to Byrnes' Store Road located within the APE

Figure 20: Segment of the West Union to Byrnes' Store Road located within the APE, View West
Photo Credit: Zachary Nelson January 24, 2008

Figure 21: Road Marker for the West Union to Byrnes' Store Road located within the APE, View South
Photo Credit: Zachary Nelson January 24, 2008

- **Setting.** The West Union to Byrnes' Store Road and its immediate surroundings has changed dramatically since the road was first constructed in 1921. These changes include shifts in the reservoir water level and the demise and eventual destruction of the Byrnes' Store.
- **Materials and Workmanship.** The West Union to Byrnes' Store Road was a simple bladed, leveled and graveled road that today is not notable for its materials or workmanship.
- **Feeling and Association.** Since the West Union to Byrnes' Store Road is no longer used for vehicle traffic and the Byrnes Store is no longer standing, this property no longer retains the integrity of feeling or association needed to convey its historic character and significance.

The 1921 West Union to Byrnes' Store Road within the APE is recommended as not eligible for inclusion on the NRHP. This property does not qualify under Criteria B, C, or D of the NRHP. The property is associated with the broad patterns of the local history (Criterion A). However, through prolonged disuse the road has decayed, become overgrown with vegetation and no longer retains its integrity of materials or design. Moreover, the surrounding physical and cultural environments have experienced notable changes. Byrnes' Store is no longer in service, vehicle travel in now occurs via a different road system, and the surrounding environment and local associational context have changed dramatically. Consequently, the property no longer retains any integrity of location, integrity of setting, or integrity of association.

Based on the above evaluation that the 1921 West Union to Byrnes' Store Road appears ineligible for listing in the NRHP, the resource also is considered to be ineligible for listing in the CRHR, and is not considered a historical resource for the purposes of CEQA.

Project Impacts: No impacts would result from the proposed Project and no further work is recommended.

5.4.3 1883 San Mateo to Half Moon Bay Toll Road and Culvert

Site Type: Historic Road

The 1883 San Mateo to Half Moon Bay Toll Road and Culvert was encountered within the APE both on the west and north margins of the reservoir (Figures 22 and 23). On the west side of the reservoir, the road trace trends northeast down a drainage and eventually disappear into the reservoir (Figure 7). Within the APE along the west shoreline, the road consists of a leveled, graveled bed approximately 20 feet wide. While generally clear of dense vegetation, at this location, the road bed has become grass covered and is beginning to show some signs of decay.

The 1883 San Mateo to Half Moon Bay Toll Road was also identified along the north end of the reservoir. The road crosses the northern end of Lower Crystal Springs Reservoir from the east along a low (10 feet) causeway (Figures 24 and 25). Along the east side of the reservoir and across the causeway, the road consists of a paved asphalt bed. After crossing the reservoir, the road base follows the western margin of the reservoir south where it is no longer paved, but graveled and eventually becomes overgrown with vegetation. No historic artifacts were located along the road in either location. The single-gate concrete culvert about 14 feet long and

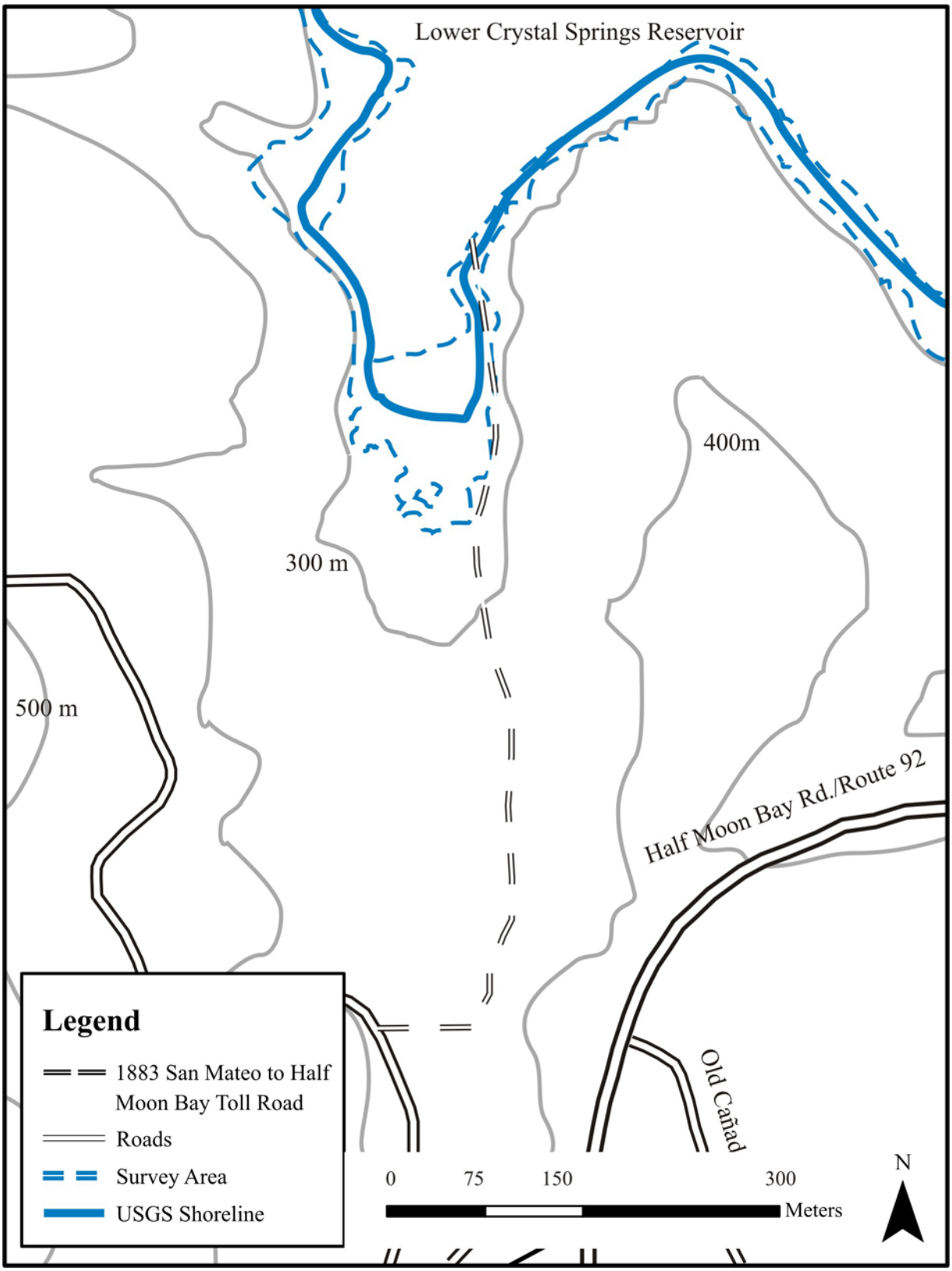

Figure 22: Map of the 1883 San Mateo to Half Moon Bay Toll Road and Culvert located within the APE

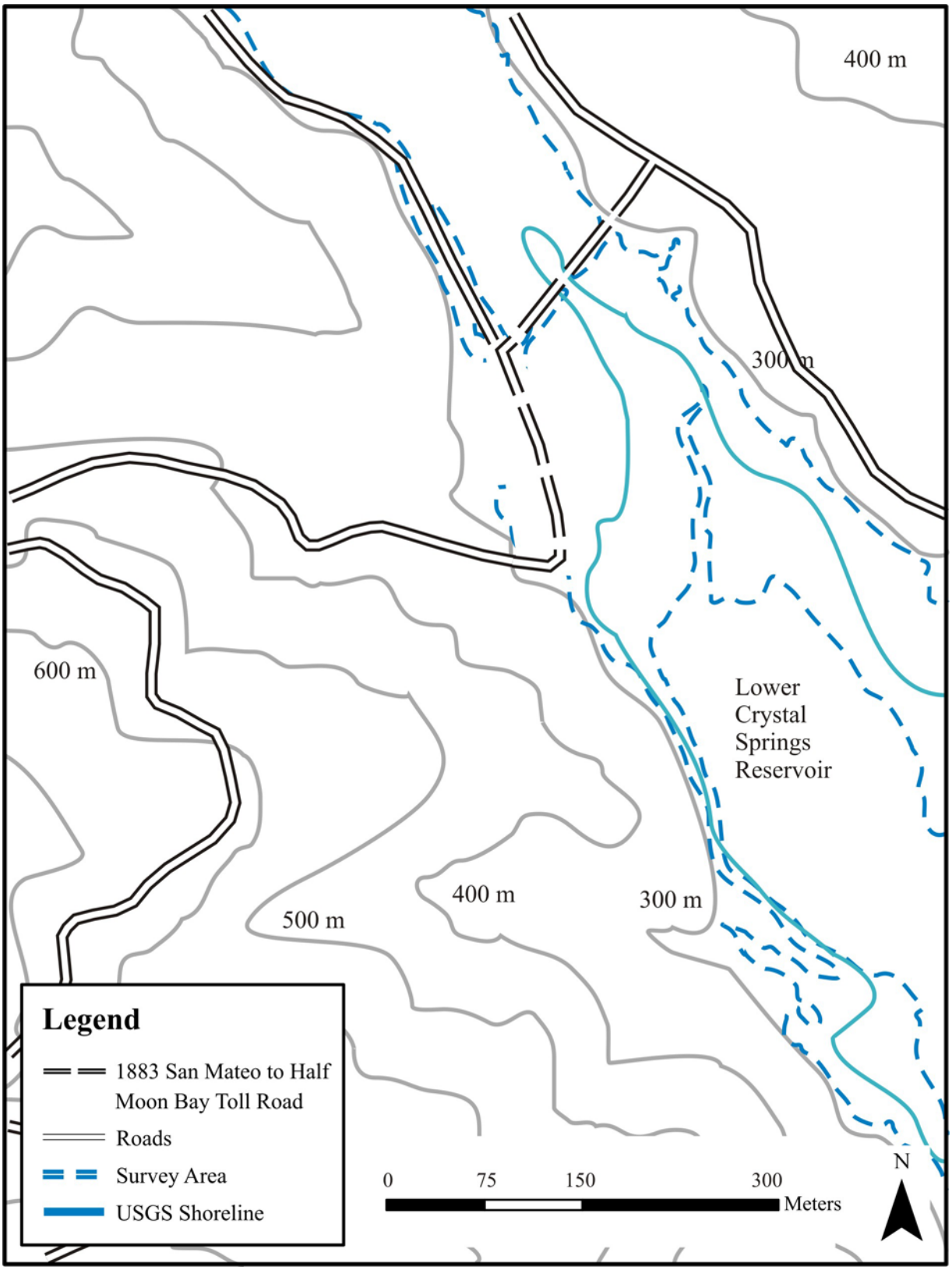

Figure 23: Map of the 1883 San Mateo to Half Moon Bay Toll Road and Culvert located within the APE

Figure 24: San Mateo to Half Moon Bay Toll Road along the West Shore of the Reservoir, View North
Photo by Zachary Nelson January 24, 2008

Figure 25: San Mateo to Half Moon Bay Toll Road along the North End of the Reservoir, View East
Photo by Zachary Nelson January 24, 2008

Figure 26: Causeway and Culvert under the San Mateo to Half Moon Bay Toll Road along the West Shore of the Reservoir
Photo by Zachary Nelson January 24, 2008

constructed during 1930 – 1940, controls the movement of water north-to-south through the toll road causeway between Lower Crystal Springs reservoir to the south and Tracy Lake to the north (Figure 26). Atop the concrete culvert is a wooden superstructure/platform from where a wheel controlled mechanism regulates the flow of water through its chute or spillway. When the reservoir reaches flood stage, the gate and stop-logs are opened to let the excess water through.

Eligibility Recommendation: The segment of the 1883 San Mateo to Half Moon Bay Toll Road and culvert within the APE is recommended as not eligible for inclusion on the NHRP. While the road has some historical associations, it retains little of its integrity. Provided below is a description of the NRHP integrity attributes for the San Mateo to Half Moon Bay Toll Road, followed by an evaluation of the culvert :

- **Location.** The San Mateo to Half Moon Bay Toll Road was located in the expected locations within the APE.
- **Design.** At both locations where it was encountered within the APE, the San Mateo to Half Moon Bay Toll Road has both decayed and become overgrown with vegetation, or it has been paved. Subsequently, its integrity of design has become severely compromised.
- **Setting.** The San Mateo to Half Moon Bay Toll Road and its immediate surroundings have changed dramatically since the road was first constructed in 1883. Recent development, including construction of the dam and newer road, as well as paving of the road alignment outside of the APE, has completely covered or obliterated the original

roadbed and radically changed the surrounding environment and local associational context.

- **Materials and Workmanship.** The San Mateo to Half Moon Bay Toll Road was a simple bladed, leveled and graveled road that today is not notable for its materials or workmanship.
- **Feeling and Association.** Since the segment of the San Mateo to Half Moon Bay Toll Road in the APE is no longer used for vehicle traffic and the community in the drainage bottom has been inundated by the reservoir, this property no longer retains the integrity of feeling or association needed to convey its historic character and significance.

The segments of the 1883 San Mateo to Half Moon Bay Toll Road within the APE are recommended as not eligible for inclusion on the NRHP. These properties do not qualify under Criteria B, C, or D of the NRHP. The road segments are associated with the broad patterns of the local history (Criterion A). The segment along the west margin of the reservoir has begun to decay through prolonged disuse and is becoming overgrown with vegetation. While it may still retain its integrity of design and materials, it does not represent a unique or outstanding example of 19th century engineering. The segment crossing the northern finger of the reservoir has been paved to the east. It is unpaved and beginning to decay to the west and as a result this segment no longer retains its integrity of materials or integrity of design. Moreover, for both segments, the surrounding physical and cultural environments have experienced notable changes. Vehicle travel in the area now occurs via a different road system, the community in the valley bottom has been inundated by the reservoir, and the surrounding environment and local associational context have changed dramatically. Consequently, these properties no longer retain any integrity of location, integrity of setting, or integrity of association.

While the toll road culvert possesses integrity of location, design, setting, materials, workmanship, feeling and association as an intact, water control facility, and has served a useful role in regulating the flow of water between Lower Crystal Springs reservoir and Tracy Lake, especially during high water or flood conditions, this type of culvert is commonly found throughout the country in support of large water control works. Therefore, the toll road culvert is not associated with a significant event and would not be eligible for listing in the National Register of Historic Places (NRHP) under criterion A. The culvert has played a secondary role in the establishment and use of the important Lower Crystal Springs reservoir and NRHP-eligible Lower Crystal Springs Dam, and in the management and historic use of the Crystal Spring's reservoir. It is also not directly associated with the former toll road that passes over the culvert. The toll road was constructed before the culvert, and the road's important use as a cross-county toll road connecting the communities of Half Moon Bay and Burlingame/San Mateo was discontinued prior to the construction of the culvert. There is also a lack of historical documentation on the culvert's date of construction and who constructed it, although it appears to have been constructed during 1930 - 1940. The culvert is also not associated with the lives of persons significant in our past or who were associated with the management and use of the Crystal Springs reservoir to be eligible for the NRHP under criterion B. The culvert is a common water control mechanism, and, thus, does not embody the distinctive characteristics of a type, period or method of construction to be eligible under criterion C. Additional information on the construction and early use of the culvert would not further our understanding of the

historic uses of the culvert or management of the reservoir's water flow to be eligible for the NRHP under criterion D. Therefore, the toll road culvert is not considered an historic resource.

Based on the above evaluation that the toll road appears ineligible for listing in the NRHP, the resource also is considered to be ineligible for listing in the CRHR and is not considered a historical resource for the purposes of CEQA.

Project Impacts: No impacts would result from the proposed Project and no further work is recommended.

5.4.4 South Crystal Springs Cottage

Site Type: Historic Building

The South Crystal Springs Cottage and associated out buildings were documented immediately adjacent to the east shoreline of reservoir (Figures 27 through 29). Records differ, but the Spring Valley Water Company built the cottage in either 1891 or 1896 (Babal 1990:105; Metcalf 1914). The cottage consists of a single-story frame structure with a shingled gable roof that originally measured 44 feet by 62 feet. In 1901 it was renovated, and two single story wings were added: one measured 19 feet by 30 feet and another 8 feet by 16 feet (Babal 1990:105; Metcalf 1914). The cottage currently measures approximately 110 feet by 55 feet.

Eligibility Recommendation: The South Crystal Springs Cottage is recommended as eligible for inclusion in the NHRP under Criterion A and the CRHR under Criterion 1. The cottage retains a high degree of integrity and represents an authentic historic property. The following is a summary from the statement of significance provided in the DPR Form 523B for this property (see Appendix B).

The South Crystal Springs Cottage is one of a number of cottages built for Spring Valley Water Company employees at the time of the construction of the Lower Crystal Springs Dam in the early 1890s. That the construction of a number of cottages to house watershed keepers and other reservoir employees coincided with the Lower Crystal Springs Dam's construction was no coincidence. The new dam tripled the size of the reservoir and watershed lands of the Upper Crystal Springs Dam that was constructed in 1876, necessitating the need for more employees to maintain and/or patrol the expanded watershed. Since commuting from nearby communities was slow-going and difficult during the late 19th century/early 20th century, cottages were conveniently constructed within the watershed to house employees in order for Spring Valley to maintain an around-the-clock presence in the watershed.

The South Crystal Springs Cottage is recommended as eligible for inclusion under Criterion A in the NRHP and under Criterion 1 in the CRHR. This property is directly associated with the original construction of the Upper and Lower Crystal Springs Reservoirs, is the oldest of the extant watershed keeper's cottages and structures built by the Spring Valley Water Company and still functions in its original purpose. As a result the South Crystal Springs Cottage is intimately tied to the Spring Valley Water Company's activities to bring water to the San Francisco Bay area in the late 19th Century through the early 20th century, and after 1935 when the Crystal Springs reservoir and watershed came under the ownership of the San Francisco Public Utility Commission (SFPUC). Moreover, because the South Crystal Springs Cottage

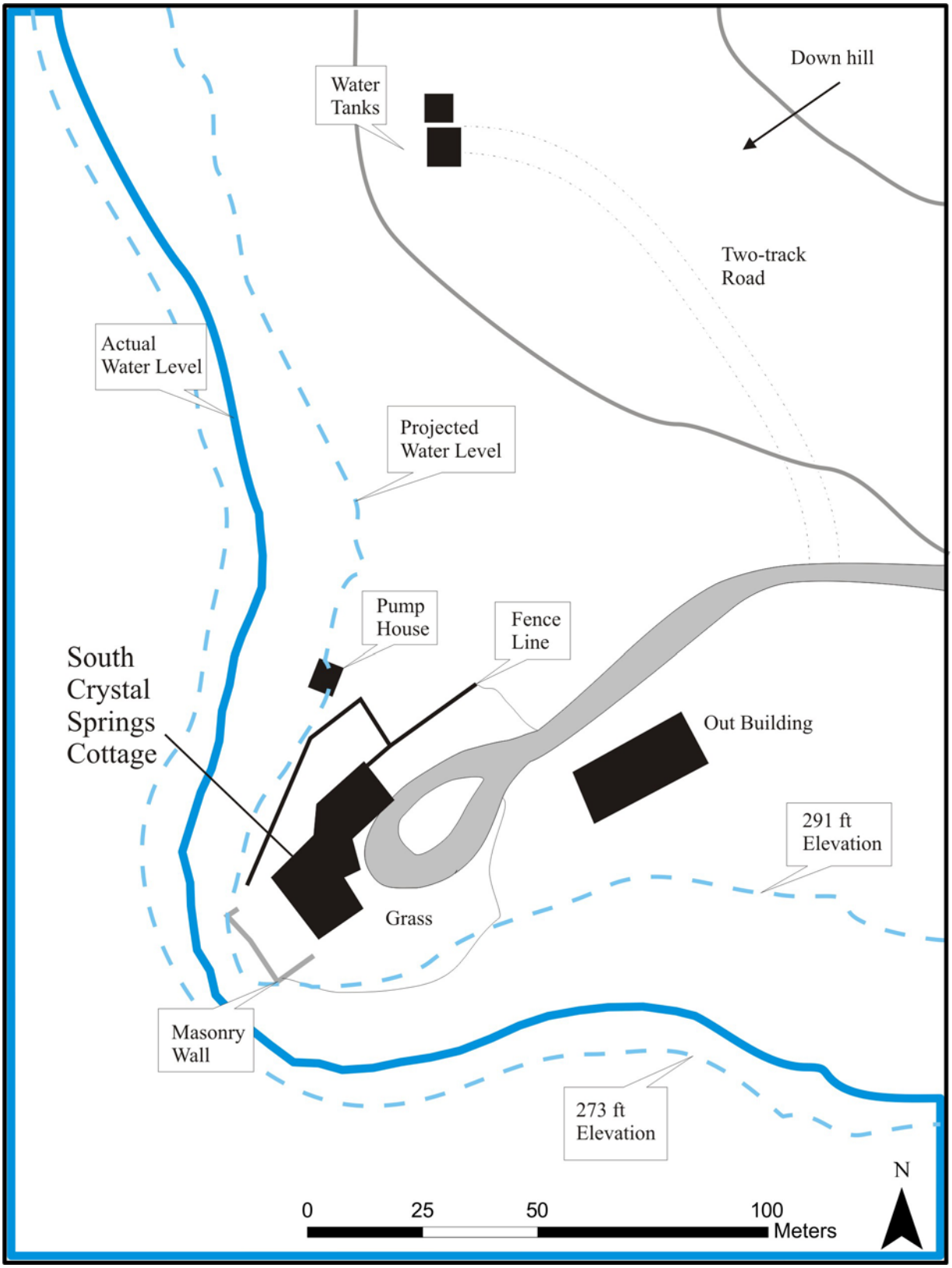

Figure 27: Map of the South Crystal Springs Cottage

Figure 28: South Crystal Springs Cottage located on the East Shore of the Reservoir, View West
Photo by Zachary Nelson, January 23, 2008

Figure 29: Pump House at the Crystal Springs Cottage, View South
Photo by Zachary Nelson, January 23, 2008

continues to be used in its original capacity, it retains its integrity of association both within the local cultural and physical environment and within the context of the cottage's original purpose. The South Crystal Springs Cottage also possesses integrity of location, design, setting, materials, workmanship, and feeling as an intact, watershed keeper's cottage. The one story wing additions are compatible with the overall original design, and, along with the other modifications including replacement windows, are compatible with the historic setting, materials, workmanship, and feeling (Metcalf 1914). The modifications to the building's north elevation, a secondary façade, are minor and do not detract from the overall integrity of the property. Important character-defining features that have been retained and convey the building's significance and integrity include its horizontal (shiplap) siding, metal vent covers, wood shingle gable roof, ornate wooden door on the east elevation, symmetrically placed wood frame windows, and distinctive shoreline setting at the head of a circular drive. Accordingly, this property is associated with events that have made a significant contribution to the broad patterns of local, regional and state history and Spring Valley Water Company's management and use of the Crystal Springs reservoir and watershed. The cottage also retains much of its original integrity and, thus, qualifies under criterion A for listing in the NRHP and under Criterion 1 in the CRHR.

The cottage does not qualify for listing in the NRHP under Criteria B, C, or D or under Criteria 2, 3, and 4 for listing in the CRHR. The building is not associated with the lives of persons important to local, California or national history under Criterion B of the NRHP and Criterion 2 of the CRHR, its vernacular cottage style is a type that was prevalent and commonly found throughout rural and urban America during the early 20th century, and, thus, does not embody the distinctive characteristics of a type or method of construction under Criterion C or Criterion 3, and does not have the potential to yield additional important information concerning the history of the region, state, or the nation under Criterion D or Criterion 4. The building's period of significance is from its construction in the 1890s through 1959, the 50 year cut-off point for consideration of eligibility for listing in the NRHP and CRHR.

The ancillary buildings to the South Crystal Springs Cottage, the outbuilding/residence/garage, pump house, and storage shed, are not recommended for listing to the NRHP and the CRHR. They all have played a secondary support role to the historic South Crystal Springs Cottage. While they are all 50 years of age and older, they constitute the type of vernacular structures typically found at larger residential and agricultural settings throughout the country. They are not architecturally distinctive or represent a method of construction that is extraordinary or unique. All three, especially the outbuilding/residence/garage, have suffered a loss of integrity due to incompatible additions and no longer function as they were originally intended. Therefore, only the cottage appears eligible for the NRHP and the CRHR. Based on the evaluation that the cottage appears eligible for listing in the NRHP under Criterion A, the resource also is considered to be eligible for listing in the CRHR under Criterion 1 and is considered a historical resource for the purposes of CEQA.

Project Impact: The proposed Project would raise the water level to within at least 2 feet of the terraced backyard of the cottage. As a result, over time wave action may erode the terrace. While there appears to be no immediate danger of adverse direct effects to the cottage structure itself, rising water levels and associated wave erosion may endanger the cottage in the future through ground subsidence/soil erosion. It is recommended that the existing masonry retaining wall be

relocated a few feet back from the new shoreline edge and extended along the entire terraced edge of the cottage property to prevent soil erosion due to wave action, which would eliminate any potential future direct effects to the cottage. The pump house, to the northeast of the cottage, is located below the proposed new water line and rising water levels would inundate this ancillary structure. While this structure is not considered an historic resource, this structure should be moved to higher ground to allow continued functioning as a pumphouse. Such a relocation of the pumphouse would have no adverse effects on the historic significance of the cottage.

5.4.5 Pulgas Discharge Channel

Beneath and adjacent to the historic Pulgas Temple site is the Pulgas Discharge Channel (Figures 30-31). While the Pulgas Temple is outside of the APE, the Discharge Channel is within the APE. The Discharge Channel is a rectangular-shaped, open channel that is approximately 800 feet long and nine feet wide. It has five-foot, three-inch-tall reinforced-concrete walls that extend westward for approximately 400 feet, and three-foot, four-inch-tall walls that extend for the remaining length of the channel. The channel walls and slab are one monolithically poured structure without horizontal construction joints. The Channel runs east-west and conveys water from the Pulgas Tunnel via the Dechloramination Facility, to the Upper Crystal Springs Reservoir. It also directs water directly to the reservoir for storage when water supply exceeds demand. Initially known as an "outfall canal," the discharge channel was constructed by Grant Smith and Company in 1924 for the San Francisco Water Department (Carey & Co., 2007).

The Pulgas Discharge Channel was previously evaluated by Carey & Co. in 2007 as part of the *Pulgas Discharge Channel Improvements Project, Historical Resources Study* (see Appendix B – DPR Forms). Carey & Co. stated that the Pulgas Discharge Channel does not appear to be eligible for listing in the National or the California Registers due to its lack of historic significance. As such, the Pulgas Discharge Channel would not be considered an historical resource for CEQA purposes.

Project Impact: The proposed project would raise the water level of the reservoir and inundate a small portion of the Pulgas Discharge Channel along the shoreline (Figure 31). As the Pulgas Discharge Channel is not eligible for the National Register or California Register, the proposed project would have no adverse impact to historical resources at this location. As such, no mitigation measures are recommended.

Figure 30: Pulgas Discharge Channel, View Southwest
Photo by Zachary Nelson January 23, 2008

Figure 31: Pulgas Discharge Channel, Terminus, View West
Photo by Zachary Nelson January 23, 2008

5.5 Previously Documented Resources Located outside of the APE or Not Relocated

The remaining six historic or potentially historic properties identified in the records search as potentially in the APE were either found to be outside of the APE or could not be relocated. These properties are discussed briefly here. As they are outside of the APE, these six resources will not be affected by the project and were not fully inventoried or evaluated for this project.

5.5.1 Domingo Feliz Adobe

Site Type: Historic Structure

The Domingo Feliz Adobe was not relocated within the APE. Babal indicates that the structure may have been located on a small hill north of the marsh at the mouth of Adobe Creek (Babal 1990:44-45)(Figure 9). Inspection of topographic maps and aerial photographs identified an unimproved road trace leading to a knoll above the marsh. The ENTRIX/MSE JV survey crew followed this road trace to its terminus above the reservoir. The survey crew walked parallel 10-meter-wide transects over the hill top using metal detectors but failed to find any historic structural remains or other metal objects. The reservoir has most likely inundated the remains of this structure.

5.5.2 San Feliz Station

Site Type: Historic Structure

The San Feliz Station was not relocated within the APE. The historic records search suggested that the structure was located along the 1883 San Mateo to Half Moon Bay Toll Road at about the same elevation as the APE (Figure 8). The survey crew walked parallel 10 meter transects using metal detectors through the area suggested to contain the San Feliz Station, but failed to find any historic structural remains or other metal objects. The reservoir has most likely inundated the remains of this structure.

5.5.3 Unnamed structure

Site Type: Historic Structure Remains

The records search identified a structure depicted on the 1915 San Mateo USGS 7.5-minute topographic map at approximately the same elevation as the upper boundary of the APE (Figure 7). The ENTRIX/MSE JV survey team relocated this site outside of the APE. This site consists of a small open pit on the south side of a ridge descending into the reservoir. The pit measures approximately 30 x 15 ft and has a maximum depth of 9 ft. A fence runs around the northern and eastern sides of the pit. At the base of the northern fence line is a 1.5-inch metal pipe. The pipe extends for 105 ft with the pit in the approximate middle. The fence posts are unevenly cut lumber measuring 5.5 inches by 4 inches and approximately 4 feet tall. There are cut square head nails embedded in the fence posts. A rusted iron implement was found at the southwest corner of the open pit. It may be the remains of a wagon frame or yoke.

5.5.4 Sherwood Homestead Site

Site Type: Historic Building/Structure/Site

The 1871 "Map of Road from Toll Road Near Crystal Springs to County Road at 17 Mile House" shows that the Sherwood Homestead had been located on the hill above the arm of the reservoir in the San Mateo Creek drainage (Figure 7). Inspection of topographic maps and aerial photographs identified an unimproved road trace leading to this location. The bench along the current shoreline and within the APE was inspected for cultural remains. The ENTRIX/MSE JV survey crew walked parallel 10-meter-wide transects using metal detectors through the area most likely to have contained the Sherwood Homestead, but failed to find any historic structural remains or other metal objects. The reservoir has most likely inundated this structure. The pedestrian survey did, however, find a granite tombstone marking the gravesite of the Sherwood family dog. The tombstone was found above the shoreline on a little knoll outside of the APE and was inscribed with: *"To Our Faithful Dog Rover, Died 1886, W.R. Sherwood."*

5.5.5 Belmont to Canada del Raymundo Road

Site Type: Historic Road

Site Description: The Belmont to Canada del Raymundo Road was relocated outside of the APE, just north of the South Crystal Springs Cottage on the eastern side of the current Cañada Road (Figure 9). Within the APE (on the western side of Cañada Road), there is no evidence of the old road's existence. Here, reservoir wave action, in combination with abundant vegetation growth, has removed any traces of the road within the Project area. Across Cañada Road to the east and outside of the APE, traces of the Belmont to Canada del Raymundo Road do remain. The roadbed has been graveled, and extends east through the valley.

5.5.6 Pulgas Water Temple

Site Type: Historic Structure

In 1938, San Francisco built the Pulgas Water Temple to acknowledge the completion of the Hetch Hetchy aqueduct project designed to bring water from the Sierra Nevada Mountains to the Bay Area (SFPUC 2008). The Pulgas Water Temple was designed in the Beaux Arts style by William Merchant, a San Francisco architect. The temple was designed to reflect the architecture of ancient Greeks and Romans, since the basic methods used to engineer the Hetch Hetchy aqueduct employed methods originating with these classical civilizations. This site contains a "temple," reflecting pool, and circular shrine (Figures 32 and 33). Today, the Pulgas Water Temple is used for weddings and includes a maintained park.

The Pulgas Water Temple was previously evaluated and recommended eligible for listing in the California and National Registers by Carey & Co. in 2007 as part of the *Baden and San Pedro Valve Lots Improvement Project, Historical Resources Technical Memorandum* (see Appendix B – DPR Forms).According to the DPR form,

> The Pulgas Water Temple appears to be eligible for the CRHR or the NRHP under Criterion C/3. Its period of significance dates to 1938 when it was

> constructed. Designed as a symbolic twin of the Sunol Water Temple, which was constructed earlier by the Spring Valley Water System in 1910, it represents the continuity of the city's water supply. It retains sufficient integrity to convey its significance as an example of a Beaux Arts style structure that functions as a symbolic terminus of the San Francisco Water System, marking the end of the water's journey from the Hetch Hetchy reservoir to San Francisco. The character-defining features include the fluted Corinthian columns, inscription, and cast-stone of the water, the shallow-depth and rectangular form of the reflecting pool, and the spatial relationship between them. Its boundary, as outlined in the location map, includes the temple, its cast stone steps, and the reflecting pool.

The historic temple, reflecting pool, and circular shrine, which exists some distance upland from the shoreline and outside of the project APE, would remain unaffected by rising water levels and any associate erosion. As such, no mitigation measures are recommended.

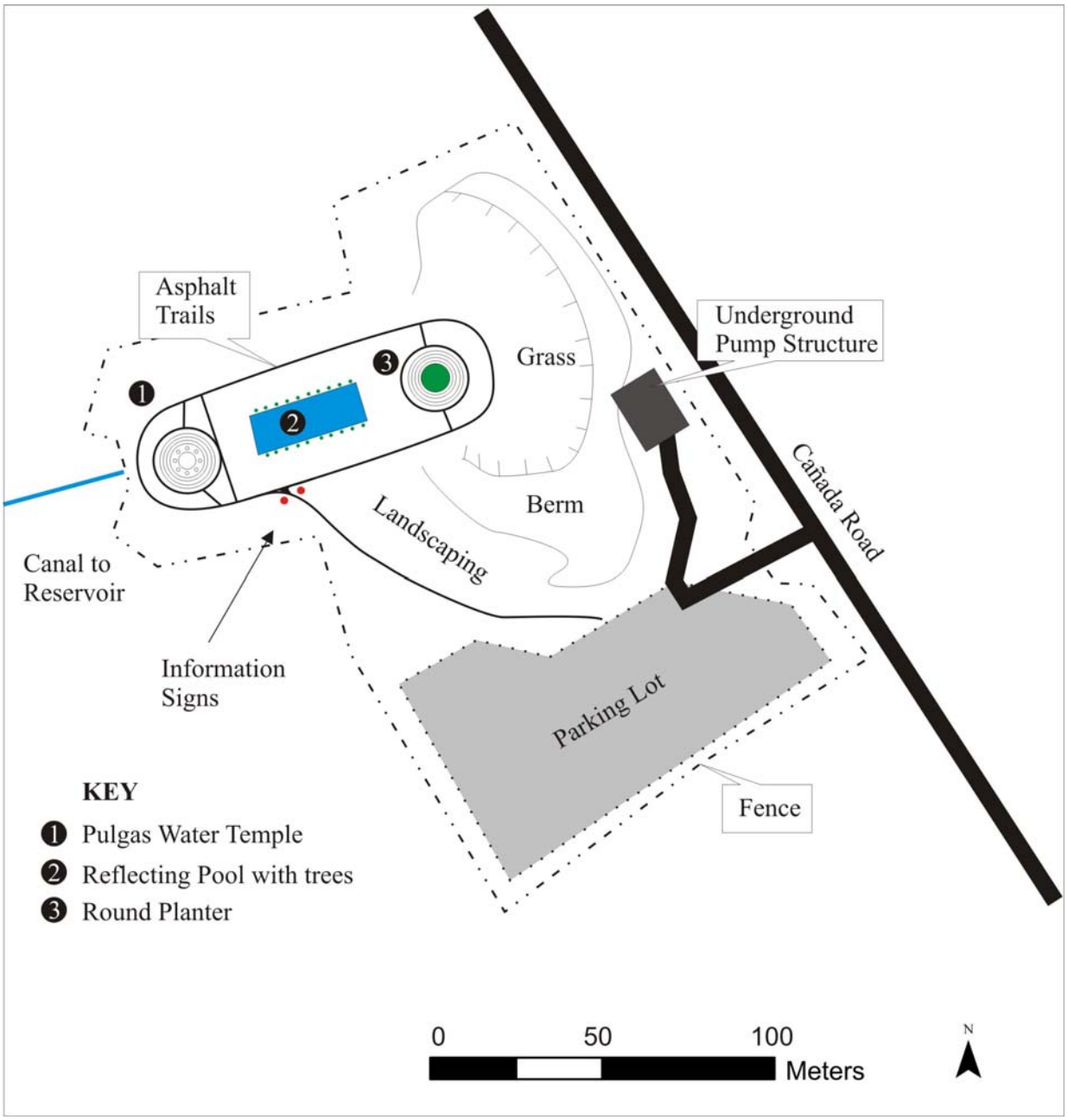

Figure 32: Map of the Pulgas Water Temple

Figure 33: Overview of the Pulgas Water Temple, View Southwest
Photo by Zachary Nelson January 23, 2008

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6.0 CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

The ENTRIX/MSE JV cultural resource survey did not identify any previously undocumented prehistoric or historic-era cultural resources within the APE. The survey did relocate four known historic-era resources identified on the records search as potentially in the APE. These include three historic-era road segments and one historic-era architectural resource. The road segments include portions of the San Mateo to Crystal Springs Road, the West Union to Byrnes Store Road, and the San Mateo to Half Moon Bay Toll Road and Culvert. All of the road segments are considered to be not eligible for the NRHP or CRHR, and no further work is recommended for these resources. The historic-era architectural resource identified in the survey, the South Crystal Springs Cottage is considered NRHP and CRHR-eligible. The proposed higher reservoir water level would inundate portions of this property, potentially causing an adverse direct effect to the cottage. Recommended mitigation measures to prevent soil erosion due to wave action include relocating the existing masonry retaining wall a few feet back from the new shoreline edge and extend it along the entire terraced edge of the cottage property. Finally, the many proposed alterations to the NRHP and CRHR-eligible LCSD would have adverse effect on this structure's historic integrity. Mitigation measures recommended to reduce these effects include HAER photo-documentation and public interpretation efforts in consultation with SHPO. Under CEQA,, the impacts of the project would remain significant and unavoidable after implementation of these measures, as the dam's integrity for the CRHR would remain materially impaired.

The ENTRIX/MSE JV field survey did not relocate within the APE the one previously recorded prehistoric site and the remaining five potential cultural resources identified in the pre-survey records search. Site CA-SMA-126 is a prehistoric resource originally recorded in 1970. An extended survey that included a systematic augering program on the landform determined most likely to contain the site failed to relocate the site. Given that this site either no longer possesses an archaeologically discernible deposit, is inundated by the reservoir, or the previously documented location is outside the APE, no further work is warranted within the APE and cultural resource clearance is recommended for the Project with no special stipulations. The Belmont to Canada del Raymundo Road, the remains of the unnamed structure in the drainage along the northeast shore of the reservoir, and the Sherwood dog's tombstone were all located outside of the APE. The ENTRIX/MSE JV survey did not relocate the Domingo Feliz Adobe, San Feliz Station, or Sherwood Homestead within or near the APE.

6.1 Unanticipated Discoveries Plan

During the course of construction activities within the APE, if a buried or otherwise previously unidentified archaeological site or feature is discovered, work should be halted at that location and a qualified cultural resource professional shall be contacted to examine the discovery and make recommendations for further study, if warranted. Specific steps and contacts for identification of cultural resources and work stoppage will be outlined in an Unanticipated Discoveries Plan to be filed with SHPO, kept on site during construction activities, and understood by supervising personnel.

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Uhle, M. 1907. The Emeryville Shellmound. *University of California Publications in American Archaeology and Ethnology*. 7(1), Berkeley, California.

Wegmann, E. 1927. The Design and Construction of Dams. John Wiley & Sons, New York.

Appendix A – SHPO Concurrence with APE Map

STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

October 12, 2007

In Reply Refer To: COE071001A

Jane M. Hicks
Chief, Regulatory Branch
Department of the Army
San Francisco District
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Re: Request for Concurrence on Determination of Area of Potential Effects for the Lower Crystal Springs Dam Improvements Project, San Mateo County, California.

Dear Ms. Hicks:

Thank you for submitting to our office, your letter and supporting documentation regarding the undertaking noted above. The U.S. Army Corps of Engineers (COE), San Francisco District, is requesting my consultation regarding the subject undertaking, pursuant to 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act. The proposed project involves proposed modifications to the existing Lower Crystal Springs Dam, which is operated by the San Francisco Public Utilities Commission (SFPUC). These modifications are designed to meet the Department of Water Resources, Division of Dam Safety (DWR-DDS) requirements to guard against failure during a major flood event. To avoid restrictions in reservoir storage levels, the SFPUC is proposing the subject modifications for which they must secure a Section 404 of the Clean Water Act permit from the COE. The COE has identified this permitting action as an undertaking pursuant to Section 106 guidelines.

The proposed modifications include: widening the existing spillway from 88 feet to approximately 208 feet, installing a new integral ogee weir, raising the parapet wall by approximately 9.0 feet, improving drainage at the top of the dam, expanding the stilling basin from 12x90 feet to approximately 105x145 feet, installing erosion control measures within and along the banks of San Mateo Creek downstream of the stilling basin, and restoring full operating levels to the reservoir basin. At this time, you are requesting my concurrence on your determination of an Area of Potential Effects (APE).

After reviewing the APE description and map delineation in your letter of September 18, 2007 and attachments, I concur that your determination of an Area of Potential Effects for this undertaking is appropriate pursuant to 36 CFR Parts 800.4(a)(1) and 800.16(a)(d). In reply to your request for "review and guidance" regarding the COE's

responsibilities under Section 106 guidelines, I refer you to the regulations codified under 36 CFR Part 800. I will provide specific comments following receipt and review of a written plan of your proposed efforts to identify and evaluate historic properties in the project APE.

Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule, Associate State Archeologist, at phone 916-654-4614 or email wsoule@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

cc:

Kathleen Ungvarsky
Department of the Army
San Francisco District
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, California 94103-1398

Appendix B - DPR Forms

HISTORIC PROPERTY SURVEY REPORT, FINDING OF EFFECT & 4 (f) STATEMENT
Lower Crystal Springs Dam, Pump Station and Skyline Boulevard Bridge,
San Mateo County, California

by

Dr. Laurence H. Shoup,
with Ward Hill

Submitted to:

Planning Commission
City and County of San Francisco
1660 Mission Street
San Francisco, CA. 94103

Submitted by:

Archaeological/Historical Consultants
609 Aileen Street
Oakland, CA. 94609

December, 1996

APPENDIX II: SITE RECORD: LOWER CRYSTAL SPRINGS DAM AND BRIDGE

Primary Record

Archaeological/Historical Consultants

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings

Review Code Reviewer Date

Resource Identifier: LOWER CRYSTAL SPRINGS DAM AND BRIDGE

P.1 Location San Mateo County

b. Address: Skyline Blvd. City Zip

c. UTM: USGS Quad San Mateo 1980 T5S R5W Unsectioned, Mt. Diablo B.M.
Zone 10 556420 mE/ 4153520 mN

d. Other Locational Data:
On Skyline Blvd. about 1000 feet south of its intersection with Crystal Springs Rd.

P2. Description
The Lower Crystal Springs Dam and the Bridge which rests upon it are set on the edge of both a forested canyon and the lake created by this Dam. The Dam is a concrete arch gravity structure, 145 feet high (154 with the parapet wall) and about 600 feet long. It is 176 feet wide at the base and 25 feet wide at the top. Its original construction cost $2.2 million , spent over the 1886-1890 years, a large sum for that time. There are four spillway bays, each about 18 feet wide. Each of these four bays are divided(see Continuation Sheet)

P3. Resources Present: Building Structure x Object Site District Element of District

P4. Photograph or Drawing

P5. Date Constructed/Age: 1886-1890

Prehistoric Historic x Both

P6. Owner and Address:
San Francisco Water Department
425 Mason Street, San Francisco, Ca.

P7. Recorded by:
Laurence H. Shoup, Historian
Archaeological/Historical Consultants
609 Aileen Street
Oakland, Ca. 94609

P8. Date Recorded: December, 1996

P9. Type of Survey: Intensive x
Reconnaissance Other
Describe:

P10. Report Citation:
Historic Property Survey Report, Finding of Effect and 4(f) Statement: Lower Crystal Springs Dam, Pump Station and Skyline Blvd. Bridge, San Mateo County, California

Attachments: None Continuation Sheet x Building, Structure, and Object Record x District Record
Linear resource Record Archaeological Record Milling Station Record Rock Art Record
Artifact Record Photograph Record Location Map Other:(List)

Building, Structure, Object Form
Archaeological/Historical Consultants

Primary #

HRI#

Resource Identifier: Lower Crystal Springs Dam

B1. Historic Name: Same

B2. Common Name: Same

B3. Address: Skysline Blvd. south of Crystal Springs Rd.

City: San Mateo **County:** San Mateo **Zip:**

B4. Zoning: 10 **B5. Threats:** None

B6. Architectural Style: Concrete Dam

B7. Alterations and Date(s): Original construction 1886-1890; Parapet Wall raised 1911

B8. Moved? No x Yes Unknown **Date:** **Original Location:**

B9. Related Features:

Historic pump house (1913, expanded 1948) ; Concrete bridge over dam, built 1923-1924.

B10. Architect: Hermann Schussler

B11. Historic Attributes: AH8 - Dam

B12. Significance: **Theme** Engineering and Technological History **Area** National

Period of Significance 1886-1890 **Property Type** Structure **Applicable Criteria** A, C

Discuss:

The explosive growth of San Francisco during the Gold Rush years of the 1850's led to a search for a reliable source of water. The first private water companies were formed during the late 1850's, and by the mid - 1860's they had joined together as the Spring Valley Water Company. As the city's growth outstripped local supply, the Spring Valley Water Company expanded into San Mateo County. Creeks in this latter county were gradually dammed to give San Francisco enough water. As the demand for water increased, plans began to take shape for a (see Continuation Sheet)

B.13. References:

Laurence H. Shoup - Historical Overview and Significance Evaluation of Lower Crystal Springs Dam and Bridge, San Mateo County, California, March, 1989.

B14. Evaluator: Laurence H. Shoup

Affiliation/Address: Archaeological/Historical Consultants
609 Aileen St.
Oakland, Ca. 94609

B15. Date of Evaluation: December, 1996

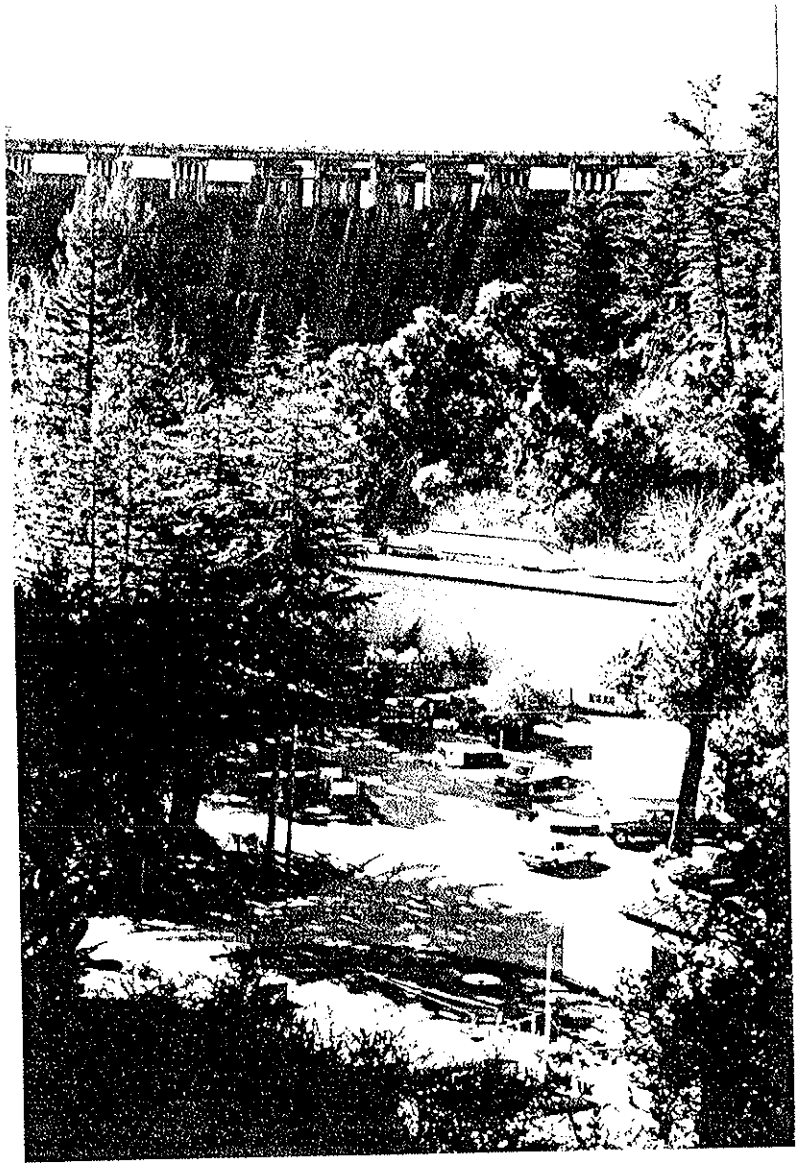
P3a Continued

in two, making eight separate spillway channels where water can be released or held. Spillway water levels are controlled by "stoplog " barriers, consisting of wooden beams about 7.5 feet long. These beams are manually inserted into slots in each of the eight spillway channels to block the water and thereby raise water levels in Crystal Springs Lake.

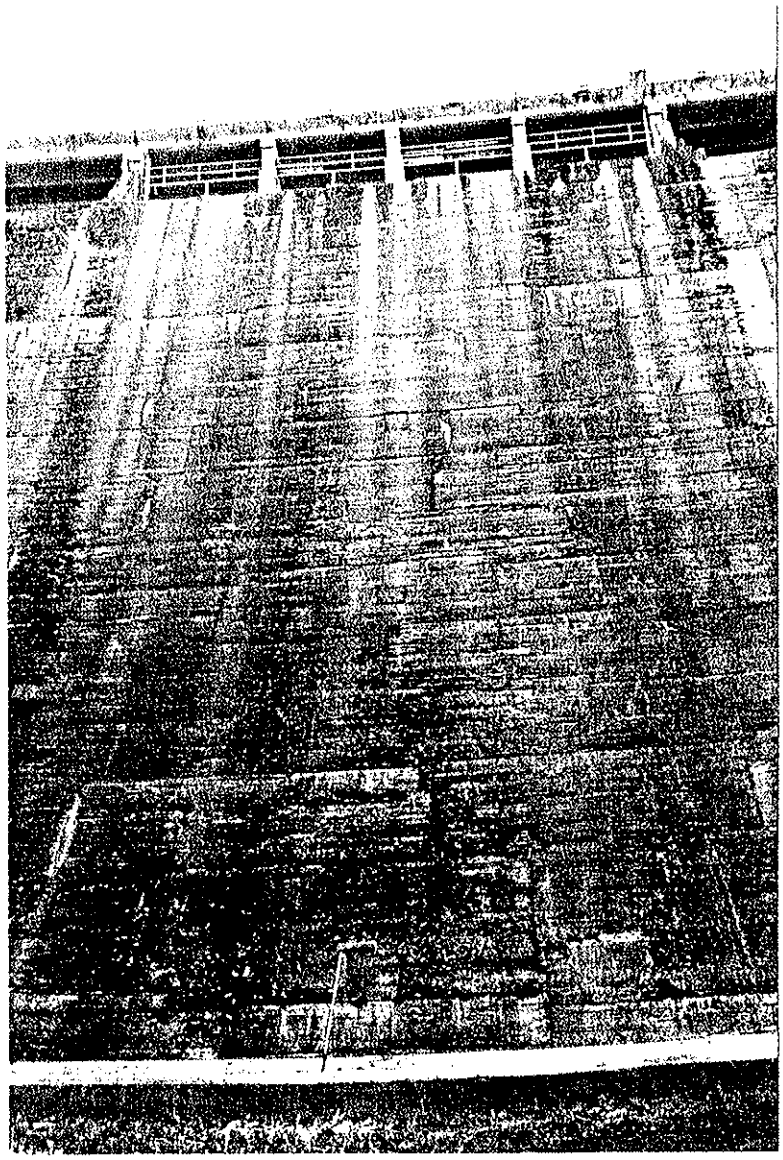
In 1891 a wooden bridge was built over the Dam to allow road traffic to conveniently travel across it. By the 1920's this bridge was old and needed replacement. The wooden bridge was then removed and a new concrete bridge was built in 1923-1924 by a private contractor working under contract with the state of California. This concrete bridge is 608 feet long and consisted of twenty concrete girder spans, together with appropriate bents, abutments and wing walls. It is a multi-span curved concrete bridge supported on multi-column concrete bents resting directly on the top of the Dam.

B12 Continued

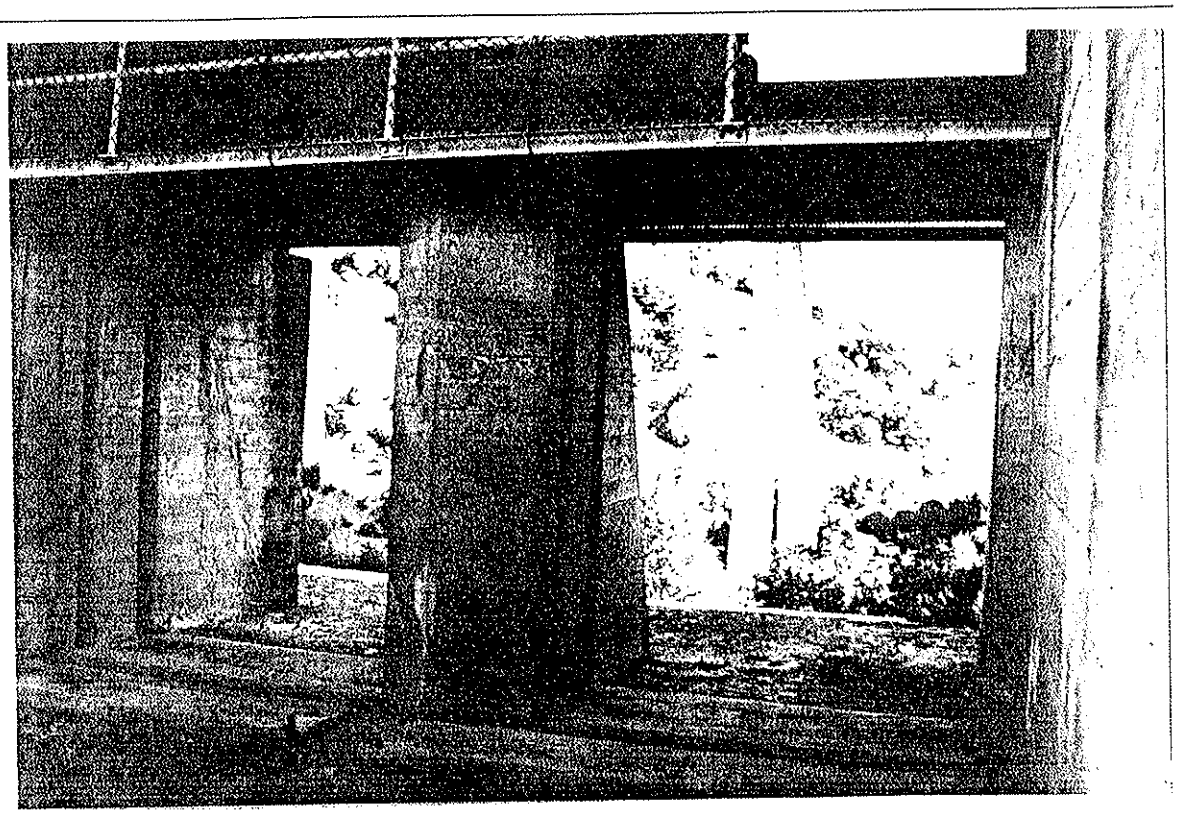
large dam at the mouth of a canyon formed by Crystal Springs Creek. The Spring Valley Water Company's Chief Engineer, Hermann Schussler would be in charge of the planning and building of this dam. The required height of this dam was to be unprecedented in American engineering. In 1885 there were only 3 dams over 100 feet tall in the entire United States, and the highest was only 119 feet. The planned Lower Crystal Springs Dam was going to be 145 feet high. Based on foreign examples and his own ideas and expertise, Schussler designed the first arch-gravity concrete dam in the United States. Schussler choose concrete as a building material for the dam because of the lack of good quality stone in the area and the strength of concrete to withstand earthquakes, since the dam was close to the San Andreas fault. Work began on the dam in 1886 and was completed in 1890. When completed, the Lower Crystal Springs Dam was one of the largest and most costly in the world. But it was a very strong dam because of the innovative design and construction techniques used by Schussler. These included interlocking irregularly shaped blocks as the dam's basic structure, the washing of the sand and aggregate used in the cement, the precise measurement of raw material used, the placing of the mixed concrete within 15 minutes, the hand ramming of the concrete and water curing. The result was a dam which could successfully withstand the massive 1906 earthquake and allow water use to expand in San Francisco despite the fact that the City is not sited on a major river. It is the pioneering nature of this dam and the fact that it showed the way for urban expansion that make it significant. It has excellent integrity, having only been expanded once, when its parapet wall was raised 9 feet in 1911.



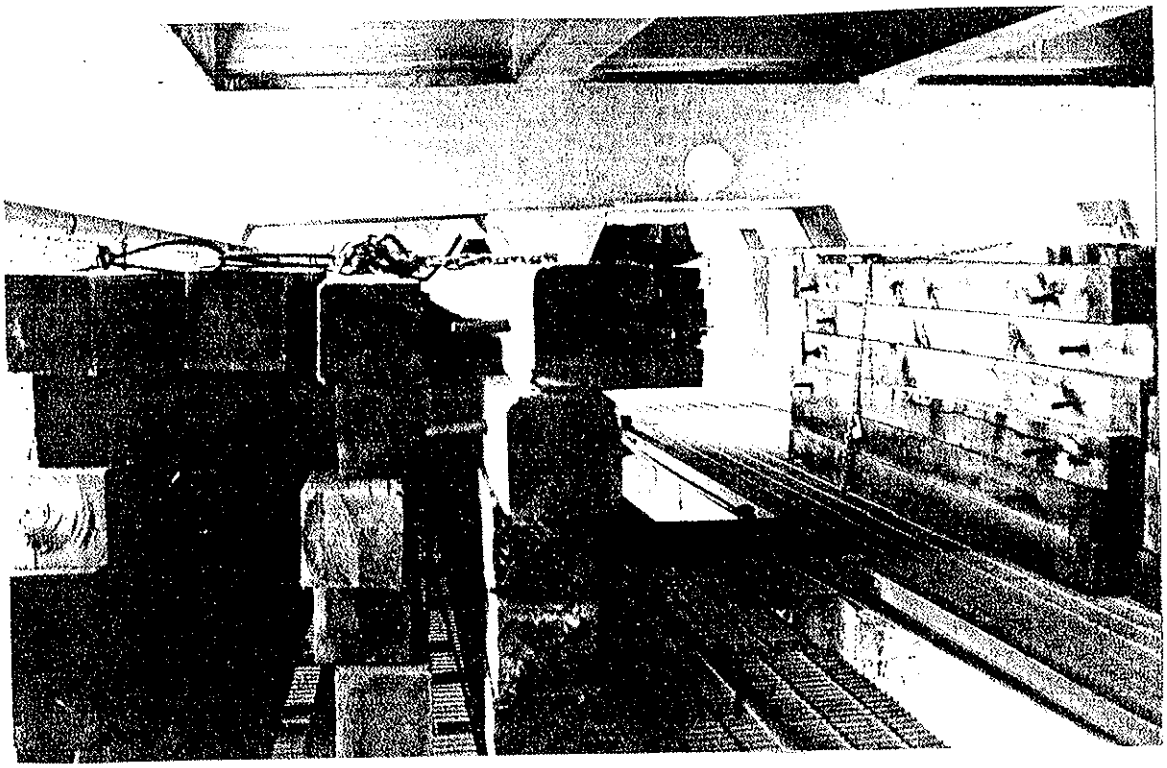
Lower Crystal Springs Dam and Bridge - November, 1996 - View is SW



Lower Crystal Springs Dam and Bridge - November, 1996.



Lower Crystal Springs Dam - Spillway Gates - November, 1996 (note grooves for stoplogs)



Lower Crystal Springs Dam - Stoplogs for Spillway Gates - November, 1996

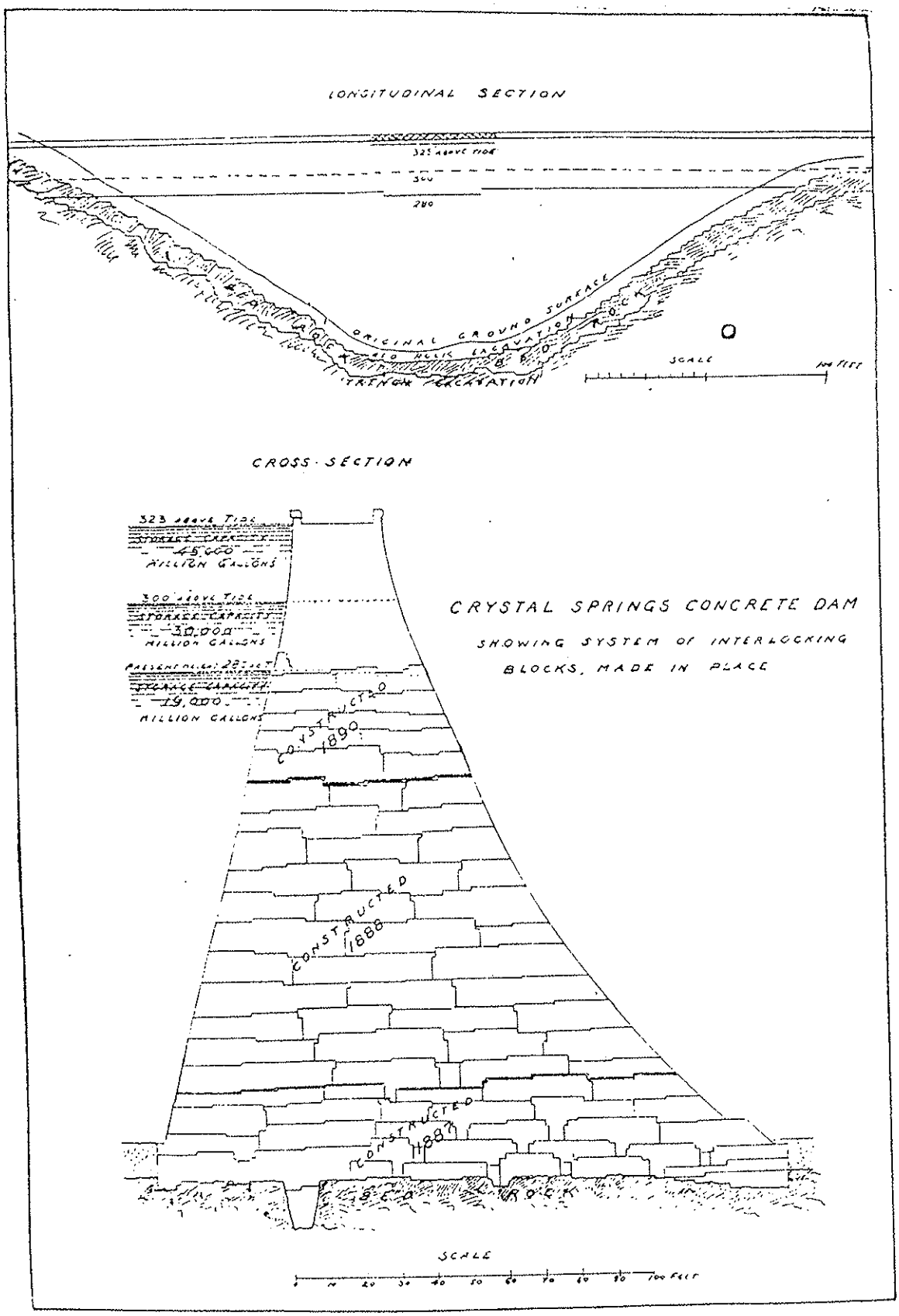


PLATE 4 — THE SHAPE AND CONSTRUCTION DATES OF SECTIONS

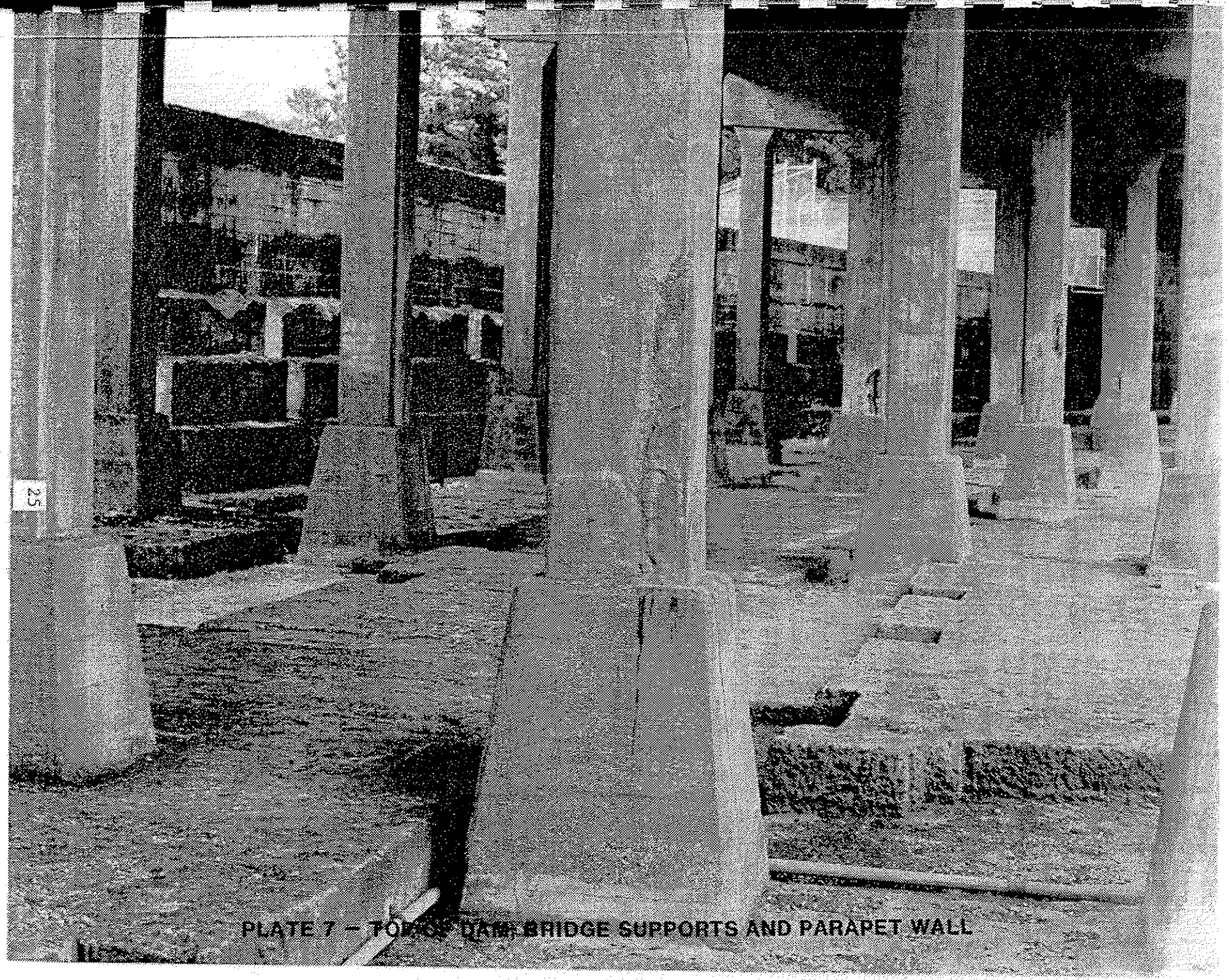


PLATE 7 – TOPPOS DAM, BRIDGE SUPPORTS AND PARAPET WALL

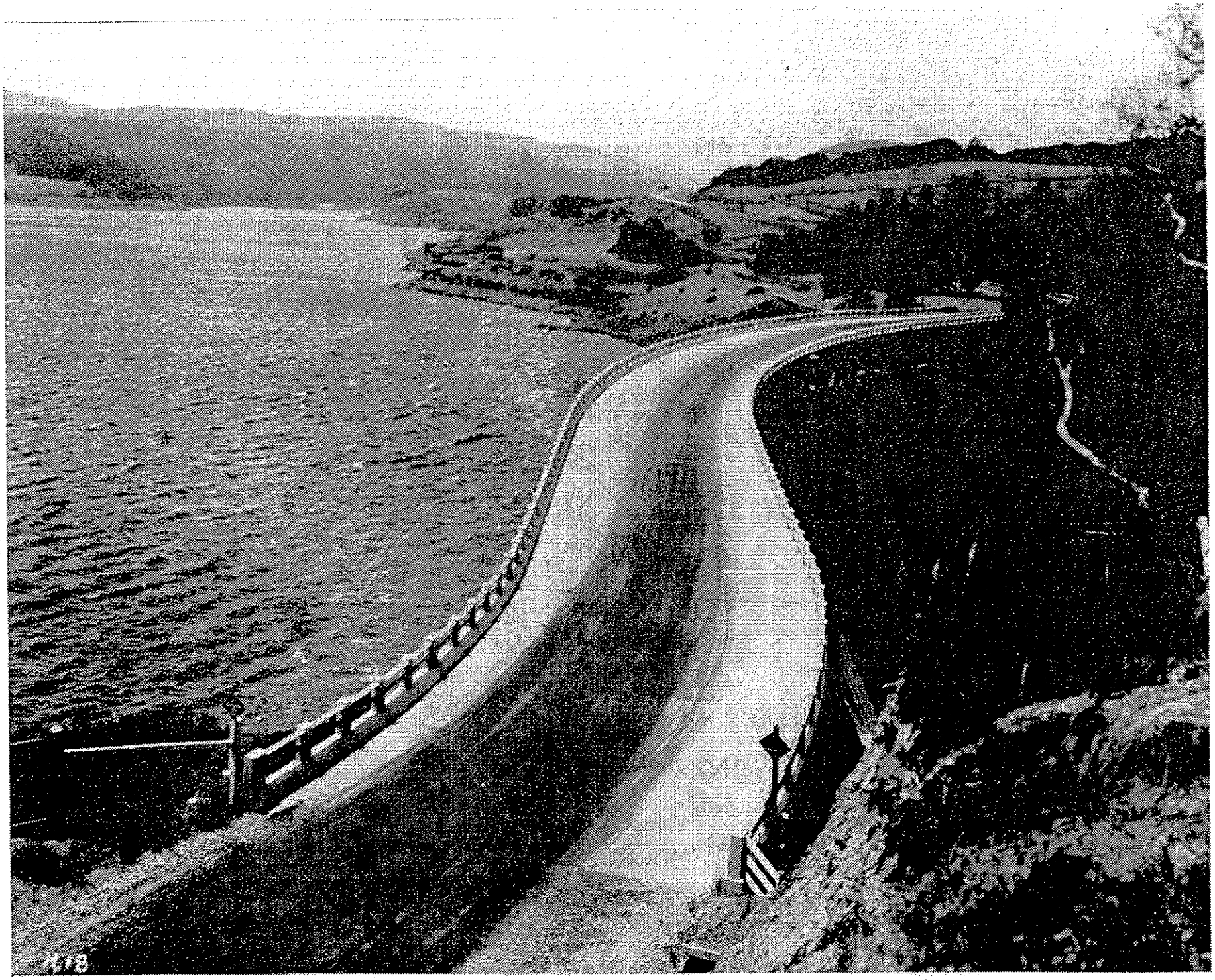


PLATE 8 — LOWER CRYSTAL SPRINGS DAM AND THE 1923 BRIDGE

APPENDIX III: SITE RECORD: LOWER CRYSTAL SPRINGS PUMP STATION

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial_____
NRHP Status Code_____

Other Listings
Review Code _____Reviewer _____Date_____

 *Resource Name or #: (assigned by recorder) Lower Crystal Springs Dam Pump Station

P1. Other Identifier: Addendum Historic Property Survey Report for Lower Crystal Springs Dam
*P2. Location: Not for Publication Unrestricted X *a. County San Mateo
and (P2b and P2c or P2d. Attach a Location Map as necessary)
b. USGS 7.5' Quad San Mateo Date 1980 T 5S; R 5W ; Sec. Unsectioned ; Mt. Diablo B.M.
c. Address not applicable City San Mateo Zip _____
d. UTM: Zone ; mE/ mN
e. Other Location Data: (e.g. parcel #, directions to resource, elevation, etc. as appropriate)
The power plant (assessor parcel # 93-07) is about 600 feet east of the Crystal Springs Dam (elevation approximately 140 feet above sea level) and Skyline Boulevard and about 300 feet south of Crystal Springs Road adjacent to and north of San Mateo Creek (see Figure 1).

*P3a. Description (Describe the resource and its major elements. Include design, materials, condition, alterations, size, setting & boundaries):
Just east of Crystal Springs Dam, the Crystal Springs Dam Pump Station is set in a flat forested area adjacent to San Mateo Creek, and just south of Crystal Springs Road (see Figure 1). A simply detailed, classical style, rectangular plan building, the Crystal Springs Dam Pump Station has exterior stucco walls and a flat roof covered with asphalt roofing paper. Projecting above the center of the length of the roof is a large, hipped skylight. Structurally, the building has a series of concrete footings supporting the wood-frame walls constructed of 15 pairs of 9 inch square posts. Diagonal struts act as cross bracing between the posts. The walls between the posts are plaster and lath, three inch wide, hollow in-fill. The posts support a series of wood trusses forming the structure for the roof.

*P3b. Resource Attributes: HP9- public utility building
*P4. Resources present: ___ Building X Structure____ Object ___ Site ___ District ___Element of District____

P5a. Photo or Drawing (see Continuation Sheets)

P5b. Description of Photo:
(see continuation sheets)
*P6. Date Constructed/Age and Sources: X Historic
____Prehistoric ____Both 1913; addition 1948 (water department records)

*P7. Owner and Address
San Francisco Water Department
425 Mason Street, San Francisco
*P8. Recorded by: (Name, affiliation, and address) Ward Hill, Architectural Historian, 3124 Octavia Street, San Francisco, CA 94123

*P9. Date Recorded December, 1996
*P10. Survey Type: (Describe)
Intensive

*P11. Report Citation (Cite survey report and other sources, or enter "none"): Addendum to Historic Property Survey Report for the Lower Crystal Springs Dam

Attachments: ____NONE____ Location Map___ Sketch Map X Continuation Sheet X Building, Structure and Object Record___ Archaeological Record ___ District Record ____ Linear Feature Record____ Milling Station Record _____Rock Art Record _____ Artifact Record _____ Photograph Record _____ Other (List)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #_____
HRI #_____

BUILDING, STRUCTURE AND OBJECT RECORD

*NRHP Status Code 6Z

 *Resource Name of # (assigned by recorder) Lower Crystal Springs Dam Pump Station

B1. Historic Name: Lower Crystal Springs Dam Pump Station
B2. Common Name: Lower Crystal Springs Dam Pump Station
B3. Original Use: pump station B4. Present Use pump station
*B5. **Architectural Style:** Renaissance classicism
*B6. **Construction History:** (Construction date, alterations, and date of alterations)
The Crystal Springs pump house was originally constructed 1913. The size of the building increased almost 50 per cent with a 1948 addition to the south facade (see Figure 2).

*B7. **Moved?** X **No** __ **Yes** __ **Unknown** **Date:** NA **Original Location:** NA

*B8. **Related Features:** Lower Crystal Springs Dam, pumping equipment, Crystal Springs Lake

B9a. Architect A. Krutmeyer with Spring Valley Water Company b. Builder: NA

*B10. **Significance: Theme** Public Utilities **Area** San Francisco Bay Area
Period of Significance 1913 **Property Type** pump station **Applicable Criteria** A & C
(Discuss importance in terms of historical or architectural context as defined by theme, period and geographic scope. Also address integrity.)

The need for a reliable source of water as San Francisco's population grew after the explosive growth of the city during the gold rush of early 1850s. In 1857, the San Francisco Water Works was the city's first water company. In 1858, a second private water company, the Spring Valley Water Company, was formed. The sources of supply and water delivery for the two companies depended on small lakes and springs in San Francisco. As the city's growth exceeded these local sources of water, the Spring Valley Water Company studied expanding the city's water supply into San Mateo County. The company dammed Pilarcitos Creek in 1864 and piped the water to San Francisco.(see Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes) HP9-Public Utility Buildings

*B12. **References:**

Discussion with Suresh Patel, Project Manager, San Francisco Utilities Engineering , November 13, 1996.
Archaeological/Historical Consultants. *Historic Property Survey Report for Lower Crystal Springs Dam*. March, 1989.
Plans and Elevations for the Crystal Springs Pumping Station, May 8, 1913, Spring Valley Water Company.
Plans for the South Extension to the Crystal Springs Pump Station, October 25, 1948, San Francisco Water Department.

B13. Remarks:

*B14. **Evaluator** Ward Hill, Architectural Historian

*Date of Evaluation: December, 1996

(This space reserved for official comments)

Sketch map with north arrow required
See attached site plan

* Required information

P3a continued

The original 1913 pump station was approximately 60 feet long by 34 feet wide. A 1948 addition to the south facade increased the length of the building 34 feet (the last five pairs of interior posts at the south end of the building; see Figure 2). The rusticated corner of the original south facade is still visible on the east facade (see Figure 3). The original south facade, with its rusticated walls and large central paneled door framed with a heavy molding, was replicated on the 1948 addition. The north facade also has rusticated corners, and the entire structure is set on a molded base. The stark east facade has three, large inset panels above four rectangular vents. The west facade is essentially a blank wall, except for the base and cornice frieze (framed with simple moldings) seen on the other three facades. A small wood-frame, shed-roof office/restroom addition projects from the northern end of the west facade.

Inside, the open interior houses primarily six large, electrically powered water pumps (all of which have been replaced since 1949). The pumps on the north half of the interior are in a pit recessed several feet into the floor. The interior, largely lit by the large central skylight, has a scored concrete floor. In the center of the east wall of the interior is a modern, pre-fabricated office area for the pump station operator. A steel beam along the top of the structural posts acts as a track for a crane that moves through the entire length of the interior.

B10 continued

In 1865, Spring Valley Water merged with San Francisco Water Works giving the company a monopoly on supplying San Francisco's water. In 1866, Spring Valley hired Hermann Schussler as its Chief Engineer. During the next 45 years, Schussler designed and constructed all the facilities to provide an adequate water supply for San Francisco. During the 1860s, water use in San Francisco increased substantially because of industrial growth as much as population growth. Consumption increased from 2 million gallons a day in 1860 to over 6 million in 1870. By 1875, the leaders of the Spring Valley Water company decided the entire Crystal Springs Valley in San Mateo County had to be developed to supply San Francisco with its future water supply. From 1875 to 1877, the Upper Crystal Springs Dam, an earthen dam, was constructed.

The planning to expand the Crystal Springs reservoir system continued into the 1880s as demand for water increased. The development of the Lower Crystal Springs reservoir involved building a large dam at a canyon formed by Crystal Springs Creek. The required height of this dam was to be unprecedented in American engineering. In 1888, there were only 17 dams over 95 feet tall in the world, and all of them were outside the United States. Based on foreign examples and his own engineering expertise, Schussler designed the first arch-gravity concrete dam in the United States. Schussler chose concrete as a building material for the dam because of the lack of good stone in the area and its strength to withstand earthquakes given the site's proximity to the San Andreas Fault. Work began on the dam in 1886, and because of delays resulting from bad weather, the dam was not completed until 1890. When completed, the 140 foot tall Crystal Springs dam was one the highest, and most costly, in the world. Schussler's system of interlocking irregularly shaped blocks of concrete used for the dam was considered particularly innovative. The structure's strength was tested in the 1906 earthquake when the dam received no serious damage. A 9 foot tall parapet wall was added to the top of the dam in 1911. To improve the water pumping system from the Lower Crystal Springs Reservoir into San Francisco, the pump station at the Crystal Springs Dam was constructed in 1913. The building originally housed two electrically operated pumps. The large increase in population on the San Francisco Peninsula after World War II led to the construction of the 1948 southern addition to the pump station which increased the size of the building by almost fifty per cent.

The 1989 *Historic Property Survey Report for the Lower Crystal Springs Dam* indicated the Crystal Springs Dam appeared to be eligible for the National Register under criteria a and c at a national level of significance. The dam was considered significant as a technological innovation and as part of the history of developing water supplies in large urban areas in the United States. In this earlier report, the Crystal Springs Pump Station was considered to be outside the area of potential eligibility for the Crystal Springs Dam. The 1913 pump station (with its major 1948 addition) was constructed considerably later than the period of primary significance for the Crystal Springs Dam (1886-1890). The pump station also is not associated with the significant early

B10 continued

period of the development of the Crystal Springs reservoir system by the Spring Valley Water Company. Architecturally, the pump station is not a distinguished example of a public utility building from this period. Although designed to complement the original building, the substantial 1948 addition has also altered the proportions of the original Renaissance style building, thus somewhat compromising its integrity.

In conclusion, the Crystal Springs Pump Station does not contribute to the significance of the Crystal Springs Dam, and the pump station itself does not appear to be individually eligible for the National Register because it is not significant under criteria a, b or c.

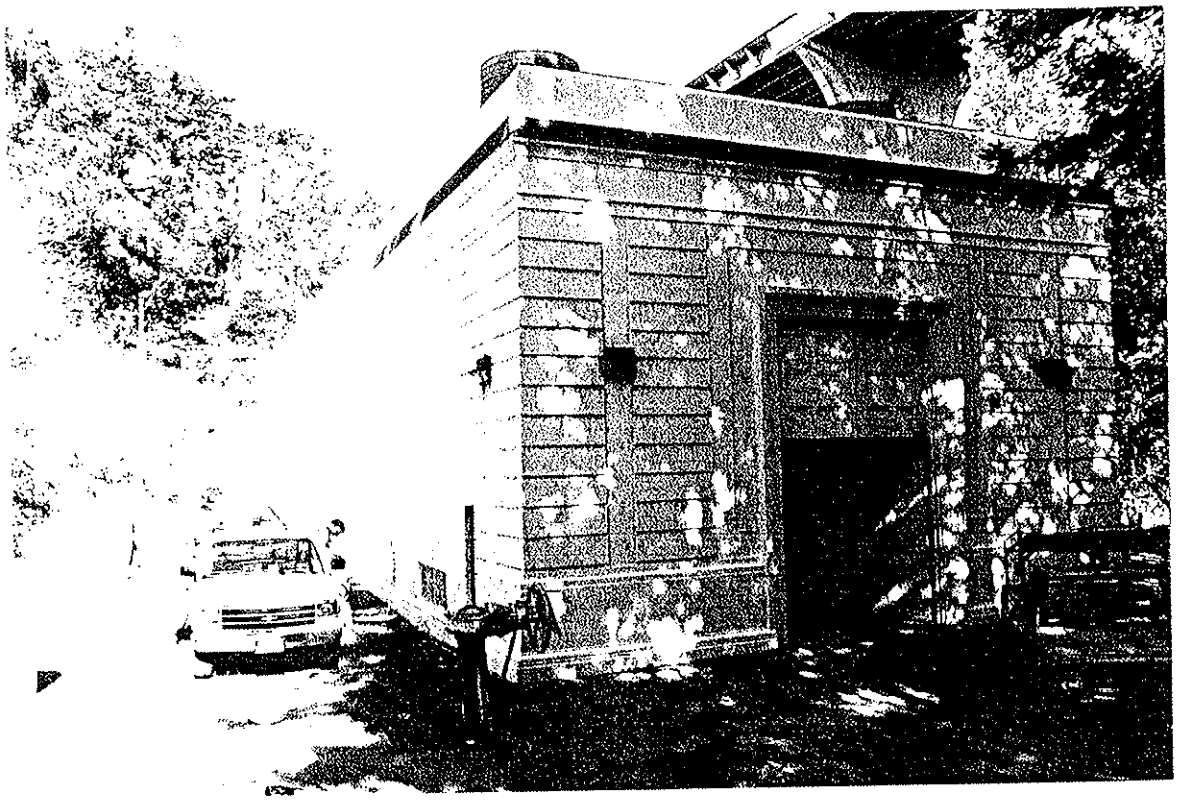
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CONTINUATION SHEET

Primary #_____
HRI #_____
Trinomial_____

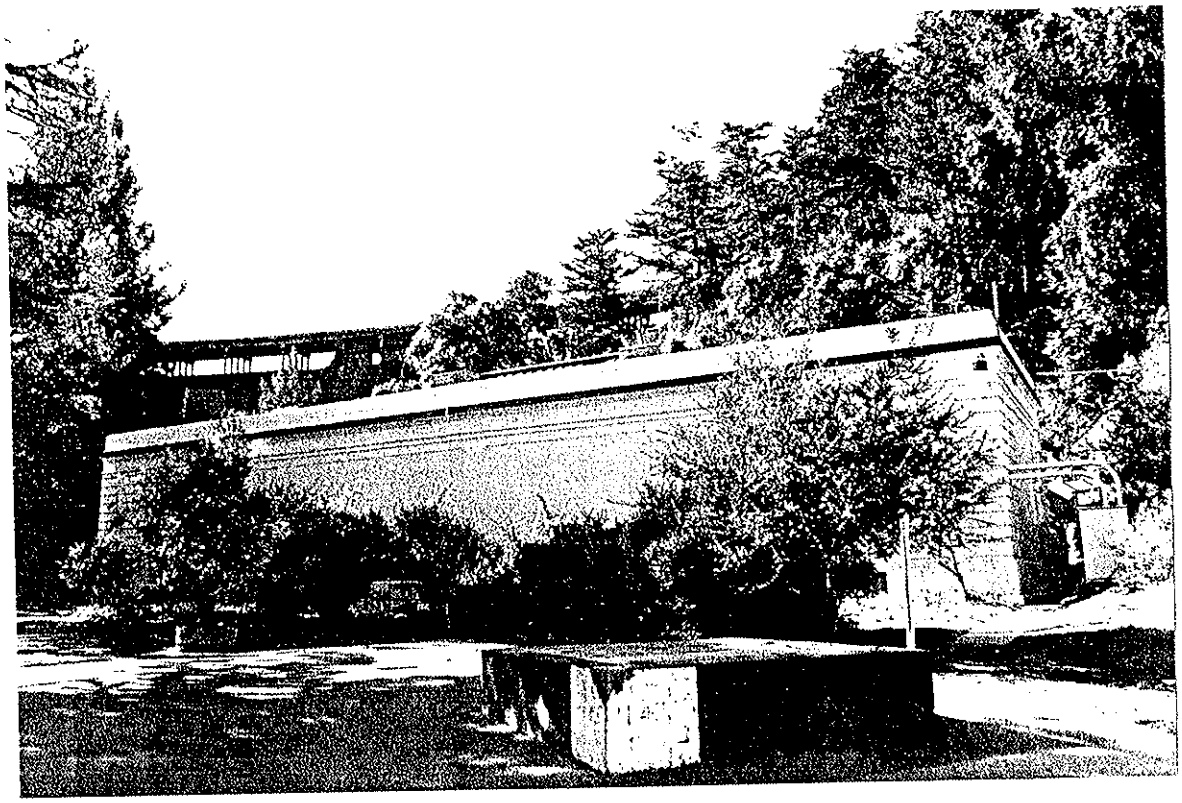
Page 5 of 8 *Resource Name of # (assigned by recorder) Lower Crystal Springs Dam Pump Station

*Recorded by Ward Hill *Date: December, 1996 X Continuation __Update



South and West Facades (view from southwest)

* Required information



East and North Facades (view from northeast)

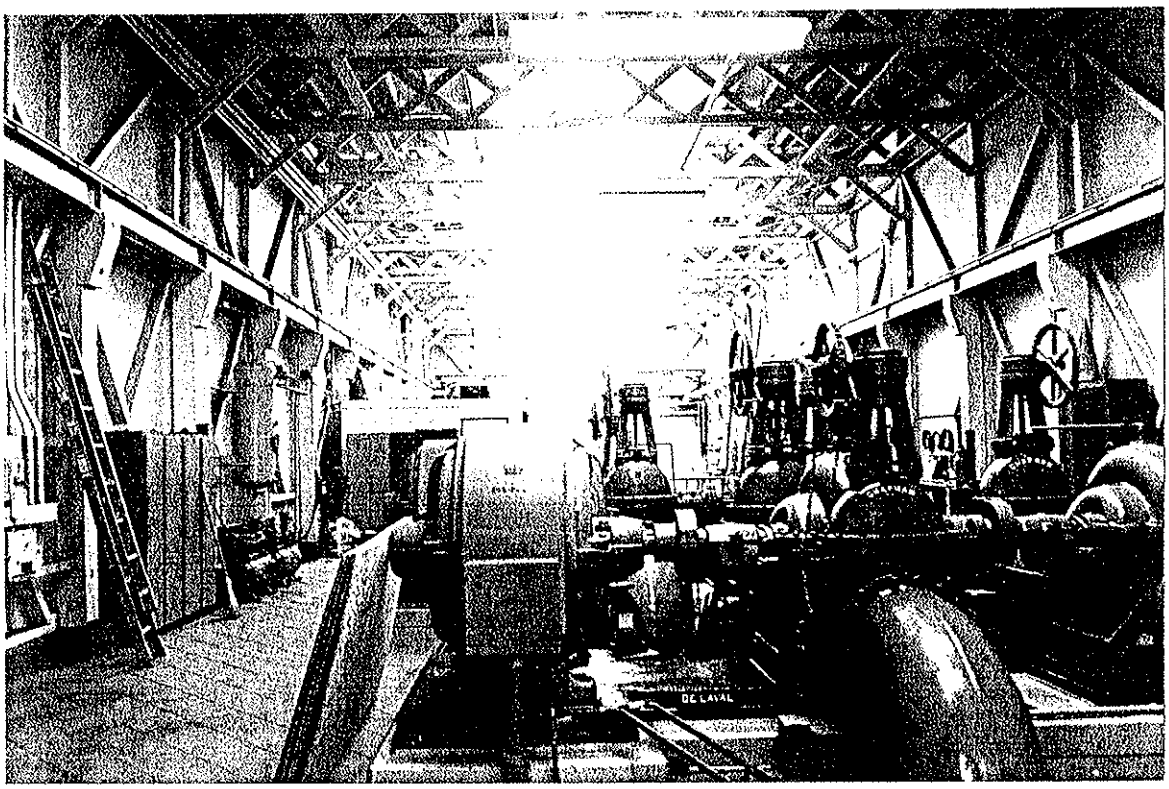
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CONTINUATION SHEET

Primary #_____
HRI #_____
Trinomial_____

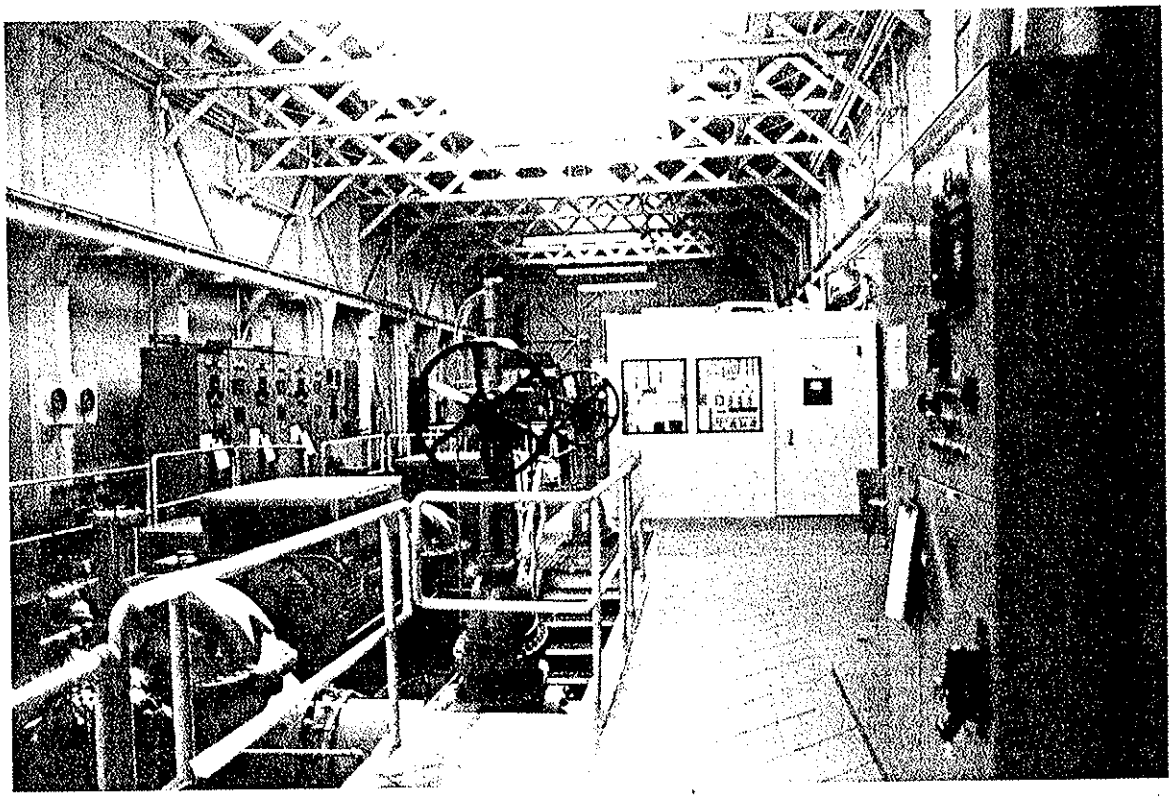
Page 7 of 8 *Resource Name of # (assigned by recorder) Lower Crystal Springs Dam Pump Station

*Recorded by Ward Hill *Date: December, 1996 X Continuation __Update



Interior (view from south)

* Required information



Interior (view from north)

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code 2S2
Other Listings Review Code	Reviewer Date

 ***Resource Name or #:** Lower Crystal Springs Dam

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** x **Unrestricted** ***a. County:** San Mateo

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** San Mateo **Date:** PR 1973 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: City: Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: The Lower Crystal Springs Dam is located west of San Mateo, near Interstate 280, approximately 500 feet south of the intersection of Crystal Springs Road and Skyline Boulevard.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The Lower Crystal Springs Dam is a concrete gravity arch structure located on the San Mateo Creek on the northeast bank of the Lower Crystal Springs Reservoir. The massive structure is comprised of irregularly shaped interlocking concrete blocks. The dam measures 154 feet in height and 600 feet in length. A concrete bridge supporting Skyline Boulevard runs atop the dam. The dam forms a reservoir with 22.6 billion gallon storage capacity.

***P3b. Resource Attributes:** (List attributes and codes) HP21, Dam

***P4. Resources Present:** ☐Building xStructure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) Photo #1, Lower Crystal Springs Dam, camera facing west, May 22, 2008

***P6. Date Constructed/Age and Sources:** xHistoric ☐Prehistoric ☐Both 1887-1890

***P7. Owner and Address:** San Francisco Public Utilities Commission
1000 El Camino Real
Millbrae, CA 94030

***P8. Recorded by:** (Name, affiliation, and address)
Kathryn Haley
ICF Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814

***P9. Date Recorded:** 5/22/2008

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report*. Prepared for San Francisco Public Utilities Commission, San Francisco, California.

***Attachments:** ☐NONE ☐Location Map ☐Sketch Map xContinuation Sheet xBuilding, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 2S2

***Resource Name or #** (Assigned by recorder) Lower Crystal Springs Dam

B1. Historic Name: San Mateo Dam, Lower Crystal Springs Dam
B2. Common Name:
B3. Original Use: Water impoundment
B4. Present Use: Water impoundment, road bridge base
***B5. Architectural Style:** N/A
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Spring Valley Water Works constructed the Lower Crystal Springs Dam during the years 1887 to 1890.

***B7. Moved?** X**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**
***B8. Related Features:** Crystal Springs Outlet Structure No. 1

B9a. Architect: Hermann Schussler (Engineer)
b. Builder: Spring Valley Water Works
***B10. Significance: Theme:** Water development
Area: San Francisco Bay Area
Period of Significance: 1886-1890
Property Type: Dam
Applicable Criteria: 1 and 3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Lower Crystal Springs Dam was constructed to a height of 145 feet between 1887 and 1890. In 1911, construction of a parapet wall top the upstream face of the dam raised the structure's height to 154 feet. In 1923-1924 a concrete bridge was built across the top of the dam. (Shoup 1989:7-12). In 1976, the Lower Crystal Springs Dam was listed as a California Historic Civil Landmark by the American Society of Civil Engineers. The Dam is also listed on the California Inventory of Historic Resources (Shoup 1989:1; SFPUC 2005:11). In 1989, Lower Crystal Springs Dam was determined individually eligible for NRHP listing under Criteria A and C for its association with the development of water storage and conveyance systems in the Bay Area and for its advancement of concrete dam engineering. (Gualtieri 1989). Hence the resource is also considered eligible for listing in the CRHR. The determination of eligibility was based on Laurence H. Shoup's (1989) findings, which included a discussion of the dam's character defining features. These features consist of the dam's location, the rural ambience of its setting, its design as a concrete gravity dam, the jigsaw-puzzle block arrangement of its construction, the visibility of its original concrete, and its original spillway. The period of significance for the dam is 1886 to 1890, the years during which the main structure was constructed. Nearby resources such as the Crystal Springs Outlet Structures were not identified as contributing features of the Lower Crystal Springs Dam in Shoup's 1989 evaluation (Shoup 1989:17).

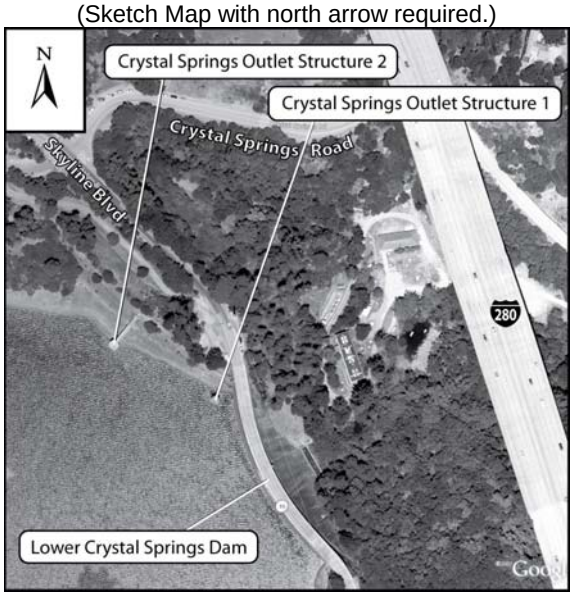
B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

For a complete list of references, see: ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report.* Prepared for San Francisco Public Utilities Commission, San Francisco, California.

B13. Remarks:

(Sketch Map with north arrow required.)



***B14. Evaluator:** Tim Yates, ICF Jones & Stokes

***Date of Evaluation:**
January 16, 2009

(This space reserved for official comments.)

Photographs (continued):

Photograph 2, bridge and parapet wall atop Lower Crystal Springs Dam

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code 3S
Other Listings Review Code	Reviewer Date

 ***Resource Name or #:** Crystal Springs Outlet Structure No. 1

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** x **Unrestricted** ***a. County:** San Mateo

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** San Mateo **Date:** PR 1973 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: City: Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

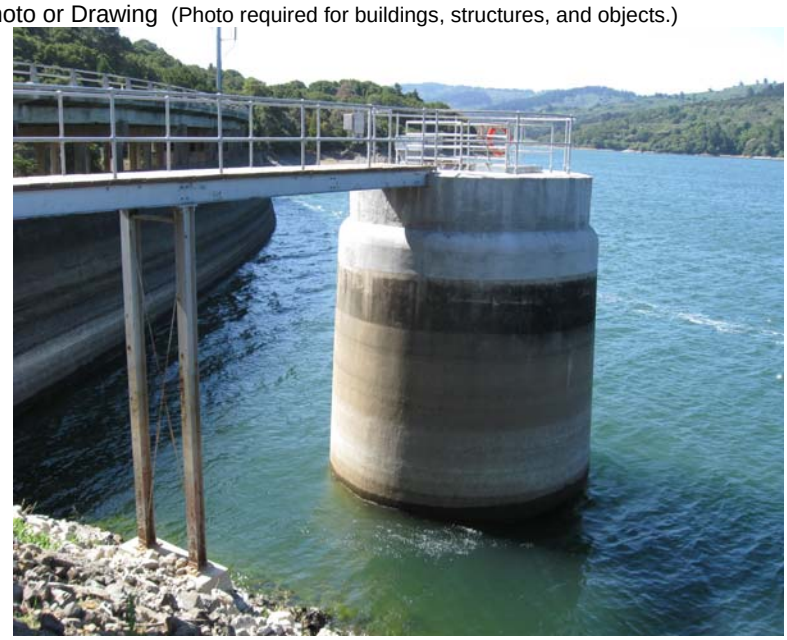
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: Crystal Springs Outlet Structure No. 1 is located west of San Mateo, near Interstate 280, approximately 500 feet south of the intersection of Crystal Springs Road and Skyline Boulevard. This structure is situated approximately 40 feet north of the north end of Lower Crystal Springs Dam.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The tower of Crystal Springs Outlet Structure No. 1 is a spherical structure comprised of brick and concrete. It is flat roofed and topped with metal rails. A walkway with railing supported by posts, all made of steel, extends from the structure to the shoreline. The structure includes three reinforced-concrete lined adits and is connected to a 370-foot long tunnel constructed of reinforced mortar-lined brick masonry. The tunnel houses a 54″ riveted steel pipe which connects to the CSPS. The interior of the entire structure is accessible to maintenance workers.

***P3b. Resource Attributes:** (List attributes and codes) HP20, Canal/aqueduct

***P4. Resources Present:** ☐Building xStructure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) Photo #1, tower of Crystal Springs Outlet Structure No. 1, camera facing south, May 22, 2008

***P6. Date Constructed/Age and Sources:** xHistoric ☐Prehistoric ☐Both 1887-1889

***P7. Owner and Address:** San Francisco Public Utilities Commission
1000 El Camino Real
Millbrae, CA 94030

***P8. Recorded by:** (Name, affiliation, and address)
Kathryn Haley
ICF Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814

***P9. Date Recorded:** 5/22/2008

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report*. Prepared for San Francisco Public Utilities Commission, San Francisco, California.

***Attachments:** ☐NONE ☐Location Map ☐Sketch Map xContinuation Sheet xBuilding, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3S

***Resource Name or #** (Assigned by recorder) Crystal Springs Outlet Structure No. 1

B1. Historic Name: Crystal Springs Outlet Structure No. 1
B2. Common Name:
B3. Original Use: Water conveyance
B4. Present Use: Water conveyance
***B5. Architectural Style:** N/A
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Spring Valley Water Works constructed the Crystal Springs Outlet Structure between 1887 and 1889 as the company built the Lower Crystal Springs Dam.

***B7. Moved?** X**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**
***B8. Related Features:** Lower Crystal Springs Dam

B9a. Architect: Hermann Schussler (Engineer)
b. Builder: Spring Valley Water Works
***B10. Significance: Theme:** Water development
Area: San Francisco Bay Area
Period of Significance: 1886-1890
Property Type: Reservoir outlet
Applicable Criteria: 3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
The Crystal Springs Outlet Structure No. 1 was constructed in 1887-1889 in conjunction with the Lower Crystal Springs Dam (also known historically as San Mateo Dam), both designed by Spring Valley's chief engineer, Hermann Schussler. Shussler and Spring Valley built the outlet structure into the hillside at the dam's north abutment.

The structure's tunnel, shaft, and branch tunnels leading from the reservoir through the hillside to the shaft were constructed of brick and concrete, and comprised a separate structure from the concrete dam. Crews drove the 390-foot wide and 9-foot diameter tunnel under the dam's north abutment. The tunnel was driven through earth and rock to run underneath the dam. (Wilson 1909: 503.) The outlet structure's 20-foot diameter outlet shaft was built to a height of 130 through the hill and connected to the reservoir end of the tunnel. The structure extended approximately 40 feet vertically above the hillside, through the reservoir waters, and above the surface. Schussler's crews constructed three branch tunnels or "adits' at varying elevations which extended from the outlet shaft, through the hill, and into the reservoir at different elevations. The adit lengths were 180 feet (lower), 16 feet long (middle), and 19 feet long (upper). The outlet structure's multi-level adit design allowed water to be drawn from the reservoir's varying surface level as long as that level remained within a range of approximately 120 feet below the spillway at the dam's crest. (Engineering News 1889:183; Schuyler 1901: 201, 203; Schussler 1906:69; Wegmann 1918:135.) (See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

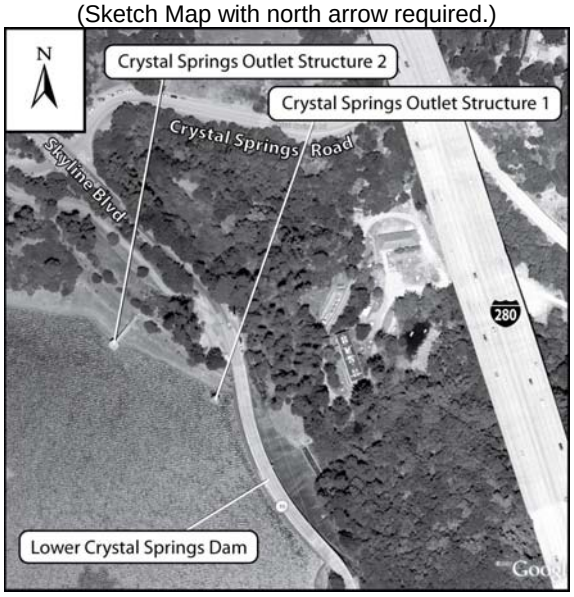
For a complete list of references, see: ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report.* Prepared for San Francisco Public Utilities Commission, San Francisco, California.

B13. Remarks:

***B14. Evaluator:** Tim Yates, ICF Jones & Stokes

***Date of Evaluation:**
January 16, 2009

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

B10. Significance (continued):

Valve, pipe, and gate facilities provided for water conveyance through the structure's adits, shaft, and tunnel. Fish screens at the ends of each adit encompassed the inlets, which consisted of bell mouths, brass-lined seats with butterfly valves, and fish screens. The flow of water through the adit pipes to the shaft's standpipe was controlled by gate valves located in the main shaft. At the base of the shaft the standpipe connected to a 54-inch riveted steel pipe running through the tunnel. This pipe in turn connected to the 44-inch Crystal Springs distribution pipeline at a regulating gate located at the outlet tunnel portal. (Shoup 1989:9; Shuyler 1901:203; Wegmann 1918.)

Crystal Springs Outlet Structure No. 1 was one of the more notable outlet structures built during the late nineteenth century. It was likely the first selective multi-level (or multi-elevation) outlet works of its type. Manuals on water engineering and dam construction published as late as 1916 pointed to the first Crystal Springs Outlet Structure as the premier example of the selective multi-level outlet structure built near rather than into a dam. (Wilson 1909:500-506; Merriman et al. 1916:1051-1053.) Indeed, the design of this outlet structure gave it several advantages over other types of reservoir outlets built during the latter nineteenth century.

One advantage the Crystal Springs Outlet Structure's design was accessibility. Engineering News noted in 1889 that maintenance workers "can . . . . pass dry-shod through the main tunnel and up the shaft, inside the reservoir, alongside the delivery pipes." Describing the Crystal Springs Outlet Structure No. 1 in 1901, James D. Schuyler, one of the leading dam engineers in the United States, wrote: "this is an admirable form of outlet, as all the pipes from the shaft are accessible to inspection and repair." The outlet structure's fish screens were maintained by reservoir divers. (Engineering News 1889:183; Schuyler 1901:203.) However, the outlet's design allowed the entirety of its interior gate and pipe works to be accessed by Spring Valley maintenance workers, who could descend into the structure from the top of the shaft or enter it from the outlet portal. Many outlet works of the era, including some multi-level outlet works, were built into the dam structures that necessitated their construction. However, few outlet structures—whether built into dam structures or not—allowed for the kind of maintenance access provided by the design of Crystal Springs Outlet Structure No. 1. During the latter nineteenth century, this first Crystal Springs Outlet Structure was the only multi-elevation reservoir outlet to be built in the United States as a structure separate from its associated reservoir-impounding dam which allowed for interior maintenance access to the entirety of its gate and valve facilities. (Schuyler 1901: 31, 39, 53, 61, 93, 67-66, 100, 162, 200, 203, 221, 226, 223, 289, 296, 303-308, Wegmann 1918: 151-153, 176-178, 185, 189-190, 200, 205.)

Perhaps most importantly, the design of the Crystal Springs Outlet Structure No. 1 had the advantage of allowing Schussler and Spring Valley to maximize the strength of the concrete Lower Crystal Springs Dam. Spring Valley had previously constructed 3 large earthen dams (1860s to mid 1880s) within several miles of the Lower Crystal Springs Dam and Outlet No. 1 site. By the late 1880s, Schussler and Spring Valley executives were aware of the San Andreas fault's presence in the vicinity of the site (SFPUC 2005: 5, 8-10; Shoup 1989:5). Not only did building outlet works into dam structures complicate dam construction, it meant sacrificing the full potential strength and structural integrity of the dam. (Merriman et al. 1916: 1052; Wilson 1909:503.) By building the Crystal Springs Outlet Structure No. 1 into hillside rock and as a separate structure from the unprecedentedly massive (for concrete water structures) Lower Crystal Springs Dam, Schussler could implement the dam's innovative interlocking concrete-block method of construction throughout the entirety of the structure. Hence the design of Outlet No. 1 was determined in part by the design of the dam, and visa versa. Both were ultimately shaped, if to different degrees, by the threat of earthquake.

The Crystal Springs Outlet Structure No. 1 design also insured that water could be delivered into the distribution line despite major fluctuations in the reservoir's water levels. During the late nineteenth century, water levels in Spring Valley's San Mateo reservoirs were apt to fluctuate seasonally. Not until the 1920s did Crystal Springs Reservoir receive regular inflow from water conveyed to San Mateo from the east (SFPUC 2005: 13, 40-41). Selective multi-level outlet works along the lines of the Crystal Springs Outlet Structure No. 1 have evolved as a means of manipulating outlet water temperature and controlling for potential water turbidity or salinity.

Crystal Springs Outlet Structure No. 1 appears to meet the criteria for listing in the CRHR as a contributing feature of the Lower Crystal Springs Dam. Its historical significance derives from its innovative design, its association with master water engineer Hermann Schussler, and its contribution to the historic significance of Lower Crystal Springs Dam. The period of significance is 1886-1890, the years during which Hermann Schussler and Spring Valley constructed the Lower Crystal Springs Dam and Outlet Structure No. 1. (See Continuation Sheet)

B10. Significance (continued):
Crystal Springs Outlet Structure No. 1 does not appear to be significant under other CRHR criteria. Individually, Crystal Springs Outlet Structure No. 1 did not make a significant contribution to water development or other aspects of regional, state, or national history (CRHR Criterion 1). Beyond its association with engineer Hermann Schussler, whose significance as the designer of the resource is appropriately evaluated under CRHR Criterion 3, Crystal Springs Outlet Structure No. 1 is not known to be associated with persons who have shaped the history of the local area, region, state, or nation (CRHR Criterion 2).

The Crystal Springs Outlet Structure No. 1 does appear to be eligible for listing in the CRHR under Criterion 3 as a contributing resource to the Lower Crystal Springs Dam. It is likely that at the time of its construction, no other outlet structure built separately from a dam allowed for equivalent control of the drawing of water from a reservoir within as wide a range of surface level variance. Moreover, the Crystal Springs Outlet Structure No. 1 was praised in engineering circles for its design, which allowed all of its pipe and gate facilities to be accessed by maintenance workers from its interior. It appears to have become the model of outlet works of its dam-independent and multi-level type. Although some nineteenth-century outlet works built into dam structures did provide for multi-level water draw and offered ample maintenance accessibility, many made recourse to pipes imbedded in concrete. In general, many outlet features of the era required maintenance from water bound divers. No other nineteenth century outlet structure besides the Crystal Springs Outlet Structure No. 1 —let alone any outlet structure built for urban water distribution during the nineteenth century—provided an equivalent combination of multi-level water draw range and maintenance accessibility. Moreover, no other nineteenth-century outlet structure design provided this combination of multi-level range and maintenance accessibility while allowing the dam structure necessitating its construction to be designed and built for maximum possible strength.

This was especially significant given the location of the Lower Crystal Springs Dam and the No. 1 Outlet Structure. The threat of earthquake posed by the nearby San Andreas Fault led Hermann Schussler to build the Lower Crystal Springs Dam utilizing Portland Cement. This allowed Schussler to implement the interlocking-block design and method of construction to produce a nineteenth-century masonry dam of unparalleled size and strength. Dam strength necessity, maintenance access to the outlet work's facilities, and multi-level water draw capability appropriate to the reservoir's predicted surface level variation all informed the design and construction of the Crystal Springs Outlet Structure No. 1. As a testament to their designs and methods of construction, both the dam and the outlet structure withstood the 1906 earthquake without major structural damage. Moreover as an innovative multi-level outlet structure built separately from, but in close proximity to, its associated dam, the Crystal Springs Outlet Structure No. 1 appears likely to have influenced the outlet works of subsequently constructed, historically notable, and increasingly large dams projects, including Cheeseman Dam, Shoshone Dam (later renamed Buffalo Bill Dam), and even Hoover Dam.

In 1989 the Lower Crystal Spring's Dam was determined eligible for the NRHP listing under Criterion A for its contribution to Bay Area water development, and under Criterion C, for its interlocking concrete block method of construction and for its association with master water engineer Hermann Schussler. (Gualtieri 1989). Laurence H. Shoup of Archaeological and Historical Consultants evaluated the property and recommended that it be considered eligible for the NRHP. Shoup's evaluation and SHPO's concurrence focused solely on the dam structure itself. (Shoup 1989; Gualtieri 1989.) The Crystal Springs Outlet Structure No. 1 was not evaluated. ICF Jones & Stokes recommends that the Crystal Springs Outlet Structure No. 1 be considered eligible for listing in the CRHR under Criterion 3, as a resource which contributes to the historic significance of the Lower Crystal Springs Dam. Dams constructed for water supply reservoirs require water-conveying outlet works, and nineteenth-century dams and outlet facilities were typically designed in unison. Construction of Lower Crystal Springs Dam was a process that shaped and was shaped by the Crystal Springs Outlet Structure No. 1. An outlet structure was necessary for the dam and reservoir to function as water supply resources. Intended to maximize strength in an earthquake-prone area, the dam's design and construction method necessitated a separate outlet structure.

In conjunction with the desirability of multi-level water draw capability and thorough maintenance accessibility, the requirement of maximum dam strength informed the innovative design of the outlet. The result was a dam structure that proved highly influential in the history of dam engineering in the United States, and an outlet structure which became a model for reservoir outlets built as separate structures from their associated dams. As water engineering features, the developmental and functional relationships between the dam and the outlet appear to enhance the historical significance of both structures as water engineering features. (See Continuation Sheet)

B10. Significance (continued):
The character defining features of the Crystal Springs Outlet Structure No. 1 are its structural separateness from the Lower Crystal Springs Dam; the brick and concrete materials of its superstructure; its multi-level withdraw capability; and the maintenance access to adit tunnel facilities, shaft piping, tunnel and tunnel piping, and gate facilities provided by the structure's design.

Crystal Springs Outlet Structure No. 1 retains integrity to its period of significance, exhibiting only minor changes that do not detract from its engineering or design. Over time, the original railing atop the outlet walkway and shaft has been replaced by modern steel railing. The original gate house at the downstream end of the tunnel is also no longer extant. Built over a century ago, the outlet structure does include some cracks and leakage. The lower adit is not currently utilized. Although the outlet structure is in need of repair, it appears to retain enough integrity of design, workmanship, and materials to convey its character defining features as a resource which contributes to the historical significance of the Lower Crystal Springs Dam.

Photographs (continued):

Photograph 2, Crystal Springs Outlet Structure No. 1

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code 6Z
Other Listings Review Code	Reviewer Date

 ***Resource Name or #:** Crystal Springs Outlet Structure No. 2

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** x **Unrestricted** ***a. County:** San Mateo

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** San Mateo **Date:** PR 1973 **T** ; **R** ; **¼ of** **¼ of Sec** ; M.D. **B.M.**

c. Address: City: Zip:

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

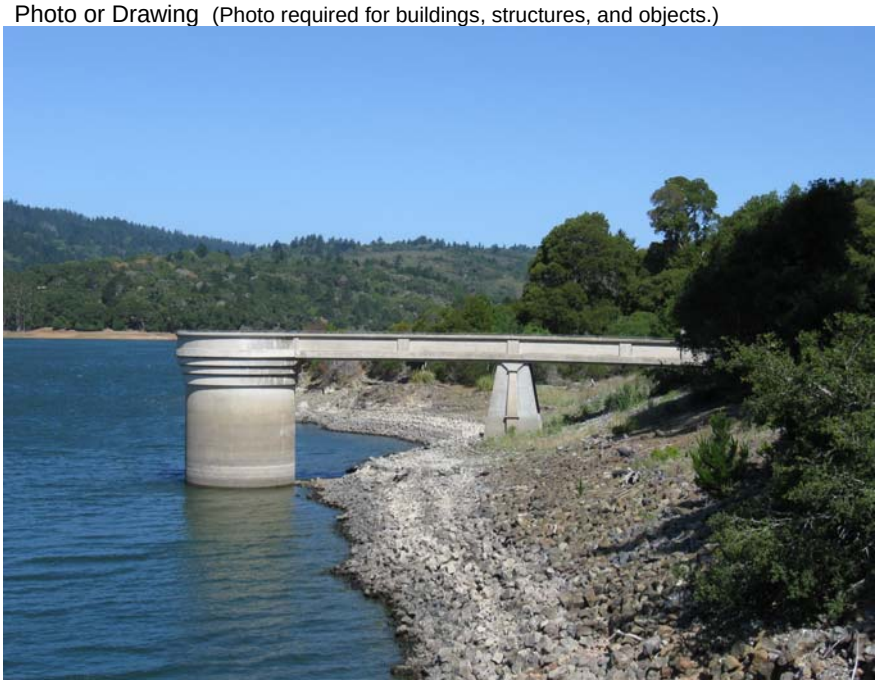
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: Crystal Springs Outlet Structure No. 1 is located west of San Mateo, near Interstate 280, approximately 500 feet south of the intersection of Crystal Springs Road and Skyline Boulevard. This structure is situated approximately 400 feet north of the north end of Lower Crystal Springs Dam.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The spherical tower of Crystal Springs Outlet Structure No. 2 is comprised of reinforced concrete and is set into a gravel and rock hillside. The lower portion of the structure is smooth concrete with a decoratively wedged upper element forming a flat roof. A concrete walkway with recessed side panels is supported by a concrete buttress which extends from the tower to the shoreline. The structure includes three reinforced-concrete lined adits and a 16-foot diameter, 640-foot tunnel made of reinforced concrete which houses a 78″ welded steel pipeline.

***P3b. Resource Attributes:** (List attributes and codes) HP20, Canal/aqueduct

***P4. Resources Present:** ☐Building xStructure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) Photo #1, tower and walkway of Crystal Springs Outlet Structure No. 2, camera facing northwest, May 22, 2008

***P6. Date Constructed/Age and Sources:** xHistoric ☐Prehistoric ☐Both 1931-1936

***P7. Owner and Address:** San Francisco Public Utilities Commission
1000 El Camino Real
Millbrae, CA 94030

***P8. Recorded by:** (Name, affiliation, and address)
Kathryn Haley
ICF Jones & Stokes
630 K Street, Suite 400
Sacramento, CA 95814

***P9. Date Recorded:** 5/22/2008

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report*. Prepared for San Francisco Public Utilities Commission, San Francisco, California.

***Attachments:** ☐NONE ☐Location Map ☐Sketch Map xContinuation Sheet xBuilding, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Crystal Springs Outlet Structure No. 2

B1. Historic Name: Crystal Springs Outlet Structure No. 2
B2. Common Name:
B3. Original Use: Water conveyance
B4. Present Use: Water conveyance

***B5. Architectural Style:** N/A

***B6. Construction History:** (Construction date, alterations, and date of alterations)
The San Francisco Water Department (SFWD) constructed the Crystal Springs Outlet Structure No. 2 between 1931 and 1936. The structure's tower and 10 feet of its tunnel were constructed in 1931. The tunnel was completed and the outlet pipe laid in 1936.

***B7. Moved?** X**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**

***B8. Related Features:** Lower Crystal Springs Dam

B9a. Architect:
b. Builder: San Francisco Public Utilities Commission / San Francisco Water Department

***B10. Significance: Theme:** Water development **Area:** San Francisco Bay Area
Period of Significance: 1931-1936 **Property Type:** Reservoir outlet **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Crystal Springs Outlet Structure No. 2 was built between 1931 and 1936 by the City of San Francisco, which acquired Spring Valley in 1930. The outlet's construction was likely initiated in anticipation of Bay Division Pipeline No. 2, completed in 1936 to deliver additional Hetch Hetchy and southern Alameda County water across the southern Bay, and built on the same alignment as Bay Division Pipeline No. 1. In 1931 SFWD constructed the outlet tower and 10 feet of tunnel for Crystal Springs Outlet Structure No. 2 north of the No. 1 Outlet Structure. (SFPUC Annual Report 1935-1936:34-35). In 1936, as the City completed the second Bay Division Pipeline, it built the remaining 630 feet of the outlet structure's concrete-lined tunnel. With Public Works Administration funding, SFWD also laid a 60-inch welded-steel pipeline from the new outlet to Burlingame. This and several other new sections of tunnel and pipeline were completed to convey water from Crystal Springs Outlet Structure No. 2 to University Mound Reservoir in San Francisco. (SFPUC Annual Reports 1935-1936:17, 34; 1936-1937:34; SFPUC 2005:40.) The design of the newer outlet structure essentially repeated the main features of the older outlet's multi-level adit design.

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

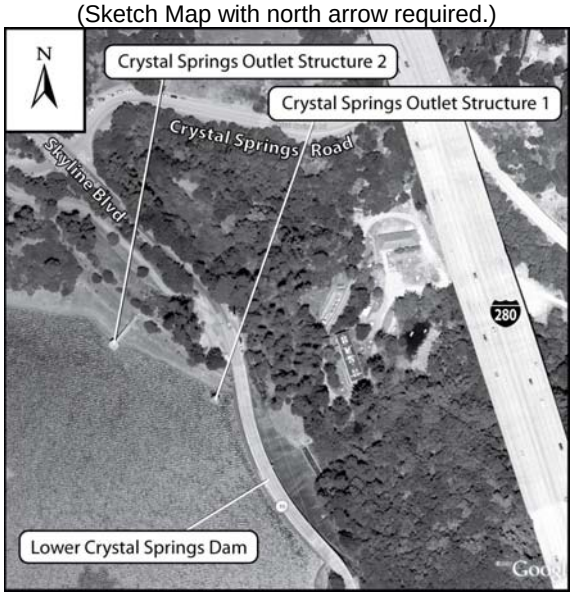
For a complete list of references, see: ICF Jones & Stokes. 2009. *Crystal Springs Transmission Upgrade Project Archaeological Survey and Architectural Inventory and Evaluation Report.* Prepared for San Francisco Public Utilities Commission, San Francisco, California.

B13. Remarks:

***B14. Evaluator:** Tim Yates, ICF Jones & Stokes

***Date of Evaluation:**
January 16, 2009

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

B10. Significance (continued):

The Crystal Springs Outlet Structures No. 2 does not appear to meet the criteria for listing in the CRHR. SFWD constructed this outlet during the 1930s. Its period of significance is 1931-1937, during which the City of San Francisco acquired the properties of the Spring Valley Water Company, completed the Hetch Hetchy project, and integrated the two systems in ways that involved construction of new facilities in the area of Lower Crystal Springs Dam. The project to construct Outlet Structure No. 2 was funded in part by the Public Works Administration under the National Recovery Act. Numerous infrastructure projects in the Bay Area were funded by or constructed by workers employed by New Deal federal agencies during the Depression era. Overall, then, this is not notable for its association with water or infrastructure development in the Bay Area, state, or nation during the interwar years and therefore does not appear to meet CRHR Criterion 1). The outlet structure is also not known to be associated with a person who made significant contributions to local, state, or national history (CRHR Criterion 2). Nor is it known to be associated with a master water engineer. The multi-level adit and accessible tower design of the Crystal Springs Outlet Structure No. 2 was essentially derivative of the older Crystal Springs Outlet Structure No. 1. Outlet No. 2 does not, therefore, appear to be eligible under CRHR Criterion 3. In summary, The Crystal Springs Outlet Structure No. 2 does not appear to meet the criteria for listing in the CRHR.

Photographs (continued):

Photograph 2, Crystal Springs Outlet Structure No. 2

State of California ♦ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 **of** 5 ***Resource Name or #:** (Assigned by recorder) Upper Crystal Springs Dam **P1.**
***a. County** San Mateo **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** San Mateo **Date** 1980 **T** 5S; **R** 5W; ___¼ **of** ___ ¼ **of Sec.**; _____**B.M.**
c. Address _____ City _____ Zip _____
d. UTM: (Give more than one for large and/or linear resources) Zone 10N, 557,250 m E / 4,151,542 m N
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Located on San Francisco watershed lands in San Mateo County, California, the Upper Crystal Springs Dam is an earthfill dam. It was constructed between 1875 and 1877 as part of Spring Valley Water Company's system of reservoirs serving the City of San Francisco.

The Upper Crystal Springs Dam is now used as a roadway, part of State Highway 92 connecting the City of San Mateo to Half Moon Bay on the Pacific Coast. The road is built directly on top of this dam, and fill has been placed on the dam to create the road. The dam is over 500 feet long and about 90 feet wide at its base. It divides Upper and Lower Crystal Springs Reservoirs.

***P3b. Resource Attributes:** (List attributes and codes)
***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)
P5b. Description of Photo: (view, date, accession #) North face of Upper Crystal Springs Dam SE view
***P6. Date Constructed/Age and Source:** ☒ Historic ☐ Prehistoric
☐ Both

P5a. Photograph

***P7. Owner and Address:**
SFPUC

***P8. Recorded by:** (Name, affiliation, and address)
Don Craig
Entriix, Inc
590 Ygnacio Valley Road
Walnut Creek, CA

***P9. Date Recorded:** 11/01/06

***P10. Survey Type:** (Describe)
Pedestrian

P11. Report Citation: (Cite survey report and other sources, or enter "none.")
None

***Attachments:** ☐ NONE ☒ Location Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):_____

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code

 *Resource Name or # (Assigned by recorder) Upper Crystal Springs Dam

B1. Historic Name: Upper Crystal Springs Dam

B2. Common Name:

B3. Original Use: Dam B4. Present Use: Road Causeway

*B5. Architectural Style: Earthfill dam

*B6. Construction History: (Construction date, alterations, and date of alterations)

Upper Crystal Springs Dam was constructed from 1874 to 1877. When completed to its final height of 83 feet, Upper Crystal Springs Dam was 30 feet wide at its crest and extended over 500 feet across the valley. In 1891, concrete spillway replaced the original brick-lined outlet tunnel and wooden This concrete spillway was entirely removed and the outlet tunnel was damaged in 1906 and rebuilt in 1924.

*B7. Moved? ☒ No ☐Yes ☐Unknown Date: _____ Original Location:

*B8. Related Features:

Upper and Lower Crystal Springs Reservoirs

B9a. Architect: Hermann Schussler b. Builder: Hermann Schussler

*B10. Significance: Theme engineering and technological history Area _____

Period of Significance 1874-1889 Property Type Structure Applicable Criteria

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Upper Crystal Springs was a substantial dam built using modern techniques during a period of growth in earthfill dam construction. The period of its significance is 1874-1889, when it served as the single largest part of San Francisco's water supply infrastructure. The 1891 and later changes to the dam involved fundamental changes to its design and function. As a composite of several distinct building and removal phases, then, and lacking the ability to hold water, this dam does not have good integrity of design.

B11. Additional Resource Attributes: (List attributes and codes)

*B12. References:

"Historic Resources Evaluation Report: Upper Crystal Springs Dam," Laurence H. Shoup, PhD, SFPUC, February 2007.

B13. Remarks:

Upper Crystal Springs Dam does not appear to be eligible for the National Register of Historic Places. The dam is a typical, if fairly common, example of its type. While the structure of the dam itself has changed little since its construction, it no longer serves its original function of water retention. The current use of the dam as a road bed, the concealment of its dry (downstream) face by the waters of the Lower Crystal Springs Reservoir, and the lack of a spillway, make it difficult for the average observer to identify the structure as a dam or to associate it with the historical period of its construction. Because of these reasons, it cannot be said to have sufficient integrity of setting, feeling, association, workmanship, or materials to be an authentic example of its theme and to convey its significance as a historic dam.

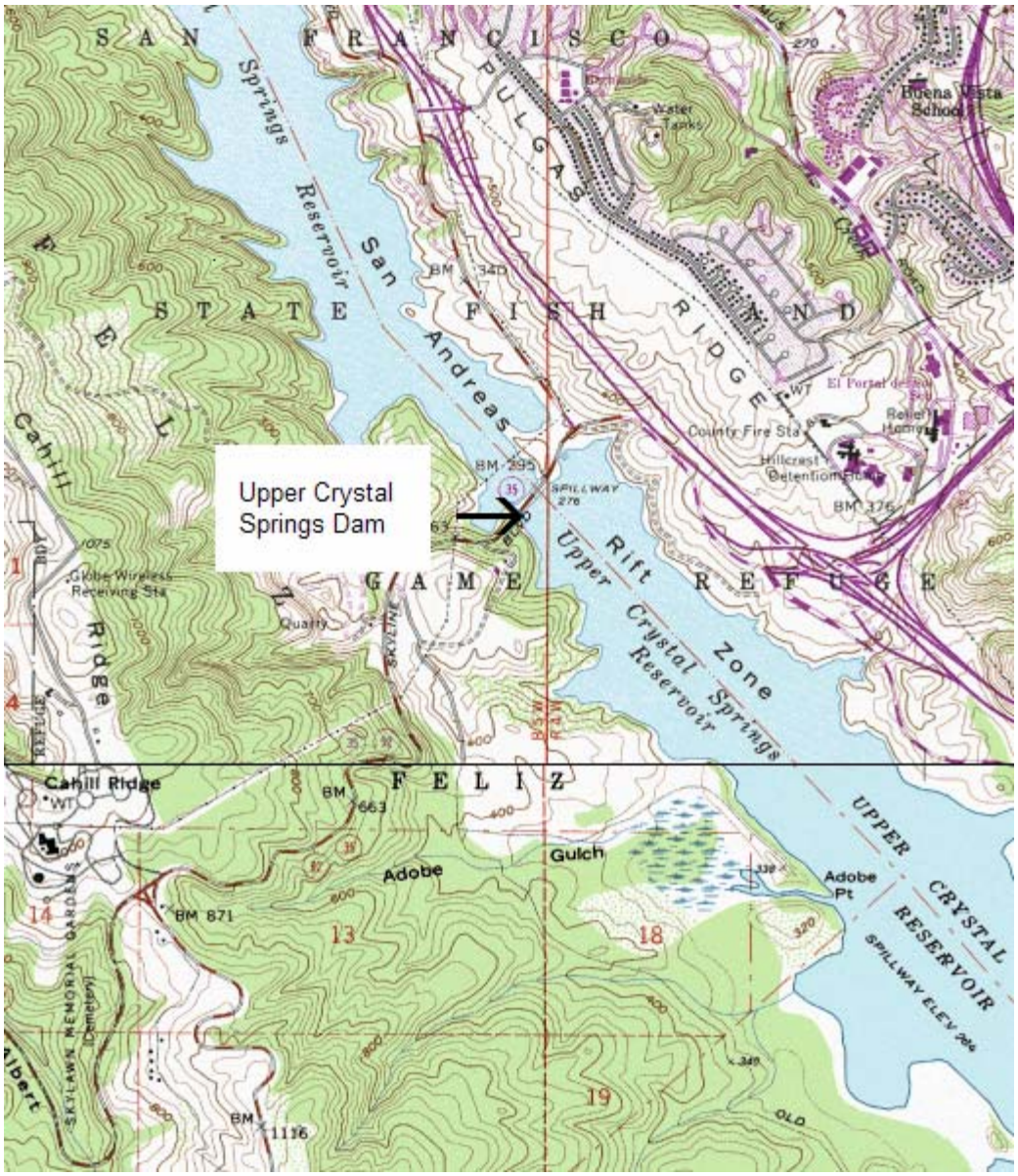
*B14. Evaluator: Laurence H. Shoup, PhD

*Date of Evaluation: February 2007

(Sketch Map with north arrow required.)

(This space reserved for official comments.)

Page 3 **of** 5 ***Resource Name or #** (Assigned by recorder) Upper Crystal Springs Dam
***Map Name:** San Mateo Quad ***Scale:** 1/24,000 ***Date of map:** 1980



South Face of Upper Crystal Springs Dam. North view.

South Face of Upper Crystal Springs Dam. Southwest view.

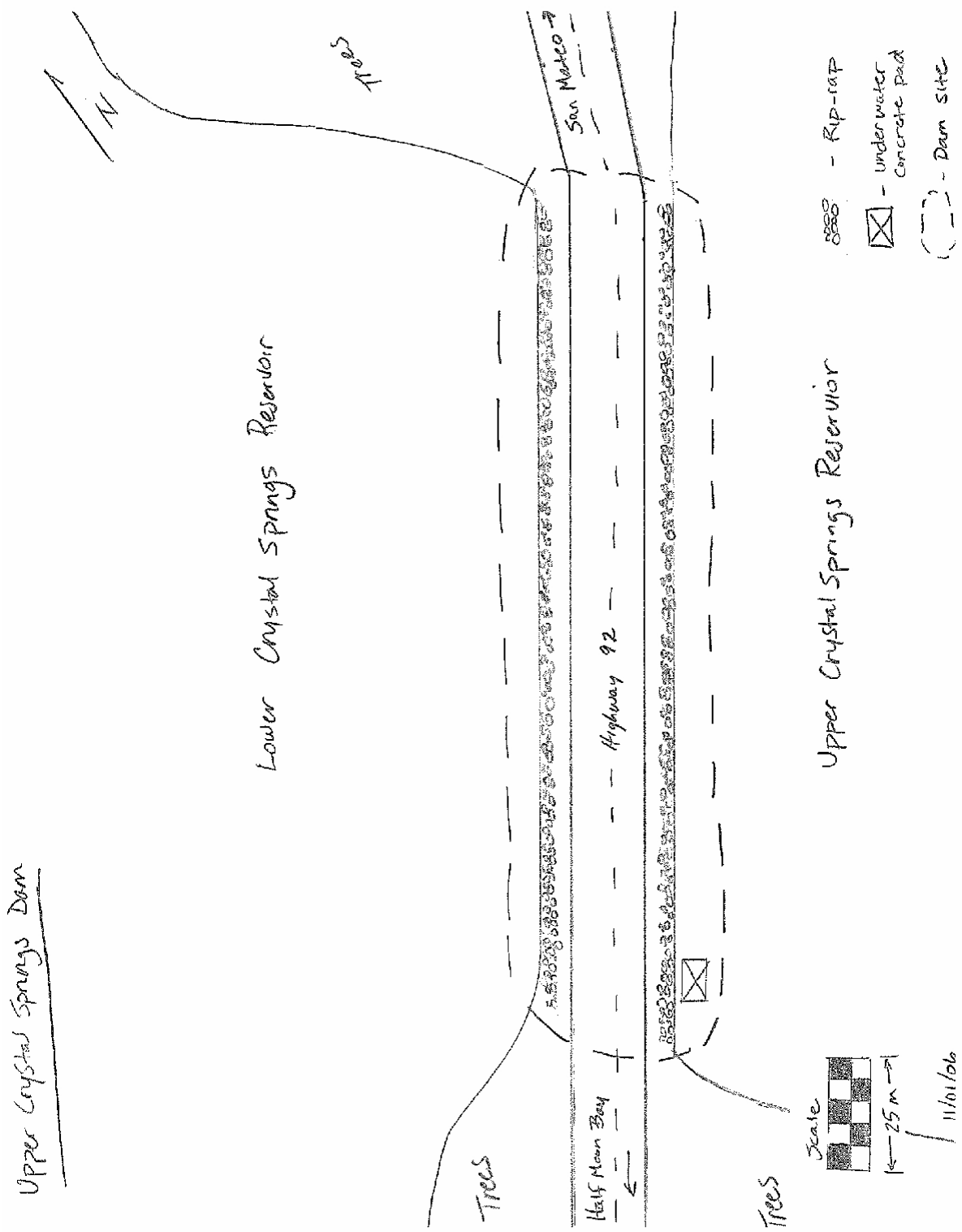
Rip-rap size and layout on north dam face.

Upper Crystal Spring Reservoir from dam. Southeast view.

State of California ♦ The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page 4 of 5 ***Resource Name or #** (Assigned by recorder) Upper Crystal Springs Dam

Drawn by: Don Craig ***Date of map:** 11/01/06



State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 **of** 13 ***Resource Name or #:** (Assigned by recorder) South Crystal Springs Cottage

P1. Other Identifier: None

***P2. Location:** 9 **Not for Publication** ☐ **Unrestricted**

***a. County** San Mateo **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Woodside **Date** 1991 **T** 5S; **R** 4W; NE **3 of** NW **3 of Sec** 17; Mt. Diablo **B.M.**

c. Address Cañada Road City near San Mateo, CA Zip 94402

d. UTM: (Give more than one for large and/or linear resources) Zone 10, 559225.27 mE/ 4149931.237 mN (NAD83)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
This property is the oldest of the extant reservoir keeper's cottages and the structure is still used for this purpose. Records differ, but the Spring Valley Water Company built the cottage in either 1891 or 1896 (Babal 1990). The cottage consists of a single-story frame structure with a shingled gable roof measuring 44' x 62' with two additions that measure 19' x 30' and 8' x 16' (Babal 1990). The wings may represent later additions to the original structure.

***P3b. Resource Attributes:** (List attributes and codes) HP2, HP4

***P4. Resources Present:** ■ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) Photo of South Crystal Springs Cottage; view West; 1/23/2008; Crystal Springs Photos #01

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

***P6. Date Constructed/Age and Source:**
■Historic: 1891 or 1896. Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study Prepared for the Golden Gate National Park Association. San Francisco, pp. 105.

***P7. Owner and Address:**
San Francisco Public Utilities Commission
1657 Rollins Road,
Burlingame, CA 94010

***P8. Recorded by:**
Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

***P9. Date Recorded:**
January 23, 2008

***P10. Survey Type:** (Describe)
Judgmental Survey of Known Historic sites

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.") Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California, 2009

***Attachments:** ☐NONE ☐Location Map ☐Continuation Sheet ■Building, Structure, and Object Record
☐Archaeological Record ☐District Record 9Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3

 ***Resource Name or #** (Assigned by recorder) South Crystal Springs Cottage

B1. Historic Name: South Crystal Springs Cottage

B2. Common Name: South Crystal Springs Cottage

B3. Original Use: Caretaker cottage for the Reservoir B4. Present Use: Same

***B5. Architectural Style:** One story frame structure with gable roof

***B6. Construction History:** (Construction date, alterations, and date of alterations)
The cottage was built in 1891/1896 as a 44 x 62 feet structure. In 1901 it was renovated. Two single story wings were added: one measuring 19 x 30 feet and another 8 x 16 feet.

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** _____ **Original Location:**

***B8. Related Features:**
The historical site includes some ancillary buildings: a garage/work area and a pumphouse.

B9a. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme** Water Management **Area** 50 x 20 m

Period of Significance 1890's **Property Type** Residential intent **Applicable Criteria**

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The South Crystal Springs Cottage is recommended as eligible for inclusion on the NRHP. This property is directly associated with the original construction of the Crystal Springs Reservoir, is the oldest of the extant reservoir keeper's cottages and still functions in its original purpose. As a result the South Crystal Springs Cottage is intimately tied to the Spring Valley Water Company's activities to bring water to the San Francisco Bay area in the late 19th Century. Moreover, because the South Crystal Springs Cottage continues to be used in its original capacity, it retains its integrity of association both within the local cultural and physical environment and within the context of the cottage's original purpose. Accordingly, this property is associated with events that have made a significant contribution to the broad patterns of the local prehistory, retains much of its original integrity and qualifies under Criterion A of the NRHP.

B11. Additional Resource Attributes: (List attributes and codes)

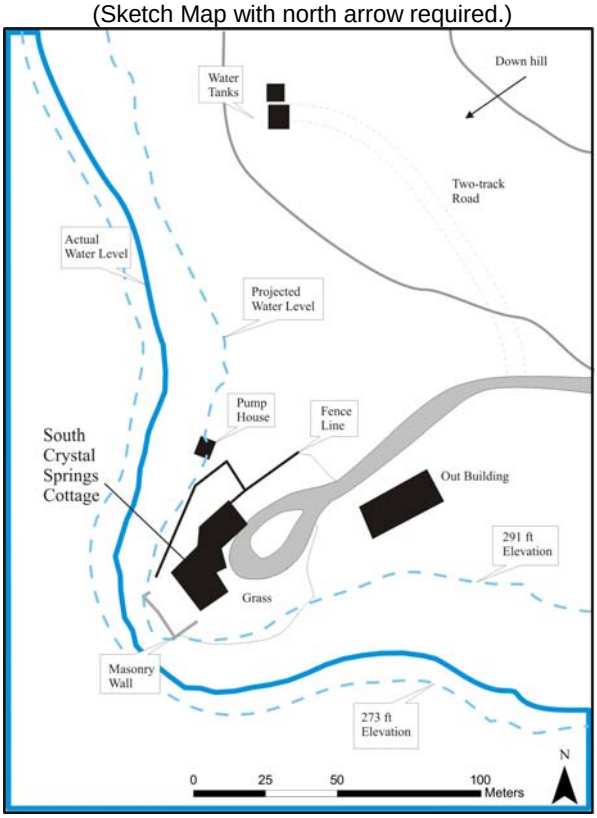
***B12. References:**
Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study Prepared for the Golden Gate National Park Association. San Francisco, pp. 105.

B13. Remarks:

***B14. Evaluator:** David Harvey, ENTRIX

***Date of Evaluation:** September, 2009

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
Trinomial

ARCHAEOLOGICAL SITE RECORD

Page 3 **of** 13 ***Resource Name or #** (Assigned by Recorder) South Crystal Springs Cottage

***A1. Dimensions: a. Length** 50 (m) **b. Width** 20 (m)

Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☐ Other: _____

Method of Determination (Check any that apply.): ☐ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☐ Topography

☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (Explain): _____

Reliability of Determination: ☐ High ☐ Low Explain: _____

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined

☐ Disturbances ☐ Vegetation ☐ Other (Explain): _____

A2. Depth: ☐None ☐ Unknown Method of Determination: _____

***A3. Human Remains:** ☐ Present ☐ Absent ☐ Possible ☐ Unknown (Explain): _____

***A4. Features**: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map.)
The site consists of a cottage with associated outbuildings (garage/work area and pumphouse). The cottage measures 44 x 62 feet with two wings of 19 x 30 feet and 8 x 16 feet. The garage/work area is approx. 100 x 40 feet. The pumphouse is perhaps 10 x 10 feet. The cottage complex was built by the Spring Valley Water Company in the 1890s.

***A5. Cultural Constituents:** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features.) None

***A6. Were Specimens Collected?** ☐ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

***A7. Site Condition:** ☐ Good ☐ Fair ☐ Poor (Describe disturbances.):.
Site is well maintained and in excellent condition

***A8. Nearest Water:** (Type, distance, and direction.) Modern Reservoir, approximately 6 m to east.

***A9. Elevation:** 294 feet

A10. Environmental Setting:
Site consists of a historic cottage surrounded by lawn. Nearby vegetation includes oak woodland, and mixed willow forest. Fauna in the general area include waterfowl, raptors, deer, and small mammals.

A11. Historical Information: This property is the oldest of the extant reservoir keeper's cottages and the structure is still used for this purpose. Records differ, but the Spring Valley Water Company built the cottage in either 1891 or 1896 (Babal 1990:105). The cottage consists of a single-story frame structure with a shingled gable roof measuring 44' x 62' with two additions that measure 19' x 30 ' and 8' x 16' (Babal 1990:105). The wings may represent later additions to the original structure.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ☐ 1914-1945

☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**
This historic structure was built in 1891 or 1896.

A13. Interpretations: (Discuss data potential, function[s], ethnic affiliation, and other interpretations)
This property is directly associated with the original construction of the Crystal Springs Reservoir, is the oldest of the extant reservoir keeper's cottages and still functions in its original purpose. As a result the South Crystal Springs Cottage is intimately tied to the Spring Valley Water Company's activities to bring water to the San Francisco Bay area in the late 19th Century. Moreover, because the South Crystal Springs Cottage continues to be used in its original capacity, it retains its integrity of association both within the local cultural and physical environment and within the context of the cottage's original purpose.

A14. Remarks:

A15. References: (Documents, informants, maps, and other references)
Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study Prepared for the Golden Gate National Park Association. San Francisco.

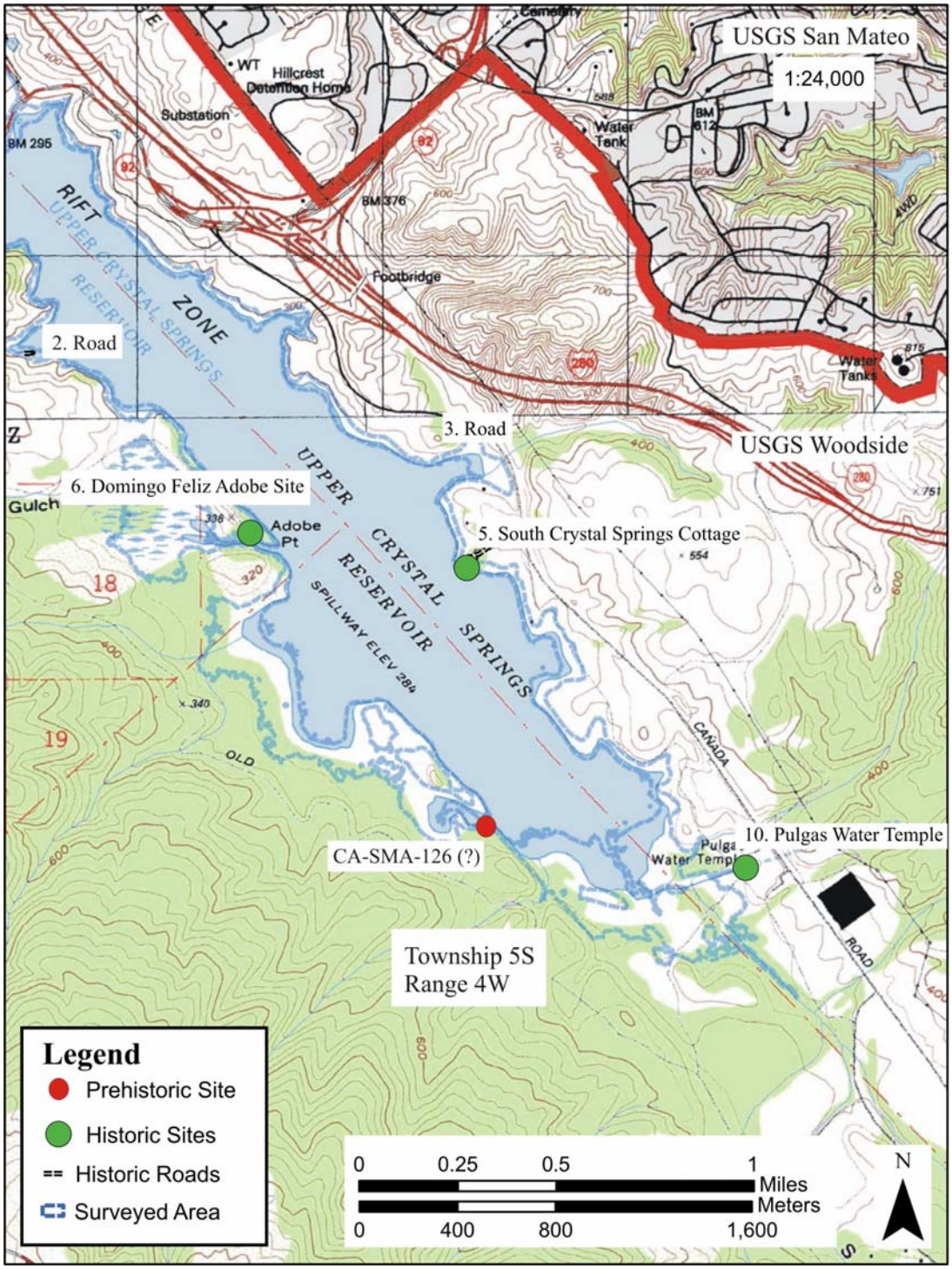
A16. Photographs (attach a Photograph Record.): Photograph Record Attached
Original Media/Negatives Kept at: ENTRIX Salt Lake City Office under "Crystal Springs"

***A17. Form Prepared by:** Dr. Zachary Nelson **Date:** March 12, 2008

Affiliation and Address: ENTRIX, Inc. 807 East South Temple, Suite 350, Salt Lake City, UT 84102

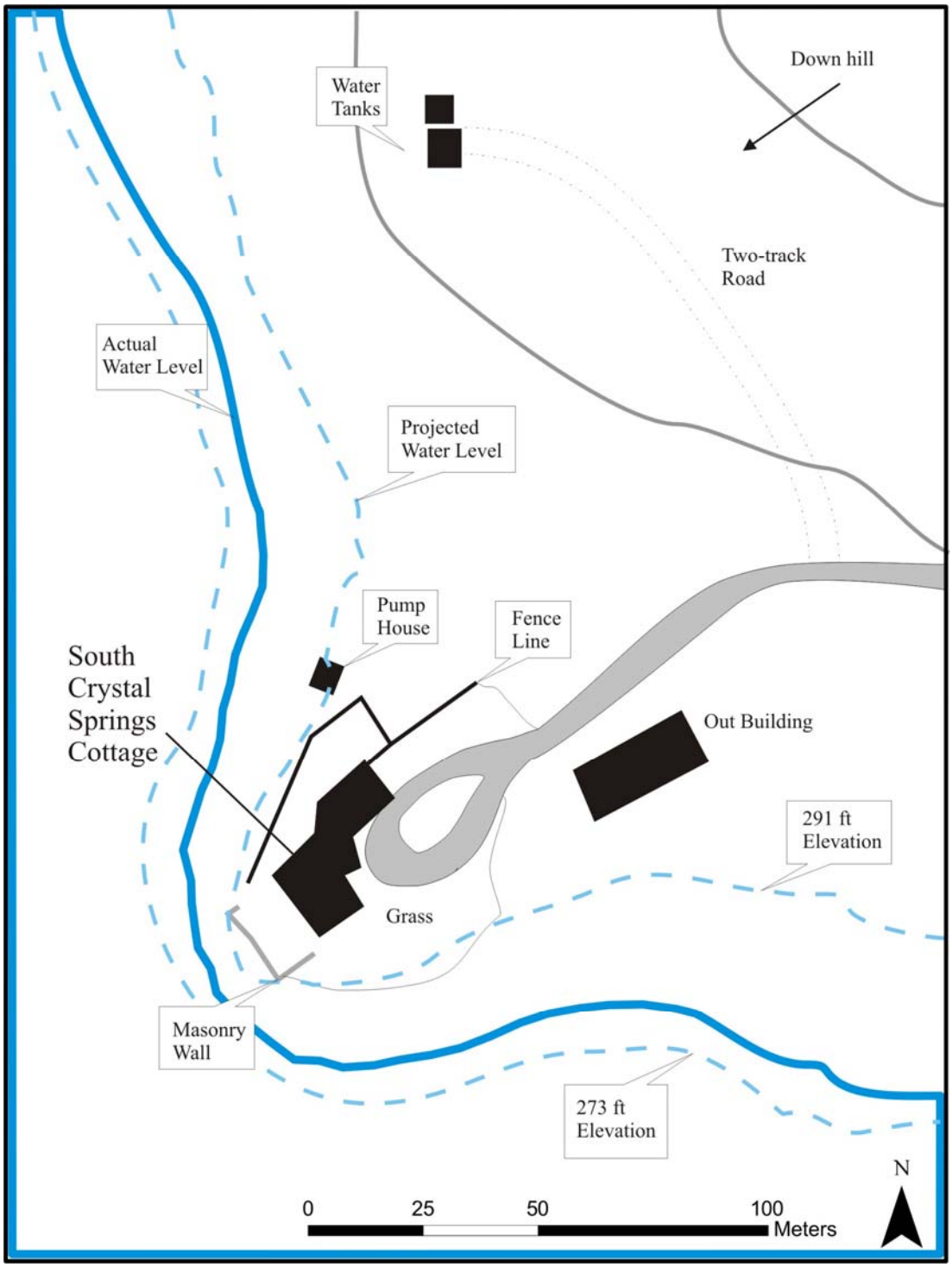
State of California -- The Resources Agency DEPARTMENT OF PARKS AND RECREATION **LOCATION MAP**	Primary # HRI# Trinomial

Page 5 **of** 13 ***Resource Name or #** (Assigned by recorder) South Crystal Springs Cottage
***Map Name:** Woodside USGS 7.5′ ***Scale:** 1:24,000 ***Date of map:** 1999



State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page 6 **of** 13 ***Resource Name or #** (Assigned by recorder) South Crystal Springs Cottage
***Drawn by:** Zachary Nelson ***Date of map:** March 8, 2008



NOTE: Include bar scale and north arrow.

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3

***Resource Name or #** (Assigned by recorder) South Crystal Springs Cottage

B1. Historic Name: South Crystal Springs Cottage
B2. Common Name: South Crystal Springs Cottage
B3. Original Use: Watershed Keeper's Residence B4. Present Use: Watershed Keeper's Residence

***B5. Architectural Style:** Cottage Vernacular

***B6. Construction History:** (Construction date, alterations, and date of alterations)

Records differ, but the Spring Valley Water Company built the cottage in either 1891 or 1896 (Babal 1990:105; Metcalf 1914). The cottage consists of a single-story frame structure with a shingled gable roof and measured approximately 44 feet by 62 feet. In 1901 it was renovated. Two single story wings were added: one measured 19 x 30 feet and another 8 x 16 feet (Babal 1990:105; Metcalf 1914). The cottage currently measures approximately 110 feet by 55 feet. The cottage's vinyl, double hung sash windows have replaced most of the original wooden, double hung sash windows, although the wood framing is intact. Two wooden decks have been added: one that spans most of the southeast/east elevation (next to the driveway), the other facing northwest with a hot tub overlooking the reservoir. A couple of single pane picture windows have replaced the original double hung windows on the north elevation. A formerly detached, wood frame coal shed is now connected to the cottage by an enclosed causeway.

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**

***B8. Related Features:**

The ancillary buildings to the historic cottage include an outbuilding/residence/garage, pump house, and a small storage shed.

B9a. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme:** Water Management **Area:** Upper Crystal Springs Reservoir

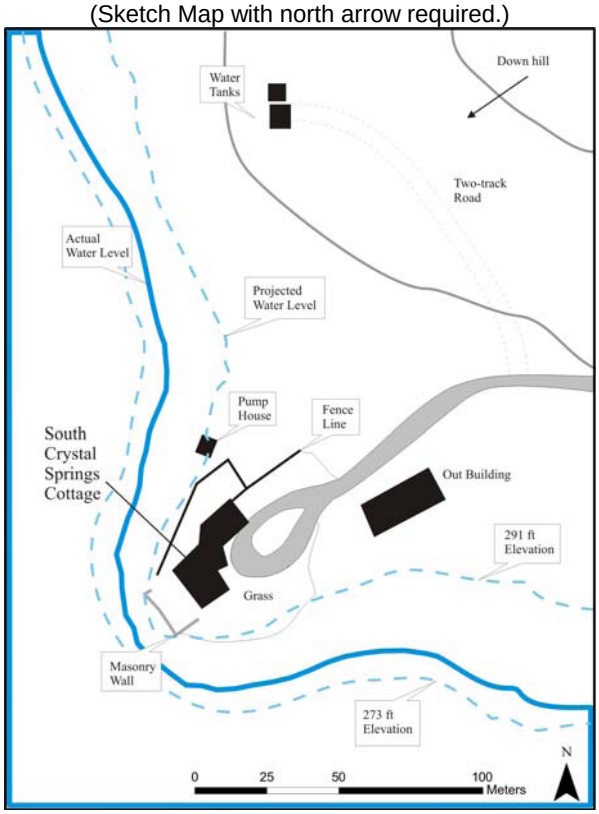
Period of Significance: mid-1890s - 1959 **Property Type:** Residence **Applicable Criteria:** National Register of Historic Places (NRHP) Criterion A and California Register of Historical Resources (CRHR) Criterion 1

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The South Crystal Springs Cottage is one of a number of cottages built for Spring Valley Water Company employees at the time of the construction of the Lower Crystal Springs Dam in the early 1890s. That the construction of a number of cottages to house watershed keepers and other reservoir employees coincided with the Lower Crystal Springs Dam's construction was no coincidence. The new dam tripled the size of the reservoir and watershed lands of the Upper Crystal Springs Dam that was constructed in 1876, necessitating the need for more employees to maintain and/or patrol the expanded watershed. Since commuting from nearby communities was slow-going and difficult during the late 19th century/early 20th century, cottages were conveniently constructed within the watershed to house employees in order for Spring Valley to maintain an around-the-clock presence in the watershed.

The South Crystal Springs Cottage is recommended as eligible for inclusion under Criterion A in the NRHP and under Criterion 1 of the CRHR. This property is directly associated with the original construction of the Upper and Lower Crystal Springs Reservoirs, and is the oldest of the extant reservoir keeper's cottages and structures built by the Spring Valley Water Company and still functions in its original purpose. As a result the South Crystal Springs Cottage is intimately tied to the Spring Valley Water Company's activities to bring water to the San Francisco Bay area in the late 19th Century through the early 20th century, and after 1935 when the Crystal Springs reservoir and watershed came under the ownership of the San Francisco Public Utility Commission (SFPUC). Moreover, because the South Crystal Springs Cottage continues to be used in its original capacity, it retains its integrity of association both within the local cultural and physical environment and within the context of the cottage's original purpose. The South Crystal Springs Cottage also possesses integrity of location, design, setting, materials, workmanship, and feeling as an intact, watershed keeper's cottage. The one story wing additions are compatible with the overall original design, and, along with the other modifications, are compatible with the historic setting, materials, workmanship, and feeling. The modifications to the building's north elevation, a secondary façade, are minor and do not detract from the overall integrity of the property. Important character-defining features that have been retained and convey the building's significance and integrity include its horizontal (shiplap) siding, metal vent covers, wood shingle gable roof, ornate wooden door on the east elevation, symmetrically placed wood frame windows, and distinctive shoreline setting at the head of a circular drive.

(Sketch Map with north arrow required.)



Building, Structure, and Object Record

B. 10 Significance

Accordingly, this property is associated with events that have made a significant contribution to the broad patterns of local, regional and state history and Spring Valley Water Company's management and use of the Crystal Springs Reservoir and watershed. The cottage also retains much of its original integrity and, thus, qualifies under criterion A for listing in the NRHP and under Criterion 1 in the CRHR. The building's period of significance is from its construction in the 1890s through 1959, the 50 year cut-off point for consideration of eligibility for listing in the NRHP and CRHR.

The cottage does not qualify for listing in the NRHP under Criteria B, C, or D or under Criteria 2, 3, and 4 for listing in the CRHR. The building is not associated with the lives of persons important to local, California or national history under Criterion B of the NRHP and Criterion 2 of the CRHR, its vernacular cottage style is a type that was prevalent and commonly found throughout rural and urban America during the early 20th century, and, thus, does not embody the distinctive characteristics of a type or method of construction under Criterion C or Criterion 3, and does not have the potential to yield additional important information concerning the history of the region, state, or the nation under Criterion D or Criterion 4.

The ancillary buildings to the South Crystal Springs Cottage, the outbuilding/residence/garage, pump house, and storage shed, are not recommended for listing in the NRHP. They all have played a secondary support role to the historic South Crystal Springs Cottage. While they are all 50 years of age and older, they constitute the type of vernacular structures typically found at larger residential and agricultural settings throughout the country. They are not architecturally distinctive or represent a method of construction that is extraordinary or unique. All three, especially the outbuilding/residence/garage, have suffered a loss of physical integrity due to incompatible additions and no longer function as they were originally intended.

B.11. Additional Resource Attributes: (List attributes and codes) HP 2, single family residence/property

*B.12 References

Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study Prepared for the Golden Gate National Park Association. San Francisco.

Metcalf, L. 1914. *Inventory of the Physical Properties and Structures of the Spring Valley Water Company, 1913*. On file, Bancroft Library, University of California, Berkeley and San Francisco Public Utility Commission Archives, San Francisco.

B.13. Remarks

***B.14. Evaluator:** David Harvey, ENTRIX, Inc., Richland, Washington

***Date of Evaluation:** July 22, 2009; revised October 16, 2009

Primary Record

P3a. Description

The South Crystal Springs Cottage and associated buildings sit at the head of a circular driveway on a prominent terrace overlooking Upper Crystal Springs Reservoir. The cottage's front elevation faces eastward towards the driveway, while the rear elevation faces west towards the reservoir. An extensive lawn surrounds the cottage, including a raised lawn in the middle of the circular drive. The complex consists of a cottage, an outbuilding/residence/garage, a small coal shed, pump house, and a small storage shed.

Cottage

Originally a rectangular-shaped (44 foot x 62 foot) structure, the South Crystal Springs Cottage, with compatible additions, is a modified, "L" shape house with interconnecting gable and hip wood shingled roofs and two brick chimneys situated on the ridge lines. Currently measuring approximately 110 feet x 55 feet, the cottage is cladded with horizontal wood siding and sits on a wood pier foundation. Vinyl, double hung sash windows have replaced most of the original wooden, double hung sash windows. The windows original dimension's, wood framing, and symmetrical placement, however, have been retained. Two wooden decks have been added: one that spans most of the southeast/east elevation (next to the driveway), the other facing northwest overlooking the reservoir.

The distinctive cottage has several notable architectural features. They include decorative vent covers on all the elevations. There is a small, open porch on the rear (west) elevation with a wood shingled hip roof. The porch has plain wood railings and square columns with a plain wooden deck. A vintage rock wall along the west elevation separates the prominent terrace and cottage from the shoreline. There is a distinctive single leaf, double panel, and recessed wooden door with a glass window on the east elevation. The recessed entry has molded trim, a partial pediment at the head of the door opening, and a flush fan window sits directly above the door. A wood landing/stoop with railings and steps leads up to the door. There is also a vintage hanging light above the door's entrance.

The cottage's northwest elevation has a contemporary wood deck with a hot tub overlooking the reservoir. A couple of single pane picture windows have replaced the original double hung windows on this elevation. A formerly detached wood frame coal shed is now connected to the cottage by an enclosed causeway. The structure is a square (11 foot x 11 foot) shape structure that currently serves as a storage shed. It has a single pitched, shed style, wood shingled roof over vertical board and batten siding with a fixed, single pane window.

Pump House

The South Crystal Springs Cottage Pump House is situated on a rock cropping above the reservoir just north of the cottage. The wood frame pump house measures 10 feet x 10 feet and pumps water to the cottage. The pump house has a gable roof with composition shingles and sits on a poured concrete slab. The cladding is vertical board and batten. Fenestration consists of two fixed, multi-pane wood frame windows and one single pane, wood frame window. The entry is a plain, single leaf plywood door. The interior walls consist of vertical boards and a plain horizontal board ceiling supported by a wooden truss. Wooden stairs with a plain wood railing connect the pump house to the shoreline.

Storage Shed

The wood frame, rectangular (14 foot x 8 foot) shaped shed is situated just east of the pump house, and is used for miscellaneous storage. It has a wood shingled gable roof over walls with vertical board and batten cladding. Fenestration consists of a fixed, single pane window. The other windows and door are boarded over. It sits on a poured concrete slab.

Outbuilding/Residence/Garage

The wood frame outbuilding/residence/garage, located east of the cottage along the driveway, was originally a rectangular (24 feet x 34 feet) shaped barn that has over the years undergone numerous modifications and additions. Today it is used as a residence and garage and for miscellaneous storage. The residence is located on the upper floor. Currently the wood frame building has a modified rectangular (80 foot x 40 foot) shaped plan with interconnecting wood shingled gable roofs and several shed roof additions. The cladding is a mixture of vertical board and batten, shingled and plywood. A shed roof dormer is located on the south slope of the upper floor roof. Fenestration consists of metal frame, sliding windows that replaced the original wood frame windows. The doors are a combination of wood and metal types, although none are the original. There are a couple of garage/barn-style wooden sliding doors on the primary (north) elevation along the driveway. A couple of wooden decks with railings were added on the lower and upper floors of the south elevation overlooking the lawn and reservoir. Outside wooden stairs lead from the 1st floor deck to the upper floor deck on the south elevation.

Primary Record
P5a. Photograph

South Crystal Springs Cottage, East Elevation. ENTRIX, July 2009.

Primary Record
P5a. Photograph or Drawing

South Crystal Springs Cottage, West Elevation. ENTRIX, July 2009.

Primary Record
P5a. Photograph

South Crystal Springs Cottage, North Elevation. ENTRIX, July 2009.

Primary Record
P5a. Photograph

South Crystal Springs Cottage, South Elevation. ENTRIX, July 2009.

State of California --The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial **NRHP Status Code**	
Other Listings Review Code	Reviewer	Date

Page 1 **of** 9 ***Resource Name or #:** 1883 San Mateo to Half Moon Bay Toll Road

P1. Other Identifier:

***P2. Location:** ■ **Not for Publication** ☐ **Unrestricted**

***a. County** San Mateo **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Montara Mountain (1999) and San Mateo (1999)

T 4S ; **R** 5W ; **T** 5S ; **R** 5W ; Mt. Diablo **B.M.**

c. UTM: Zone 10 , 553710 mE/ 4156846 mN; 556631 mE/ 4151795 mN (NAD83)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The 1883 San Mateo to Half Moon Bay Toll Road was encountered within the APE both on the west and north margins of the reservoir. On the west side of the reservoir, the road trace trends northeast down a drainage and eventually disappears into the reservoir. Within that APE along the west shoreline, the road consists of a leveled, graveled bed approximately 20 feet wide. The roadbed has become grass covered and is beginning to show some signs of decay. Another portion was also identified along the north end of the reservoir. Along the east side of the reservoir and across the causeway, the road consists of a paved asphalt bed. After crossing the reservoir, the road base follows the western margin of the reservoir south where it is no longer paved, but graveled and eventually becomes overgrown with vegetation. No historic artifacts were located along the road in either location.

***P3b. Resource Attributes:** ~~HP37; AH7~~

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ■ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) San Mateo to Half Moon Bay Toll Road along the West Shore of the Reservoir, View North. Taken By Zachary Nelson 1/24/2008. Photo #89

P5a. Photograph or Drawing

***P6. Date Constructed/Age and Source:** ■Historic
Present on General Land Office Maps.

***P7. Owner and Address:**
San Francisco Public Utilities Commission
1657 Rollins Road,
Burlingame, CA 94010

***P8. Recorded by:**
Zachary Nelson
ENTRIX Inc.
807 East South Temple,
Suite 350
Salt Lake City, UT 84102

***P9. Date Recorded:**
January 23, 2008

***P10.Survey Type:**
Judgmental Survey of Known Historic sites

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California. Report by ENTRIX Inc.

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ☐Building, Structure, and Object Record
■Archaeological Record ☐District Record ■Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ■Photograph Record ☐ Other (List):

State of California --The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
Trinomial

ARCHAEOLOGICAL SITE RECORD

 ***Resource Name :** 1883 San Mateo to Half Moon Bay Toll Road

***A1. Dimensions: a. Length** North Section: 405 x 5m; West Section: 213 x 5 m

Method of Measurement: ☐ Paced ■ Taped ☐ Visual estimate ☐ Other: _____

Method of Determination (Check any that apply.): ☐ Artifacts ■ Features ☐ Soil ☐ Vegetation ☐ Topography

☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (Explain): _____
Genral Land Office maps show the old road as do modern topographic maps.

Reliability of Determination: ■ High ☐ Low Explain: Clearly visible road feature.

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ■ Site limits incompletely defined

☐ Disturbances ☐ Vegetation ☐ Other (Explain): This road extends outside of the surveyed area, only the portions inside the surveyed area are included here.

A2. Depth: ☐ None ■ Unknown Method of Determination: _
Road bed is differentially built up in places from 0 to 4 m.

***A3. Human Remains:** ☐ Present ■ Absent ☐ Possible ☐ Unknown (Explain): _____

***A4. Features**: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map.)
Site consists of two portions of the 1883 San Mateo to Half Moon Bay Toll Road. One portion is located to the north of Lower Crystal Springs Reservoir, the other to the south of the Lower Crystal Springs Reservoir on west side.

***A5. Cultural Constituents:** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features.)
Site consists of graveled and paved portions of 1883 road. Road bed has been built up in places.

***A6. Were Specimens Collected?** ■No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

***A7. Site Condition:** ☐ Good ■ Fair ☐ Poor (Describe disturbances.):
Modern construction overshadows the original road surface. Likewise, it is exposed to erosion from reservoir waters.

***A8. Nearest Water:** (Type, distance, and direction.): Lower Crystal Springs Reservoir. 0 Meters.

***A9. Elevation:** 291 feet

A10. Environmental Setting: Nearby vegetation includes oak woodland, and mixed willow forest. Fauna in the general area include waterfowl, raptors, deer, and small mammals.

A11. Historical Information: General Land Office maps show this road.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ■ 1880-1914 ☐ 1914-1945 ☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**
Road appears on General Land Office maps dating to 1883.

A13. Interpretations: (Discuss data potential, function[s], ethnic affiliation, and other interpretations)
While the road may still retain its integrity of design and materials, it does not represent a unique of outstanding example of a 19th Century engineering. Moreover, for both segments, the surrounding physical and cultural environments have experienced notable changes. Vehicle travel in the area now occurs via a different road system, the community in the valley bottom has been inundated by the reservoir, and the surrounding environment and local associational context have changed dramatically. Consequently, these properties no longer retain any integrity of location, integrity of setting, or integrity of association.

A14. Remarks:

A15. References: (Documents, informants, maps, and other references)
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California. Report prepared by ENTRIX, Inc.

A16. Photographs (attach a Photograph Record.): Photograph Record Attached

Original Media/Negatives Kept at: ENTRIX Salt Lake City Office under "Crystal Springs"

***A17. Form Prepared by:** Dr. Zachary Nelson **Date:** March 12, 2008

Affiliation and Address: ENTRIX, Inc. 807 East South Temple, Suite 350, Salt Lake City, UT 84102

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

Page 3 **of** 9 **Resource Name:** 1883 San Mateo to Half Moon Bay Toll Road

L1. Historic and/or Common Name: _____

L2a. Portion Described: ☐ Entire Resource ■ Segment **Designation:** North and West Segments

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

USGS 7.5' Quad Montara Mountain (1999) and San Mateo (1999); **T** 4S ; **R** 5W ; **T** 5S ; **R** 5W ; Mt. Diablo **B.M.** UTM: Zone 10 , 553710 mE/ 4156846 mN; 556631 mE/ 4151795 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
North Segment: The road crosses the northern end of Lower Crystal Springs Reservoir from the east along a low (10 ft) causeway. Along the east side of the reservoir and across the causeway, the road consists of a paved asphalt bed. After crossing the reservoir, the road base follows the western margin of the reservoir south where it is no longer paved, but graveled and eventually becomes overgrown with vegetation.

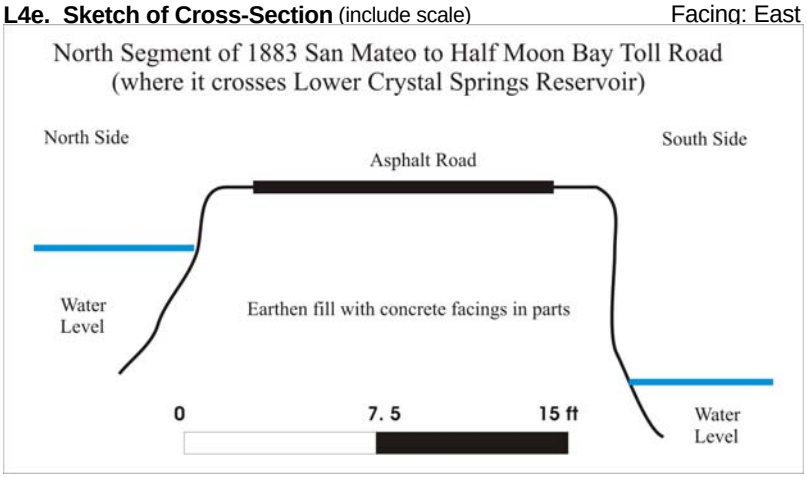
West Segment: On the west side of the reservoir, the road trace trends northeast down a drainage and eventually disappears into the reservoir. Within that APE along the west shoreline, the road consists of a leveled, graveled bed approximately 20 feet wide. The roadbed has become grass covered and is beginning to show some signs of decay.

L4. North Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width 15 ft
b. Bottom Width 15 ft
c. Height or Depth 10 ft
Length of Segment 1328 ft

West Dimensions: Top Width 20 ft
d. Bottom Width 25 ft
e. Height or Depth 12 ft
f. Length of Segment 700 ft

L4e. Sketch of Cross-Section (include scale) Facing: East



L5. Associated Resources: The associated resources for this site, i.e., communities it served have been inundated by the reservoir waters.

L8a. Photograph, Map or Drawing

L6. Setting: The road moves out of the reservoir into an area with natural oak and willow vegetation as it continues uphill.

L7. Integrity Considerations: The segment along the west margin of the reservoir has begun to decay through prolonged disuse and is becoming overgrown with vegetation. (Continued on Continuation Sheet)

L8b. Description of Photo, Map, or Drawing (View, scale, etc.) 1883 Road crossing Lower Crystal Springs Reservoir , Facing West. Photo #110.

L9. Remarks:

L10. Form Prepared by: (Name, affiliation, and address)
Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

L11. Date: March 13, 2008

State of California - - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page 4 of 9 Project Name: Crystal Springs Dam Year 2008
Camera Format: Canon PowerShot A550 Negatives Kept at: ENTRIX, Inc. Salt Lake City Office

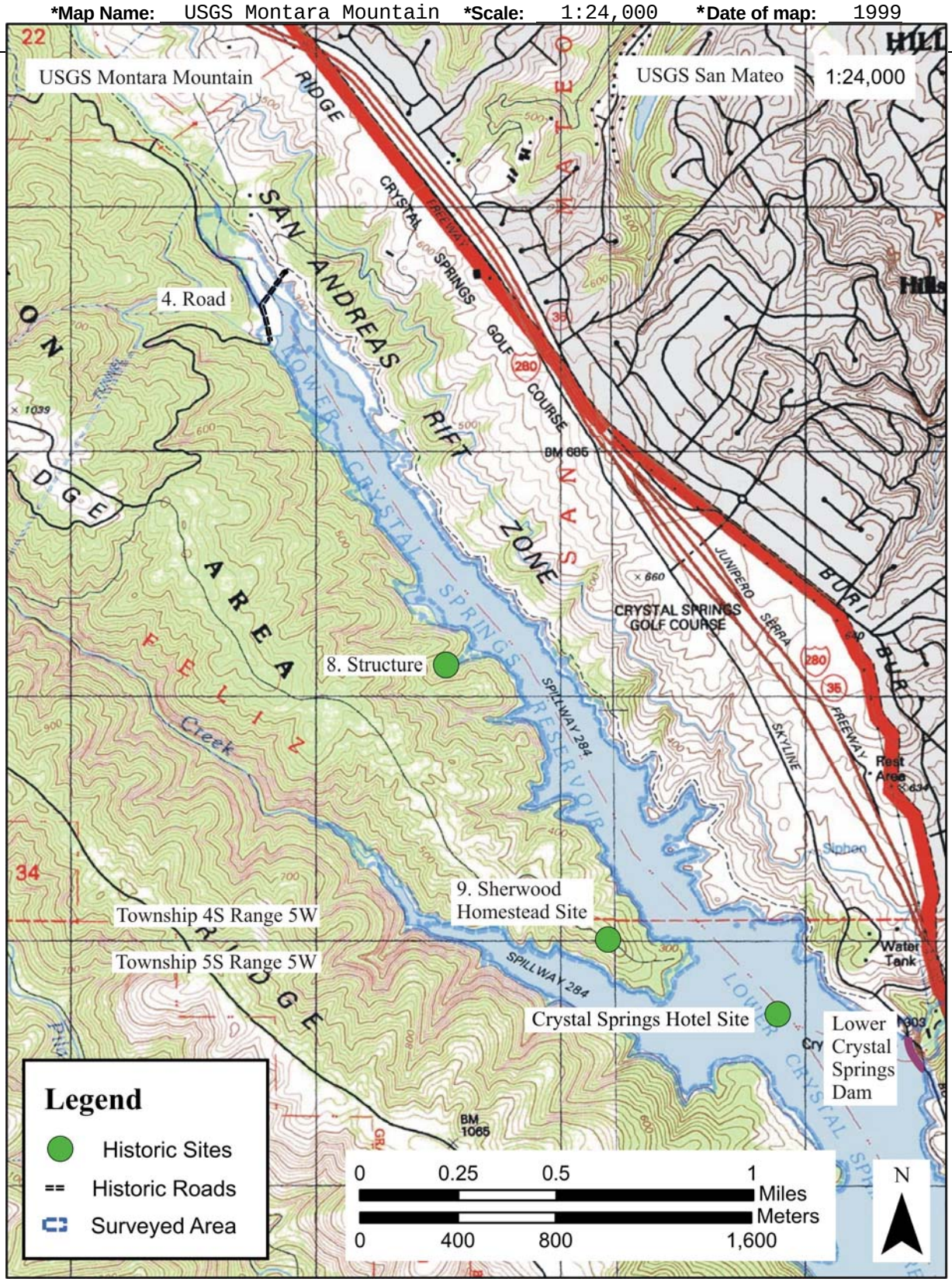
Mo.	Day	Exp./ Frame	Subject/Description	View Toward
1	24	85	West 1883 San Mateo Road outside of APE where road diverges into quarry. Road is asphalt with asphalt ditch at this point	S
1	24	86	West 1883 San Mateo Road looking N into reservoir	N
1	24	87	Ibid with emphasis on asphalt drain on E side of road	N
1	24	88	Metal culvert along West 1883 San Mateo Road	N
1	24	89	Chris Hogle as scale along West 1883 San Mateo Road as it enters the reservoir	N
1	24	90	Allen Denoyer in West 1883 San Mateo Road while another access roads veers above him.	S
1	24	91	West 1883 San Mateo Road taken from Reservoir level	E
1	24	92	West 1883 San Mateo Road base taken from reservoir level	E
1	24	93	Chris Hogle with boat at terminus of West 1883 San Mateo Road	NE
1	24	106	North 1883 San Mateo Road, base of dam/road	N
1	24	107	Allen Denoyer at North 1883 San Mateo Road	N
1	24	108	North 1883 San Mateo Road, paved	E
1	24	109	North 1883 San Mateo Road culvert	N
1	24	110	North 1883 San Mateo Road crossing reservoir	W
1	24	111	Sign on S side of North 1883 San Mateo Road	S
1	24	112	North 1883 San Mateo Road crossing reservoir	E
1	24	113	W terminus of North 1883 San Mateo Road crossing with pump station	N
1	24	114	North 1883 San Mateo Road following reservoir S on West side	S

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Page 5 **of** 9 ***Resource Name or #** North 1883 San Mateo to Half Moon Bay Toll Road (4)
***Map Name:** USGS Montara Mountain ***Scale:** 1:24,000 ***Date of map:** 1999

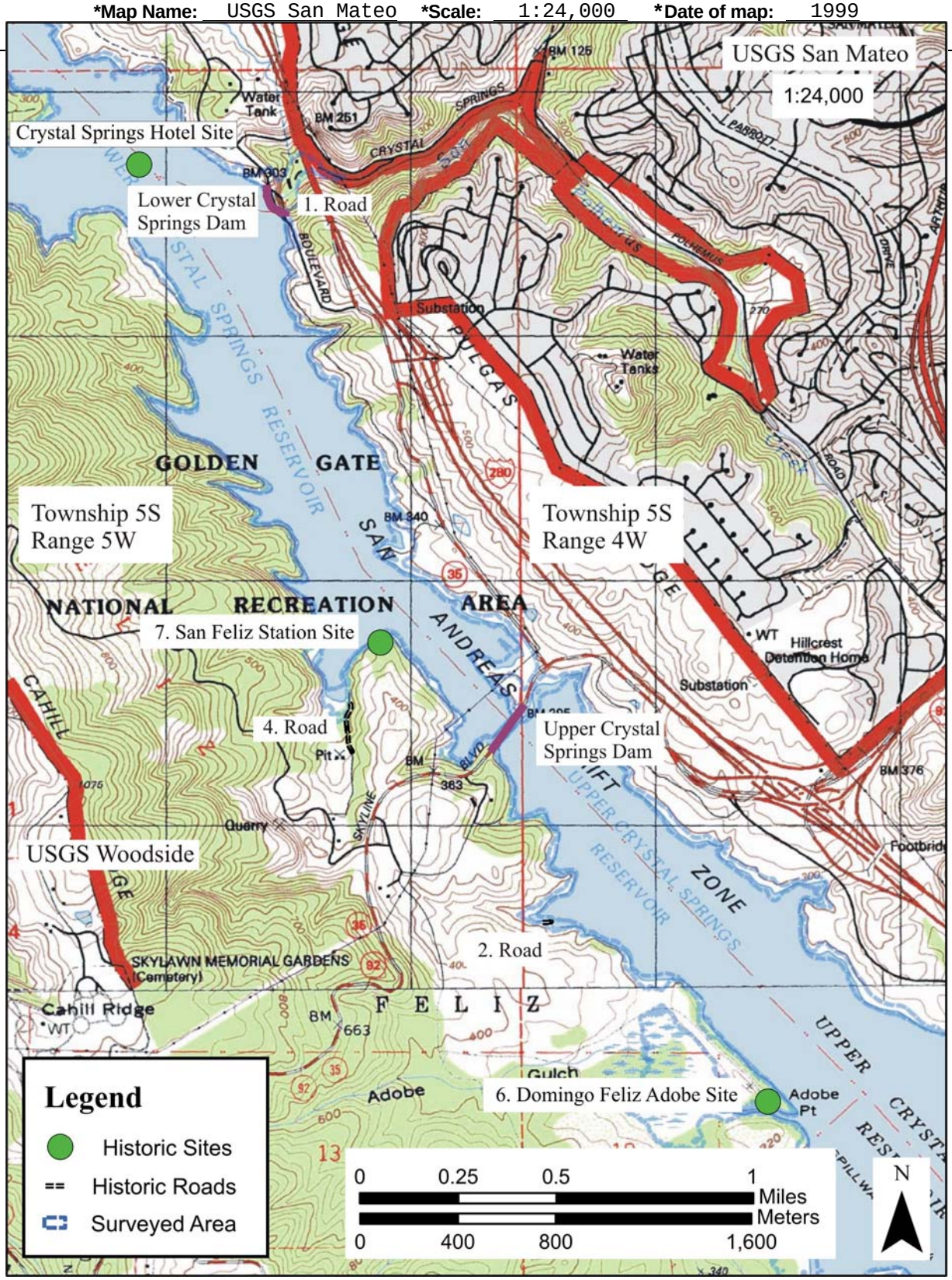


State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

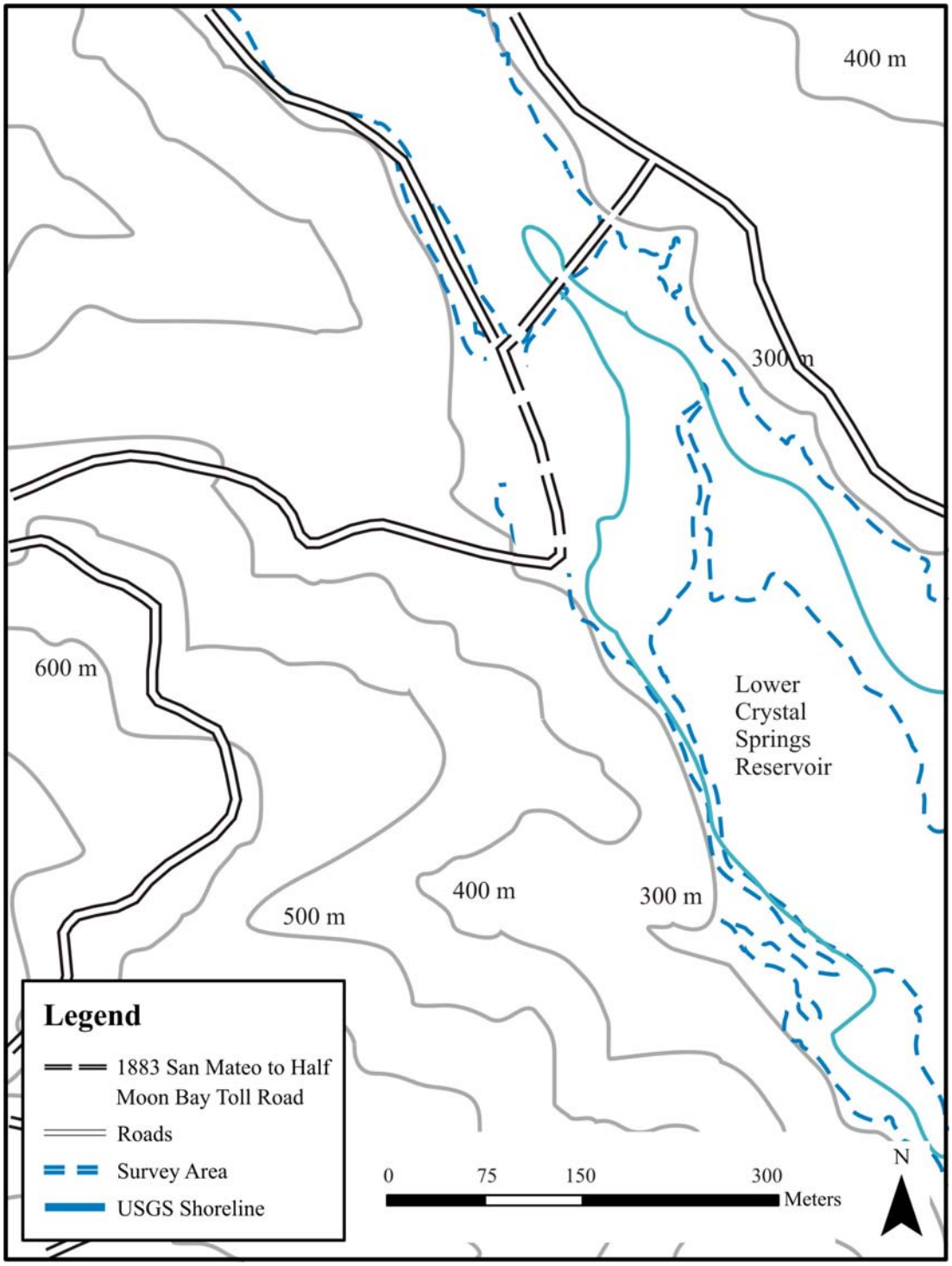
Primary #
HRI#
Trinomial

Page 6 **of** 9 ***Resource Name or #** West 1883 San Mateo to Half Moon Bay Toll Road (4)
***Map Name:** USGS San Mateo ***Scale:** 1:24,000 ***Date of map:** 1999



State of California -- The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

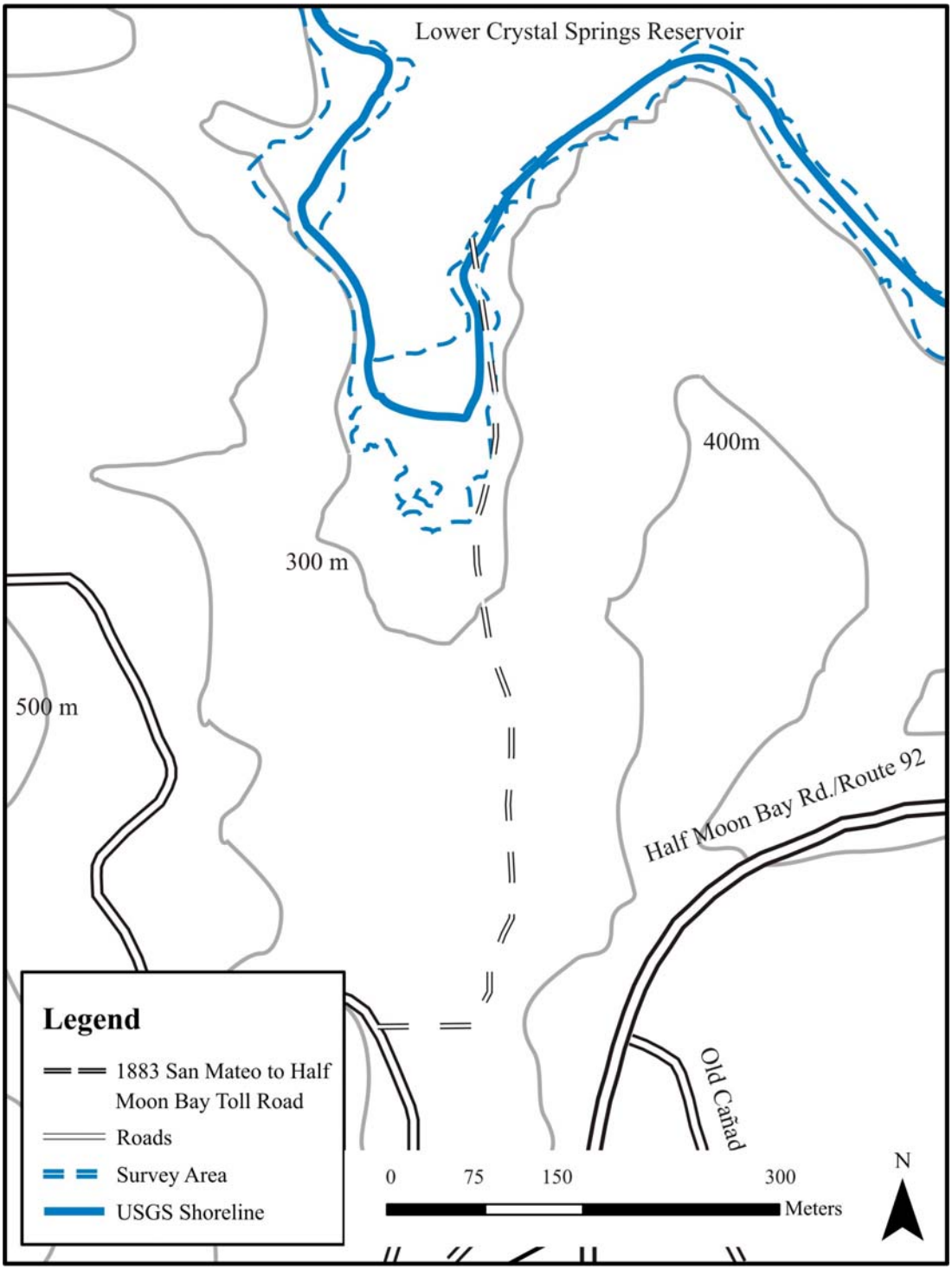
Page 7 **of** 9 ***Resource Name or #** North 1883 San Mateo to Half Moon Bay Toll Road
***Drawn by:** Zachary Nelson ***Date of map:** March 13. 2008



NOTE: Include bar scale and north arrow.

State of California -- The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page 8 **of** 9 ***Resource Name or #** West 1883 San Mateo to Half Moon Bay Toll Road
***Drawn by:** Zachary Nelson ***Date of map:** March 13. 2008



NOTE: Include bar scale and north arrow.

L7. Integrity Considerations:

While it may still retain its integrity of design and materials, it does not represent a unique or outstanding example of a 19th Century engineering. The segment crossing the northern finger of the reservoir has been paved to the east, is unpaved and beginning to decay to the west and as a result this segment no longer retains its integrity of materials or integrity of design. Moreover, for both segments, the surrounding physical and cultural environments have experienced notable changes. Vehicle travel in the area now occurs via a different road system, the community in the valley bottom has been inundated by the reservoir, and the surrounding environment and local associational context have changed dramatically. Consequently, these properties no longer retain any integrity of location, integrity of setting, or integrity of association.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code	
Other Listings Review Code	Reviewer	Date

Page 1 of 1 *Resource Name or #: Burlingame/San Mateo to Half Moon Bay Toll Road Culvert

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted** ***a. County:** San Mateo

and (P2b and P2c or P2d. Attach a Location Map as necessary. See Primary Record for *1883 San Mateo to Half Moon Bay Toll Road* for location map.)

***b. USGS 7.5' Quad:** Montara Mountain **Date:** 1999 **T** 4 S; **R** 5W; Mt. Diablo **B.M.**

c. Address: Crystal Springs reservoir and watershed City: San Mateo County

d. UTM: Zone: 10 ; 553710 mE/ 4156846 mN (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Located on former toll road causeway on north shore of Lower Crystal Springs reservoir; west of Crystal Springs golf course.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single-gate culvert controls the movement of water north-to-south through the toll road causeway between Lower Crystal Springs reservoir to the south and Tracy Lake to the north. Atop the concrete culvert is a wooden superstructure/platform from where a wheel controlled mechanism regulates the flow of water through its chute or spillway. When the reservoir reaches flood stage, the gate and stop-logs are opened to let the excess water through.

Tracy Lake is a catch basin for sediment runoff from the watershed hills surrounding the north end of the reservoir. The Lower Crystal Springs reservoir was established with the construction of the Lower Crystal Springs Dam in 1889-90. The former Burlingame/San Mateo to Half Moon Bay Toll Road was constructed during the last quarter of the 19th century. This abandoned section of the toll road was paved at a later date. The culvert was constructed sometime during the 1930s-40s.

The precast concrete toll road culvert and wooden superstructure measure approximately 12 feet x 12 feet. The concrete culvert tunnel under the causeway connecting the reservoir and Tracy Lake measures approximately 13-14 feet long. The width of the tunnel and the concrete support wall/facing on each side measures approximately 22-23 feet wide on the north side (facing Tracy lake) and 50 feet on the south side (facing the reservoir). The wooden superstructure and platform on top of the concrete culvert is constructed of plain wooden railings and columns and a deck built of 2 inch by 11 inch wood planks.

***P3b. Resource Attributes:** (List attributes and codes) HP 11, Engineering structure; HP 22, Lake/river/reservoir

***P4. Resources Present:** ☐Building ■Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) Burlingame/San Mateo to Half Moon Bay Toll Road Culvert, located below Toll Road on south shoreline of Tracy Lake, view east. ENTRIX, Inc. 7/21/09. Photograph #23.

***P6. Date Constructed/Age and Sources:** ■ Historic ☐Prehistoric ☐Both

***P7. Owner and Address:** San Francisco Public Utility Commission, 1657 Rollins Road, Burlingame, CA 94010

***P8. Recorded by:** David Harvey, ENTRIX, Inc., Richland, WA 99354

***P9. Date Recorded:** July 20, 2009

***P10. Survey Type:** (Describe)

Historical/Architectural Assessment of the Toll Road Culvert and South Crystal Springs Cottage

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")

Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study prepared for the Golden Gate National Park Association. San Francisco, CA.

***Attachments:** ☐NONE ☐Location Map ☐Sketch Map ☐Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** Burlingame/San Mateo to Half Moon Bay Toll Road Culvert

B1. Historic Name: Unknown
B2. Common Name: Burlingame/San Mateo to Half Moon Bay Toll Road Culvert
B3. Original Use: Single-gate culvert B4. Present Use: Single-gate culvert
***B5. Architectural Style:** Industrial vernacular
***B6. Construction History:** (Construction date, alterations, and date of alterations)
The construction date of this single-gate culvert is unknown. It is located under a causeway at the north end of the Lower Crystal Springs reservoir on the former Burlingame/San Mateo to Half Moon Bay Toll Road, also known as the San Mateo-Spanishtown Turnpike/Road. While some form of road has been at this location since the last quarter of the nineteenth century, the culvert was constructed at a later date. Field observations confirm that the culvert was probably built sometime after the construction of the Lower Crystal Springs Dam and reservoir in 1889-90. The type of materials and concrete used for the culvert, including the concrete tunnel under the causeway, suggests a construction date somewhere between the 1930s -1940s. The culvert may have replaced an earlier culvert, although there is a lack of evidence of such a structure.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:**
This historical period property includes the former Burlingame/San Mateo to Half Moon Bay Toll Road, also known as the San Mateo-Spanishtown Turnpike/Road. The single-gate culvert controls the movement of water north-to-south through the paved causeway between Lower Crystal Springs reservoir and Tracy Lake.

B9a. Architect: Unknown **b. Builder:** Unknown
***B10. Significance: Theme:** Water Management **Area:** Lower Crystal Springs Reservoir, Tracy Lake and Toll Road/Causeway

Period of Significance: N/A **Property Type:** Water Control **Applicable Criteria:** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The single-gate culvert controls the movement of water north-to-south through the toll road causeway. Atop the concrete culvert is a wooden superstructure/platform from where a wheel controlled mechanism regulates the flow of water through its chute or spillway. When the reservoir reaches flood stage, the gate and stop-logs are opened to let the excess water through.

The causeway and former toll road preceded the construction of the culvert. In the mid-1850s, San Francisco County created a toll road through the San Andreas valley between the communities of Burlingame and Spanishtown (Half Moon Bay). San Mateo County Maps of 1868 and 1877 confirm that this early stage coach route crossed the San Andreas Creek at the location of the causeway and culvert and proceeded to join the San Mateo-Spanishtown Turnpike at the confluence the main branches of San Mateo Creek (and San Andreas and Laguna Creeks), the location of the future Lower Crystal Springs Dam (Babal 1990). The construction of the Lower Crystal Springs Dam in 1889-90 flooded the valley roads, including the Burlingame and San Mateo-Half Moon Bay roads (Babal 1990). The following year (in 1891) the Upper Crystal Springs Dam (constructed in 1876) was decommissioned and raised 20 feet to provide a causeway for a new (and more direct) route for the San Mateo to Half Moon Bay Road. The 1894 county map shows the new route of the San Mateo to Half Moon Bay Road over the former Upper Crystal Springs Reservoir (Babal 1990). The toll road along the north and west shore of the reservoir between Half Moon Bay and Burlingame and San Mateo fell into disuse and was no longer indicated on county maps.

Field observations and analysis confirm that the construction of a wood frame platform/superstructure over the precast concrete culvert occurred sometime after the former toll road and causeway. There may have been an earlier culvert at this location but there is no evidence of such a facility. The culvert includes a concrete tunnel under the causeway that connects the reservoir and Tracy Lake.

While the toll road culvert possesses integrity of location, design, setting, materials, workmanship, feeling and association as an intact, water control facility, and has served a useful role in regulating the flow of water between Lower Crystal Springs reservoir and Tracy Lake, especially during high water or flood conditions, this type of culvert is commonly found throughout the country in support of large water control works. ENTRIX, thus, recommends that the toll road culvert is not associated with a significant event under criterion A to be eligible for listing in the National Register of Historic Places (NRHP). The culvert has played a secondary role in the establishment and use of the important Lower Crystal Springs reservoir and NRHP-eligible Lower Crystal Springs Dam, and in the management and historic use of the Crystal Spring's reservoir. It is also not directly associated with the former toll road that passes over the culvert. The toll road was constructed before the culvert, and the road's important use as a cross-county toll road connecting the communities of Half Moon Bay and Burlingame/San Mateo was discontinued prior to the construction of the culvert. (ENTRIX also recommended that the former toll road was not eligible for the NRHP during a cultural resources survey in 2008.) There is also a lack of historical documentation on the culvert's date of construction and who constructed it. The culvert is also not associated with the lives of persons significant in our past or who were associated with the management and use of the Crystal Springs reservoir to be eligible for the NRHP under criterion B. The culvert is a common water control mechanism, and, thus, does not embody the distinctive characteristics of a type, period or method of construction to be eligible under criterion C. Additional information on the construction and early use of the culvert would not

BUILDING, STRUCTURE, AND OBJECT RECORD

further our understanding of the historic uses of the culvert or management of the reservoir's water flow to be eligible for the NRHP under criterion D.

B11. Additional Resource Attributes: (List attributes and codes)
HP 11, Engineering structure
HP 22, Lake/river/reservoir

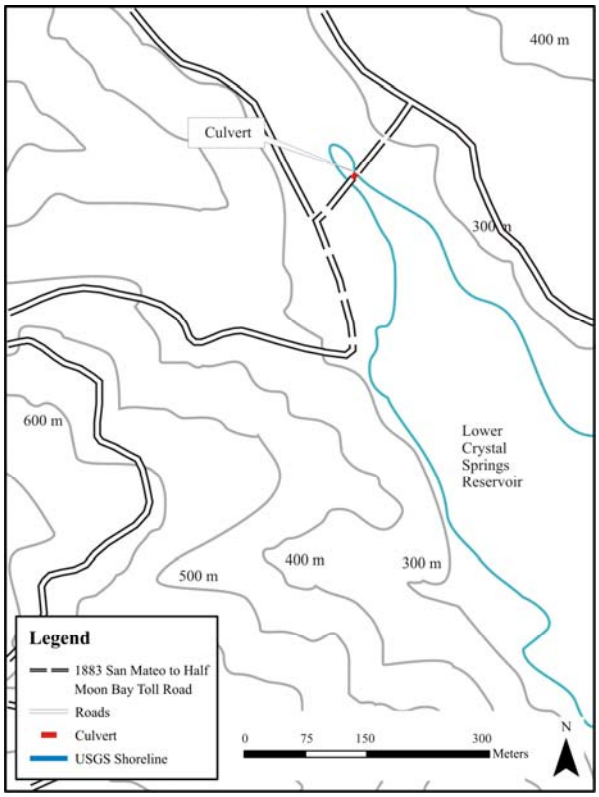
***B12. References:**

Babal, M. 1990. *The Top of the Peninsula: A History of Sweeney Ridge and the San Francisco Watershed Lands, San Mateo County, California*. An Historical Resources Study prepared for the Golden Gate National Park Association. San Francisco, CA.

B13. Remarks:

***B14. Evaluator:** David Harvey, ENTRIX, Inc., Richland, WA

***Date of Evaluation:** July 30, 2009



Burlingame/San Mateo to Half Moon Bay Toll Road Culvert

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 **of** 6 ***Resource Name or #:** (Assigned by recorder) 1859 San Mateo to Crystal Springs Road

P1. Other Identifier:

***P2. Location:** ■ **Not for Publication** □ **Unrestricted**

***a. County** San Mateo **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** San Mateo **Date** 1999 **T** 5S ; **R** 5W; Mt. Diablo **B.M.**

c. UTM: (Give more than one for large and/or linear resources) Zone 10N , 556354.92 mE/ 4153743.33 mN (NAD83)
556463.20 mE/4153894.52mN;

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The location of the 1859 San Mateo to Crystal Springs Road within the APE lies largely under the Lower Crystal Springs Dam. The dam's utility buildings lie along the built-up asphalt road that probably follows the contours of the original road. The area has been heavily disturbed and built up to accommodate the dam, its construction, and the nearby facilities. No trace of the original road was discovered.

***P3b. Resource Attributes:** (List attributes and codes) HP37; AH7

***P4. Resources Present:** □ Building □ Structure □ Object ■ Site □ District □ Element of District □ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) Segment of the San Mateo to Crystal Springs Road located within the APE, View East. Taken By Zachary Nelson 1/24/2008. Photo #119

***P6. Date Constructed/Age and Source:** ■ Historic □ Prehistoric □ Both;
Constructed approx. 1859, General Land Office Maps.

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

***P7. Owner and Address:**
San Francisco Public Utilities Commission
1657 Rollins Road,
Burlingame, CA 94010

***P8. Recorded by:**
Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

***P9. Date Recorded:**
January 23, 2008

***P10.Survey Type:**
Judgmental Survey of Known Historic sites

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California

***Attachments:** □NONE ■Location Map ■Continuation Sheet □Building, Structure, and Object Record
■Archaeological Record □District Record ■Linear Feature Record □Milling Station Record □Rock Art Record
□Artifact Record ■Photograph Record □ Other (List):

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
Trinomial

ARCHAEOLOGICAL SITE RECORD

Page 2 **of** 6 ***Resource Name or #** (Assigned by Recorder) 1859 San Mateo to Crystal Springs Road

***A1. Dimensions: a. Length** 593 (m) × **b. Width** 6 (m)

Method of Measurement: ☐ Paced ■ Taped ☐ Visual estimate ☐ Other: _____

Method of Determination (Check any that apply.): ☐ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ■ Other (Explain): The road is paved to that distance.

Reliability of Determination: ■ High ☐ Low Explain: Paved road

Limitations (Check any that apply): ■ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined ☐ Disturbances ☐ Vegetation ☐ Other (Explain): _____

A2. Depth: ☐ None ■ Unknown Method of Determination: Paved Road

***A3. Human Remains:** ☐ Present ■ Absent ☐ Possible ☐ Unknown (Explain): _____

***A4. Features**: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map.)
The location of the 1859 San Mateo to Crystal Springs Road within the APE lies largely under the Lower Crystal Springs Dam. The dam's utility buildings lie along the built-up asphalt road that probably follows the contours of the original road. The area has been heavily disturbed and built up to accommodate the dam, its construction, and the nearby facilities. No trace of the original road was discovered.

***A5. Cultural Constituents:** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features.)
Site consists of a road, now paved. No historical artifacts were found in association with the road.

***A6. Were Specimens Collected?** ■ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

***A7. Site Condition:** ☐ Good ☐ Fair ■ Poor (Describe disturbances.):
No trace of original road remains, modern pavement covers it completely.

***A8. Nearest Water:** (Type, distance, and direction.) Crystal Springs Reservoir. 0 m, West.

***A9. Elevation:** 291 ft

A10. Environmental Setting: Road moves from reservoir eastward up through a natural canyon with oak woodlands.

A11. Historical Information: General Land Office maps denote 1859 road.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ■ 1848-1880 ☐ 1880-1914 ☐ 1914-1945 ☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**
General Land Office maps denote 1859 road.

A13. Interpretations: (Discuss data potential, function[s], ethnic affiliation, and other interpretations)
Recent development, including construction of the dam and newer road, as well as paving of the road alignment outside of the APE, has completely covered/obliterated the original roadbed and radically changed the surrounding environment and local associational context. Consequently, the property no longer retains any integrity of location, integrity of design, integrity of setting, integrity of materials or integrity of association.

A14. Remarks:

A15. References: (Documents, informants, maps, and other references)
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California. Report prepared by ENTRIX, Inc.

A16. Photographs: Attached Photograph Record.
Original Media/Negatives Kept at: ENTRIX Salt Lake City Office under "Crystal Springs"

***A17. Form Prepared by:** Dr. Zachary Nelson **Date:** March 12, 2008

Affiliation and Address: ENTRIX, Inc. 807 East South Temple, Suite 350, Salt Lake City, UT 84102

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

Page 3 **of** 6 **Resource Name or #:** (Assigned by recorder) 1859 San Mateo to Crystal Springs Road

L1. Historic and/or Common Name: Lower Crystal Springs Dam road

L2a. Portion Described: ☐ Entire Resource ■ Segment ☐ Point Observation **Designation:** 1. Road

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

USGS 7.5' Quad San Mateo **Date** 1999 **T** 5S ; **R** 5W; Mt. Diablo **B.M.**

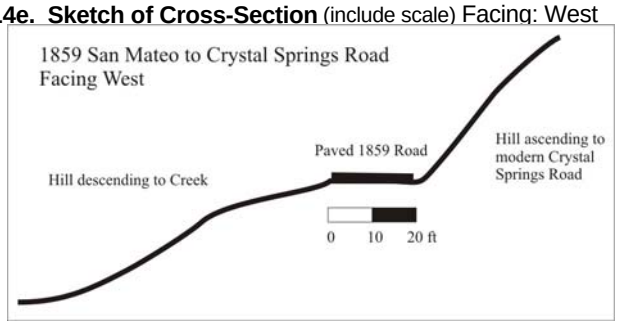
UTM: Zone 10N , 556354.92 mE/ 4153743.33 mN

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
The location of the 1859 San Mateo to Crystal Springs Road within the APE lies largely under the Lower Crystal Springs Dam. The dam's utility buildings lie along the built-up asphalt road that probably follows the contours of the original road. The area has been heavily disturbed and built up to accommodate the dam, its construction, and the nearby facilities. No trace of the original road was discovered.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

a. Top Width 20 ft
b. Bottom Width 20 ft
c. Height or Depth 0.8 ft
d. Length of Segment 1945 ft

L4e. Sketch of Cross-Section (include scale) Facing: West



L5. Associated Resources:
No other historical resources are present.

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.):
Road originally went under the current Lower Crystal Springs Dam and rose following the natural contours of the gully along the current path of the Crystal Springs Road.

L7. Integrity Considerations:
Recent development, including construction of the Lower Crystal Springs dam and newer road, as well as paving of the road alignment outside of the APE, has completely covered/ obliterated the original roadbed and radically changed the surrounding environment and local associational context. Consequently, the property no longer retains any integrity of location, integrity of design, integrity of setting, integrity of materials or integrity of association.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing (View, scale, etc.)
1859 Road / Entrance to Dam facilities facing west. Photo 120 by Zachary Nelson on January 24, 2008.

L9. Remarks:

L10. Form Prepared by:
(Name, affiliation, and address)
Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

L11. Date: March 13, 2008

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page 4 **of** 6 **Project Name:** Crystal Springs Dam **Year** 2008
Camera Format: Canon PowerShot A550 **Negatives Kept at:** ENTRIX, Inc. Salt Lake City Office

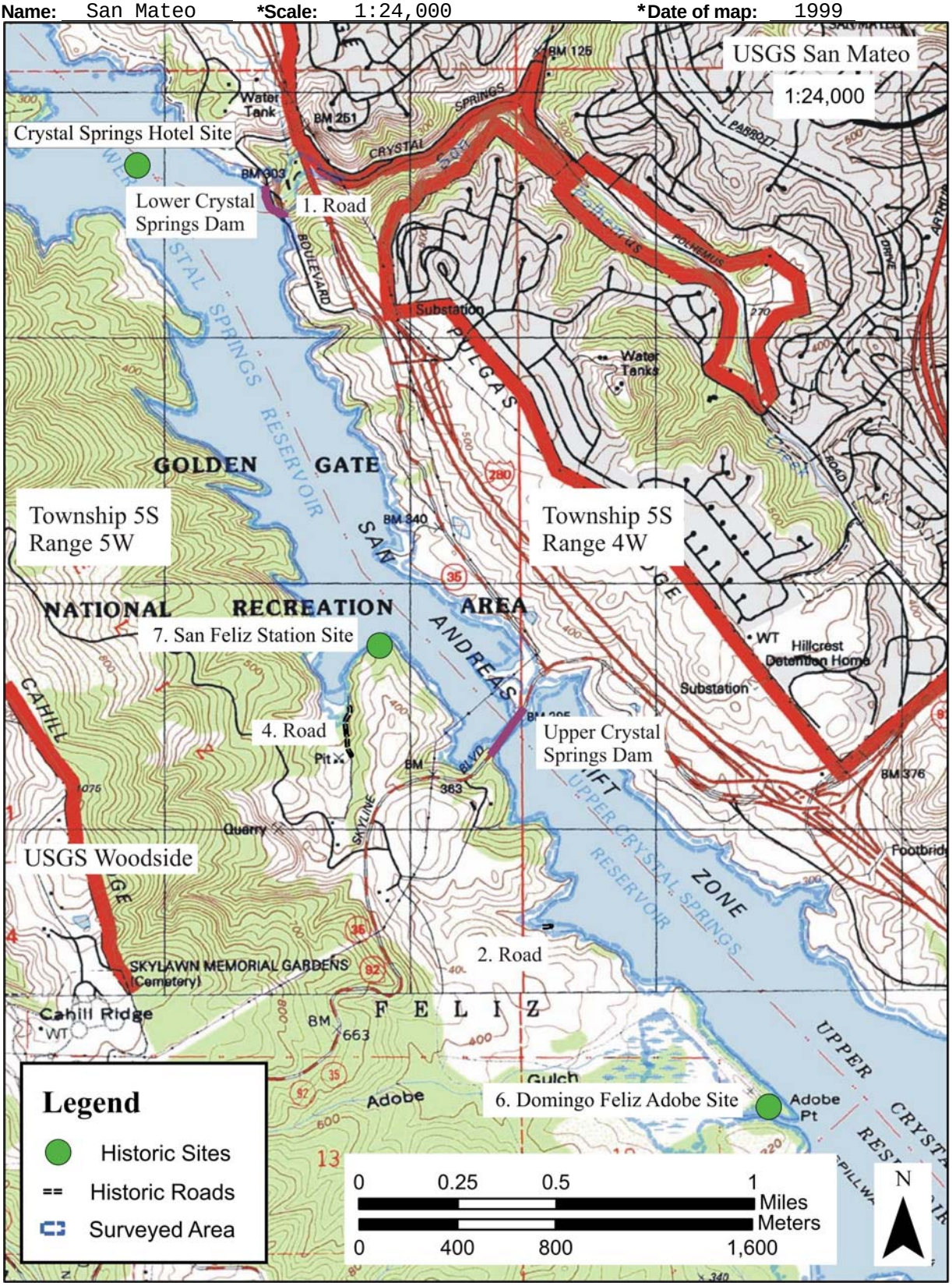
Mo.	Day	Exp./Frame	Subject/Description	View Toward
1	23	117	1859 San Mateo to Crystal Springs Road (Road #1) on E side of Crystal Springs Dam	N
1	23	118	Underside of Overpass on W side of dam	-
1	23	119	1859 San Mateo to Crystal Springs Road (Road #1), asphalt, maintained, elevated, on dam side	E
1	23	120	Entrance to 1859 San Mateo to Crystal Springs Road (Road #1) from dam side	W

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Page 5 **of** 6 ***Resource Name :** 1859 San Mateo to Crystal Springs Road (1. Road)
***Map Name:** San Mateo ***Scale:** 1:24,000 ***Date of map:** 1999

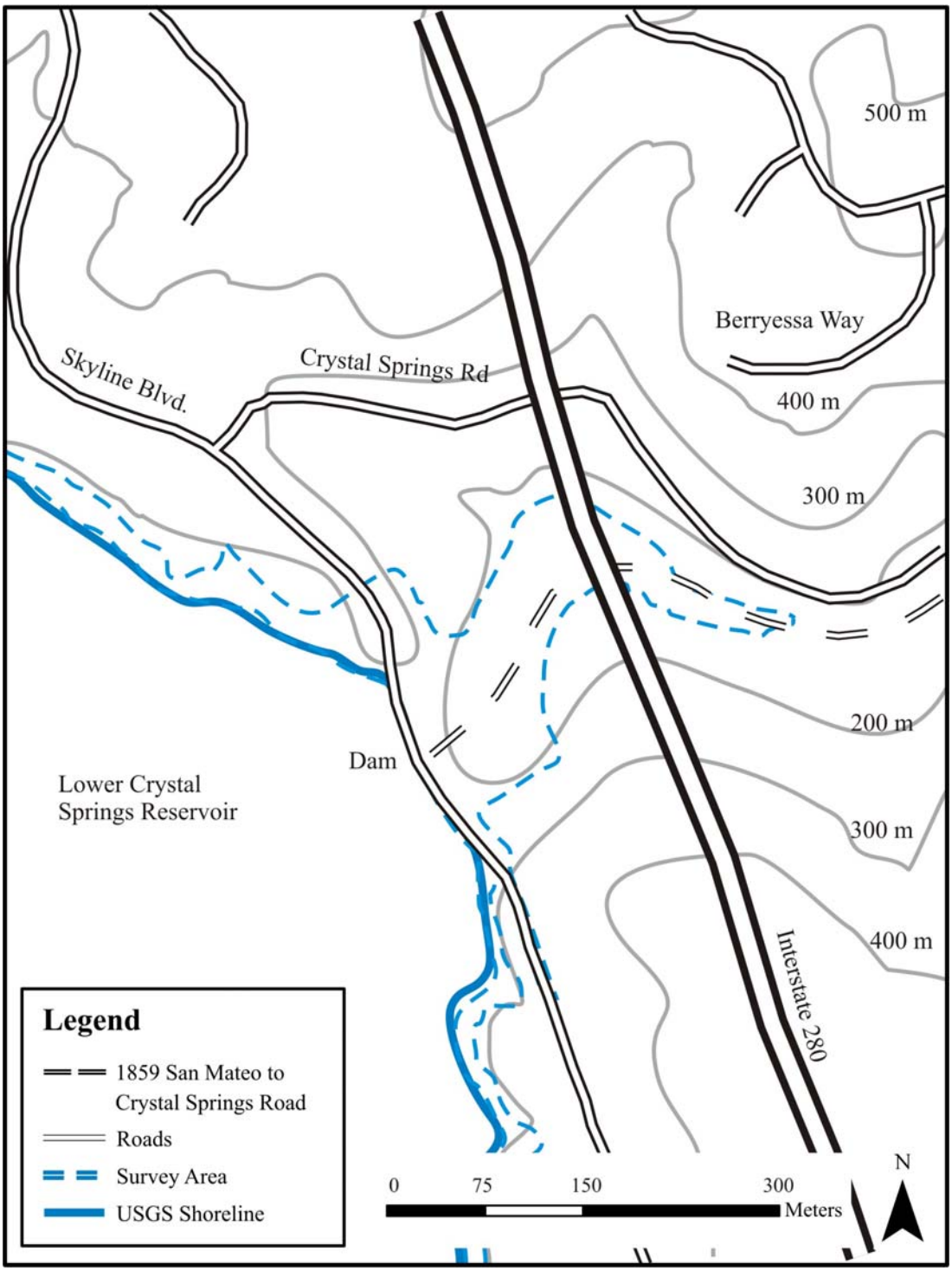


State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Page 6 **of** 6 ***Resource Name :** 1859 San Mateo to Crystal Springs Road
***Drawn by:** Zachary Nelson ***Date of map:** March 14, 2008



NOTE: Include bar scale and north arrow.

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 **of** 6 ***Resource Name or #:** (Assigned by recorder) 1921 West Union to Byrnes Store Road

P1. Other Identifier: None

***P2. Location:** ■ **Not for Publication** □ **Unrestricted**

***a. County** San Mateo **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Woodside **Date** 1999 **T** 5S ; **R** 4W;; Mt. Diablo **B.M.**

c. Address _____ City _____ Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone 10 , 557473.73 mE/ 4150796.70 mN (NAD83)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The 1921 West Union to Byrnes Store Road was relocated on the western shore of the reservoir, approximately 2000 feet south of the Lower Crystal Springs Dam. The road bed is densely vegetated and road consists of a shallow, lightly graveled linear depression approximately 20 feet wide that trends from the waters edge upslope to the west. A cylindrical 12" tall metal marker was encountered along the side of the roadbed. An intensive survey of the roadbed failed to identify any other artifacts or architectural/engineering features.

***P3b. Resource Attributes:** (List attributes and codes) HP37, AH7

***P4. Resources Present:** □ Building □ Structure □ Object ■ Site □ District □ Element of District □ Other (Isolates, etc.)

P5b. Description of Photo: (view, date, accession #) Segment of the 1921 West Union to Byrnes Store Road located within the APE, View West. Taken By Zachary Nelson 1/24/2008. Photo #116.

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

***P6. Date Constructed/Age and Source:** ■ Historic □ Prehistoric
Resources identified on General Land Office maps.

***P7. Owner and Address:**
San Francisco Public Utilities Commission
1657 Rollins Road,
Burlingame, CA 94010

***P8. Recorded by:**
Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

***P9. Date Recorded:** January 23, 2008

***P10. Survey Type:**
Judgmental Survey of Known Historic sites

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California. Report prepared by ENTRIX, Inc.

***Attachments:** □NONE ■Location Map □Continuation Sheet □Building, Structure, and Object Record
■Archaeological Record □District Record ■Linear Feature Record □Milling Station Record □Rock Art Record
□Artifact Record ■Photograph Record □ Other (List):

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary #
Trinomial

ARCHAEOLOGICAL SITE RECORD

 ***Resource Name:** 1921 West Union to Byrnes Store Road

***A1. Dimensions: a. Length** 483 (m) × **b. Width** 6 (m)

Method of Measurement: ☐ Paced ■ Taped ☐ Visual estimate ☐ Other: _____

Method of Determination (Check any that apply.): ☐ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ■ Other (Explain): Historical General Land Office maps show the road.

Reliability of Determination: ■ High ☐ Low Explain: Historical Data

Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Site limits incompletely defined ☐ Disturbances ■ Vegetation ☐ Other (Explain): _____

A2. Depth: ■ None ☐ Unknown Method of Determination: Historical graveled road without fill.

***A3. Human Remains:** ☐ Present ■ Absent ☐ Possible ☐ Unknown (Explain): _____

***A4. Features**: (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map.)
Site consists of a single roadbed and a 12″ road marker. The 1921 West Union to Byrnes Store Road was relocated on the western shore of the reservoir, approximately 2000 feet south of the Lower Crystal Springs Dam. The road bed is densely vegetated.

***A5. Cultural Constituents:** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with features.)
Road consists of a shallow, lightly graveled linear depression approximately 20 feet wide that trends from the waters edge upslope to the west. A cylindrical 12″ tall metal marker was encountered along the side of the roadbed. An intensive survey of the roadbed failed to identify any other artifacts or architectural/engineering features.

***A6. Were Specimens Collected?** ■ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

***A7. Site Condition:** ☐ Good ☐ Fair ■ Poor (Describe disturbances.):
Heavy vegetation has taken over road outside of the APE. Inside the APE, road enters into a reservoir, which has eroded and covered it.

***A8. Nearest Water:** (Type, distance, and direction.) Upper Crystal Springs Reservoir, 0 m, East.

***A9. Elevation:** 290 ft

A10. Environmental Setting: Nearby vegetation includes oak woodland, and mixed willow forest. Fauna in the general area include waterfowl, raptors, deer, and small mammals.

A11. Historical Information: General Land Office maps show this road.

***A12. Age:** ☐ Prehistoric ☐ Protohistoric ☐ 1542-1769 ☐ 1769-1848 ☐ 1848-1880 ☐ 1880-1914 ■ 1914-1945 ☐ Post 1945 ☐ Undetermined **Describe position in regional prehistoric chronology or factual historic dates if known:**
Road appears on General Land Office maps dating to 1920s.

A13. Interpretations: (Discuss data potential, function[s], ethnic affiliation, and other interpretations)
Through prolonged disuse the road has decayed, become overgrown with vegetation and no longer retains its integrity of materials or design. Moreover, the surrounding physical and cultural environments have experienced notable changes. Byrnes Store is no longer in service, vehicle travel in now occurs via a different road system, and the surrounding environment and local associational context have changed dramatically. Consequently, the property no longer retains any integrity of location, integrity of setting, or integrity of association.

A14. Remarks:

A15. References: (Documents, informants, maps, and other references)
Historic Context and Archaeological Survey Report for the Proposed Lower Crystal Springs Dam Improvements Project, San Mateo County, California. Report prepared by ENTRIX, Inc.

A16. Photographs: Attached Photograph Record.
Original Media/Negatives Kept at: ENTRIX Salt Lake City Office under "Crystal Springs"

***A17. Form Prepared by:** Dr. Zachary Nelson **Date:** March 12, 2008

Affiliation and Address: ENTRIX, Inc. 807 East South Temple, Suite 350, Salt Lake City, UT 84102

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LINEAR FEATURE RECORD

Primary #
HRI #
Trinomial

Page 3 **of** 6 **Resource Name or #:** (Assigned by recorder) 1921 West Union to Byrnes Store Road

L1. Historic and/or Common Name: None

L2a. Portion Described: ☐ Entire Resource ■ Segment ☐ Point Observation **Designation:** 2. Road

b. Location of point or segment: (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

USGS 7.5' Quad Woodside **Date** 1999 **T** 5S ; **R** 4W;; Mt. Diablo **B.M.**

Zone 10 , 557473.73 mE/ 4150796.70 mN (NAD83)

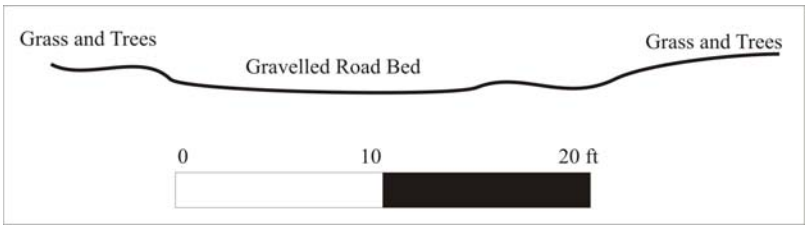
L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

The 1921 West Union to Byrnes Store Road was relocated on the western shore of the reservoir, approximately 2000 feet south of the Lower Crystal Springs Dam. The road bed is densely vegetated and road consists of a shallow, lightly graveled linear depression approximately 20 feet wide that trends from the waters edge upslope to the west. A cylindrical 12″ tall metal marker was encountered along the side of the roadbed. An intensive survey of the roadbed failed to identify any other artifacts or architectural/engineering features.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- **a. Top Width** 20 ft
- **b. Bottom Width** 20 ft
- **c. Height or Depth** 0.5 ft
- **d. Length of Segment** 1584 ft

L4e. Sketch of Cross-Section (include scale) Facing: Northwest.



L5. Associated Resources:

See Description.

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.):

The road descends from the Old Cañada road down a gully into the modern reservoir.

L7. Integrity Considerations:

Through prolonged disuse the road has decayed, become overgrown with vegetation and no longer retains its integrity of materials or design. Moreover, the surrounding physical and cultural environments have experienced notable changes. Byrnes Store is no longer in service, vehicle travel in now occurs via a different road system, and the surrounding environment and local associational context have changed dramatically. Consequently, the property no longer retains any integrity of location, integrity of setting, or integrity of association.

L8a. Photograph, Map or Drawing

L8b. Description of Photo, Map, or Drawing

Segment of the 1921 West Union to Byrnes Store Road located within the APE, View West. Taken By Zachary Nelson 1/24/2008. Photo #116.

L9. Remarks:

L10. Form Prepared by: (Name, affiliation, and address)

Zachary Nelson
ENTRIX Inc.
807 East South Temple, Suite 350
Salt Lake City, UT 84102

L11. Date: March 13, 2008

State of California -- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page 4 **of** 9 **Project Name:** Crystal Springs Dam **Year** 2008
Camera Format: Canon PowerShot A550 **Negatives Kept at:** ENTRIX, Inc. Salt Lake City Office

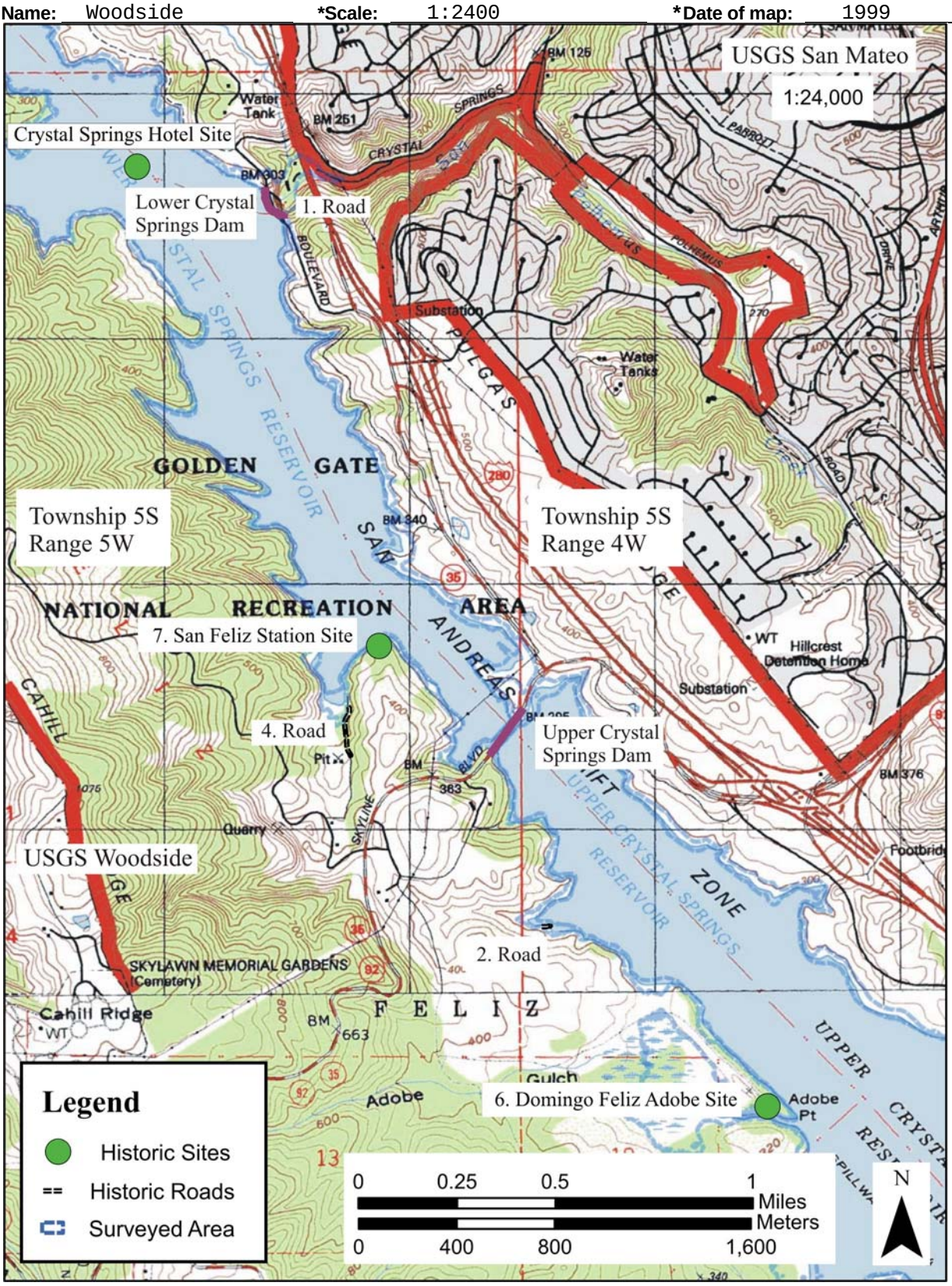
Mo.	Day	Exp./Frame	Subject/Description	View Toward
1	24	115	1921 West Union to Byrnes Store Road marker	S
1	24	116	Remnants of 1921 West Union to Byrnes Store Road	W

State of California - - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

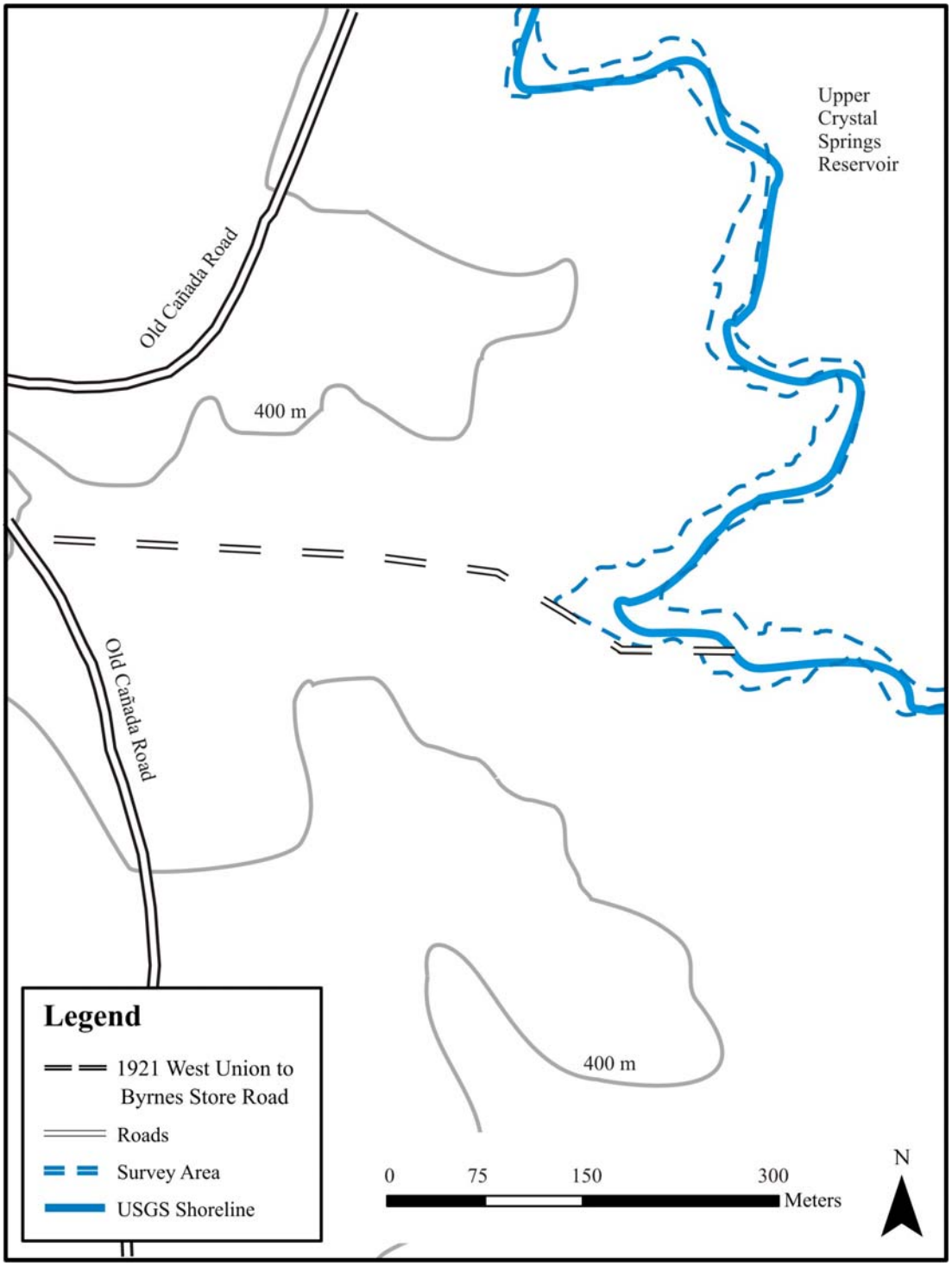
Primary #
HRI#
Trinomial

Page 5 **of** 6 ***Resource Name or #** (Assigned by recorder) 1921 West Union to Byrnes Store Road
***Map Name:** Woodside ***Scale:** 1:2400 ***Date of map:** 1999



State of California - - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **SKETCH MAP**	Primary # HRI# Trinomial

Page 6 **of** 6 ***Resource Name or #** (Assigned by recorder) 1921 West Union to Byrnes Store Road
***Drawn by:** Zachary Nelson ***Date of map:** March 14, 2008



NOTE: Include bar scale and north arrow.

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code	
Other Listings Review Code	Reviewer	Date

 ***Resource Name or #:** Pulgas Discharge Channel

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☑ **Unrestricted** ***a. County:** San Mateo

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** **Date:** **T** ; **R** ; **¼ of** **¼ of Sec** **;** M.D. **B.M.**

c. Address: west of Woodside Road/south of the Upper Crystal Springs Reservoir City: Woodside Zip: 94062

d. UTM: Zone: 10 ; mE/ mN (G.P.S.)

e. Other Locational Data: Elevation:

***P3a. Description:**

The Pulgas Discharge Channel is a rectangular-shaped, open channel that is approximately 800 feet long and nine feet wide. It has five-foot, three-inch-tall reinforced-concrete walls that extend westward for approximately 400 feet, and three-foot, four-inch-tall walls that extend for the remaining length of the channel. A tapered section extends for approximately 60 feet between the five-foot-tall and the three-foot-tall sections. In addition, the channel has a six-inch vitrified sub-drain embedded in the drain rocks running underneath it.

The channel walls and slab are one monolithically poured structure without horizontal construction joints. The five-foot wall section of the channel is reinforced with a double curtain of vertical half-inch-square deformed bar at twelve inches on center, continuous through both walls and floor, on the soil side, and 3/8-inch-square deformed bar at twenty-four inches on center on the channel side, and horizontal 3/8-inch-square deformed bar at twenty-four inches on center on both sides. The three-foot wall section is reinforced with a single curtain of vertical 1/2-inch-square deformed bar at twelve inches on center, continuous through both walls and floor, on the soil side, and horizontal 3/8-inch-square deformed bar at twenty-four inches on center.

***P3b. Resource Attributes:** HP11- Engineering Structure; HP20- Canal/Aqueduct

***P4. Resources Present:** ☐Building ☑Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing

P5b. Description of Photo:
View of the channel toward the east, April 23, 2007.

***P6. Date Constructed/Age and Sources:**
☑Historic ☐Prehistoric ☐Both
Constructed in 1924.; SFPUC *Annual Report* 1923-24.

***P7. Owner and Address:**
City and County of San Francisco,
San Francisco Public Utilities Commission
1155 Market Street, 5th Floor
San Francisco, CA 94013

***P8. Recorded by:**
Erica Schultz
Carey & Co., Inc.
460 Bush Street
San Francisco, CA 94108

***P9. Date Recorded:** December 2007

***P10. Survey Type:** Reconnaissance

***P11. Report Citation:** Carey & Co., Inc. "Pulgas Discharge Channel Improvements Project, Historical Resources Study." December 17, 2007.

***Attachments:** ☐NONE ☑Location Map ☐Sketch Map ☑Continuation Sheet ☑Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** Pulgas Discharge Channel

B1. Historic Name: Pulgas Outfall Channel
B2. Common Name:
B3. Original Use: water conveyance
B4. Present Use: water conveyance
***B5. Architectural Style:** Utilitarian
***B6. Construction History:** Constructed in 1924.

***B7. Moved?** ☒ No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:** Pulgas Tunnel (1924) and Pulgas Water Temple (1938)

B9a. Architect: Unknown
b. Builder: Grant Smith & Co.
***B10. Significance: Theme:** N/A **Area:** N/A
Period of Significance: N/A **Property Type:** Water Conveyance Structure **Applicable Criteria:** N/A

The Pulgas Discharge Channel does not appear to be eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR) due to its lack of historic significance. Its inferred period of significance dates to 1924 when it was constructed.

The Grant Smith and Company constructed the discharge channel in 1924 after it was awarded Hetch Hetchy Water Supply Contract No. 85 by the San Francisco Water Department. Initially known as an "outfall canal," the discharge channel runs east-west from a grated underwater pipe section located underneath the Pulgas Water Temple to the Crystal Springs Reservoir. The discharge channel conveys water from the Pulgas Tunnel via the Dechloramination Facility, to the Upper Crystal Springs Reservoir. It also directs water directly to the reservoir for storage when water supply exceeds demand (SFPUC, 2006).

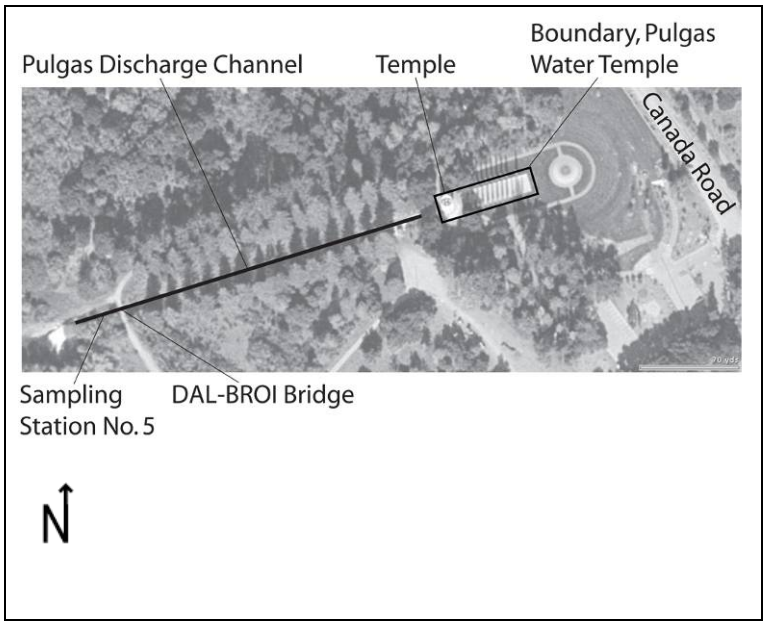
The discharge channel was constructed along with the Pulgas Tunnel and Bay Division Pipeline No. 1 as part of an agreement between the San Francisco Water Department and the Spring Valley Water Company (SVWC) in 1921. The

B11. Additional Resource Attributes:

***B12. References:**

See continuation sheet.

B13. Remarks:



***B14. Evaluator:** Carey & Co., Inc.

***Date of Evaluation:** December 2007

Continuation of B10. Significance:

agreement handed down by the California State Railroad Commission ended a dispute arising in 1917 when the Spring Valley Water Company sought to increase its water rates (October 1927, 2). In anticipation that they would purchase the SVWC, the city approached the Commission to suspend the company's rate increase request (October 1927, 1). However, the city's deal to purchase the SVWC did not pass, leaving the company without funds to construct additional infrastructure required for the city's growing population. Therefore, the Railroad Commission passed an agreement wherein the SVWC and the city would construct additional infrastructure. The SVWC agreed to increase the capacity of the Calaveras Reservoir by raising its height, to grant the right-of-way for the Hetch Hetchy aqueduct to traverse its property, and to pay the city up to $250,000 per year for the right to use the Bay Division Pipeline. They also agreed to maintain the pipeline at their own cost (April 1924, 13). In return, the city agreed to construct the Bay Division Pipeline, which it completed in 1925 to convey water from the Coast Range Tunnel to the Crystal Springs Reservoir via the Pulgas Tunnel, and had the right to purchase the company at a fixed price during the length of the contract.

Following its construction in 1924, the SVWC lease the discharge channel from the city, and in 1926, constructed a concrete weir and recording device in the channel to record the amount of water flowing from the Pulgas Tunnel to the Crystal Springs Reservoir.1 Further modifications to the channel occurred in 1938 with the construction of the permanent Pulgas Water Temple. 100 feet of the channel was covered as result of the temple's construction (SFPUC Databook, 1995, 58).

The Pulgas Discharge Channel does not appear to be eligible for listing in the NRHP or CRHR. It does not appear to be directly associated with events or people that have had a broad-reaching impact on the community at the local, state, or national level and is thus not eligible under NRHP/CRHR Criterion A/1 (Events) and NRHP/CRHR Criterion B/2 (Persons). Archival research has not revealed the discharge channel to be associated with a specific event "marking an important moment in American prehistory or history" or a "pattern of events or a historic trend that made a significant contribution to the development of a community, a State, or a nation (NPS 1990)." The San Francisco water system is significant for influencing the growth and prosperity of the San Francisco Bay Area and marks an important shift in the delivery of water to San Francisco. The delivery of water from Hetch Hetchy resolved long standing water shortage issues in the city, and other Bay Area communities, and provided higher quality of water. However, according to National Register Bulletin 15, "mere association with historic events or trends is not enough…the property's specific association must be considered important as well (NPS 1990)." Although it was constructed as part of the San Francisco regional water system, the discharge channel, as a small-scale water conveyance structure of generic construction, does not possess a specific association with the water system important enough to be considered a historical resource.

Furthermore, the discharge channel does not embody the characteristics of a distinctive type, period, or method of construction, or represent the work of a master architect or builder. Although it is a component of the water system, it was not the first or most significant discharge channel in the San Francisco regional water system. It did not introduce an evolutionary engineering or technological design into the water system nor is it a significant engineering structure. Therefore, the channel does not appear to be eligible under NRHP/CRHR Criterion C/3 (Design).

Finally, it does not appear that the channel has the potential to yield information important to the prehistory or history of the local area, the state, or the nation and does not appear to be eligible under Criterion D/4 (Historic/Pre-historic Information). Although the Pulgas Discharge Channel retains some integrity related to its inferred period of significance, the resource lacks historic significance, and therefore, does not appear to be eligible for the NRHP or the CRHR.

Continuation of B12. References:

Basin Research Associates. *Cultural Resource Assessment, San Francisco Public Utilities Commission (SFPUC), Hetch Hetchy Chloramine Conversion Project, Proposed Interim Pulgas Water Temple Site Facility*. San Leandro, CA: Basin Research Associates, 1999.

Basin Research Associates. *Hetch Hetchy Water Treatment Project – Chloramine Conversion, Cultural Resources Background Report*. San Leandro, CA: Basin Research Associates, 1999.

City & County of San Francisco, Department of Public Works, Bureau of Engineering Management. *Conceptual Engineering Report: Pulgas Discharge Channel Modifications Project* (CUW36102). 2006.

City & County of San Francisco, Planning Department (SFPD). *Peninsula Watershed Management Plan, Final Environmental Impact Report*. 2001.

City & County of the San Francisco, Public Utilities Commission (SFPUC). *Annual Report of the San Francisco Public Utilities Commission, Fiscal Years 1937-1949.*

City & County of the San Francisco, Public Utilities Commission. *San Francisco Water Department Specification No. 136 for Pulgas Outfall Improvements (in San Mateo County)*, Federal Public Works Docket 1132-6b. December 1936.

City & County of San Francisco, Public Utilities Commission, Water Supply and Treatment Division. *Regional Water System Facility Data Sheets.* September 29, 2004.

Spring Valley Water Company. *San Francisco Water*. San Francisco, CA: Spring Valley Water Company, 1922-1930.

State of California, Department of Parks and Recreation, Office of Historic Preservation. *Technical Assistance Series #5, California Register of Historical Resources: The Listing Process*. n. d.

State of California, Department of Parks and Recreation, Office of Historic Preservation. *Technical Assistance Series #6, California Register and National Register: A Comparison (for the purposes of determining eligibility for the California Register)*. 16 March 2006.

United States Department of the Interior, National Park Service (NPS). *How to Apply the National Register Criteria for Evaluation*, National Register Bulletin 15. Washington, DC: U.S. Department of the Interior, 1997a.

***Recorded by:** Carey & Co., Inc. ***Date:** December 2007 ☑ Continuation ☐ Update

Additional Photographs

View east toward the Pulgas Water Temple (Carey & Co., Inc.; April 23, 2007)

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Western terminus of the Pulgas Discharge Channel (Carey & Co., Inc.; April 23, 2007).

State of California — The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI #**
PRIMARY RECORD
Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** Pulgas Water Temple

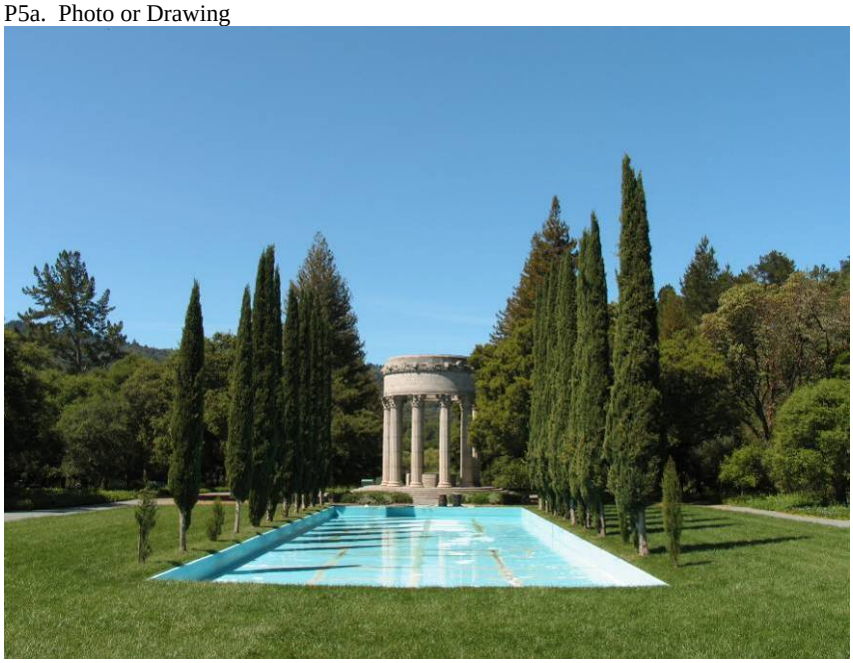
P1. Other Identifier:
***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** San Mateo
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad:** **Date:** **T** ; **R** ; **¼ of** **¼ of Sec** **;** M.D. **B.M.**
c. Address: west of Woodside Road/south of the Upper Crystal Springs Reservoir City: Woodside Zip: 94062
d. UTM: Zone: 10 ; mE/ mN (G.P.S.)
e. Other Locational Data: Assessor Parcel Number: 093-090-070 Elevation:

***P3a. Description**

The Pulgas Water Temple is 60 feet tall and 25 feet in diameter. A twelve-foot wide circular weir connected to the Pulgas Discharge Channel is located underneath the temple to allow water to pass from the Pulgas Tunnel, through the discharge channel, and to the Crystal Spring Reservoirs. Constructed of cast stone, the open-air temple has fluted columns with Corinthian capitals and is encircled by six cast stone steps. A frieze located above the columns is inscribed with the quote, "I give waters in the wilderness and rivers in the desert, to give drink to my people. Isaiah 43:20." A band of garlands and a band with a fret pattern adorn the interior of the frieze. A designed, axial landscape accompanies the temple and includes a reflecting pool, a stepped platform, and a concrete pathway. The shallow, rectangular reflecting pool lined with trees extends west of the temple and measures 40 feet wide, 120 feet long, and 2 feet deep. A circular stepped platform with annual plantings in its center is located east of the pool. A U-shaped, concrete pathway encompasses the temple, reflecting pool, and the platform.

***P3b. Resource Attributes:** HP11- Engineering Structure; HP26 - Monument
***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)
P5b. Description of Photo:
View west toward the Pulgas Water Temple and reflecting pool; April 23, 2007.

P5a. Photo or Drawing



***P6. Date Constructed/Age and Sources:**
☒Historic ☐Prehistoric ☐Both
Constructed in 1938; SFPUC's *Annual Report 1978-1938*.

***P7. Owner and Address:**
City and County of San Francisco,
San Francisco Public Utilities Commission
1155 Market Street, 5th Floor
San Francisco, CA 94013

***P8. Recorded by:**
Erica Schultz
Carey & Co., Inc.
460 Bush Street
San Francisco, CA 94108

***P9. Date Recorded:** November 2007
***P10. Survey Type:** Intensive
***P11. Report Citation:** "Baden and San Pedro Valve Lots Improvement Project, Historical Resources Technical Memorandum," November 16, 2007, Carey & Co., Inc.

***Attachments:** ☐NONE ☒Location Map ☐Sketch Map ☒Continuation Sheet ☒Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code:** 3S

***Resource Name or #** Pulgas Water Temple

B1. Historic Name: Pulgas Water Temple
B2. Common Name:
B3. Original Use: Commemorative water temple
B4. Present Use: Commemorative water temple
***B5. Architectural Style:** Beaux Arts/Classical
***B6. Construction History:** Temporary water temple constructed here in 1934. Permanent water temple constructed in 1938. Upgrades to the temple in 1967. Additional landscaping and construction of stepped platform and new parking lots in 1975.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:** Pulgas Tunnel and Discharge Channel (1924), Pulgas Pumping Station (1975)

B9a. Architect: William Gladstone Merchant
b. Builder: Albert Bernasconi
***B10. Significance: Theme:** Municipal Water System
Area: San Francisco Bay Area
Period of Significance: 1938
Property Type: Water Temple
Applicable Criteria: C

The Pulgas Water Temple appears to be eligible for the CRHR or the NRHP under Criterion C/3. Its period of significance dates to 1938 when it was constructed. Designed as a symbolic twin of the Sunol Water Temple, which was constructed earlier by the Spring Valley Water System in 1910, it represents the continuity of the city's water supply. It retains sufficient integrity to convey its significance as an example of a Beaux Arts style structure that functions as a symbolic terminus of the San Francisco Water System, marking the end of the water's journey from the Hetch Hetchy reservoir to San Francisco. The character-defining features include the fluted Corinthian columns, inscription, and cast-stone of the water, the shallow-depth and rectangular form of the reflecting pool, and the spatial relationship between them. Its boundary, as outlined in the location map, includes the temple, its cast stone steps, and the reflecting pool.

Hetch Hetchy water first flowed under the Pulgas Water Temple, initially a temporary plaster structure, on October 24, 1934. A permanent temple was constructed in 1938 to symbolically mark the terminus of the Hetch Hetchy Aqueduct at

B11. Additional Resource Attributes: None.

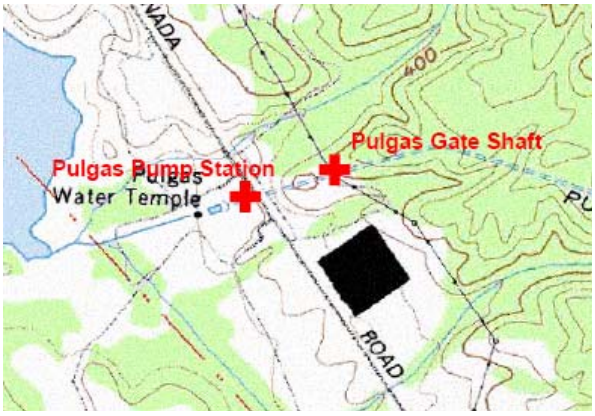
***B12. References:**

See continuation sheet.

B13. Remarks:

***B14. Evaluator:** Erica Schultz, Carey & Co., Inc.

***Date of Evaluation:** November 2007



N

(This space reserved for official comments.)

Continuation of B10. Significance:

the Crystal Springs Reservoir. The temple was designed in the Beaux Arts style and mimics the Spring Valley Water Company's earlier Sunol Water Temple designed by Willis Polk in 1900. Although similar in function and plan, the Pulgas Water Temple has several design elements distinguishing it from the Sunol Water Temple. Most notably, the Pulgas Water Temple is open-air while the Sunol Water Temple has a conical, red clay tile clad roof with elaborate paintings and beams located on its underside.

The Federal Emergency Administration of Public Works (P. W. A.) provided the funds to construct the temple, and the contract for the work was awarded to W. O. Tyson in 1938 (SFPUC, 1938). In 1939, the temple's weir and interior basin were lined with green tile by the American Art Tile Company, a bronze plaque was erected on the temple, and native shrubs and plants were planted (SFPUC, 1940).

William Gladstone Merchant, a noted San Francisco architect, designed the permanent temple. Born in 1889, Merchant trained in the offices of John Galen Howard and Bernard Maybeck. He obtained his architectural license in 1918 and afterwards worked in the office of George W. Kelham. Merchant also assisted in the design of the Palace of Fine Arts and designed a variety of buildings in San Francisco after opening his own firm in 1930. His commissions included buildings at San Francisco State College and the Temples of the East and the Pacific Building at the San Francisco World's Fair. In addition, he was the consulting architect for the San Francisco Recreation Commission and designed fifteen structures for the Parks and Recreations Department.

Master stone carver Albert Bernasconi produced the temple's stonework. Born in 1888, Bernasconi emigrated from France in 1912 after studying at the Sorbonne in Paris. He is most noted for his role in the construction of San Francisco's City Hall from 1914 to 1915. He oversaw a team of sixty stonecutters and sculptors who carved the figures and friezes that adorn the building's dome. In addition, his work can be found on the Pacific Gas and Electric Building and the War Memorial Opera House in San Francisco and Hearst Castle in San Simeon (*Chronicle*, 1972). He died in 1978 (*Chronicle*, 1978).

The temple was also accompanied by a designed landscape, which originally featured the reflecting pool and a series of rectilinear paths that encompassed the temple and pool. The eight-foot wide gravel paths initially extended east from the temple and terminated at two sets of concrete steps at the edge of a linear parking area running parallel to Cañada Road.

In 1975, the landscaping around the water temple was upgraded and the pathways reconfigured in conjunction with the construction of the Pulgas Pumping Station. Royston, Hanamoto, Beck & Abey produced the design for the new landscaping. The linear parking area was removed, and the gravel pathways were paved with concrete and extended to the east, completing a circuit around the newly constructed stepped platform. The stepped platform mirrors the water temple and has the same shape and diameter as the temple's steps. A U-shaped parking lot was constructed adjacent to the stepped platform and has since been replaced with an open grass lawn.

The Pulgas Water Temple appears to be eligible under NRHP/CRHR Criterion C/3 for embodying distinctive characteristics of a type, period, and method of construction and possessing high artistic value. With its fluted Corinthian columns, radial symmetry, and decorative bands and garlands, the temple is a representative example of a Beaux Arts style structure within the San Francisco water system. The Beaux Arts style was predominate around 1885 to 1930 and is characterized by symmetrical façades; wall surfaces decorated with garlands, floral patterns, and shields; and Ionic or Corinthian columns or pilasters (McAlester, 379). Although similar to the Sunol Water Temple, its design is relatively distinct within the water system. For example, structures designed in a Mission Revival style (such as the Moccasin Power House) or Art Moderne/Deco (such as various valve houses) are relatively common. However, the temple does not appear to be eligible under Criterion C/1 as a designed landscape. Although the current landscape is compatible with the original design and retains its strong axial plan, the designed landscape has lost its integrity of design and setting and was therefore not included in the temple's boundaries.

In addition, the water temple does not appear to be eligible for the NRHP/CRHR under Criterion A/1 (Events), Criterion B/2 (Persons), or Criterion D/4 (Historic/Pre-historic Information). It is not known to be directly associated with events or persons which had a broad-reaching impact on the community at the local, state, or national level. It has a strictly ornamental function

Continuation of B10. Significance:

that does not contribute to the delivery of water within the water system. Archival research did not reveal any significant people who are associated with the temple. Lastly, archival research provided no indication that the site has the potential to yield information important to the prehistory or history of the local area, state, or the nation.

Continuation of B12. References:

Basin Research Associates. *Cultural Resource Assessment, San Francisco Public Utilities Commission (SFPUC), Hetch Hetchy Chloramine Conversion Project, Proposed Interim Pulgas Water Temple Site Facility*. San Leandro, CA: Basin Research Associates, 1999.

Brown & Caldwell and Montgomery. *A Study of the Crystal Springs Balancing Reservoir and Pumping Station: a report prepared for the San Francisco Water Department on the Preliminary Design of the Crystal Springs Balancing Reservoir and Pumping Station*. September 1971.

City & County of San Francisco, San Francisco Public Utilities Commission, Water Supply and Treatment Division. *Regional Water System Facility Data Sheets*. September 29, 2004.

"City Hall Honors a Master Building." *San Francisco Chronicle*. 11 August 1972, p. 6.

City & County of San Francisco, Art Commission. "Memorandum regarding the Civic Design, Planning and Art Enrichment Committee Meeting of 17 April 1972." n. d.

City & County of San Francisco, Department of Public Works, Bureau of Engineering Management. *Conceptual Engineering Report: Pulgas Discharge Channel Modifications Project*. San Francisco Public Utilities Commission, 2006.

City and County of the San Francisco, Public Utilities Commission. *Annual Report of the San Francisco Public Utilities Commission, Fiscal Years 1937-1949.*

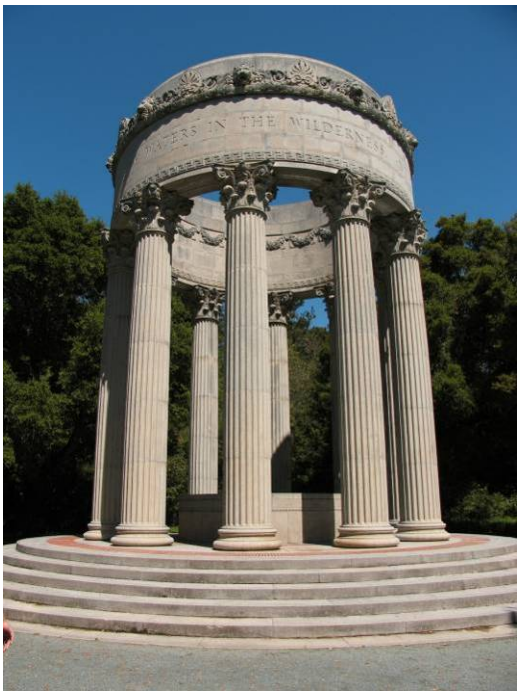
City and County of the San Francisco, Public Utilities Commission. *San Francisco Water Department Specification N. 136 for Pulgas Outfall Improvements (in San Mateo County), Federal Public Works Docket 1132-6b.* December 1936.

City & County of San Francisco, San Francisco Public Utilities Commission, Water Supply and Treatment Division. *Regional Water System Facility Data Sheets*. September 29, 2004.

Hanson, Warren D. *San Francisco Water and Power: A History of the Municipal Water Department and Hetch Hetchy System*. San Francisco: Public Utilities Commission, City and County of San Francisco, 2005.

McAlester, Virginia and Lee. *A Field Guide to American Houses*. New York: Alfred A. Knopf, 1986.

Additional Photographs



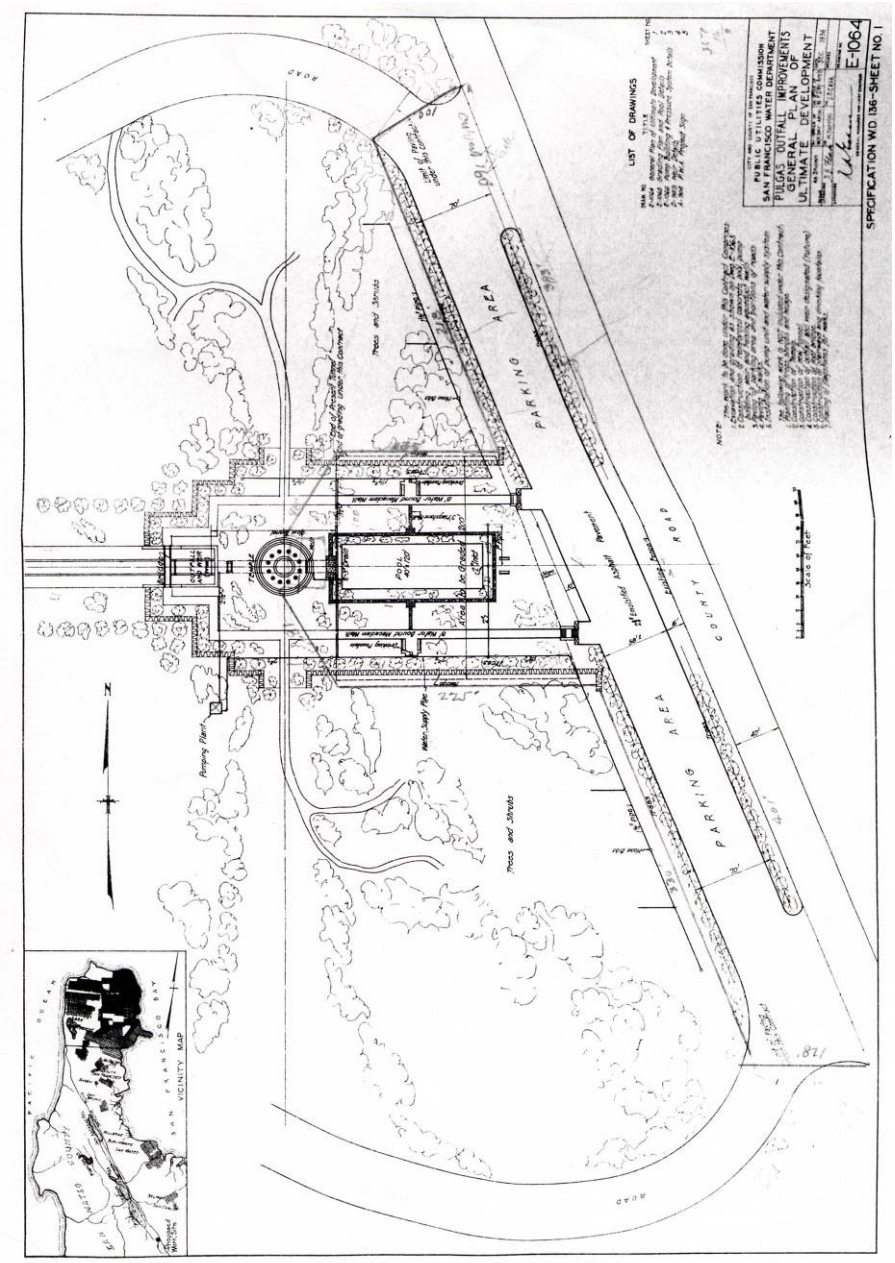
View west toward the temple (Carey & Co., April 23, 2007).

View east toward the reflecting pool and stepped platform (Carey & Co., April 23, 2007).

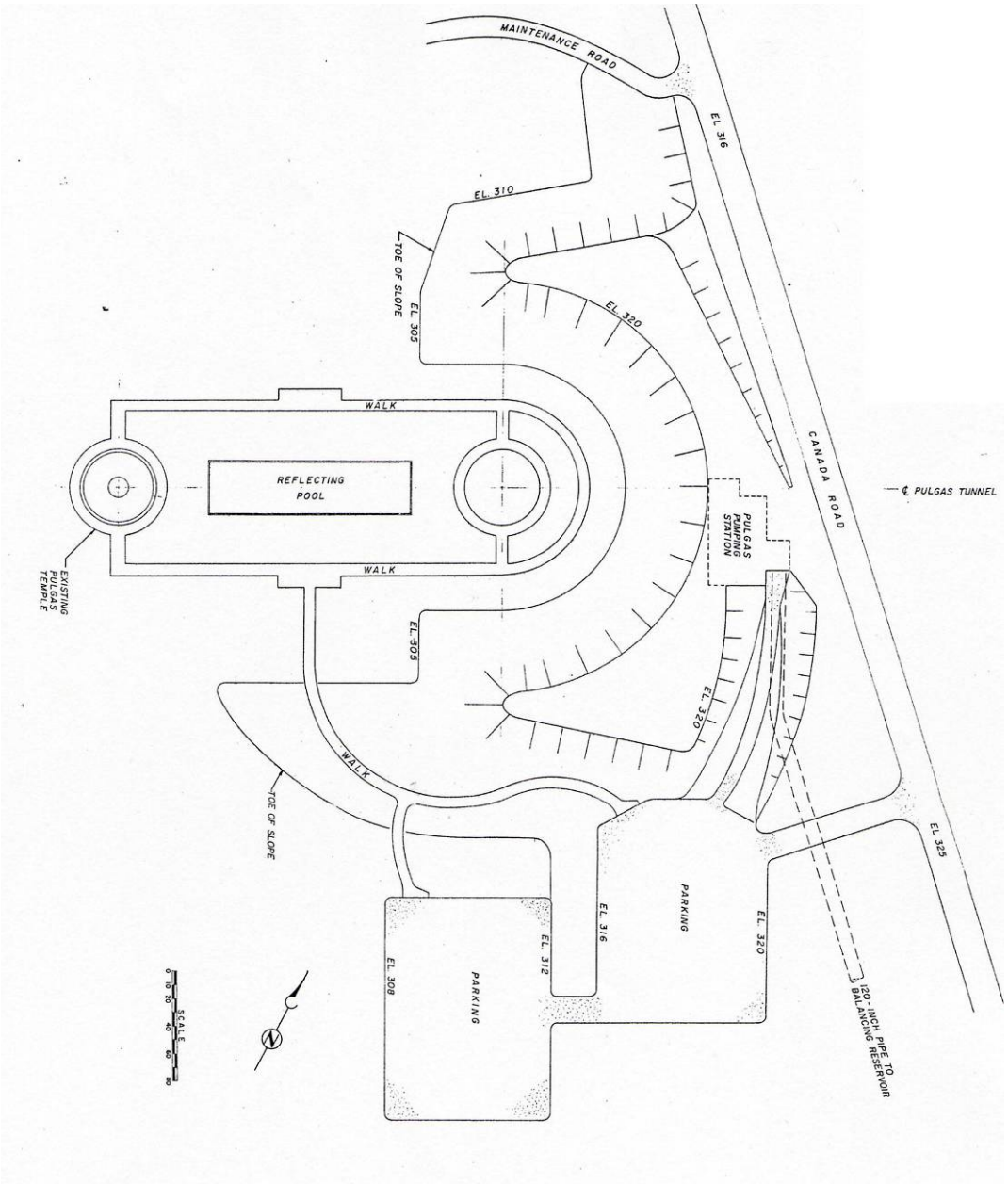
View east toward the stepped platform (Carey & Co., April 23, 2007).

State of California — The Resources Agency	Primary #
DEPARTMENT OF PARKS AND RECREATION	HRI#
CONTINUATION SHEET	Trinomial

***Recorded by:** Carey & Co., Inc. ***Date:** November 2007 ☒ **Continuation** ☐ **Update**



Site map of the Pulgas Water Temple from 1936
(Source: SFPUC, *San Francisco Water Department Specification N. 136 for Pulgas Outfall Improvements*.)

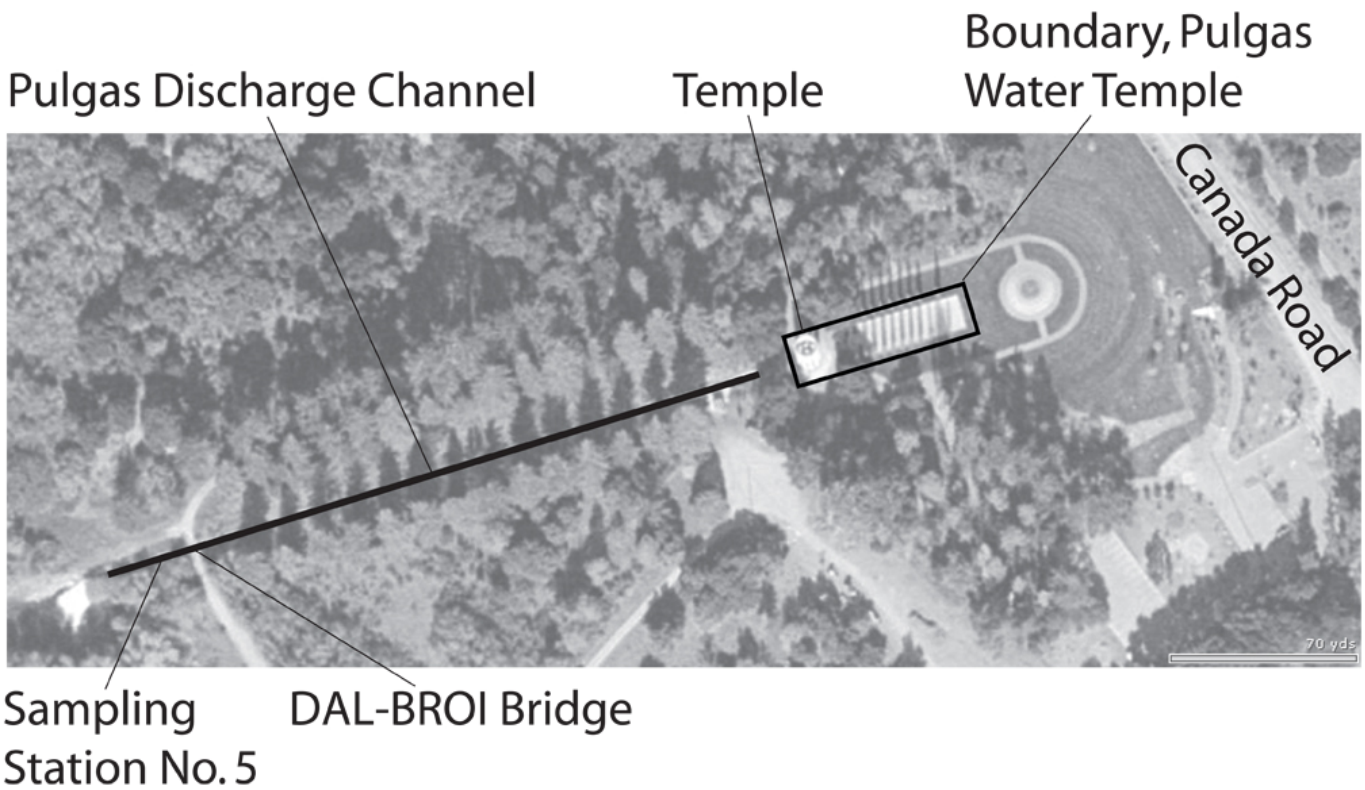


Site map of the Pulgas Water Temple from 1971
(Source: Brown & Caldwell and Montgomery. *A Study of the Crystal Springs Balancing Reservoir and Pumping Station*.)

***Resource Name or #:** Pulgas Water Temple

***Map Name:** Aerial (*local.live.com*)

***Date of Map:** Accessed Nov. 14, 2007



Appendix C – Resumes

Donald Louis Craig

SENIOR STAFF SCIENTIST

DISCIPLINE/SPECIALTY

- Prehistoric/Historic Archaeology
- Southeast/Coastal Archaeology
- Ceramic/Lithic Analysis

EDUCATION

- In progress - M.A. Anthropology, Concentration in Prehistoric Archaeology, University of Southern Mississippi, 2002 – 2004
- B.A., English, Oregon State University, 1990

CONTINUING EDUCATION

- Spanish Studies Seminar, Universidad Catolica, Quito, Ecuador, 1989

PROFESSIONAL AFFILIATIONS

- Society of American Archaeologists
- Southeastern Archaeological Conference
- Mississippi Archaeological Association

ORGANIZATIONS

- 2004 University of Southern Mississippi Anthropology Society, Graduate Advisor
- 2003 University of Southern Mississippi Anthropology Society, Graduate Advisor

HONORARY MEMBERSHIPS

- 2004 Lambda Alpha, National Collegiate Honors Society for Anthropology, Beta Chapter of Mississippi
- 2004 Sigma Xi, Scientific Research Society, Southern Mississippi Chapter

SUMMARY OF QUALIFICATIONS

Mr. Craig has a strong background in prehistoric and historic archaeology with field experience in a wide range of environmental regions including Southeast (Mississippi, Alabama, Florida), Northwest (Idaho, Washington), mountain states (Montana, Wyoming), and Southern California. While his primary focus is prehistoric archaeology, his experience includes historic archaeology, forensic recovery, and prehistoric ceramic and lithic analysis. Mr. Craig has field experience and maintained leadership roles in archaeological excavation, testing, and survey. Mr. Craig has been involved in producing NEPA and CEQA documents, and consulted directly with clients assisting them through Section 106 compliance.

RELEVANT EXPERIENCE

ARCHAEOLOGY FIELD EXPERIENCE

Survey Crew Member, Coal Bed Methane Well Survey, Montana and Wyoming

Mr. Craig served as a crewmember surveying potential sites for methane well pads, access roads, service lines, and drainage reservoirs. The work included identification of prehistoric and historic sites in high desert (5000 ft. +) environments in Wyoming and Montana.

Survey Crewmember, Ivyglen Transmission Line Project, Riverside County, California

Mr. Craig joined a survey crew to identify cultural resources within potential transmission line routes in Riverside County, California. Previously recorded sites were located, and new prehistoric and historic sites were identified.

Field Arch III, Crew Leader, Spokane River Hydroelectric Project Relicensing Evaluation, Benewah and Kootenai Counties, Idaho

Mr. Craig participated in testing, excavation, and survey work in cultural evaluations around Lake Couer d'Alene, Idaho, as part of a dam relicensing project. Mr. Craig led a survey crew during project, identifying and recording potential sites, as well as GPS data gathering.

Field Technician, Phase III excavation at Wicked Branch Site, Greene County, Mississippi

Mr. Craig worked on the excavation of a late Woodland village site in Greene County, Mississippi. The site was mitigated due to imminent destruction from new highway construction. The project included both field excavation and lab analysis.

ARCHAEOLOGY FIELD SCHOOL

Excavation at Sims Site, Forrest County, Mississippi (22FO582), University of Southern Mississippi

Mr. Craig participated in the University of Southern Mississippi's excavation of a multi-component occupation on the Leaf River in Forrest County, Mississippi. The project included identification of the site, layout of the excavation, recovery, and analysis of the Archaic through Mississippian site.

Field Supervisor, Sims Site, Forrest County, Mississippi (22FO582), University of Southern Mississippi

During the University of Southern Mississippi archaeology field school at the Sims Site in Forrest County, Mr. Craig served as the field supervisor, getting the crew to the site every day, supervising the site in the absence of the field director, and addressing crew questions and problems.

Archaeology Internship

Archaeology Intern, USDA Forest Service, Chickasawhay Ranger District, Desoto National Forest, Mississippi

As an archaeology intern for the U.S. Forest Service in the Desoto National Forest in Mississippi, Mr. Craig participated in a large-scale survey within the national forest boundaries. Besides identifying both prehistoric and historic sites during the survey, his duties included pre-survey research, GPS data gathering, lithic and ceramic analysis, report writing, database maintenance, and archiving.

Academic Archaeology Field Experience

Planning, survey, and test excavation at Deer Island Site, Harrison County, Mississippi (22HR500), University of Southern Mississippi

Mr. Craig planned and executed surveying and test excavation at the Deer Island Site on Deer Island located off the coast of Mississippi. The project was part of Mr. Craig's thesis work studying the ceramic assemblage of the Mississippian site located on the island.

Field Supervisor, Field Technician, Excavation of human burials at Joe Moran Site, Harrison County, Mississippi (22HR517), University of Southern Mississippi

Mr. Craig served as a field supervisor during the excavations and analysis of human burials discovered beneath an art studio in Biloxi, Mississippi. Thought to be Native American burials, analysis determined the remains to be seventeenth century French. Mr. Craig's specific participation in the project was analyzing mortuary practices and recording the burial site and the positions of the remains. Mr. Craig also co-authored a paper on the site submitted for publication to the Mississippi Archaeological Association.

Field Technician, Test excavation at Bilbo Basin Site, Greene County, Mississippi (22GE512), University of Southern Mississippi

Mr. Craig aided in the test excavation of a known Mississippian site conducted as a thesis project by a graduate student at the University of Southern Mississippi. The excavation took place to determine the depth of deposition at the site and to develop temporal boundaries.

Field Technician, Test excavation at Brandon Site, Mississippi (22RA649), Mississippi Department of Archives and History

Mr. Craig aided in the testing of a possible village site conducted by the Mississippi Department of Archives and History. The testing took place because of likely destruction from nearby construction. The site consisted mainly of postmolds that where measured and recorded.

Field Technician, Test survey at Bilbo Basin Site, Greene County, Mississippi (22GE512), University of Southern Mississippi

Mr. Craig aided in the testing of a known Mississippian site conducted as a thesis project by a graduate student at the University of Southern Mississippi. The testing took place to develop previously unknown boundaries of the site.

Field Technician, Test survey at D'Lo Water Park, Simpson County, Mississippi (22SI590), University of Southern Mississippi

Mr. Craig participated in testing at the D'Lo Water Park in Simpson County, Mississippi, during Mississippi Archaeology Month activities. The testing showed an archaic component within the park boundaries. The testing was part of a public outreach program and duties included interaction with public participants.

Forensic Field Experience

Lauderdale County, Mississippi

Mr. Craig participated in a request made by the Lauderdale County Sheriff's office to the University of Southern Mississippi's Anthropology Department to recover the skeletal remains of a white male, age 30-45, found at a transient camp. The remains were photographed, mapped, and recovered from the site. The death was determined to be of natural causes.

Simpson County, Mississippi

Mr. Craig participated in a request made by the Simpson County Sheriff's office to the University of Southern Mississippi's Anthropology Department to recover the partially buried skeletal remains of a white male, age 30-45, found in a forested area of Simpson County, Mississippi. The remains were photographed, mapped, and

recovered from the site. While recovering the partially buried remains, a handgun was recovered, and the Sheriff's office treated the area as a crime scene. The disposition of the case is unknown.

PUBLICATIONS

PEER-REVIEWED, PUBLISHED PAPERS

Craig, Donald, 2002, Summary of: Walter Hough, 1928, "The Lead Glaze Decorated Pottery of the Pueblo Region," *American Anthropologist* 30:243-249, American Anthropology Project (Journal Archive): http://www.publicanthropology.org.

Craig, Donald, 2002, Summary of: Robert H. Lowie, 1928, "Edward Sandford Burgess Obituary," *American Anthropologist* 30:481-482. American Anthropology Project (Journal Archive): http://www.publicanthropology.org.

Craig, Donald, 2002, Summary of: Jerry D. Moore. 1989. "Pre-Hispanic Beer in Coastal Peru: Technology and Social Context of Prehistoric Production," *American Anthropologist* 91(3):682-695. American Anthropology Project (Journal Archive): http://www.publicanthropology.org

PRESENTED PAPERS

- Craig, Donald, 2004, "French Colonial Mortuary Practices on the North Gulf Coast," paper presented at the 2004 Mississippi Academy of Sciences conference, Biloxi, Mississippi, February 2004

David W. Harvey

SENIOR ARCHITECTURAL HISTORIAN

DISCIPLINE/SPECIALTY

- Historian/architectural historian
- Historic preservation specialist

EDUCATION

- M.A., History, Western Washington University, 1975
- Interdisciplinary Graduate Studies, Oregon State University, 1974
- B.A., American History and Government, Fairleigh Dickinson University, 1970

CONTINUING EDUCATION AND CERTIFICATIONS

- Urban Design & Planning, University of Washington, 1991-1993
- Historic Preservation, Western Washington University, 1979

PROFESSIONAL AFFILIATIONS

- Please refer to list toward end of this resume

SUMMARY OF QUALIFICATIONS

Mr. Harvey has over 30 years of experience in historic preservation, cultural resources management, architectural history, and historic research in the Pacific Northwest, California, Alaska, and Montana, and has assisted federal and state agencies, local governments and utilities, and private architectural and engineering firms in carrying out their cultural resources obligations under sections 106 and 110 of the National Historic Preservation Act.

He has extensive experience in researching cold war histories, and the inventory and evaluation of historic buildings and structures for Department of Energy (DOE) sites in Washington, California, and New Mexico. Mr. Harvey has also worked closely with federal land management agencies, such as the U. S. Forest Service, National Park Service, Bureau of Reclamation, Bureau of Land Management, and U. S. Army Corps of Engineers throughout the Pacific Northwest and Alaska, where he conducted determination of National Register eligibility studies, Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentations, assessments of agricultural/early settlement landscapes, and historic land use studies. Other activities have included the research and writing of historic contexts and National Register nominations, recordation of historic property inventory forms, programmatic agreements and memorandum of agreements for the mitigation of historic properties.

RELEVANT EXPERIENCE

Senior Architectural Historian / Project Scientist — Cultural Resources Survey for the South Park Bridge Replacement Project, Washington

This project falls under ENTRIX's King County Archaeological and Cultural Resources On-Call Contract for Section 106 NHPA compliance. Mr. Harvey researched and wrote the historic context, summary letter report, and senior reviewer for the Cultural Resources Section 106 Technical Report. He also documented and evaluated the Boeing Company buildings in the project area for National Register eligibility.

Senior Architectural Historian / Project Scientist — Bandaret Bridge Replacement & Associated Road Improvements Project, Washington

Under ENTRIX's King County Archaeological and Cultural Resources On-Call Contract for Section 106 NHPA compliance, Mr. Harvey acted as senior reviewer of the Cultural Resources Section 106 Technical Report. He also wrote the summary letter report for the cultural resources survey.

Senior Architectural Historian / Project Scientist — Novelty Hill Road Improvement Project, Phase 2, Washington

Mr. Harvey was a member of the inventory team that conducted a historical resources inventory of the project area under the King County Archaeological and Cultural Resources On-Call Contract for Section 106 NHPA compliance. He wrote the historic context and was senior reviewer of the Cultural Resources Section 106 Technical Report.

Senior Architectural Historian, Project Scientist — Soboba Band of Luiseño Mission Indians, Horseshoe-Grande Fee-to-Trust Project, San Jacinto, California

Mr. Harvey conducted a cultural resources survey of Soboba Indian tribal lands on the Ramljak properties. He authored an addendum to the Cultural Resources

Section 106 Technical Report Horseshoe Grande Fee-to-Trust Project and sections of the final environmental impact statement (EIS) report.

Senior Architectural Historian, Project Scientist — Enloe Dam Relicensing project, Okanogan County PUD, Washington

Mr. Harvey acted as a senior reviewer of draft sections of the Cultural Resources Section 106 Technical Report and the historic property management plan for compliance with Federal Energy Regulatory Commission (FERC) requirements.

Senior Architectural Historian, Project Scientist — Historical and Architectural Evaluation PG&E Materials Storage Building, Watsonville Service Center, Watsonville, California

Mr. Harvey conducted a historical and architectural evaluation of the Pacific Gas and Electric Company's (PG&E) Materials Storage building at the Watsonville Service Center in response to the proposed site (soil) remediation at the facility. He wrote the final inventory report which included an evaluation of the building for National Register eligibility, researched and wrote the property's historic context, and completed State of California Department of Parks and Recreation (DPR) Historic Property Recordation forms.

Senior Architectural Historian, Project Scientist — Cultural Resources Evaluation of Tumwater Canyon, Washington State Department of Transportation, Leavenworth, Washington

Mr. Harvey researched the prehistory and history of Tumwater Canyon/U.S. Highway 2 for the canyon road improvement project. Historical photographs and publications were utilized for the completion of a technical memo including a historical context and documentation of the areas prehistoric and railroad, hydroelectric, and highway resources.

Senior Architectural Historian, Project Scientist — Results of the Cultural Resources Inventory, Williams Gas Pipeline, selected areas in Washington, Oregon and Idaho

Mr. Harvey conducted an intensive cultural resources survey of proposed pipeline ground bed sites, work space areas, and cathotic protection and recoats sites. He also was author of the final cultural resources inventory reports.

Historian/Architectural Historian/Historic Preservation Consultant — Multiple Sites, Western United States

As the owner/principal of Northwest Cultural Resources Services based in Richland, Washington, Mr. Harvey identified and documented/preserved Manhattan Project/Cold War era artifacts that have interpretive/educational value as potential museum exhibits at the Department of Energy's (DOE) Hanford Site, as a subcontractor to Washington Closure Hanford and Fluor Hanford. Other projects included documenting historic buildings at the Lawrence Berkeley National Laboratory for the DOE, completing a National Register of Historic Places nomination of the Seattle-King County YWCA building in downtown Seattle, and completing a historic context study and land use analysis as a subcontractor to the Port of Benton, Richland.

FEMA Project Officer/Historic Preservation Specialist — The Environmental Company (TEC), Charlottesville, Virginia

From 2005 to 2006, Mr. Harvey conducted damage assessments, wrote work scopes, and determined cost estimates for the repair and/or replacement of damaged government facilities under the Public Assistance program for FEMA in New Orleans, Louisiana, in response to the Hurricane Katrina disaster.

Senior Research Scientist/Architectural Historian/Historic Preservation Specialist — Battelle, Pacific Northwest National Laboratory, Richland, Washington

From 1993 to 2005, Mr. Harvey was responsible for the inventory, evaluation, and protection of historic buildings/facilities and structures on the Hanford Site and other DOE facilities, development of a programmatic agreement for the management of the built environment on the Hanford Site, and assessments for NEPA documents. He authored the cultural resources and land use sections for the Hanford Site Solid Waste EIS and draft Fast Flux Test Facility Decommissioning EIS. In addition, he advised and assisted DOE in carrying out their cultural resource compliance obligations under Sections 106 and 110 of the National Historic Preservation Act at the Hanford Site, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Lawrence Berkeley National Laboratory. Also participated in the Hanford Historic Buildings Task Group to identify and evaluate properties related to the Manhattan Project/Cold War period. Other activities included HABS/HAER documentation, determinations of National Register eligibility, generation of reports and publications,

documentation of Hanford's built environment on historic property inventory forms, and historic research and writing of narratives for the Hanford Building Mitigation Project. Mr. Harvey served as the editor and co-author of the National Register of Historic Places Multiple Property Documentation Form - Historic, Archaeological, and Traditional Cultural Properties of the Hanford Site, Washington.

Architectural Historian/Historic Preservation Consultant/Principal — Multiple Projects for Northwest Preservation Resources, Seattle, Washington

From 1982-1993, Mr. Harvey served as the project supervisor/principal investigator of cultural resource management/historic preservation activities for federal, state, and local government agencies and architectural - engineering firms. His activities included conducting surveys, inventories and evaluations of cultural resources for National Register eligibility, preservation planning, HABS/HAER documentation, Section 106 compliance activities and environmental assessments, and authoring project reports.

Historian — Multiple Projects for Ertec Northwest, Inc., Seattle, Washington

Mr. Harvey conducted cultural resource assessments and historical overviews for environmental impact statements, participated in archaeological surveys and testing, and co-authored project reports.

Project Supervisor — Laboratory of Archaeology and History, Washington State University, Pullman, Washington (1981)

Mr. Harvey conducted cultural resource surveys on the Mid-Columbia River, Washington, as well as co-authored final survey reports.

Cultural Resource Specialist — Ochoco National Forest, Crooked River National Grassland, Prineville, Oregon

On behalf of the U. S. Forest Service, Mr. Harvey conducted surveys and inventories of prehistoric/historic sites to comply with Sections 106 and 110, National Historic Preservation Act and authored project reports.

Historic Preservation Planner — Whatcom County Parks, Bellingham, Washington

Mr. Harvey conducted surveys and inventories of historical places for the County Parks Department, established first County Register of Historical Places in the State, and authored final survey forms.

Historian — Multiple Projects for Bureau of Land Management's District Office, Anchorage, Alaska

Mr. Harvey conducted historical research and documentation of historical sites on BLM land, and co-authored a definitive study on the mining settlement of Denali, Alaska.

PROFESSIONAL AFFILIATIONS AND RECOGNITIONS

- Recognition for eight years of Dedicated Service on the Governor's Advisory Council on Historic Preservation, 1997-2004. Vice-Chair; advise the Governor of Washington and the Department of Archaeology and Historic Preservation on heritage and historic preservation matters.
- PNNL Certificate of Appreciation Hanford Site Solid Waste Program, Hanford Site, 1997-2004.
- PNNL Outstanding Team Performance Award for contributions to the Hanford Solid Waste Environmental Impact Statement. Hanford Site, 2003.
- PNNL Outstanding Performance Award in recognition of significant contribution to implementing the Historic Buildings Programmatic Agreement, Hanford Site, 2002.
- PNNL Outstanding Performance Award for support in the production of the Hanford Site NEPA Characterization Report, 2001.
- Hanford Site Historic Buildings Task Group, Richland, Washington.
- Certificate of Appreciation, U. S. Department of Energy, 1996.
- Chair, Historic Preservation Commission, City of Kennewick, Washington, appointed board member by Kennewick City Council in 1996; Chair 1999-2006.

LAURENCE H. SHOUP

Archaeology/Historic Preservation

EDUCATION

Ph.D (U.S. History), Northwestern University, 1974
M.A. (Social Science), California State University, Los Angeles, 1967
B.A. (History), California State University, Los Angeles, 1966

PROFESSIONAL CERTIFICATIONS/AFFILIATIONS

California Council for the Promotion of History, Registered Professional Historian
California Historical Society
Samuel Knight Chapter of the Society for Industrial Archeology

CURRENT POSITION

Since 1979, Dr. Shoup has been a partner in and senior historian for Archaeological/Historical Consultants, a California cultural resources management firm. During these 25 years, he has provided historical consulting services to civic, state, and federal agencies and to a large number of environmental services companies and other private clients, completing over 150 major and minor reports.

Dr. Shoup has conducted research and written reports on a wide variety of historical topics in California. These have included historical overviews ranging from small local to large regional syntheses and numerous specific studies. He is an expert in California's mining, industrial, hydroelectric, transportation, and logging history and has prepared numerous local history overviews. His work also includes research into the history of hazardous waste sites. During the course of his cultural resources management work, Dr. Shoup has written many National Register of Historic Places significance evaluations and is very familiar with federal Section 106 and California Environmental Quality Act (CEQA) compliance procedures.

Dr. Shoup has also taught a course on how to prepare National Register evaluations at Sonoma State University.

CURRICULUM VITAE

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Education

Ph. D., Anthropology, 2005	Pennsylvania State University, University Park, PA
M. A., Anthropology, 2000	Brigham Young University, Provo, UT
B. A., with Honors, Anthropology, 1998	Brigham Young University, Provo, UT

Research Interests

Ancient Maya Epigraphy, GIS in Archaeology, Remote Sensing, Settlement Pattern Analysis, Household Archaeology, Urbanism, Lithic Analysis, Precolumbian Art, & Visual Archaeology

Language Competence

Spoken and Read: English, Spanish

Grants

2007 FAMSI #07055, for El Zotz Satellite Survey ($6,850)
2002 Hill Grant (PSU), for lab research involving Piedras Negras ($4,250)
2002 Hill Grant (PSU), for lab research involving Piedras Negras ($500)
2002 FAMSI #01044, for lab research involving Piedras Negras ($5,000)

Positions

Archaeologist, Entrix Inc., July 30, 2007 to present
Post-doctoral Fellow in Anthropology, Brown University, July 2005 - June 2007
Academic Computing Fellow, Pennsylvania State University, Fall 2002 - Spring 2005
Graduate Research Assistant, Pennsylvania State University, Fall 2000 - Spring 2002
Teaching Assistant, Brigham Young University, Fall 1998 - Spring 2000

Field Experience

2007 CRM Surveys in Arizona, Arkansas, California, Colorado, Oklahoma, and Utah (5 months)
2007 Survey in El Zotz, Guatemala (1 month)
2006 Field School Director, The First Baptist Church in America, Providence RI (4 months)
2006 Survey in El Zotz, Guatemala (1 month)
2004 Survey and Excavation, Piedras Negras, Guatemala (2 months)
2003 Survey and Excavation, Kaminaljuyú, Guatemala (3 months)
2002 Lab analysis, Piedras Negras, Guatemala (3 months)
2001 Lab analysis, Piedras Negras, Guatemala (2 months)
2000 Excavation and lab analysis, Piedras Negras, Guatemala (4 months)
1999 Survey and lab analysis, Piedras Negras, Guatemala (3 months)

1999 Lab analysis, Lithics, Chiapas, Mexico (3 months)
1998 Survey and Excavation, Capitol Reef National Park, Utah (2 months)
1997 Survey and Excavation, Capitol Reef National Park, Utah (2 months)

Professional Memberships
American Anthropological Association
Council for Northeast Historical Archaeology
Society for American Archaeology, Member of Committee on Media Relations since 2003

Courses Taught
Archaeological Field Work (Brown University, Fall 2006)
Civilizations of the New World (Brown University, Summer 2007)
Human Sacrifice in the New World (Brown University, Winter 2007)
South American Culture (Brigham Young University, Fall 1998)

Theses
2005 Urban Development of Piedras Negras, Guatemala; Unpublished dissertation, Pennsylvania State University.
2000 Analysis of an Obsidian Workshop at Hacienda Metepec, Teotihuacan, Mexico, AD 700-800. Unpublished Master's Thesis, Brigham Young University
1998 Altar de Sacrificios Revisited: A Modern Translation of Ancient Writings. Unpublished Honors Undergraduate Thesis, Brigham Young University

Publications
2006 Una pirámide de primera: Investigaciones en la estructura K-5 y sus alrededores, Piedras Negras, Petén. Stephen D. Houston, Héctor L. Escobedo and Zachary Nelson. In *XIX Simposio de Investigaciones Arqueológicas en Guatemala, 2005*, edited by Juan Pedro Laporte, Bárbara Arroyo, and Héctor Mejía, pp. 345-352. Guatemala City: Ministerio de Cultura y Deportes, IDAEH, Asociación Tikal, Fundación Arqueológica del Nuevo Mundo (FAMSI).
2005 The Pool of the Rain God: An Early Stuccoed Altar at Aguacatal, Campeche, Mexico. Stephen Houston, Karl Taube, Ray Matheny, Deanne Matheny, Zachary Nelson, Gene Ware, and Cassandra Mesick. *Mesoamerican Voices* 2:1-29.
2005 Nuevas perspectivas sobre la Acrópolis de Kaminaljuyu, Guatemala. Stephen Houston, Zachary Nelson, Carlos Chiriboga, Carlos Alvarado, Héctor Escobedo, and Karl Taube. In *XVIII Simposio de Investigaciones Arqueológicas en Guatemala, 2004*, edited by Juan Pedro Laporte, Bárbara Arroyo, and Héctor Mejía, pp. 505-510. Guatemala City: Ministerio de Cultura y Deportes, IDAEH, Asociación Tikal, FAMSI.
2004 De la cartografía al cálculo de población de Piedras Negras, Guatemala. In *XVII Simposio de Investigaciones Arqueológicas en Guatemala, 2003*. Edited by Juan Pedro Laporte, Bárbara Arroyo, Héctor Escobedo and Héctor Mejía, pp. 7-15 (vol. 1). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.
2003 The Acrópolis of Kaminaluyu, Guatemala: Recovering A Lost Excavation. Stephen Houston, Zachary Nelson, Carlos Chiriboga and Ellen Spensley. *Mayab* 16: 49-64.
2003 El papel de los machacadores en la economía doméstica Maya. In *XVI Simposio de Investigaciones Arqueológicas en Guatemala, 2002*. Edited by Juan Pedro Laporte,

Héctor Escobedo and Bárbara Arroyo, pp. 509-512 (vol. 2). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.

2002 Soil Chemical Analysis Applied as an Interpretive Tool for Ancient Human Activities in Piedras Negras, Guatemala. John Jacob Parnell, Richard Terry, and Zachary Nelson. *Journal of Archaeological Science* 29: 379-404.

2002 La función y distribución de artefactos liticos en una residencia de Piedras Negras, Guatemala. Zachary Nelson and Zachary Hruby. In *XV Simposio de Investigaciones Arqueológicas en Guatemala, 2001*. Edited by Juan Pedro Laporte, Héctor Escobedo and Barbara Arroyo, pp. 987-996 (vol. 2). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.

2001 *A Thematic Bibliography of Ancient Maya Writing*. Stephen Houston and Zachary Nelson. Provo: Research Press, Brigham Young University.

Technical Reports

2007 *A Phase I Cultural Resource Inventory of the Proposed Springerville Municipal Airport Expansion, Apache County, Arizona*. Archaeological Field Report submitted to Armstrong Associates and the Arizona State Historic Preservation Office.

2007 *A Class III Cultural Resource Inventory for the Proposed Tesoro Corporation 16" Pipeline, Salt Lake and Davis Counties, Utah*. Archaeological Field Report submitted to Jacob Carter Burgess and Utah State Historic Preservation Office.

2007 *CenterPoint Energy Gas Transmission Company Tontitown Project: Natural Gas Pipeline, Logan and Franklin Counties Arkansas*. David Byers and Zachary Nelson. Archaeological Field Report submitted to the Arkansas State Historic Preservation Office and Arkansas Archeological Survey.

2007 *CenterPoint Energy Gas Transmission Company Tontitown Project: Poteau Compressor Station Cultural Report*. Archaeological Field Report submitted to the Oklahoma State Historic Preservation Office and Oklahoma Archeological Survey.

2007 *A Class III Cultural Resource Inventory of the Timpie ESR Parcels, Tooele, Utah*. Archaeological Field Report submitted to Bureau of Land Management, Salt Lake Field Office and Utah State Historic Preservation Office.

2007 *A Class III Cultural Resource Inventory of the East Woodruff Parcels, Rich County, Utah*. Zachary Nelson and Lance McNees. Archaeological Field Report submitted to Bureau of Land Management, Salt Lake Field Office and Utah State Historic Preservation Office.

2007 *A Class III Cultural Resource Inventory of the Manhead Road Parcel, Rich County, Utah*. Zachary Nelson and Lance McNees. Archaeological Field Report submitted to Bureau of Land Management, Salt Lake Field Office and Utah State Historic Preservation Office.

2007 *Churchyard Archaeology: Archaeological Investigations at the First Baptist Church in America*. Edited by Zachary Nelson and Katherine Marino. Archaeological Field Report submitted to the First Baptist Church in America and the Rhode Island Historical Preservation & Heritage Commission. [361 pages] http://proteus.brown.edu/archaeologyofcollegehill/2039

2007 Churchyard Archaeology and Picnics. In *Churchyard Archaeology: Archaeological Investigations at the First Baptist Church in America*. Zachary Nelson and Zoe Agoos. Edited by Zachary Nelson and Katherine Marino, pp. 2-6. Archaeological Field Report