Appendix C

Cultural Resources Reports

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Appendix C-1

Archaeological Resources Inventory and Evaluation Report

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ARCHAEOLOGICAL RESOURCES INVENTORY AND EVALUATION REPORT FOR THE NEWELL CREEK PIPELINE IMPROVEMENT PROJECT

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ACHP	Advisory Council on Historic Preservation
APE	area of potential effect
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CRHR	California Register of Historical Resources
FBPS	Felton Booster Pump Station
GHWTP	Graham Hill Water Treatment Plant
NCP	Newell Creek Pipeline
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
PRC	Public Resources Code
SCWD	Santa Cruz Water Department
SLF	Sacred Lands File
USACE	U.S. Army Corps of Engineers

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Executive Summary

The City of Santa Cruz retained Dudek to complete a cultural resources inventory and evaluation report for a project to replace 8.75 miles of the existing Newell Creek Pipeline (NCP) Improvement Project with a new 24–inch pipeline (Proposed Project) in Santa Cruz, California. To implement the proposed action, permitting through federal agencies, potentially including, but not limited to the U.S. Army Corps of Engineers (USACE) and Federal Emergency Management Agency (FEMA), may be necessary. Federal agencies are required to comply with Section 106 of the National Historic Preservation Act (NHPA). In accordance with the NHPA's implementing regulations, 36 CFR 800.4, the federal agencies require an inventory of cultural resources within the Proposed Project's area of potential effect (APE) in order to determine the presence or absence of historic properties and potential effects upon those properties.

This report addresses archaeological resources and includes the following components: (1) a California Historical Resources Information System (CHRIS) records search conducted by the Northwest Information Center (NWIC); (2) a Sacred Lands File (SLF) search by the Native American Heritage Commission (NAHC); (3) outreach to locally affiliated Native American tribes; (4) pedestrian survey of the Proposed Project site for evidence of archaeological resources; (5) a determination regarding whether or not there are historic properties or historical resources within the Proposed Project APE that might be affected by the Proposed Project under Section 106 of the NHPA and the California Environmental Quality Act (CEQA).

This report is intended to assist the lead agencies with their requirements the requirements of Section 106 of the National Historic Preservation Act of 1966, as amended (2004) (NHPA; 36 CFR 800, as amended 2004), and California Environmental Quality Act (CEQA), both of which require lead agencies to determine whether a discretionary project may have a significant impact on historic properties (NHPA) or historical resources (CEQA). The City of Santa Cruz is the CEQA lead agency for the Proposed Project. The purpose of this report is to identify all cultural resources within the Proposed Project's Area of Potential Effect (APE) and to determine whether the Proposed Project/undertaking would result in a significant impact to a historical resource under CEQA or an adverse effect to an historic property under Section 106 of the NHPA. This report does not address built environment resources within the Proposed Project APE. Built Environmental cultural resources within the Proposed Project APE are addressed in the separate *Historical Resources Inventory And Evaluation Report For The Newell Creek Pipeline Improvement Project* (Dudek 2021).

No archaeological resources were identified within the APE during the CHRIS records search, Native American coordination, or archaeological survey. There is potential for previously unknown, subsurface archaeological deposits and human remains to be uncovered during earth disturbing activities. Therefore, Dudek recommends the implementation of the City's Standard Construction Practice 17 regarding inadvertent discovery of archaeological deposits and Standard Construction Practice 18 regarding inadvertent discovery of human remains to reduce potential impacts to any unanticipated archaeological resources and human remains identified during construction, both of which are part of the Proposed Project.

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1 Project Location and Description and Area of Potential Effects (APE)

1.1 Project Location and Description

The Proposed Project is in Santa Cruz County California beginning approximately three miles north of Monterey Bay and trending north/south to a point approximately ten miles north of Monterey Bay (Figures 1 and 2). The existing Newell Creek Pipeline (NCP) consists of two primary segments (Northern and Southern) with a total length of approximately 8.75 miles. The Northern Segment connects Newell Creek Dam and Felton Booster Pump Station (Figure 3), and the Southern Segment connects Felton Booster Pump Station (FBPS) and Graham Hill Water Treatment Plant (GHWTP) (Figure 4). The existing pipeline ranges in size from 18 to 27 inches in diameter, with the majority at 20 or 22 inches in diameter.

The Proposed Project consists of replacement of approximately 8.75 miles of the existing NCP with a new 24-inch polyvinylchloride (PVC), ductile iron, or high-density polyethylene (HDPE) pipeline. The purpose of the Proposed Project is to address the identified deficiencies in existing pipeline conditions and provide improved access for maintenance and repair. The pipeline generally would be installed within existing road pavement, road rights-of-way, and/or existing Santa Cruz Water Department (SCWD) easements. The proposed NCP Northern Segment would generally follow the existing NCP alignment, with a few minor variations to avoid crossing private property. The Southern Segment of the proposed NCP from the FBPS to the GHWTP would generally consist of a new pipeline constructed within the Graham Hill Road ROW that would avoid/replace the existing NCP through Henry Cowell Redwoods State Park. Once the new pipeline is installed and the interconnections are made, the existing NCP would be abandoned in place and injected with grout.

1.2 Project Area of Potential Effect (APE)

The proposed Area of Potential Effects (APE) for archaeological resources (Figures 5A and 5B) includes those areas where project ground-disturbing activities would occur, including construction staging areas. The width of the ground disturbance along the construction route varies between 10 to 120 feet. The vertical APE for the Proposed Project is generally between 5 and 15 feet below ground surface and is variable based on the diameter of the pipe installed and ground conditions, except that the Brackney North section may be deeper at up to 50 feet below ground surface.

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2 Regulatory Context

2.1 Federal

The NHPA established the NRHP and the President's Advisory Council on Historic Preservation (ACHP) and provides that states may establish State Historic Preservation Officers to carry out some of the functions of the NHPA. Most significantly, for federal agencies responsible for managing cultural resources, Section 106 of the NHPA directs that

> [t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP.

Section 106 also affords the ACHP a reasonable opportunity to comment on the undertaking (16 U.S.C. 470f).

Title 36 of the Code of Federal Regulations, Part 800 (36 CFR 800) implements Section 106 of the NHPA. It defines the steps necessary to identify historic properties (those cultural resources listed in or eligible for listing in the NRHP), including consultation with federally recognized Native American tribes to identify resources with important cultural values; to determine whether or not they may be adversely affected by a proposed undertaking; and the process for eliminating, reducing, or mitigating the adverse effects.

The content of 36 CFR 60.4 defines criteria for determining eligibility for listing in the NRHP. The significance of cultural resources identified during an inventory must be formally evaluated for historic significance in consultation with the ACHP and the California State Historic Preservation Officer to determine if the resources are eligible for inclusion in the NRHP. Cultural resources may be considered eligible for listing if meet one of the four significance criteria and they possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Regarding criteria A through D of Section 106, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, cultural resources, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (36 CFR 60.4):

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or
B. Are associated with the lives of persons significant in our past; or
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
D. have yielded or may be likely to yield, information important in prehistory or history.

The 1992 amendments to the NHPA enhance the recognition of tribal governments' roles in the national historic preservation program, including adding a member of a Native American tribe or Native Hawaiian organization to the ACHP.

The NHPA amendments:

- Clarify that properties of traditional religious and cultural importance to a Native American tribe or Native Hawaiian organization may be determined eligible for inclusion in the National Register
- Reinforce the provisions of the Council's regulations that require the federal agency to consult on properties of religious and cultural importance.

The 1992 amendments also specify that the ACHP can enter into agreement with tribes that permit undertakings on tribal land and that are reviewed under tribal regulations governing Section 106. Regulations implementing the NHPA state that a federal agency must consult with any Native American tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.

2.2 State of California

2.2.1 The California Register of Historical Resources

In California, the term "historical resource" includes "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (Public Resources Code (PRC) Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). The criteria for listing resources on the CRHR, enumerated in the following text, were developed to be in accordance with previously established criteria developed for listing in the NRHP. According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

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

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR, as well as for federal listing, if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

2.2.2 California Environmental Quality Act

As described further in the following text, the following CEQA statutes and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

> PRC Section 21083.2(g) defines "unique archaeological resource."
>
> PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource." It also defines the circumstances when a project would materially impair the significance of a historical resource.
>
> PRC Section 21074(a) defines "tribal cultural resources."
>
> PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
>
> PRC Sections 21083.2(b)–(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures; preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context, and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; CEQA Guidelines Section 15064.5(b)). If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources, or identified as significant in a historical resources survey (meeting the requirements of PRC Section 5024.1(q)), it is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource, even if it does not fall within this presumption (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of a historical resource is materially impaired when a project does any of the following:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

3. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA [CEQA Guidelines Section 15064.5(b)(2)].

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Section 21083.2(a), (b), and (c)).

Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact ((PRC Section 21083.2(a); CEQA Guidelines Section 15064.5(c)(4)). However, if a non-unique archaeological resource qualifies as tribal cultural resource (PRC 21074(c); 21083.2(h)), further consideration of significant impacts is required.

CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. As described in the following text, these procedures are detailed in PRC Section 5097.98.

2.2.3 Native American Historic Cultural Sites

State law (PRC Section 5097 et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and established the Native American Heritage Commission (NAHC) to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy a Native American historic or cultural site that is listed or may be eligible for listing in the CRHR.

2.2.4 California Health and Safety Code section 7050.5

In the event that Native American human remains or related cultural material are encountered, Section 15064.5(e) of the CEQA Guidelines (as incorporated from PRC Section 5097.98) and California Health and Safety Code Section 7050.5 define the subsequent protocol. If human remains are encountered, excavation or other disturbances shall

be suspended of the site or any nearby area reasonably suspected to overlie adjacent human remains or related material. Protocol requires that a county-approved coroner be contacted in order to determine if the remains are of Native American origin. Should the coroner determine the remains to be Native American, the coroner must contact the NAHC within 24 hours. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98 (14 CCR 15064.5(e)).

2.2.5 Local

This inventory report also serves to comply with local cultural and paleontological resource protection regulations. The SCWD is not subject to the Santa Cruz County General Plan but is subject to the Local Coastal Program (SCCGP-LCP 1994), although the APE is not located in the coastal zone. Nevertheless, the investigation is consistent with the County's General Plan, Objective 5.19, which outlines steps to protect and preserve archaeological resources within the County. This report complies with Policy 5.19.2, site surveys, which requires archaeological surveys in areas determined to have very high potential for cultural resources; the potential is determined by the inventory of nearby archaeological sites, or if the project location is within an area mapped as archaeologically sensitive.

Chapters 16.40 (Native American Cultural Sites) and 16.44 (Paleontological Resource Protection) of the Santa Cruz County Code also outline methods and regulations for the identification and treatment of cultural and paleontological resources within the County.

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3 Environmental Setting

The Proposed Project's northern extent is located within the Newell Creek Watershed in the Santa Cruz mountains approximately 1.2 miles upstream from the confluence with the San Lorenzo River. The APE trends south east of the San Lorenzo River to just east of Zayante Creek and then follows Graham Hill Road to the GHWTP at its southern terminus. The climate is characterized as Mediterranean, with warm dry summers and cool wet winters. The average rainfall is 49 inches, generally with no snow. The APE drops from an elevation of 400 feet above mean sea level in the north to about 200 feet in the south. Adjacent land uses are a mixture rural and suburban, with recreational areas and private residences near the APE. The natural vegetation in the Proposed Project vicinity is dominated by redwood forest regime (Küchler 1977), but includes a California annual grassland, coyote brush scrub, mixed chaparral, and Douglas fir forest and other forest types, which include Douglas fir (*Pseudotsuga menziesii*), redwood (*Sequoia sempervirens*), bigleaf maple (*Acer macrophyllum*), and coast live oak (*Quercus agrifolia*), among other species. The understory is composed of coyote brush (*Baccharis pilularis*), French broom (*Genista monspessulana*) ferns, poison oak (*Toxicodendron diversilobum*), blackberry (Rubus ursinus) and seasonal grasses. The Natural Resources Conservation Service (NRCS) maps numerous soil types within the 9.25-mile APE (USDA 2021).

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4 Cultural Setting

4.1 Prehistory

The APE lies within the territory that was occupied by the Costanoan or Ohlone people prior to European contact. Costanoan refers to eight separate Penutian-stock language groups situated roughly from modern-day Richmond in the north to Big Sur in the south. The Awaswas tribelet occupied the Santa Cruz Mountains and the San Lorenzo River Valley at the time of European contact (Levy 1978).

Glimpses into the ways of life for prehistoric Californians continue to be pieced together through studies of ethnography and archaeology. Early European explorers from the 16th and 18th centuries provided the first written descriptions about the native Californians they encountered, although details are sparse. Attempts at systematic ethnographies did not occur until the early 20th century, generations after the effects of missionization and integration had altered Costanoan/Ohlone lifestyles drastically. Much of these studies focused on recording Native languages before they fell into disuse. Information from the archaeological record continues to fill in the gaps of prehistoric lifeways. Archaeologists extrapolate trends in tool use, trade, diet, and migration from studies on archaeological sites. Costanoan/Ohlone descendants are often invited to participate in decisions about their ancestral sites as well as educate others about their traditional lifeways.

New archaeological finds continue to fill in the gaps of our understanding of prehistoric lifeways. Jones et al. (2007) present a synthetic overview of prehistoric adaptive change in the Central Coast. This temporal framework for the prehistoric era of greater Central California coast, spans a period of approximately 10,000–12,000 years, and divides into six different periods. Researchers distinguish these periods by perceived changes in prehistoric settlement patterns, subsistence practices, and technological advances. These adaptive shifts identify differences in temporally discrete artifact assemblages, site locations, and site types. Table 1 summarizes the cultural chronology presented by Jones et al. (2007).

Table 1. California Central Coast Chronology

Temporal Period	Date Range*
Paleo-Indian	pre-8000 cal BC
Millingstone (or Early Archaic)	8000 to 3500 cal BC
Early	3500 to 600 cal BC
Middle	600 cal BC to cal AD 1000
Middle-Late Transition	cal AD 1000-1250
Late	cal AD to 1250-1769

Source: Jones et al. (2007).

4.1.1 Paleo-Indian Period

The Paleo-Indian era represents people's initial occupation of the region and is quite sparse across the Monterey Bay region. Evidence of this era is generally expressed through isolated artifacts or sparse lithic scatters (Bertrando 2004). Farther south, in the San Luis Obispo area, fluted points characterizing this era are documented near the town of Nipomo (Mills et al. 2005) and Santa Margarita (Gibson 1996). No points of this type have been found yet in the Monterey Bay region. Possible occupation dating to the Paleo-Indian period is reported at CA-SCR-38/123,

at Wilder Ranch (Bryne 2002), and in CA-SCR-177 in Scotts Valley (Cartier 1993). The traditional interpretation is that people living during this time were highly mobile hunters who focused subsistence efforts on large mammals. In contrast, Erlandson et al. (2007) propose a "kelp highway" hypothesis for the peopling of the Americas. Proponents of this model argue that the earliest inhabitants of the region migrated by sea and focused their economic pursuits on coastal resources. Paleo-Indian sites in the Santa Barbara Channel Islands support this hypothesis, but there is little evidence within the greater Bay Area. Some scholars hypothesize that Paleo-Indian sites in the Bay Area may exist but are inundated due to rising ocean levels throughout the Holocene (Jones and Jones 1992).

4.1.2 Millingstone Period

Settlement in the Central Coast appears with more frequency in the Millingstone Period. Sites of this era have been discovered in Big Sur (Jones 1993; Fitzgerald and Jones 1999) and Moss Landing (Jones and Jones 1992; Milliken et al. 1999). Assemblages are characterized by abundant millingstones and handstones, core and core-cobble tools, thick rectangular (L-series) Olivella beads, and a low incidence of projectile points, generally lanceolate or large side-notched varieties (Jones et al. 2007). Eccentric crescents are also found in Millingstone components. Sites are often associated with shellfish remains and small mammal bone, which suggest a collecting-focused economy. Newsome et al. (2004) report that stable isotope studies on human bone, from a Millingstone component, indicate a diet composed of 70%–84% marine resources. Contrary to these findings, deer remains are abundant at some Millingstone sites (cf. Jones et al. 2008), which suggests a flexible subsistence focus. People living during the Millingstone era are thought to have been highly mobile.

4.1.3 Early Period

The Early Period corresponds with the earliest instance of the "Hunting Culture" which continues through to the Middle-Late Transition (Rogers 1929). This period is marked by a greater emphasis on formalized flaked stone tools, such as projectile points and bifaces, and the initial use of mortar and pestle technology. Early Period sites are located in more varied environmental contexts than Millingstone sites, suggesting more intensive use of the landscape than previous eras (Jones and Waugh 1997). Early Period artifact assemblages are characterized by large side-notched points, Rossi Square-stemmed points, Spire-lopped (A), End-ground (B2b and B2c), Cap (B4), and Rectangular (L-series) Olivella beads. Other artifacts found during this period are less temporally diagnostic, such as the Contracting-stemmed points, Año Nuevo long-stemmed points, and bone gorges. Early Period sites are common and often found in estuary settings along the coast or along river terraces inland and are present in both Monterey and Santa Cruz Counties. Coastal sites dating to this period include CA-MNT-108 (Breschini and Haversat 1992a), CA-SCR-7 (Jones and Hildebrandt 1990), and components of CA-SCR-38/123 (Jones and Hildebrandt 1994).

Archaeologists have long debated whether the shift in site locations and artifact assemblages during this time represent either population intrusion as a result of mid-Holocene warming trends, or an in-situ adaptive shift (cf. Mikkelsen et al. 2000). The initial use of mortars and pestles during this time appears to reflect a more labor-intensive economy associated with the adoption of acorn processing (cf. Basgall 1987).

4.1.4 Middle Period

The trend toward greater labor investment is apparent in the Middle Period. During this time, there is increased use of plant resources, more long-term occupation at habitation sites, and a greater variety of smaller "use-specific" localities. Artifacts common to this era include Contracting-stemmed projectile points, a greater variety of Olivella shell beads and Haliotis ornaments that include discs and rings (Jones 2003). Bone tools and ornaments are also

common, especially in the richer coastal contexts (Jones and Ferneau 2002a; Jones and Waugh 1995), and circular shell fishhooks are present for the first time. Grooved stone net sinkers are also found in coastal sites. Mortars and pestles become more common than millingstones and handstones at some sites (Jones et al. 2007). Important Middle Period sites include CA-MNT-282 at Willow Creek (Jones 2003; Pohorecky 1976), components of CA-MNT-229 at Elkhorn Slough (Dietz et al. 1988), CA-SCR-9 and CA-SMA 218 at Año Nuevo (Hylkema 1991).

The Middle Period continues the pattern of the "Hunting Culture" that began in the Early Period (Jones et al. 2007; Rogers 1929). The pattern reflects a greater emphasis on labor-intensive technologies that include projectile and plant processing. Additionally, faunal evidence highlights a shift toward prey species that are more labor intensive to capture, either by search and processing time or through technological needs. These labor-intensive species include small schooling fishes, sea otters, rabbits, and plants such as acorn. Early and Middle Period sites are difficult to distinguish without shell beads due to the similarity of artifact assemblages (Jones and Haney 2005).

4.1.5 Middle-Late Transition Period

The Middle-Late Transition marks the end of the "Hunting Culture." Artifacts associated with the Middle-Late Transition include contracting-stemmed, double side-notched, and small leaf-shaped projectile points. The latter are thought to represent the introduction of bow and arrow technology to the region. A variety of Olivella shell bead types are found in these deposits and include B2, B3, G1, G2, G6, and K1 varieties (Jones 1995). Notched line sinkers, hopper mortars, and circular shell fishhooks are also present (Jones et al. 2007). Sites that correspond with this time are CA-MNT-1233 and CA-MNT-281 at Willow Creek (Pohorecky 1976), CA-MNT-1754, and CA-MNT-745 in Priest Valley (Hildebrandt 2006).

The Middle-Late Transition is a time that appears to correspond with social reorganization across the region. This era is also a period of rapid climatic change known as the Medieval Climatic Anomaly (cf. Stine 1994). The Medieval Climatic Anomaly is proposed as an impetus for the cultural change that was a response to fluctuations between cool-wet and warm-dry conditions that characterize the event (Jones et al. 1999). Archaeological sites are rarer during this period, which may reflect a decline in regional population (Jones and Ferneau 2002b).

4.1.6 Late Period

Late Period sites are found in a variety of environmental conditions and include newly occupied task sites and encampments, as well as previously occupied localities. Artifacts associated with this era include Cottonwood and Desert Side-notched arrow points, flaked stone drills, steatite and clamshell disc beads, Haliotis disc beads, Olivella bead types E1 and E2, and earlier used B2, B3, G1, G6, and K1 types. Millingstones, handstones, mortars, pestles, and circular shell fishhooks also continue to be used (Jones et al. 2007). Sites dating to this era are found in coastal and interior contexts. Late Period sites include CA-MNT-143 at Asilomar State Beach (Brady et al. 2009), CA-MNT-1765 at Moro Cojo Slough (Fitzgerald et al. 1995), CA-MNT-1485/H and CA-MNT-1486/H at Rancho San Carlos (Breschini and Haversat 1992b), and CA-SCR-117 at Davenport Landing (Fitzgerald and Ruby 1997).

Coastal sites dating to the Late Period tend to be more resource acquisition or processing sites, while residential occupation is more common inland (Jones et al. 2007).

4.2 History

4.2.1 Spanish Period (1542–1822)

The earliest known European visitor to the Monterey Peninsula was Juan Rodríquez Cabrillo, a Portuguese explorer who was sent by the Viceroy of New Spain in 1542 to explore the Pacific coast north of Mexico. In 1602, Sebastián Vizcaíno led a Spanish envoy mission to survey the California coastline to locate feasible ports for shipping. Finding the bay to be commodious, fertile, and extremely favorable for anchorage, Vizcaíno named the Bay "Monterey" after the Conde de Monterey, the Spanish Viceroy of New Spain (Chapman 1920).

Despite being mapped as an advantageous berth for Spanish shipping efforts, the epicenter of Spanish settlement in Alta California, the Spanish colonial state that included all of the modern U.S. states of California, Nevada, and Utah, and parts of Arizona, Wyoming, Colorado, and New Mexico, did not make its way to the Monterey Bay until the second half of the eighteenth century. In an effort to prevent the establishment of English and Russian colonies in northern Alta California, Don Gaspar de Portolá, the Governor of Baja, embarked on a voyage in 1769 to establish military and religious control over the area. This overland expedition by Portolá marks the beginning of California's Historic period, occurring just after King Carlos III of Spain installed the Franciscan Order to direct religious colonization in assigned territories of the Americas (Kyle 2002; Koch 1973).

On their quest to locate the Monterey Bay from the 160-year-old accounts of Sebastián Vizcaíno, the Portolá expedition first reached the present-day Live Oak area on October 17, 1769, encountering the three creeks that empty to the bay forming deep gulches that lead back to the mountains. The expedition continued on, reaching the region of Santa Cruz a week later. After mistakenly circumventing the Monterey Bay and reaching the San Francisco Bay, the expedition backtracked to San Diego. The following year on May 31, 1770, a second expedition was organized by Portolá resulting in a successful location of the Monterey Bay. However, it would be an additional 21 years before the Franciscan order would establish Mission Santa Cruz (Koch 1973).

Father Fermín Lasuén, Corporal Luis Peralta, and five soldiers established Mission Santa Cruz on August 28, 1791, as the twelfth mission in the California Mission system. The Spanish missions drastically altered the lifeways of the Native Americans. Spanish missionaries conscripted members of local Native American communities to move to the Mission, where they were indoctrinated as Catholic neophytes. Villa Branciforte was also established at that time on the eastern part of Santa Cruz as one of three Spanish civil settlements in California. The land taken by the Spanish was eventually repatriated to the Native tribes, but the massive decline in the population as a result of disease and cultural disintegration meant that by the time the land was repatriated , few eligible recipients remained alive and in the area (Koch 1973).

4.2.2 Mexican Period (1822–1848)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants. In 1834, the Mexican government secularized the mission lands releasing the Native Americans from control of the mission-system (Cleland 2005; Dallas 1955). Extensive land grants were established in the interior during the Mexican Period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated its colonization efforts. Land grants to citizens covered over 150,000 acres of present-day Santa Cruz County.

Jose Antonio Rodriguez served in the military in several locations in Alta California prior to his retirement at Villa Branciforte in 1798, along with his wife and nine children. His children went on to become the recipients of several land grants in present-day Santa Cruz County, including the 1,473-acre Arroyo del Rodeo land grand of 1834 in which the APE is located (Koch 1973; Robinson 2012).

4.2.3 American Period (1848–Present)

The Mexican–American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American Period. Santa Cruz was designated as one of the 27 original counties of California on February 18, 1850, shortly before California officially became a state with the Compromise of 1850 that also designated Utah and New Mexico (with present-day Arizona) as U.S. territories. The new state of California recognized the ownership of lands in the state distributed under the Mexican Land Grants of the previous several decades (Waugh 2003; Koch 1973).

As the Gold Rush was picking up steam in 1849, a massive influx of people seeking gold steadily flooded the rural counties of California. Insightful entrepreneurs in Santa Cruz also saw the arrival of opportunity-seeking laborers to harvest the abundant natural resources found throughout the area. The lumber, fishing, lime, cement, and leisure industries formed the economic foundation of the County of Santa Cruz, while in the fertile acreage of central and south Santa Cruz County, agriculture took hold as the leading economic venture (Koch 1973).

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5 Records Search Results

To identify cultural resources potentially affected by the Proposed Project, the City defined a records search study area that includes the APE, all alternative alignments, and a 0.25-mile buffer from the APE and alternative alignments for previously recorded resources and technical reports. The City obtained the CHRIS records search results from NWIC on April 3, 2020, (NWIC File No. 19-1522). The Records Search request reviewed:

- Archaeological and non-archaeological resource records and reports on file at NWIC
- Built Environment Resources Directory (BERD)
- OHP Archaeological Determinations of Eligibility
- California Inventory of Historical Resources (1976)
- Historical Maps
- Local Inventories

The records search revealed no previously recorded archaeological resources within the APE and 36 recorded resources within the study area buffer. Of the 36 known resources three are close enough to the APE to be reviewed in detail (CA-SCR-78, CA-SCR-112/H, and CA-SCR-162). These three resources are described in Section 5.1. There have been 168 previous archaeological studies conducted within in the greater study area. Of those 168 reports, 22 have project areas that intersect the APE, and thus relate directly to the Proposed Project. The 22 reports are discussed in Section 5.2. Collectively, the 22 reports demonstrate that approximately 65 percent of the APE has been previously surveyed and that some segments have been surveyed multiple times. Importantly, the previously surveyed area includes all the APE south of the FBPS where new pipeline trenching is proposed for the relocation of the NCP. Results of the records search are presented in Appendix A of this report.

5.1 Proximate Archaeological Resources

CA-SCR-78 (P-44-000083)

This resource is a bedrock mortar (BRM) milling station recorded by Lönnberg in 1972. There are nine mortar cups of various depth and diameters within two masses of indurated sandstone material covering an area of about 75 square feet (15 X 5 feet). Lönnberg noted scattered clam shells near the BRMs but attributed the debris to modern deposition.

The site record is not clear regarding the location of the resource from the APE, which at this location is the Graham Hill road right-of-way. The location is estimated to be approximately 250 feet east of the APE.

CA-SCR-112/H (P-27-000116)

This resource first recorded by Jean and Don Stafford in 1975 as a light scatter of chert lithic debris. Given the site location on a gentle slope above a small unnamed stream the recorders speculated that the location may have been an indigenous hunting station. Constituents noted from the site include a medial fragment of a Monterey chert biface tool, a few lithic debitage fragments and sparse marine shell. Historical debris including ceramic was also noted. A site record update (Cabrillo College ATP 2002) noted only two Monterey chert flakes and sparse historical debris including ceramic and window glass.

The site record is not clear regarding the location of the resource from the APE, which at this location is the Graham Hill road right-of-way directly across Graham Hill Road from CA-SCR-78. The location of CA-SCR-112/H is estimated to be approximately 100 feet west of the APE.

CA-SCR-162 (P-27-000165)

Morris (1977a) recorded this site as a midden deposit with flake stone tools, cores, debitage and fire affected rock. Morris interpreted the materials as a temporary indigenous campsite for short-term or seasonal use. The location is ambiguous relative to the APE, which is the Graham Hill Road right-of-way. The location is estimated to be approximately 300 feet west of Graham Hill Road and 1,000 feet south of the Graham Hill Road intersection at Sims Road.

5.2 Reports Associated with the APE

S-3917; Preliminary Archaeological Reconnaissance of Proposed Christian Life Center, Santa Cruz County, California

S-3917 reports the discovery of one prehistoric resource (CA-SCR-162) from a reconnaissance of 7.5 acres of land proposed for development west of Graham Hill Road approximately 1,600 feet south of the Sims Road intersection at Graham Hill Road (Morris 1977b). The report describes CA-SCR-162 north of the study's 7.5-acre project area and within the route of the planned access road to the proposed project. The associated map in the report indicates the site is located approximately 1,000 feet south of Sims Road and 300 feet west of Graham Hill Road. Morris recommended redesign of the planned access road to avoid impacts to the site.

S-4005; Cultural Resources Assessment of the Pasatiempo/Rollingwoods Wastewater Project Locations, Santa Cruz County, California

Chavez (1979) conducted a cultural resources assessment for a wastewater project that included survey of approximately 2.1 miles of Graham Hill Road right of way for a pipeline. Chavez noted the existence of CA-SCR-162 and estimated the distance of CA-SCR-162 from Graham Hill Road at 0.2 miles (1,050 feet) and recommended monitoring of construction on Graham Hill Road in the vicinity of the site. As calculated in this report, the distance of CA-SCR-162 from the APE is approximately 300 feet.

S-4074; Preliminary Archaeological Reconnaissance of the Bridal Path Estates Subdivision, Santa Cruz County, California

In 1980, Whitlow and Breschini conducted a phase one archaeological investigation for a 155-acre subdivision proposal located on the west side of Graham Hill Road at the intersection of Graham Hill Road and Sims Road. This investigation included survey of approximately 0.45 miles of the west side of the Graham Hill Road right-of-way. This segment of Graham Hill Road was also included in the survey reported in S-4005 (Chavez 1979) above. No cultural resources were reported near Graham Hill Road.

Other areas surveyed during their investigation were immediately adjacent to CA-SCR-162, the prehistoric site recorded by Morris in 1977. Whitlow and Breschini reported that they had access to the recorded location of CA-SCR-162 and that they tried to find the site in the field. They reported "An examination of the area described as CA-SCR-162 did not reveal any materials modified by human activities" and further, "Morris…reported Monterey banded chert flake tools, but none of this material was located during our survey" (Whitlow and Breschini:4).

S-4101; Environmental Assessment, City of Santa Cruz, Newell Creek Tract, Santa Cruz Co., California

This is a report for a 2,870-acre timber harvest plan for land surrounding the Loch Lomond Reservoir (Greig 1979). The northern 0.4 miles of the APE was included in the survey conducted by the author. No new cultural resources were found.

S-4125; Cultural Resources Evaluation for the Pasatiempo Pines Wastewater Facilities Project, Scotts Valley, Santa Cruz County, California

This report summarizes an approximately 400-acre survey for a wastewater facilities project (Chavez 1981). While this report study area does include approximately 1,500 feet of the east side of Graham Hill Road at the intersection of Graham Hill Road and Lockwood Lane, it is unclear what portions of the study area were intensively surveyed for cultural resources. In any case, no cultural resources were reported or discussed along Graham Hill Road.

S-6365; An Archaeological Reconnaissance of the Approximately 160 Acre Cowell Foundation Site, Southeast of the Town of Felton in Santa Cruz County, California

In 1984, Dietz conducted a phase one archaeological investigation for 160-acre Cowell Foundation property located on the west side of Graham Hill Road, north of the intersection of Graham Hill Road and Sims Road. This investigation included survey of approximately 0.85 miles of the west side of the Graham Hill Road right-of-way. This segment of Graham Hill Road is north of the area reported in S-4005 (Chavez 1979) above. No cultural resources were reported near Graham Hill Road.

S-14437; Preliminary Cultural Resources Reconnaissance of a Portion of the Graham Hill Subdivision, Santa Cruz County, California

In 1992, Runnings and Breschini conducted a phase one archaeological investigation for 20-acre portion of the Graham Hill Subdivision property located on the west side of Graham Hill Road, south of the intersection of Graham Hill Road and Sims Road. This investigation included survey of approximately 0.3 miles of the west side of the Graham Hill Road right-of-way. This segment of Graham Hill Road is south of the area reported in S-4074 (Whitlow and Breschini 1980) above. No cultural resources were reported near Graham Hill Road.

S-16692; Cultural Resource Evaluation of Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County

Cartier (1994) surveyed 130 acres of land for two housing projects in the area east of the San Lorenzo River and north of Graham Hill Road in Felton (S-16692). The larger 115-acre western section of the survey area included the FBPS and approximately 0.4 miles of the APE. Cartier reported finding prehistoric items including a Monterey banded chert flake and a possible mano near a spring, and historical period remains including a picket fence with square nails in the northwest portion of the property, ceramics, a logging road, and evidence of logging activities. All the found resources were located east of the APE. The smaller 15-acre eastern section does not intersect the APE.

S-16692a; Historic Research and Archaeological Testing Program Evaluation for the Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County

Cartier retuned to the property in 1995 and conducted subsurface testing where evidence of resources had been found (S-16692a). Additional historical research on the ownership history of the property was also presented at that time (S-16692a Appendix I). Two test units were excavated in the 115-acre parcel approximately 600 feet east of the APE. Both test units were uniformly negative for cultural resources (Cartier et al. 1995).

S-22415; Preliminary Archaeological Reconnaissance of the Mount Hermon Christian Conference Center, Mount Hermon, Santa Cruz County, California

Archaeological Consulting conducted a phase I cultural resources investigation (Doane and Haversat 1999) for a proposal to construct improvement to the Mount Hermon Christian Conference Center east of the Felton (S-22415). The extreme western portion of the investigation study area included approximately 0.17 miles of the APE and a staging area along the east site of Graham Hill road between East Zayante Road to Roaring Camp Road. No resources were reported near the APE.

S-22415a; Archaeological Assessment of the Sawmill Area and Southern Pacific Railroad Depot at Redwood Camp, Mount Hermon, California

A phase II historical report (S-22415a) that came out of the phase I investigation was focused on the historic site of the Redwood Camp Sawmill and the extant Felton Depot located approximately 0.4 miles northeast of the APE (Wills and Rushing 2002). The phase II work found minimal evidence for potentially significant archaeological resources. The report included a site record for the Southern Pacific Zayante Railroad Depot.

S-26659; Preliminary Archaeological Reconnaissance of the City of Santa Cruz Water Department Felton Booster Pump Station, Felton, Santa Cruz County, California

This report is from a survey of the FBPS property at 6000 East Zayante Road (Doane and Haversat 2003) located on the west bank of Zayante Creek and on the north side of Graham Hill Road. The survey included approximately 0.02 miles of the APE. The results of the survey were negative.

S-28321; Archaeological and Historical Resources Survey and Impact Assessment a Supplemental Report for a Timber Harvesting Plan, Dunworth THP, THP #1-94-566

This is a survey report for a timber harvest plan in the upper Newell Creek watershed (Paul 1994). The northwest corner of the timber harvest plan study area overlaps approximately 0.15 miles of the APE along Newell Creek Road just south of the northern terminus of the APE. No cultural resources were reported.

S-28447; Historic Property Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California

S-28447a; Negative Archaeological Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California

S-28447 is a Historic Properties Survey Report for a 0.64-mile segment of Graham Hill Road (Kelley 2004a) for a roadway safety improvement project. All of study area is within the APE and includes the right-of-way of Graham Hill Road from just west of Roaring Camp Road to a point on Graham Hill Road approximately 3,700 feet east Roaring Camp Road. The report included a phase I archaeological investigation (S-28447a) that was negative for archaeological resources (Kelley 2004b).

S-28447b; Historical Resources Evaluation Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California

S-28447c; California State Office of Historic Preservation Letter to Caltrans dated April 5, 2004

A second technical report (S-28447b) is a historical resource evaluation of built environment resources (Marvin 2004). The report presents a historical context, description of five resources, and a formal evaluation of five resources potentially impacted by the project with DPR 523 Series Forms for each resource. All five buildings were found to be not eligible for the National Register and for the purposes of CEQA. The project concurrence letter from SHPO (S-28447c) is dated April 5, 2004.

S-28809; An Archaeological Reconnaissance of the Proposed San Lorenzo Valley Trail Alignment Alternatives, Boulder Creek-Santa Cruz, Santa Cruz County, California

Clark (2004) conducted extensive surveys for the San Lorenzo Valley Train alignments. The coverage presented in the report includes the 4 miles of the APE along Graham Hill Road from Felton to the Graham Hill Water Treatment Plant. Clark noted the resources near the APE described in Section 5.1 of this report but did not report any found resources.

S-32657; Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Graham Hill Showgrounds THP, THP#1-98-347 SCR

This report is an archaeological survey (McGuire 1998) for a timber harvest plan for 170 acres on the west side of Graham Hill Road near the intersection of Graham Hill Road and Sims Road. The study's project area only intersects the APE at Graham Hill Road fractionally (0.05 miles). No new resources were reported from the survey.

S-36272; Historic Properties Survey Report Cultural Resources Evaluation for the Proposed Incidental Take at the Graham Hill Water Treatment Plant, City of Santa Cruz, California

Hylkema (2009) surveyed the entire 13.2 acres of the GHWTP for an incidental take permit application. The survey covered all the APE within the boundaries of the Plant. No new resources were reported.

S-40205; Preliminary Archaeological Assessment for the Rolling Woods and Graham Hill/Woods Cove Sewer Annexation Project in Santa Cruz, Santa Cruz County, California

This report is from a records search and survey related to a sewer annexation project (Doane and Breschini 2013). The project area at that time included approximately 1.5 miles of the APE along Graham Hill Road from just north of Sims Road to the GHWTP. The report was negative for evidence of new archaeological resources.

S-50967; Archaeological Records Search and Site Reconnaissance, Ben Lomond Transfer Station Pond Drainage Repair, Assessor's Parcel 076-245-01, Santa Cruz County, California

Schlagheck (2017) conducted a records research and a field survey for a repair project related to storm runoff from the Ben Lomond Transfer Station property. The study's project area for the repairs was about 1,000 square feet adjacent to Newell Creek Road and includes a fractional portion (20 feet) of the APE on both sides of Newell Creek Road just south of the vehicular entrance to the Transfer Station on the west side of Newell Creek Road. No new resources were discovered.

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6 Native American Outreach

On January 19, 2021, Dudek sent a request to the Native American Heritage Commission (NAHC) for a search of the SLF, a list of properties important to local Native American tribes, for the Proposed Project vicinity. On January 27, 2021, Dudek received a letter from the NAHC with *negative* findings from the SLF search. NAHC also provided a list of Native American contacts that might have local knowledge of archaeological or tribal cultural resources near the Proposed Project.

To access additional information from local tribes, Dudek sent letters to the Native American contacts provided by the NAHC on February 3, 2021. On February 3, 2021, Valentine Lopez, Chairman of the Amah Mutsun Tribal Band, sent an email to Dudek indicating that he had no comment on the Proposed Project, but would like to request a Native American monitor from his tribe if cultural resources are encountered. On February 10, 2021, Mike Grone, Director of Archaeological Resource Management for Amah Mutsun Land Trust, requested an introduction to the Proposed Project and information on additional resources in the APE. Dudek provided the requested information, and Mr. Grone sent a second correspondence on February 15, 2021 indicating that Amah Mutsun Land Trust had no comments.

On March 3, 2021, the lead author called Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan,to inform her of an email failure of Dudek's email to her regarding the Proposed Project. Dudek sent a second email with a new email address to Ann Marie Sayers with the original Project letter on March 3, 2021.

No additional Native American contacts have responded to the outreach letters as of March 9, 2021. A complete record of the NAHC SLF search and Native American outreach effort is included in this report in Appendix B.

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7 Field Survey

Dudek conducted an intensive pedestrian reconnaissance survey for archaeological resources on all accessible land within the APE on December 2, 9, and 16, 2020. During each of these surveys, two Dudek archaeologists surveyed using 15- to 20-meter-spaced transects, with one person walking along either side of the existing or proposed pipeline alignment. The archaeologists inspected the ground for indications of prehistoric or historic archaeological sites and used the Esri Collector application on iPads to follow the Proposed Project alignment and to record the locations of any resources. Surface visibility for all three surveys was adequate for the purposes of the survey, however, paved surfaces and areas of thick vegetation limited visual access to the ground in some locations.

Dudek archaeologists, John Schlagheck, MA, and Sarah Brewer, BA, conducted the first of three pedestrian surveys of the APE on December 2, 2020. The survey was conducted with an escort from the SCWD, Doug Valby, and followed the San Lorenzo Way Section, the Brackney South Section, the Brackney North Section, and also the portion of the Newell Creek Road Section behind a locked gate that is owned by the SCWD (Figure 3). All of these portions represent parts of the existing pipeline alignment slated to be replaced in their current location.

The only cultural resource encountered during the December 2 survey was a portion of the former South Pacific Coast Railroad, of which Brackney was a stop. This railroad alignment is within in the Brackney North, Brackney South and San Lorenzo Way Sections and has already been impacted/re-purposed by the original NCP installation. This resource will be addressed in the built environment report for the Proposed Project.

On December 9, 2020, Dudek archaeologist, Sarah Brewer, BA, and Dudek architectural historian, Fallin Steffen, MA, conducted a pedestrian survey with SCWD escort, Doug Valby, along the Pipeline Road Section within Henry Cowell Park. This section contains an existing alignment of the pipeline which is proposed to be re-routed along Graham Hill Road. If this abandonment occurs, the only ground-disturbance along this alignment would be the removal of the existing apertures such as the vents and wharf valves, and filling of those holes with grout or cement. The existing pipeline will be addressed in the built environment report for the Proposed Project.

On December 16, 2020, Sarah Brewer, BA, and Julie Royer, MA, conducted a survey focused on the public portion of the Newell Creek Road Section, the Glen Arbor Road Section, the Felton Booster Section, and the Graham Hill Road Section. These sections represent existing alignments to be replaced, existing alignments to be abandoned and proposed re-alignments (Figures 3 and 4). Existing alignments to be replaced include the Newell Creek Road Section, approximately 75% of the Glen Arbor Road Section, approximately 50% of the Felton Booster Section, and approximately 25% of the Graham Hill Road Section. Existing alignments to be abandoned and/or realigned include a small portion at the northern and southern extents of the Glen Arbor Road Section, approximately 50% of the Felton Booster Section and approximately 75% of the Graham Hill Road Sections. Dudek archaeologists did not encounter any archaeological resources during this portion of the survey.

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8 Summary and Recommendations

8.1 Summary of Findings

The CHRIS records search, Native American coordination, and field survey did not identify any archaeological resources within the APE or any specific cultural resource sensitivity concerns. The three known resources (CA-SCR-78, CA-SCR-112/H, and CA-SCR-162) previously recorded relatively close to the APE have been reviewed in detail (Section 5.1). Due to the location and characteristics of these resources, they are not likely to be impacted by the Proposed Project. However, it is always possible that intact archaeological deposits are present in subsurface contexts. Given this potential, Dudek provides recommendations for addressing unanticipated discoveries in Section 8.2.

The findings of this study are that the Proposed Project will have no significant impact on potentially significant historical resources under CEQA. Furthermore, the Proposed Project will have **No Adverse Effect** on Historic Properties of an archaeological nature under Section 106 of the NHPA.

8.2 Management Recommendations

No further effort regarding the discovery of archaeological resources within the APE is warranted. However, the Proposed Project should proceed under a plan that accounts for the inadvertent discovery of archaeological resources during construction consistent with NHPA Section 106 regulations, CEQA, and applicable local regulations.

Unanticipated Discovery of Archaeological Resources and Human Remains

The City has adopted standard construction practices that would be implemented by the City or its contractors during construction activities associated with the Proposed Project, Standard Construction Practice 17 regarding inadvertent discovery of archaeological deposits and Standard Construction Practice 18 regarding inadvertent discovery of human remains to reduce potential impacts to any unanticipated archaeological resources and human remains identified during construction.

17. In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the Proposed Project, immediately stop all construction work occurring within 100 feet of the find until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find. The archaeologist will determine whether additional study is warranted. Should it be required, the archaeologist may install temporary flagging around a resource to avoid any disturbances from construction equipment. Depending upon the significance of the find under CEQA (14 CCR 15064.5[f]; California Public Resources Code, Section 21082), the archaeologist may record the find to appropriate standards (thereby addressing any data potential) and allow work to continue. If the archaeologist observes the discovery to be potentially significant under CEQA, preservation in place or additional treatment may be required.

18. In accordance with Section 7050.5 of the California Health and Safety Code, if potential human remains are found, immediately notify the lead agency staff and the County Coroner of the discovery. The coroner would provide a determination within 48 hours of notification. No further excavation or disturbance of

the identified material, or any area reasonably suspected to overlie additional remains, can occur until a determination has been made. If the County Coroner determines that the remains are, or are believed to be, Native American, the coroner would notify the Native American Heritage Commission within 24 hours. In accordance with California Public Resources Code, Section 5097.98, the Native American Heritage Commission must immediately notify those persons it believes to be the Most Likely Descendant from the deceased Native American. Within 48 hours of this notification, the Most Likely Descendant would recommend to the lead agency her/his preferred treatment of the remains and associated grave goods.

9 References Cited

Basgall, M.E. 1987. Resource Intensification among Hunter-Gatherers: Acorn Economies in Prehistoric California. Research in Economic Anthropology 9:21–52.

Bertrando, E. 2004. Evidence and Models for Late Pleistocene Chronology and Settlement along California's Central Coast. In Emerging from the Ice Age: Early Holocene Occupations on the California Central Coast, edited by Ethan Bertrando and V.A. Levulett, pp. 93–105. San Luis Obispo County Archaeological Society Occasional Papers no. 17.

Brady, R., J. Farquhar, T. Garlinghouse, and C. Peterson. 2009. Archaeological Evaluation of CA-MNT-143 for the Asilomar Boardwalk Replacement Project, Asilomar State Beach, Pacific Grove, California. Albion Environmental, Inc., Santa Cruz. Copies available from the Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Breschini, G., and T. Haversat. 1992a. Preliminary Excavations at CA-MNT-108, Fisherman's Wharf, Monterey County, California. In Archaeological Investigations of Some Significant Sites on the Central Coast of California, edited by H. Dallas, Jr. and G.S. Breschini, pp. 39–47. Coyote Press Archives of California Prehistory No. 37, Salinas.

Breschini, G., and T. Haversat. 1992b. Baseline Archaeological Studies at Rancho San Carlos, Carmel Valley, Monterey County, California. Coyote Press Archives of California Prehistory No. 36, Salinas.

Bryne, S. 2002. Archaeological Monitoring of the Wilder Ranch Bike Path Construction and Mitigation Related to Archaeological Site CA-SCR-38/123/H. Garcia and Associates, San Anselmo. Copies available from Northwest Archaeological Information Center, Department of Anthropology, Sonoma State University, Rohnert Park, California.

Cabrillo College ATP (Archaeological Technology Program). 2002. Site Record for CA-SCR-112 (P-44-000116). On file, Northwest Information Center.

Cartier, R. 1993. The Scotts Valley Site: CA-SCR-177. The Santa Cruz Archaeological Society, Santa Cruz.

Cartier, R. 1994. Cultural Resource Evaluation of Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692), On file, Northwest Information Center.

Cartier, R., and L. Eckert, J. Goetz, M. Pokriots, and J. Reddington. 1995. Historic Research and Archaeological Testing Program Evaluation for the Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692a), On file, Northwest Information Center.

Chapman, C. 1920. "Sebastian Vizcaino: Exploration of California." The Southwestern Historical Quarterly 23(4). April 1920. Accessed September 17, 2018. http://www.jstor.org/stable/27794572.

Chavez, D. 1979. Cultural Resources Assessment of the Pasatiempo/Rollingwoods Wastewater Project Locations, Santa Cruz County, California (S-4005). On file, Northwest Information Center.

Chavez, D. 1981. Cultural Resources Evaluation for the Pasatiempo Pines Wastewater Facilities Project, Scotts Valley, Santa Cruz County, California (S-4125). On file, Northwest Information Center.

Clark, M. 2004. An Archaeological Reconnaissance of the Proposed San Lorenzo Valley Trail Alignment Alternatives, Boulder Creek-Santa Cruz, Santa Cruz County, California (S-28809). On file, Northwest Information Center.

Cleland, R.G. 2005. The Cattle on a Thousand Hills: Southern California, 1850-80. 2nd ed. San Marino, California: The Huntington Library

Dallas, S.F. 1955. "The Hide and Tallow Trade in Alta California 1822–1848." PhD dissertation, Bloomington: Indiana University.

Dietz, S.A. 1984. An Archaeological Reconnaissance of the Approximately 160 Acre Cowell Foundation Site, Southeast of the Town of Felton in Santa Cruz County, California (S-6365). On file, Northwest Information Center.

Dietz, S.A., W.R. Hildebrandt, and T. Jones 1988. Archaeological Investigations at Elkhorn Slough: CA-MNT-229 A Middle Period Site on the Central California Coast. Papers in Northern California Anthropology, Number 3.

Doane, M., and G.S. Breschini. 2013. Preliminary Archaeological Assessment for the Rolling Woods and Graham Hill/Woods Cove Sewer Annexation Project in Santa Cruz, Santa Cruz County, California (S-40205). On file, Northwest Information Center.

Doane, M. and T. Haversat. 1999. Preliminary Archaeological Reconnaissance of the Mount Hermon Christian Conference Center, Mount Hermon, Santa Cruz County, California (S-22415). On file, Northwest Information Center.

Doane, M. and T. Haversat. 2003. Preliminary Archaeological Reconnaissance of the City of Santa Cruz Water Department Felton Booster Pump Station, Felton, Santa Cruz County, California (S-26659). On file, Northwest Information Center.

Erlandson, J.M., M.H. Graham, B.J. Bourque, D. Corbett, J.A. Estes, and R.S. Steneck. 2007. The Kelp Highway Hypothesis: Marine Ecology, the Coastal Migration Theory, and the Peopling of the Americas. The Journal of Island and Coastal Archaeology 2(2): 161–174.

Fitzgerald, R.T., J.L. Edwards, J.M. Farquhar, and K. Loefler. 1995. Archaeological Test Excavation at CA-MNT-1765, for the Moro Cojo Standard Subdivision Project (SH93001), Monterey County, California. Biosystems Analysis, Inc., Santa Cruz. Report on file Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Fitzgerald, R.T. and T.L. Jones 1999. The Milling Stone Horizon Revisited: New Perspectives from Northern and Central California. Journal of California and Great Basin Anthropology 21:65-93.

Fitzgerald, R.T. and A. Ruby. 1997. Archaeological Test Excavations at CA-SCR-117, the Davenport Landing Site. Garcia and Associates, San Anselmo. Report on file Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Gibson, R.O. 1996. Results of Archaeological Monitoring for Unocal Soil Testing Program along Pipelines near Santa Margarita, San Luis Obispo County, California. Gibson's Archaeological Consulting, Paso Robles. Report submitted to UNOCAL CERT, San Luis Obispo. Copies available from the Central Coast Information Center, Department of Anthropology, University of California, Santa Barbara.

Greig, J.E. 1979. Environmental Assessment, City of Santa Cruz, Newell Creek Tract, Santa Cruz Co., California (S-4101). On file, Northwest Information Center.

Hildebrandt, W.R. 2006. Archaeological Evaluation of the Priest Valley Knoll Sites (CA-MNT-745), Eastern Monterey County, California. Far Western Anthropological Research Group, Inc., Davis. Copies available from the Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Hylkema, M.G. 1991. Prehistoric Native American Adaptations Along the Central California Coast of San Mateo and Santa Cruz Counties. Master's thesis, Department of Anthropology, San Jose State University. University Microfilms, Ann Arbor.

Hylkema, M.G. 2009. Historic Properties Survey Report Cultural Resources Evaluation for the Proposed Incidental Take at the Graham Hill Water Treatment Plant, City of Santa Cruz, California (S-36272). On file, Northwest Information Center.

Jones, T.L. 1993. Big Sur: A Keystone in Central California Culture History. Pacific Coast Archaeological Quarterly.

Jones, T.L. 1995. Transitions in Prehistoric Diet, Mobility, Exchange, and Social Organization Along California's Big Sur Coast. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Davis.

Jones, T.L. 2003. Prehistoric Human Ecology of the Big Sur Coast, California. Contributions of the University of California Archaeological Research Facility, Berkeley.

Jones, T.L., G. M. Brown, L.M. Raab, J.L. McVickar, W.G. Spaulding, D.J. Kennett, A. York, and P.L. Walker. 1999. Environmental Imperatives Reconsidered: Demographic Crises in Western North America During the Medieval Climatic Anomaly. Current Anthropology 40:137-170.

Jones, T.L. and J.A. Ferneau 2002a. Prehistory at San Simeon Reef: Archaeological Data Recovery at CA-SLO-179 and -267, San Luis Obispo, California. San Luis Obispo Archaeological Society Occasional Paper No. 16.

Jones, T.L., and J.A. Ferneau. 2002b. Deintensification along the Central Coast. In Catalysts to Complexity: Late Holocene Societies of the California Coast, edited by J.M. Erlandson and T.L. Jones, pp. 205-232. Perspectives in California Archaeology, Vol. 6. Cotsen Institute of Archaeology, University of California, Los Angeles.

Jones, T.L. and J. Haney. 2005. Archaeological Evaluation of CA-MNT-910, -1748/H, -1919, and -2182, Fort Hunter Liggett Military Installation, Monterey County, California. California Polytechnic State University, San Luis Obispo.

Jones, D., and W.R. Hildebrandt. 1990. Archaeological Investigation at Sand Hill Bluff: Portions of Prehistoric Site CA-SCr-7, Santa Cruz County, California. Far Western Anthropological Research Group, Inc., Davis. Copies available from Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Jones, D., and W.R. Hildebrandt. 1994. Archaeological Investigations at Sites CA-SCR-10, CA-SCR-17, CA-SCR-304, and CA-SCR-38/123 for the North Coast Treated Water Main Project, Santa Cruz County, California. Far Western Anthropological Research Group, Inc. Copies available from Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Jones, T.L., and D. Jones. 1992. Elkhorn Slough Revisited: Reassessing the Chronology of CA-MNT-229. Journal of California and Great Basin Anthropology 14:159-179.

Jones, T.L., J.F. Porcasi, J.W. Gaeta, and B.F. Codding. 2008. The Diablo Canyon Fauna: A Coarse-grained Record of Trans-Holocene Foraging from the Central California Mainland Coast. American Antiquity 73:289–316.

Jones, T. L., N.E. Stevens, D.A. Jones, R.T. Fitzgerald, and M.G. Hylkema. 2007. The Central Coast: A Midlatitude Milieu. In California Prehistory Colonization, Culture, and Complexity, edited by Terry L. Jones and Kathryn A. Klar, pp: 125-146. Altamira Press, Lanham.

Jones, T.L., and G. Waugh. 1995. Central California Coastal Prehistory: A View from Little Pico Creek. Perspectives in California Archaeology No. 3, Institute of Archaeology, University of California, Los Angeles.

Jones, T.L., and G. Waugh. 1997. Climatic Consequences or Population Pragmatism? A Middle Holocene Prehistory of the Central California Coast. In Archaeology of the California Coast During the Middle Holocene, edited by J.M. Erlandson and M.A. Glassow, pp. 111-128. Perspectives in California Archaeology 4. Institute of Archaeology, University of California, Los Angeles.

Kelley, J. 2004a. Historic Property Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447). On file, Northwest Information Center.

Kelley, J. 2004b. Negative Archaeological Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447a). On file, Northwest Information Center.

Koch, M. 1973. Santa Cruz County: Parade of the Past. Fresno, California: Valley Publishers.

Küchler, A.W. 1977. Natural Vegetation of California Map. University of Geography, University of Kansas, Lawrence, Kansas.

Kyle, D.E. 2002. Historic Spots in California. 5th ed. Stanford, California: Stanford University Press.

Levy, R. 1978. Costanoan. Handbook of North American Indians. Vol. 8. Edited by Robert F. Heizer. Smithsonian Institution, Washington.

Lönnberg, A. 1972. Site Record for CA-SCR-78 (P-44-000083). On file, Northwest Information Center.

Newsome, S.D., D.L. Phillips, B.J. Culleton, T.P. Guilderson, and P. Koch. 2004. Dietary Reconstruction of an Early to Middle Holocene Human Population from the Central California Coast: Insights from Advanced Stable Isotope Mixing Models. Journal of Archaeological Science 31:1101-1115.

Marvin, J. 2004. Historical Resources Evaluation Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447b). On file, Northwest Information Center.

McGuire, J. 1998. Confidential Archaeological Addendum for Timber Operations on Non-Federal Lands in California, Graham Hill Showgrounds THP, THP#1-98-347 SCR (S-32657). On file, Northwest Information Center.

Mikkelsen, P., W.R. Hildebrandt, and D.A. Jones 2000. Prehistoric Adaptations on the Shores of Morro Bay Estuary: Excavations at Site CA-SLO-165, Morro Bay, California. Occasional Paper No. 14, San Luis Obispo County Archaeological Society, San Luis Obispo, California.

Milliken, R., J. Nelson, W.R. Hildebrandt, and P. Mikkelsen. 1999. The Moss Landing Hill Site: A Technical Report on Archaeological Studies at CA-MNT-234 in 1991 and 1997-1998. Far Western Anthropological Research Group, Inc., Davis. Copies available from the Northwest Information Center, Department of Anthropology, Sonoma State University, Rohnert Park.

Mills, W.W., M.F. Rondeau, and T.L. Jones. 2005. A Fluted Point from Nipomo, San Luis Obispo County, California. Journal of California and Great Basin Anthropology 25:214-220.

Morris, J.W. 1977a. Site Record for CA-SCR-162 (P-44-0001165). On file, Northwest Information Center.

Morris, J.W. 1977b. Preliminary Archaeological Reconnaissance of Proposed Christian Life Center, Santa Cruz County, California (S-3917). On file, Northwest Information Center.

Paul, G. 1994. Archaeological and Historical Resources Survey and Impact Assessment a Supplemental Report for a Timber Harvesting Plan, Dunworth THP, THP #1-94-566 (S-28321). On file, Northwest Information Center.

Pohorecky, Z.S. 1976. Archaeology of the South Coast Ranges of California. University of Archaeological Research Facility 34, Berkeley.

Robinson, L. 2012. The San Lorenzo Valley. Charleston, South Carolina: Arcadia Publishing.

Rogers, D.B. 1929. Prehistoric Man of the Santa Barbara Coast. Museum of Natural History, Santa Barbara.

Runnings, A., and G.S. Breschini. 1992. Preliminary Cultural Resources Reconnaissance of a Portion of the Graham Hill Subdivision, Santa Cruz County, California (S-14437). On file, Northwest Information Center.

Schlagheck, J. 2017. Archaeological Records Search and Site Reconnaissance, Ben Lomond Transfer Station Pond Drainage Repair, Assessor's Parcel 076-245-01, Santa Cruz County, California (S-50967). On file, Northwest Information Center.

Stafford, J., and D. Stafford. 1975. Site Record for CA-SCR-112 (P-44-000116). On file, Northwest Information Center.

Stine, S. 1994. Extreme and Persistent Drought in California and Patagonia during Medieval Time. Nature 369:546-549.

USDA (U.S. Department of Agriculture). 2021. Web Soil Survey. USDA Natural Resources Conservation Service, Soil Survey Staff.

Waugh, J.C. 2003. On the Brink of Civil War: The Compromise of 1850 and How It Changed the Course of American History. Wilmington, Delaware: Scholarly Resources Inc.

Whitlow, J., and G.S. Breschini. 1980. Preliminary Archaeological Reconnaissance of the Bridal Path Estates Subdivision, Santa Cruz County, California (S-4070. In file, Northwest Information Center.

Willis, C.D., and B. Rushing. 2020. Archaeological Assessment of the Sawmill Area and Southern Pacific Railroad Depot at Redwood Camp, Mount Hermon, California (S-22415a). On file, Northwest Information Center.

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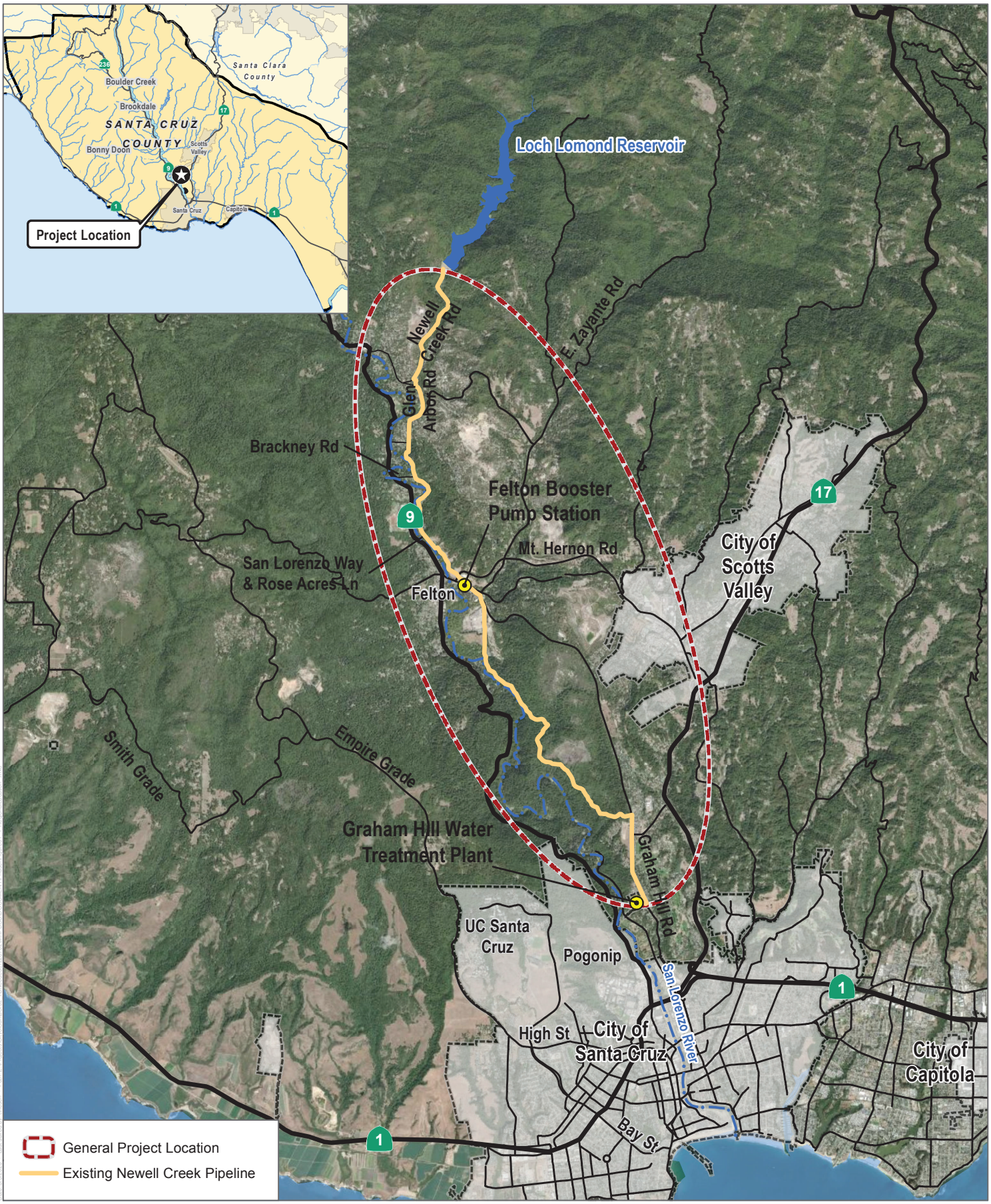


SOURCE: ESRI 2020, City of Santa Cruz 2020

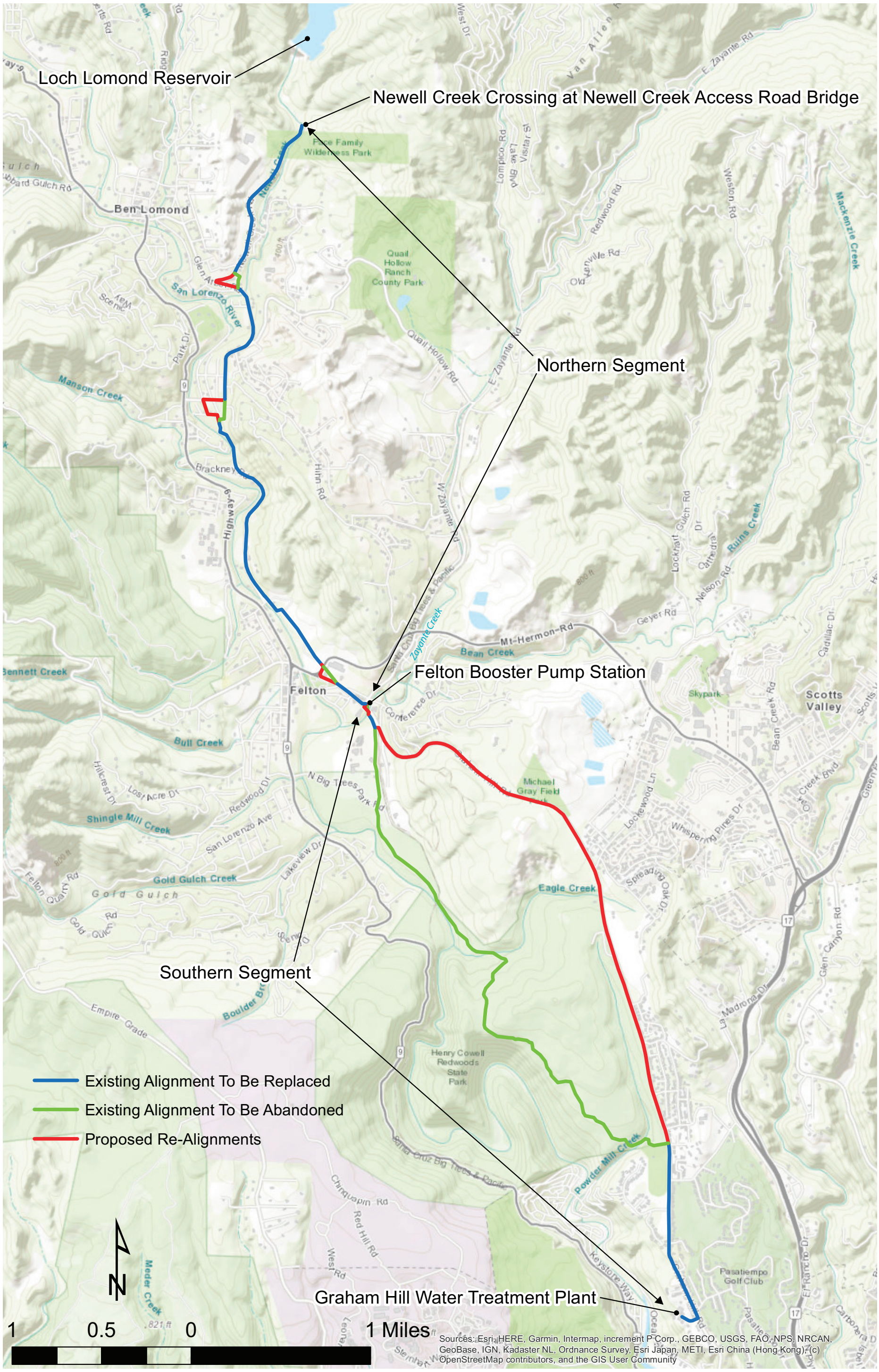
DUDEK

0 3,750 7,500 Feet

FIGURE 1

Project Location

Newell Creek Pipeline Improvement Project



SOURCE: City of Santa Cruz Water Department 2020

FIGURE 2

Proposed Newell Creek Pipeline Improvement Project Overview

Newell Creek Pipeline Improvement Project

DUDEK

Loch Lomond Reservoir

Newell Creek Crossing at Newell Creek Access Road Bridge

Newell Creek Road Section

Newell Creek Crossing at Glen Arbor Road Bridge

Glen Arbor Road Section

Brackney North Section
(Brackney Landslide Area Pipeline Risk Reduction Project)

Brackney South Section

San Lorenzo Way Section

Felton Booster Section

Felton Booster Pump Station

Existing Alignment To Be Replaced

Existing Alignment To Be Abandoned

Proposed Re-Alignments

0.5 0.25 0 0.5 Miles

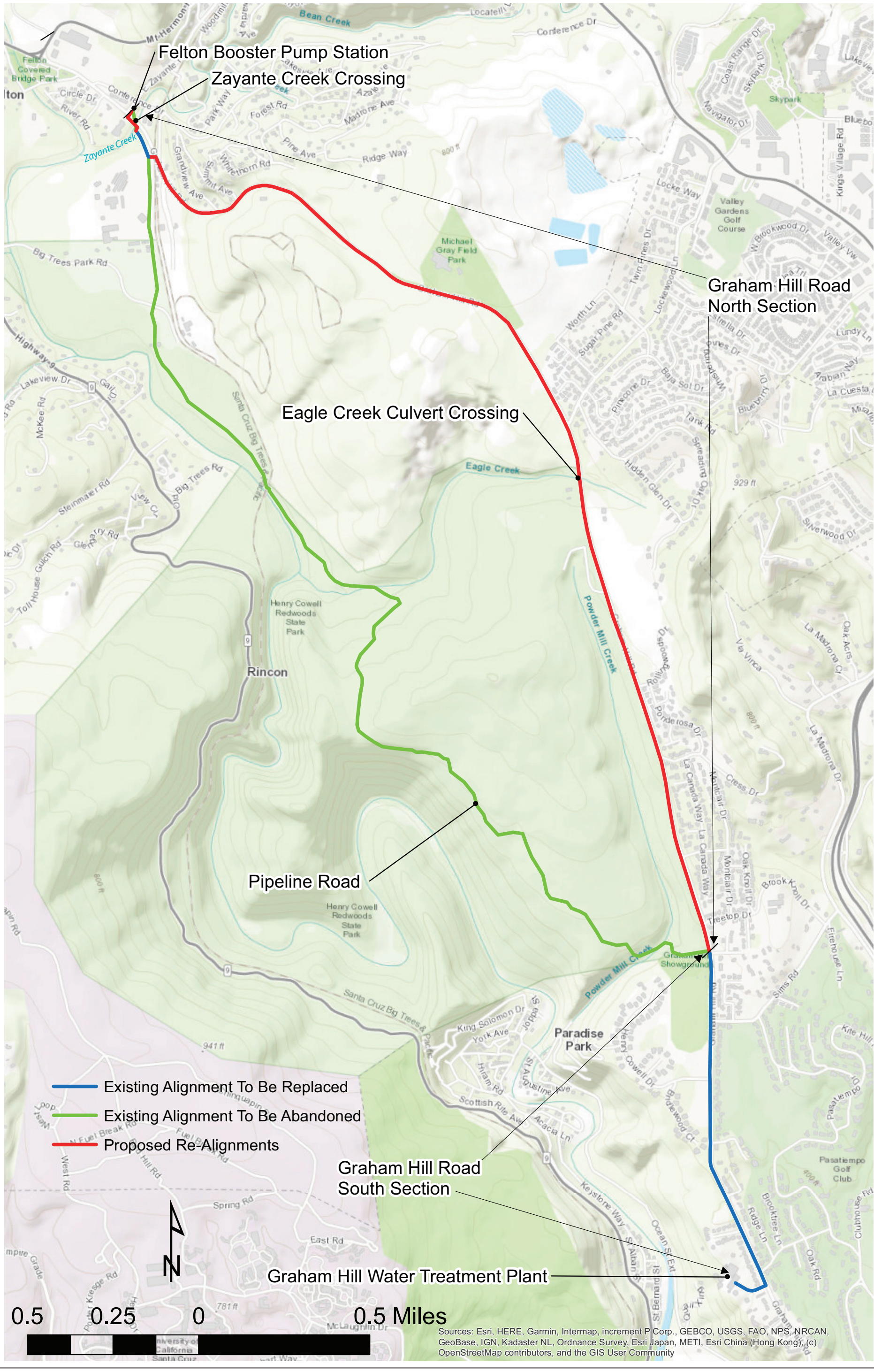
SOURCE: City of Santa Cruz Water Department 2020

FIGURE 3

Proposed Newell Creek Pipeline Improvement Project Northern Segment

Newell Creek Pipeline Improvement Project

DUDEK

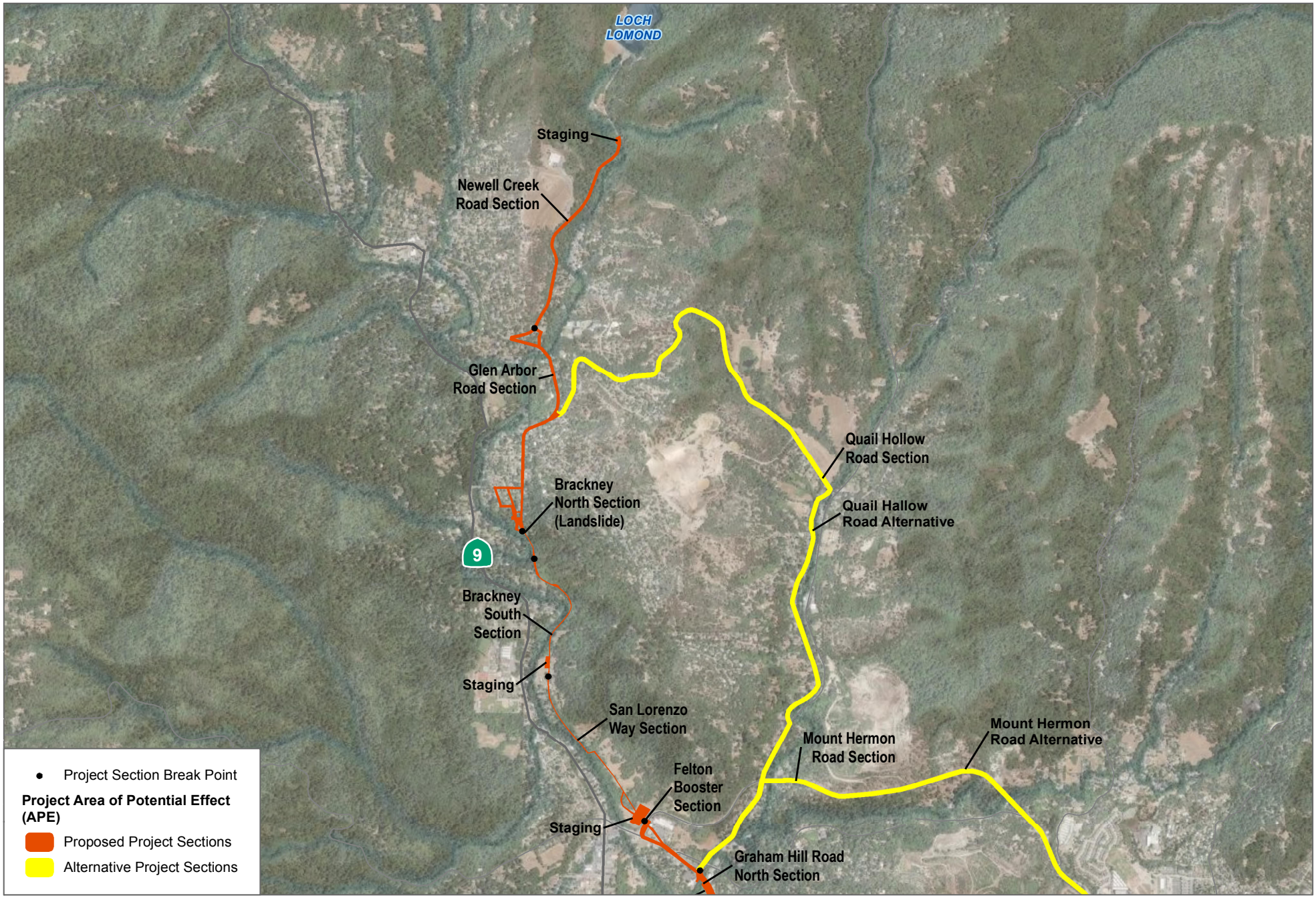


SOURCE: City of Santa Cruz Water Department 2020

FIGURE 4

Proposed Newell Creek Pipeline Improvement Project Southern Segment

DUDEK



SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

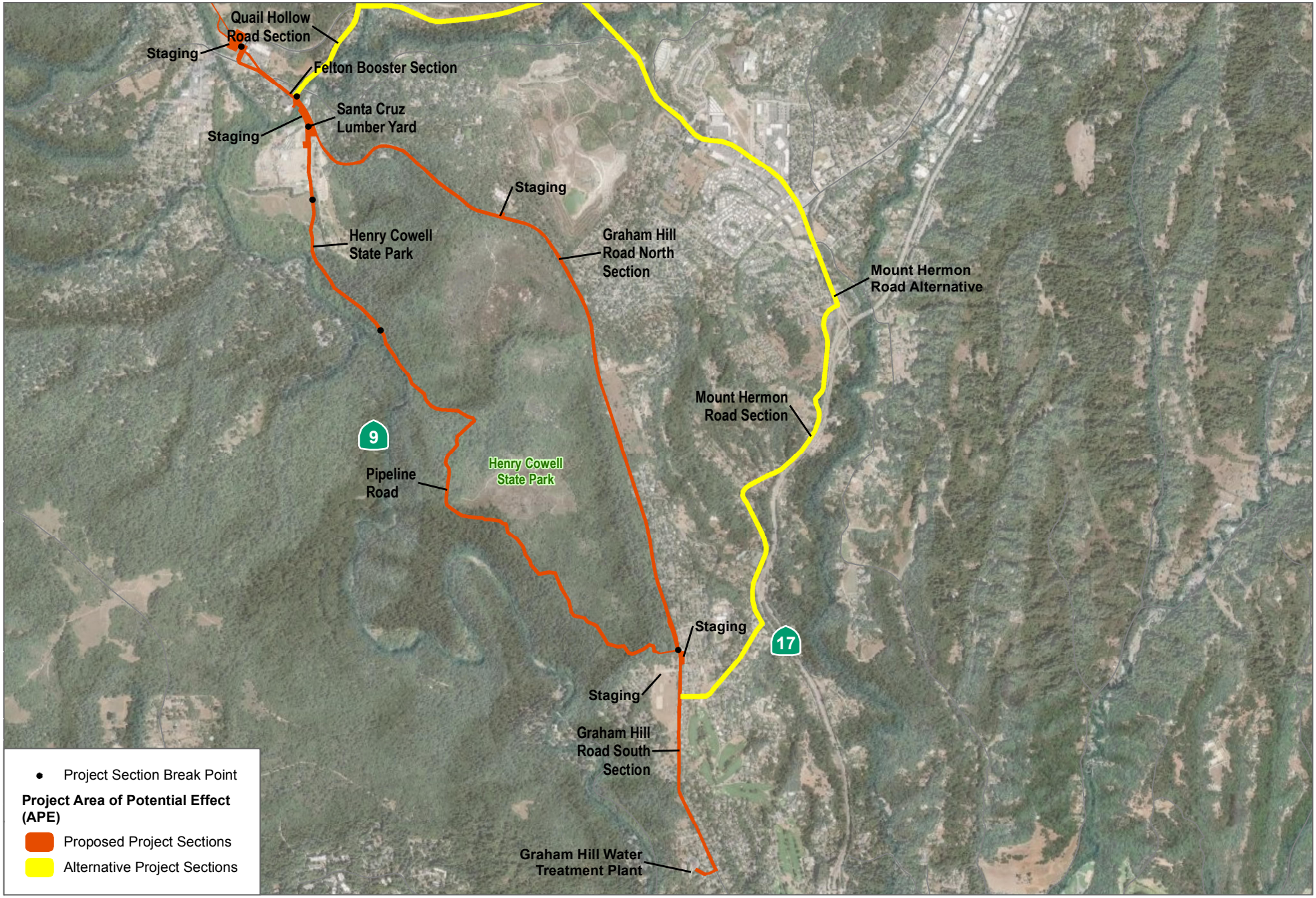
DUDEK

0 1,500 3,000 Feet

FIGURE 5A

Area of Potential Effects (APE) - Northern Segment

Newell Creek Pipeline Improvement Project



SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

0 1,500 3,000 Feet

FIGURE 5B

Area of Potential Effects (APE) - Southern Segment

Newell Creek Pipeline Improvement Project

Appendix A

Confidential Records Search Results

Appendix B

SLF Search and Tribal Correspondence

Appendix C-2

Historical Resources Inventory, Evaluation and Finding of Effect Report

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HISTORICAL RESOURCES INVENTORY, EVALUATION AND FINDING OF EFFECT REPORT FOR THE NEWELL CREEK PIPELINE IMPROVEMENT PROJECT

Prepared for:

CITY OF SANTA CRUZ WATER DEPARTMENT
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APPENDICES

EXHIBITS

TABLES

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APE	area of potential effects
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information Center
City	City of Santa Cruz
CRHR	California Register of Historical Resources
FBPS	Felton Booster Pump Station
GHWTP	Graham Hill Water Treatment Plant
NCP	Newell Creek Pipeline
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
ROW	right-of-way
SCCHRI	Santa Cruz County Historic Resources Inventory
SPRR	Southern Pacific Railroad

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Executive Summary

The City of Santa Cruz (City) retained Dudek to complete a historical resources inventory and evaluation report (report) for the Newell Creek Pipeline Improvement Project (Proposed Project) to replace 8.75 miles of the existing Newell Creek Pipeline (NCP) located in Santa Cruz County, California with a new 24-inch water main pipeline. To implement the proposed actions, permitting through federal agencies, potentially including, but not limited to, the U.S. Army Corps of Engineers and Federal Emergency Management Agency, may be necessary. Federal agencies are required to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966. In accordance with the NHPA's implementing regulations, 36 CFR 800.4, the U.S. Army Corps of Engineers requires an inventory of cultural resources within the Project's area of potential effect (APE) in order to determine the presence or absence of historic properties and potential effects upon those properties.

The purpose of this report is to identify all built environment cultural resources within the Project's APE and to determine whether the Project/undertaking would result in a significant impact to an historical resource under the California Environmental Quality Act (CEQA) or an adverse effect to an historic property under Section 106 of the NHPA. Archaeological cultural resources within the Project APE are addressed in the separate *Archaeological Resources Inventory and Evaluation Report for the Newell Creek Pipeline Improvement Project* (Dudek 2021). The preparation of this report included the following components: (1) a California Historical Resources Information System (CHRIS) records search conducted by the Northwest Information Center (NWIC); (2) the development of a Built Environment APE; (3) outreach to local historical societies requesting information about historical resources in the vicinity of the APE; (4) a pedestrian survey of the APE for built environment resources; (5) a historical significance evaluation of four historic era structures within the APE; and (6) an assessment of project-related impacts to historical resources in conformance with CEQA, project effects to historic properties in conformance with Section 106 of the NHPA, and in consideration of applicable local municipal code and planning documents.

Dudek conducted an intensive-level ground pedestrian survey for built environment resources within the APE on December 2, 2020, December 9, 2020, and December 16, 2020. Following review of the CHRIS records and additional background research of the APE Dudek found two built environment structures that required consideration of potential project related adverse effects in the APE. The first structure is the existing NCP and it is the only built environment property requiring formal recordation and evaluation as part of this study. No previous recordation or evaluation of the historic era NCP structure was identified through background research. As such, Dudek recorded and evaluated the NCP under National Register of Historic Places (NRHP) the California Register of Historical Resources (CRHR), and the Santa Cruz County Historic Resources Inventory (SCCHRI) criteria. Dudek recommends that the NCP is ineligible for listing in the NRHP and the CRHR due to a lack of historical associations and engineering merit. For these same reasons, the property also does not rise to the level of significance for local designation in the SCCHRI. Therefore, the Newell Creek Pipeline is not considered an historic property under Section 106 of the NHPA nor an historical resource under CEQA.

The Newell Creek Access Road Bridge is also located within the APE and is considered a contributing feature of the Newell Creek Dam complex, which was determined eligible for the National Register of Historic Places (NRHP) following consultation with the State Historic Preservation Officer (SHPO) in 2019 under Criterion A/1 for its association with important events that have made a significant contribution to the development of water infrastructure in Santa Cruz (COE_2019_0610_002). See Appendix A: Newell Creek Access Road Bridge (Newell Creek Dam Complex Contributor): SHPO concurrence letter and DPR 523 form set.

As the Newell Creek Access Road Bridge is considered a contributing feature of the Newell Creek Dam complex, it is therefore considered a historic property under Section 106 of the NHPA and a historical resource under CEQA. A

detailed CEQA impacts and Section 106 adverse effect assessment is presented as part of this study in Section 5. Dudek recommends a Project finding of a less-than-significant to built environment historical resources under CEQA and no adverse effect to historic properties under Section 106

1 Introduction

This section provides a preliminary description of the proposed Newell Creek Pipeline Improvement Project (Proposed Project), and includes information about the location and setting; existing facilities and operations; background on the Santa Cruz Water Department (referred to herein as City) and the NCP; purpose and objectives; Proposed Project components; construction schedule and activities; operations and maintenance; the City's Standard Construction Practices incorporated into the Proposed Project; and anticipated required permits and/or approvals for the Proposed Project. All project location and project description figures can be found in Appendix B. This section also presents a description of the Built Environment APE, project personnel, and the regulatory setting for the project.

1.1 Project Location and Setting

The existing NCP is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion of the NCP that extends onto the City's Graham Hill Water Treatment Plant (GHWTP) property, which is located within the City of Santa Cruz, but is surrounded by unincorporated lands; see Figure 1-1, Project Location, in Appendix B. Both the existing NCP and the Proposed Project extend approximately 9 miles between the GHWTP on the south and Newell Creek Dam, a City facility that impounds Loch Lomond Reservoir, on the north. The existing NCP and Proposed Project alignment are located within a primarily semi-rural area, characterized by forested terrain with rural and semi-rural, low-density residential neighborhoods and limited commercial development; see Figure 2-1, Proposed Newell Creek Pipeline Improvement Project Overview.

The northern segment of the existing pipeline extends from just south of the existing Newell Creek Dam to the Felton Booster Pump Station (FBPS) that is located at the intersection of Graham Hill Road and East Zayante Road. The northern segment is located east of Highway 9 and north of Mount Hermon Road, generally between the unincorporated communities of Felton and Ben Lomond and west of Lompico in the San Lorenzo Valley; see Figure 2-2. Proposed Newell Creek Pipeline Improvement Project Northern Segment. The southern segment of the existing NCP extends from the FBPS to the GHWTP; see Figure 2-3. Proposed Newell Creek Pipeline Improvement Project Southern Segment.

1.2 Existing Facilities

The NCP is a critical component of the City's raw water supply infrastructure. It conveys untreated water to and from the Loch Lomond Reservoir, which is the City's only raw water storage facility. The NCP is critical to supplying the water system during dry seasons as well as during storm events, and also is critical in conveying untreated water from the existing Felton Diversion to the Reservoir for storage. The existing 9.25-mile NCP was constructed in 1960 in conjunction with construction of the Newell Creek Dam. The pipeline material is predominantly concrete cylinder pipe, which is composed of a steel cylinder lined with cement mortar on the interior and is helically wrapped with a mild steel bar or wire and coated with dense cement mortar. The existing NCP includes three creek crossings—two over Newell Creek in the northern segment and one over Zayante Creek in the southern segment—as well as numerous culverted creek and drainage crossings.

The existing pipeline size ranges in diameter from 18 inches to 27 inches, with the majority of the NCP being 20 or 22 inches in interior diameter (HDR 2020). According to the 1960 Construction Specifications, the northern

segment consists of approximately 22,670 linear feet of 22-inch pipeline. The NCP extends south from the toe of Newell Creek Dam and generally follows existing roads through residential neighborhoods, but also extends through undeveloped private property along abandoned railroad bed in the Brackney Road and Rose Acres Lane neighborhoods. The southern NCP segment consists of approximately 3,700 linear feet of 27-inch-diameter, 11,335 feet of 22-inch-diameter, 8,797 feet of 20-inch-diameter, and 1,151 feet of 18-inch-diameter pipeline according to the 1960 Construction Specifications (Santa Cruz Sentinel 1960a: 18; Brown and Caldwell 1960: Sheets 1-2).

1.3 Project Background

There are a number of known concerns regarding the condition and operation of the existing NCP. Generally, the NCP, constructed nearly 60 years ago, is reaching the end of its useful life and is experiencing increased frequency of breaks as a result of corrosion and land movement along portions of its alignment due to geological conditions. There is no functioning cathodic protection system[1] on the NCP, and corrosion has been observed, which presents risks of leaks and failure.

Due to steep terrain and landslides present in some locations, the existing NCP has been damaged and/or is located in areas that make access and repairs difficult. A portion of the existing NCP along Pipeline Road in Henry Cowell Redwoods State Park has the highest recent break history, and several areas of Pipeline Road have washed out, resulting in exposure of the NCP. Another portion of the NCP was constructed in an old railroad bed along a steep hillside in the Brackney area, east of Highway 9 between Felton and Ben Lomond, which includes several landslide hazard areas that could cause stress or breakage of the pipeline as further explained below. Furthermore, some appurtenances, such as isolation valves, are inoperable or are unknown in location, and some portions of the existing pipeline alignment have appurtenant structures (such as fences, retaining walls and sheds) constructed on top of the NCP (HDR 2018).

A major capital improvement at the Newell Creek Dam, consisting of replacement of the dam's inlet/outlet facilities and appurtenances, was approved and permitted in 2019, and construction was initiated in May 2020. It is noted that approximately 2,000 linear feet of the northernmost section of the existing NCP is not part of this Proposed Project. The first phase of the Newell Creek Dam Inlet/Outlet Replacement Project includes replacement of this section of the NCP with a new 30-inch pipeline from the toe of the dam to just upstream of the Newell Creek Access Road Bridge. Construction started in May 2020.

1.4 Project Purpose

The purpose of the Proposed Project is to address the identified deficiencies in existing pipeline conditions, as well as provide improved access for maintenance and repair. As described in Section 1.3 above, having been constructed in approximately 1960, the NCP is reaching the end of its useful life and is experiencing increased frequency of breaks due to corrosion and land movement along portions of its alignment due to geological conditions. In addition to the age of the existing pipeline, development throughout Santa Cruz County over the past

[1] Cathodic protection is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell. A simple method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode. The sacrificial metal then corrodes instead of the protected metal. For structures such as long pipelines, where passive galvanic cathodic protection is not adequate, an external DC electrical power source is used to provide sufficient current.

60 years has created differing conditions along the NCP alignment from its original installation, which has resulted in constraints to accessing the pipeline for maintenance and repair activities due to intervening private development. Various surface improvements were made as part of the pipeline installation (unpaved access roads, drainage crossings, appurtenant features), which have also experienced nearly 60 years of wear and are in need of replacement and/or rehabilitation.

1.5 Project Components

1.5.1 Project Overview

The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24-inch PVC, ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing City easements. The proposed northern NCP segment from the Newell Creek Access Road Bridge to the FBPS generally follows the existing NCP alignment with a few short re-alignments to avoid crossing private property. Wherever possible, the new pipeline would be installed parallel to the existing pipeline. The proposed southern NCP segment from the FBPS to the GHWTP generally includes a new pipeline section along Graham Hill Road. Figure 2-1 provides an overview of the proposed NCP alignment. Once the new pipeline is installed and the interconnections are made, the existing NCP would be removed or abandoned in place. Key features of the Proposed Project are summarized in Table 1 and further described in Section 1.5.2.

Two pipeline sections have been identified as having the highest priority for replacement: (1) the section along Graham Hill Road that would replace the existing pipe through Henry Cowell State Park and (2) the Brackney North section. The engineering design phase for these sections commenced in December of 2020 with completion of 10% design plans in May 2021 and 30% design plans in the summer of 2021. For the remainder of the pipeline alignment, a conservative project scenario would be installation of the new pipeline within specified corridors as identified in Section 1.5.2.

Table 1. Key Proposed Project Features

Project Feature	Northern Segment Newell Creek Road to FBPS	Southern Segment FBPS to GHWTP
Alignment Length (feet)	22,492	23,745
Number of Creek or River Crossings	3	1
Maximum Elevation (feet above mean sea level)	392	727
New Pump Station Required	No	No

Source: HDR 2019a.

1.5.2 Description of Pipeline Segments

1.5.2.1 Northern Segment

The proposed northern NCP segment is planned within the same alignment as the existing pipeline with some minor realignments to avoid private properties. The new pipeline would be installed within existing roadway, road ROWs, and/or City easements. The northern segment has a maximum surface elevation of approximately 392 feet above mean sea level, can gravity flow to the Felton Booster pump station, and has two creek crossings over Newell Creek and over one

unnamed tributary. Three short portions of pipe sections are currently under private property and would be rerouted as described below. There are six distinct sections that comprise the northern segment as discussed below, summarized in Table 2, and shown on Figure 2-2. Further description for each section is provided below.

Table 2. Proposed Project Northern Segment Summary

Section	Section Length (feet)	Pipeline Corridor Width (feet)[1, 2]	Description[3]
Newell Creek Road	5,035	60–100 Open cut trench	Runs along Newell Creek Road from the Newell Creek Access Road Bridge to the intersection where the pipeline passes between homes and connects at Glen Arbor Road. *Creek Crossing: Newell Creek*
Glen Arbor Road	7,120	40–60 Open cut trench	Continues along Newell Creek Road turning onto Glen Arbor Road, crossing Newell Creek, turning onto Hermosa Avenue, Oak Avenue, and Fremont Avenue to north end of Brackney Road. *Creek Crossing: Newell Creek*
Brackney North (Brackney Landslide Area Pipeline Risk Reduction Project)	875	10 TBD (trenchless or open cut)	Runs along an abandoned railroad bed alongside the San Lorenzo River between a Glen Arbor Road neighborhood and the Brackney Road neighborhood
Brackney South	3,250	10 Open cut trench	Extends from Brackney North section, partially along unpaved easement and paved road and ends at a property boundary at north end of San Lorenzo Way/Rose Acres Lane.
San Lorenzo Way	4,242	10 Open cut trench	Runs from north to south end of San Lorenzo Way/Rose Acres Lane and through private property to the edge of Mount Hermon Road. *Creek Crossing: Unnamed creek that is likely tributary to San Lorenzo River*
Felton Pump Station	1,970	60–120 Open cut trench	Runs along Mount Hermon Road and Graham Hill Road to Felton Pump Station.
Total	22,492		

Sources: HDR 2020; City of Santa Cruz 2017.
Notes:
1 Includes area in which new pipeline could be located and area of disturbance during pipeline installation. Construction method is identified.
2 Pipeline location to be specified in 10%–30% design plans. Construction activities would require temporary disturbance outside of the 10-foot easement for the boring and receiving pits.
3 Sections where pipeline crosses a creek are noted.

1.5.2.2 Southern Segment

The southern segment of the proposed NCP extends from the FBPS to the GHWTP and generally consists of a new 24-inch pipeline constructed within the Graham Road ROW and replacement of the southernmost section of existing pipeline located in Graham Hill Road as shown on Figure 2-3 and summarized on Table 3. The paved roadway width of Graham Hill Road varies between 28 and 40 feet in a 40- to 90-foot-wide ROW. This alignment would replace the existing NCP Santa Cruz Lumber Yard section, and the Henry Cowell State Park and Pipeline Road sections through Henry Cowell Redwoods State Park.

Table 3. Proposed Project NCP Southern Segment Summary

Segment Section	Section Length (feet)	Pipeline Corridor Width (feet)[1, 2]	Description[3]
Graham Hill Road North	17,880	40–70 Open cut trench (except for creek crossing)	From Felton Pump Station, crosses Zayante Creek, runs alongside Graham Hill Road, crosses railroad tracks entering Graham Hill Road and follows Graham Hill Road to southern entrance of Henry Cowell Redwoods State Park. *Creek Crossing: Zayante Creek*
Graham Hill Road South	5,865	65–120 Open cut trench	Follows Graham Hill Road from southern entrance of Henry Cowell Redwoods State Park to GHWTP.
Total	**23,745**		

Sources: HDR 2020; City of Santa Cruz 2017.
Notes:
1 Includes area in which new pipeline could be located and area of disturbance during pipeline installation. Construction method is identified.
2 Pipeline location to be specified in 10%–30% design plans.
3 Sections where pipeline crosses a creek are noted.

The southern segment has a maximum elevation of approximately 727 feet above mean sea level, one creek crossing at Zayante Creek and two culverted creek crossings (Eagle Creek and Powder Hill Creek), and requires no new pump station. The bridge crossing over Zayante Creek has a 3-foot-wide raised pedestrian crossing on one side of the bridge; the existing Felton Diversion pipeline crossing is located on the west side of the bridge (HDR 2020).

1.5.3 Other Project Components

1.5.3.1 Appurtenances and Improvements

Other components of the Proposed Project include installation of air release valves that extend approximately 24 inches above ground. Existing air valves will be replaced, and new air valves will be required in new pipeline sections in locations to be determined during design. The FBPS has been improved over the past decade, and no new pump stations are required. No other improvements or appurtenances have been identified for the Proposed Project.

1.5.3.2 Post-Construction Revegetation/Restoration

Upon completion of construction, construction sites would be revegetated and/or restored, and disturbed roadways would be repaved in accordance with County requirements.

1.5.3.3 Decommissioning of Existing Pipeline

Once the new NCP pipeline sections are completed and operational, the existing pipeline sections would be decommissioned. This would involve capping off the existing pipeline and injecting the pipeline with grout. With the decommissioning of existing NCP sections, existing fire hydrants along Pipeline Road in Henry Cowell Redwoods State Park also would be abandoned. All above-grade appurtenances along the abandoned pipeline would be completely removed.

1.6 Project Construction

The Proposed Project is scheduled to be constructed in phases over multiple years from approximately 2022 to 2028. For sections of the pipeline that are installed using standard trenching techniques, it is expected that approximately 60 to 100 linear feet of new pipeline would be installed per day on average. Estimated construction periods for each pipeline section are provided below.

The majority of the Proposed Project would be installed using conventional (open cut) trenching methods. Special construction techniques may be utilized in the Brackney area and for creek crossings. As indicated in section 1.5.1, the Proposed Project generally would be constructed within existing road pavement, road ROW and/or existing City easements.

Conventional (open cut) trenching would use excavators and loaders. The standard pipeline construction trench would be approximately 3 feet wide and 5 feet deep, minimum. Construction activities would be expected to occur within an approximate 10-foot-wide to 15-foot-wide construction corridor, which includes the area of trenching and placement of equipment.

Installation of a new pipe in the Brackney North section would involve installation of approximately 875 linear feet of pipeline in the same corridor as the existing NCP alignment, but installing the new pipeline deeper in the bedrock below the most likely potential landslide plane. Options under consideration include micro-tunneling through the bedrock and potential slides and installing the pipeline in a deepened trench excavated into the bedrock, as well as horizontal directional drill; deep open cut into rock; shallow open cut with pipe supports anchored to bedrock; and auger bore (Mott MacDonald 2021). Further geotechnical and design analyses are being conducted, and the actual design and method of construction will be identified as part of the 10% design plans.

The Proposed Project includes four open creek crossings and numerous culverted creek and drainage crossings. The actual method/design will be developed as part of future engineering design plans for the pipeline sections with creek crossings. However, it is expected that the pipeline will be attached to the two Newell Creek bridges as currently exist and will be installed under Zayante Creek or above the creek adjacent to the existing Felton Diversion pipeline.

The City has adopted standard construction practices, presented in this section, that would be implemented by the City or its contractors during construction activities associated with the Proposed Project, where relevant. Standards 17 and 18 relate to cultural resources:

17. In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the Proposed Project, immediately stop all construction work occurring within 100 feet of the find until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find. The archaeologist will determine whether additional study is warranted. Should it be required, the archaeologist may install temporary flagging around a resource to avoid any disturbances from construction equipment. Depending upon the significance of the find under CEQA (14 CCR 15064.5[f]; California Public Resources Code, Section 21082), the archaeologist may record the find to appropriate standards (thereby addressing any data potential) and allow work to continue. If the archaeologist observes the discovery to be potentially significant under CEQA, preservation in place or additional treatment may be required.

18. In accordance with Section 7050.5 of the California Health and Safety Code, if potential human remains are found, immediately notify the lead agency staff and the County Coroner of the discovery. The coroner would provide a determination within 48 hours of notification. No further excavation or disturbance of the identified material, or any area reasonably suspected to overlie additional remains, can occur until a determination has been made. If the County Coroner determines that the remains are, or are believed to be, Native American, the coroner would notify the Native American Heritage Commission within 24 hours. In accordance with California Public Resources Code, Section 5097.98, the Native American Heritage Commission must immediately notify those persons it believes to be the Most Likely Descendant from the deceased Native American. Within 48 hours of this notification, the Most Likely Descendant would recommend to the lead agency her/his preferred treatment of the remains and associated grave goods.

1.7 Built Environment Area of Potential Effect

The area of potential effect, or APE, is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties. Determination of the APE is influenced by a project's setting, the scale and nature of the undertaking, and the different kinds of effects that may result from the undertaking (36 CFR 800.16[d]).

The Built Environment APE, presented in Figures 3-1 through 3-5 provided in Appendix B, Built Environment Area of Potential Effects follows the maximum possible area of potential effects resulting from the Proposed Project, including all construction activities that will be confined to the public ROW within the limits of work for the Project. As shown in these figures, the built environment APE is limited to the extent of the project footprint illustrated as the Proposed Project Section (orange) and Alternative Project Sections (yellow). Any new disturbances or easements/property takes within the area surrounding the APE will require further study to determine potential adverse effects.

Only one built environment cultural resource over the age of 45 required formal recordation and significance evaluation in the APE. This resource is the NCP and the associated infrastructure components such as wharf hydrants and vents which accompany the structure. Details on this resource are presented in this study.

The City owns and maintains the Newell Creek Access Road Bridge, a bridge located on Newell Creek Road just south of the Newell Creek Dam within the Project APE. The bridge is considered a contributing feature of the Newell Creek Dam complex, which was designed by engineers Creegan and D'Angelo and completed by contractors Williams and Burrows Inc. in 1960. The Newell Creek Dam and its associated features were determined eligible in 2019 under Criterion A/1 eligible for local listing under Santa Cruz County Criterion 2 for its contribution to the broad patterns of our history because of its association with important events that made a significant contribution to the development of water infrastructure in Santa Cruz. These important events include concerns over local water shortages in the late 1950s (as documented in state and local water supply reports) leading up to the passage of the Water Revenue Bond in 1958, which approved funding for construction of the Newell Creek Dam in direct response to concerns over water shortages, and also that water shortages in the late 1950s threatened to make Santa Cruz a less than desirable choice for the location of the next University of California campus in the early 1960s (Dudek 2018).

Other resources over the age of 45 years of age are located in the APE but will not be adversely affected by Project construction or implementation. As such, the following railroad segments, road segments, and bridges (see section

2.2 for description of bridges within but not impacted by the APE) which are not known to be previously evaluated, were not formally recorded or evaluated in this study. A section of the Santa Cruz and Felton Railroad is present within the APE where it briefly transects the planned path of the pipeline. Several roads also run parallel with or briefly transect the Project APE, including Graham Hill Road, Mt. Herman Road, Glen Arbor Road, numerous small county roads, as well as several private and local agency bridges (see Section 2.2 Additional Research on Built Environment Resources in the APE). These structures are not associated with the NCP as they maintain distinct development histories. Most importantly, the Proposed Project does not include any actions related to the realignment or replacement of these structures. Roadwork proposed within the APE as part of the Project implementation will not result in a change of use for the road or any other transecting resource, nor will the work impact the alignment of the structures. Resurfacing of roadways to the extent required for the implementation of the Proposed Project does not extend beyond that which has already taken place as part of the installation of utilities along these throughfares at multiple stages in the past. As such, there is no potential for these resources to be affected by the Proposed Project. As there is no possibility that resources beyond the NCP will be affected by the proposed undertaking, these additional resources are not included in the APE. These resources were therefore not evaluated for historic significance under NRHP, CRHR or SCCHRI criteria as a part of this report.

1.8 Project Personnel

This report, including fieldwork, research, and property significance evaluations, was prepared by Dudek Architectural Historian Fallin Steffen, MPS, and Senior Architectural Historian, Katherine Haley, MA. Resumes for all key personnel are provided in Appendix C.

1.9 Regulatory Setting

This study was completed in compliance with federal cultural resources laws and regulations, including Section 106 of the NHPA. Under Section 106, historic and archaeological districts, sites, buildings, structures, and objects are assigned significance based on their exceptional value or quality in illustrating or interpreting history, architecture, archaeology, engineering, and culture. A number of criteria are used in demonstrating resource importance and are described below.

1.9.1 Federal

The NHPA established the NRHP and the President's Advisory Council on Historic Preservation (ACHP), and provided that states may establish State Historic Preservation Officers to carry out some of the functions of the NHPA. Most significantly, for federal agencies responsible for managing cultural resources, Section 106 of the NHPA directs that

> [t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP.

Section 106 also affords the ACHP a reasonable opportunity to comment on the undertaking (16 U.S.C. 470f).

Title 36 of the Code of Federal Regulations, Part 800 (36 CFR 800) implements Section 106 of the NHPA. It defines the steps necessary to identify historic properties (those cultural resources listed in or eligible for listing in the NRHP), including consultation with federally recognized Native American tribes to identify resources with important cultural values; to determine whether or not they may be adversely affected by a proposed undertaking; and the process for eliminating, reducing, or mitigating the adverse effects.

The content of 36 CFR 60.4 defines criteria for determining eligibility for listing in the NRHP. The significance of cultural resources identified during an inventory must be formally evaluated for historic significance in consultation with the ACHP and the California State Historic Preservation Officer to determine if the resources are eligible for inclusion in the NRHP. Cultural resources may be considered eligible for listing if they possess integrity of location, design, setting, materials, workmanship, feeling, and association.

Regarding criteria A through D of Section 106, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, cultural resources, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (36 CFR 60.4):

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or
B. Are associated with the lives of persons significant in our past; or
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
D. have yielded or may be likely to yield, information important in prehistory or history.

The 1992 amendments to the NHPA enhance the recognition of tribal governments' roles in the national historic preservation program, including adding a member of an Indian tribe or Native Hawaiian organization to the ACHP.

The NHPA amendments:

> Clarify that properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may be determined eligible for inclusion in the National Register
>
> Reinforce the provisions of the Council's regulations that require the federal agency to consult on properties of religious and cultural importance.

The 1992 amendments also specify that the ACHP can enter into agreement with tribes that permit undertakings on tribal land and that are reviewed under tribal regulations governing Section 106. Regulations implementing the NHPA state that a federal agency must consult with any Indian tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking.

1.9.2 State

1.9.2.1 California Register of Historical Resources

In California, the term "historical resource" includes but is not limited to "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California Public Resources Code Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (California Public Resources Code Section 5024.1(a)). The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP, enumerated below. According to California Public Resources Code Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

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

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

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

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

In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are the state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

1.9.2.2 California Environmental Quality Act

As described further below, the following CEQA statutes and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

- California Public Resources Code Section 21083.2(g) defines "unique archaeological resource."
- California Public Resources Code Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource." It also defines the circumstances when a project would materially impair the significance of an historical resource.
- California Public Resources Code Section 21074(a) defines "tribal cultural resources."

- California Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
- California Public Resources Code Sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures; preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

More specifically, under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (California Public Resources Code Section 21084.1; CEQA Guidelines Section 15064.5(b).) If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources or identified as significant in a historical resources survey (meeting the requirements of California Public Resources Code Section 5024.1(q)), it is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (California Public Resources Code Section 21084.1; CEQA Guidelines Section 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (California Public Resources Code Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); California Public Resources Code Section 5020.1(q)). In turn, CEQA Guidelines section 15064.5(b)(2) states the significance of an historical resource is materially impaired when a project:

1. Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
3. Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA.

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (California Public Resources Code Section 21083.2[a], [b], and [c]).

California Public Resources Code Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact (California Public Resources Code section 21083.2(a); CEQA Guidelines Section 15064.5(c)(4)). However, if a non-unique archaeological resource qualifies as tribal cultural resource (California Public Resources Code Section 21074(c), 21083.2(h)), further consideration of significant impacts is required. CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. As described below, these procedures are detailed in California Public Resources Code Section 5097.98.

1.9.3 Local – Santa Cruz County

1.9.3.1 Santa Cruz County Historic Resources Inventory

Historic Resources in the County of Santa Cruz are managed under the aegis of the Santa Cruz County Planning Department. A list of Historic Resources is maintained in the County's Historic Resources Inventory, which identifies those Historic Resources located in the unincorporated areas of the County.

- *Historic Resource* is defined in Chapter 16.42.030 (I) as

  …any structure, object, site, property, or district which has a special historical, archaeological, cultural or aesthetic interest or value as part of the development, heritage, or cultural characteristics of the County, State, or nation, and which either has been referenced in the County General Plan, or has been listed in the historic resources inventory adopted pursuant to SCCC 16.42.050 and has a rating of significance of NR-1, NR-2, NR-3, NR-4, or NR-5 (County Code 16.42.030 (I) [Ord. 5061 § 28, 2009; Ord. 4922 § 1, 2008]).

- *Historic District* is defined in Chapter 16.42.30 (E) as

  "…an area designated as a historic resource and which contains improvements that:

  1. Have character of special historic or aesthetic interest or value; and
     - Represent one or more periods or styles of architecture typical of one or more eras in the history of the County; and

- Cause such area, by reason of these factors, to constitute a geographically definable area possessing a significant concentration or continuity of sites, buildings, structures, or objects that are unified by past events, or aesthetically by plan or physical development (County Code 16.42.030 (E) [Ord. 5061 § 28, 2009; Ord. 4922 § 1, 2008]).”

- The processes for Historic Resource designation in Santa Cruz County are explained in Chapter 16.42.050 as follows:

  (A) Protected Historic Resources. The Santa Cruz County historic resources inventory shall consist of those structures, objects, properties, sites, and districts as designated by certified resolution of the Board of Supervisors and thereby incorporated by reference and made a part of this chapter, with subsequent amendments as provided for in subsection (E) of this section.

  (B) Rating of Significance. For purposes of administering the historic preservation program, general public information, and to aid in the nomination of historic resources to the National Register, designated historic structures, objects, sites and districts shall be assigned a National Register (NR) Rating Code for historic significance based upon guidelines published by the United States Department of the Interior, National Park Service as follows:

    (1) NR-1. A property listed in the National Register of Historic Places.

    (2) NR-2. A property that has been determined to be eligible for listing on the National Register by the U.S. Department of the Interior.

    (3) NR-3. A property eligible, in the opinion of the County Historic Resources Commission, to be listed on the National Register of Historic Places.

    (4) NR-4. Property which may become eligible for listing on the National Register if additional research provides a stronger statement of significance, or if the architectural integrity is restored. These buildings have either high architectural or historic significance, but have a low rating in the other categories.

    (5) NR-5. A property determined to have local historical significance.

    (6) NR-6. The County shall maintain a listing of those properties which have been evaluated and determined to be ineligible for designation as an historic resource based on the criteria in subsections (B) and (C) of this section and/or due to their deteriorated architectural integrity or condition. These properties shall be given a rating of significance of NR-6. An NR-6 rated property is part of the historic resource inventory but is not subject to the provisions of this chapter. An NR-6 rated property may be reevaluated periodically.

  (C) Designation Criteria. Structures, objects, sites, and districts shall be designated as historic resources if, and only if, they meet one or more of the following criteria and have retained their architectural integrity and historic value:

    (1) The resource is associated with a person of local, State, or national historical significance.

    (2) The resource is associated with an historic event or thematic activity of local, State, or national importance.

    (3) The resource is representative of a distinct architectural style and/or construction method of a particular historic period or way of life, or the resource represents the work of a master builder or architect or possesses high artistic values.

    (4) The resource has yielded, or may likely yield, information important to history.

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2 Research and Field Methods

The following section summarizes Dudek's efforts to identify built environment cultural resources in the APE. Efforts included a records search, property specific research, efforts are summarized below.

2.1 CHRIS Records Search

To identify cultural resources potentially affected by the Project, the City requested a records search for known resources and technical reports from the NWIC of the CHRIS on April 3, 2020 (NWIC File No. 19-1522). The City defined a records search study area that includes the APE, all alternative alignments, and a 0.25-mile buffer from the APE and alternative alignments for previously recorded resources and technical reports. The records search also included a review of the NRHP, the CRHR, the California Points of Historical Interest list, the California Inventory of Historic Resources, the California Historic Landmarks list, historical maps including rancho plat maps, and local inventories. The results are presented in Sections 2.1.1 and 2.1.2 below and in Confidential Appendix D of this report.

2.1.1 Previously Conducted Cultural Resources Studies

The records search results included 168 previously conducted studies within the 0.25-mile study area. Of those 168 reports, 22 have project areas that intersect the APE, and thus relate directly to the Project. The 22 reports are summarized in the stand-alone Archaeological Resources Inventory and Evaluation Report Study prepared for the Proposed Project by Dudek in conjunction with this report (Dudek 2021). Of these 22 previously conducted cultural resource studies, 3 address and record built environment resources in detail within their respective project areas. These reports are summarized below. The results of the records search are presented in Confidential Appendix D of this report.

S-16692 and S-16692a

Cartier (1994) surveyed 130 acres of land for two housing projects in the area east of the San Lorenzo River and north of Graham Hill Road in Felton (S-16692). The larger 115-acre western section of the survey area includes the FBPS and approximately 0.4 miles of the APE. Cartier reported finding prehistoric items including a Monterey banded chert flake and a possible mano near a spring, and historical period remains including a picket fence with square nails in the northwest portion of the property, ceramics, a logging road, and evidence of logging activities. All the found resources were located east of the APE. The smaller 15-acre eastern section does not intersect the APE. Cartier retuned to the property in 1995 and conducted subsurface testing where evidence of resources had been found (S-16692a). Additional historical research on the ownership history of the property was also presented at that time (S-16692a Appendix B). Two test units were excavated in the 115-acre parcel approximately 600 feet east of the APE. Both test units were uniformly negative for cultural resources (Cartier et al. 1995).

S-22415 and S-22415a

Archaeological Consulting conducted a phase I cultural resources investigation (Doane and Haversat 1999) for a proposal to construct improvement to the Mount Hermon Christian Conference Center east of the Felton Covered Bridge (S-22415). The extreme western portion of the investigation study area includes approximately 0.17 miles of the APE and a staging area along the east site of Graham Hill Road from East Zayante Road to Roaring Camp Road. No resources were reported near the APE. A phase II historical report (S-22415a) that came out of phase I investigation was focused on the historic site of the Redwood Camp Sawmill and the extant Southern Pacific Depot located approximately 0.4 miles northeast of the APE. The report concludes that the Southern Pacific Depot building

retains a high degree of historic integrity and appears to be individually eligible for the SCCHRI. The resource (see resource number P-44-000971 in Table 4 below) was assigned a CRHR status code of *5S2, Individual property that is eligible for local listing or designation*. This resource is located outside the APE.

S-28447, S-28447a, S-28447b, and S-28447c

S-28447 is a Historic Properties Survey Report for a 0.64-mile segment of Graham Hill Road (Kelley 2004a) for a roadway safety improvement project. All of the study area is located within the APE and includes the ROW of Graham Hill Road from just west of Roaring Camp Road to a point on Graham Hill Road approximately 3,700 feet east of Roaring Camp Road. The report included a phase I archaeological investigation (S-28447a) that was negative for archaeological resources (Kelley 2004b). The second technical report (S-28447b) is a historical resource evaluation of built environment resources (Marvin 2004). The report presents a historical context, description of five resources, and a formal evaluation of five resources potentially impacted by the project with DPR 523 Series Forms for each resource. All five buildings were found to be not eligible for the NRHP and for the purposes of CEQA. The project concurrence letter from the State Historic Preservation Office (S-28447c) is dated April 5, 2004.

2.1.2 Previously Recorded Cultural Resources

The records search revealed 34 previously recorded cultural resources within the record search study area. Five previously recorded cultural resources (all built environment resources) intersect the APE and 29 recorded resources are located within the study area buffer outside the APE. The five resources located within the APE have been previously found ineligible, so there is no potential for adverse effect.

Table 4. Previously Recorded Cultural Resources Within the Records Search Area

Primary Number	Trinomial	Resource Name/ Description	Age	Year (Recorded By)	NRHP/CRHR Eligibility Status	Proximity to APE
Resources within the APE						
P-44-000546	—	No. 1; 5300 Graham Hill Road/Building	Historic	2003 (Judith Marvin, LSA Associates Inc.)	6Y	Intersects
P-44-000547	—	No. 2; 5300 Graham Hill Road Shed; Other - Belz Equipment Shed/ Building	Historic	2003 (Judith Marvin, LSA Associates Inc.)	6Y	Intersects
P-44-000548	—	No. 3; 34 Summit Avenue/ Building	Historic	2003 (Judith Marvin, LSA Associates Inc.)	6Y	Intersects
P-44-000549	—	No. 4; 5125 Graham Hill Road/Building	Historic	2003 (Judith Marvin, LSA Associates Inc.)	6Y	Intersects
P-44-000550	—	No. 5; 5300 Graham Hill Road/Building	Historic	2003 (Judith Marvin, LSA Associates Inc.)	6Y	Intersects

Table 4. Previously Recorded Cultural Resources Within the Records Search Area

Primary Number	Trinomial	Resource Name/ Description	Age	Year (Recorded By)	NRHP/CRHR Eligibility Status	Proximity to APE
Resources within the 0.25-mile Record Search Buffer						
P-44-000038	CA-SCR-000032	Camp Mitchell/ Site	Prehistoric	1950 (DWL, WJW); 1974 (Jean Stafford, Don Stafford, Cabrillo College); 1984 (Basin Research Associates)	Unknown	Outside
P-44-000083	CA-SCR-000078	Part of old Cowell Estate/ Site	Prehistoric	1972 (Allan Lonnberg); 1984 (Basic Research Associates)	Unknown	Outside
P-44-000092	CA-SCR-000088/H	J.J. Graham Peat Bog; Other - Paul Sweet Tannery/ Site	Prehistoric, Historic	1974 (Jean Stafford, [none])	Unknown	Outside
P-44-000116	CA-SCR-000112/H	Stafford - 3/9/75; Other - Historical Stage Stop/ Site	Prehistoric, Historic	1976 ([none], Scotts Valley Historical Society)	Unknown	Outside
P-44-000165	CA-SCR-000162	GH-1/Site	Prehistoric	1985 ([none], Basin Research Associates)	Unknown	Outside
P-44-000209	CA-SCR-000207H	Felton Covered Bridge/ Structure	Historic	1975 (Jean & Don Stafford); 1984 (Basin Research); 2002 (Foley, Connolly, Gorham, Bowen, Peebles, Edwards, Cabrillo College Archaeological Technology Program)	1S	Outside
P-44-000210	CA-SCR-000208H	Felton Presbyterian Church/Building	Historic	1977 (Mrs. Edith E. Fikes, Faye G. Belardi Board of Trustees);	1S	Outside
P-44-000237	CA-SCR-000235	SV-1; Other - P-6/ Site	Prehistoric	1979 (J. Cooper, Cabrillo College); 1984 (Basin Research Associates)	Unknown	Outside
P-44-000289	CA-SCR-000312H	Quail Hollow/Building, Structure, Site	Historic	1995 (Lynne Eckert, Archaeological Resource Management)	6Y	Outside
P-44-000320	CA-SCR-000134	No Name/ Site	Prehistoric	1973 (T. Buckman, M. Furley); 1984 (Basin Research Associates)	Unknown	Outside

Table 4. Previously Recorded Cultural Resources Within the Records Search Area

Primary Number	Trinomial	Resource Name/ Description	Age	Year (Recorded By)	NRHP/CRHR Eligibility Status	Proximity to APE
P-44-000401	CA-SCR-000329H	OC-9, MC-9; Other - Highway 9 (Santa Cruz County)/ Structure, Site, Other	Historic	1999 (J. Berg, S. Mikesell, FWARG, JRP)	Unknown	Outside
P-44-000402	CA-SCR-000330H	OC-17, MC-17; Highway 17/ Structure, Other	Historic	1999 (L. Leach-Palm, S. Mikesell, FWARG, JRP)	Unknown	Outside
P-44-000409	CA-SCR-000336H	The Castle Property/Site	Historic	1999 (Larry Bourdeau, Pacific Museum Consultants)	Unknown	Outside
P-44-000439	CA-SCR-000338	The Walgreens Site/Site	Prehistoric	2000 (Larry Bourdeau, Pacific Museum Consultants)	Unknown	Outside
P-44-000590	—	101 Quail Hollow Road; Other - Zayante Fire Protection Division Station/ Building	Historic	2005 (Christopher McMorris/Julia Cheney, JRP Historical Consulting)	6Z	Outside
P-44-000769	—	Felton Fire District Station/ Building	Historic	2013 (Dana Supernowicz, Historic Resource Associates)	6Y	Outside
P-44-000855	—	Cowell Home Ranch District/ District	Historic	2006 (David G. Eselius, Historic Opportunities of Santa Cruz)	Unknown	Outside
P-44-000971	—	Southern Pacific Depot/Building	Historic	1988 (Edna F. Kimbro, Historical Architectural Research); 2001 (Brett Rushing, ENTRIX Inc.)	5S2	Outside
P-44-001004	—	Moose Club Lodge/Building	Historic	1995 (Susan Lehmann, SCR County)	7N	Outside
P-44-001014	—	Rose Acres Ranch/Building	Historic	1995 (Susan Lehmann, SCR County)	7N	Outside
P-44-001017	—	Asst. Superintendent's House, Calif. Powder Works; Other - Paradise Park Clubhouse/ Building	Historic	1995 (Susan Lehmann)	7N	Outside

Table 4. Previously Recorded Cultural Resources Within the Records Search Area

Primary Number	Trinomial	Resource Name/ Description	Age	Year (Recorded By)	NRHP/CRHR Eligibility Status	Proximity to APE
P-44-001117	—	6338 Highway 9/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001118	—	Lazy Daze Motel; Other - Ana-Don Motel/Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001119	—	Beach Street/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001120	—	Bea's Beauty Salon/Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001121	—	9420-24 Highway 9/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001122	—	6407 Highway 9/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001123	—	6385 Highway 9/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside
P-44-001124	—	Giblin's Chevron Service/ Building	Historic	1986 (Gregory King, Caltrans District 4)	6	Outside

Status Codes: (1S) Individual Property listed in the NRHP by the Keeper; (5S2) Individual property that is eligible for local listing or designation; (6) Not eligible for listing; (6Y) Determined ineligible for NRHP by consensus through Section 106 process – Not evaluated for CRHR or Local Listing; (6Z) Found ineligible for NRHP, CRHR, or Local designation through survey evaluation; and (7N) Needs to be reevaluated.
Notes: FWARG = Far Western Anthropological Research Group Inc.; JRP = JRP Historical Consulting LLC; Caltrans = California Department of Transportation.

2.2 Additional Research on Built Environment Resources in the APE

In addition to the resources that were identified in the results of the CHRIS search, several other built environment resources were identified in the proximity of the APE that were not returned as part of the CHRIS search. The resources listed below were identified through a review of the California Department of Transportation (Caltrans) Bridge Inventory and documentation provided by the City. A summary of these resources is presented below. Records related to these resources are included in Appendix D, Confidential Record Search Results.

Newell Creek Bridge (36C0041)

The Newell Creek Bridge (36C0141) is located on Glen Arbor Road just south of the intersection with Newell Creek Road within the Project APE. The local agency bridge was completed in 1936 and is included in the Caltrans Historic Bridge Survey with a NRHP historical significance status designation of 5, Ineligible for National Register listing.

San Lorenzo River Bridge (36C0085)

The San Lorenzo River Bridge (36C0085) is located east of the intersection of Highway 9 and Clearview Place and it briefly transects the APE north of Felton. The local agency bridge was completed in 1920 and is included in the Caltrans Historic Bridge Survey with a NRHP historical significance status designation of 2, Eligible for National Register listing.

Bean Creek Bridge (36C0141)

The Bean Creek Bridge (36C0141) is located on Graham Hill Road just south of the intersection with East Zayante Road within the Project APE. The local agency bridge was completed in 1936 and is included in the Caltrans Historic Bridge Survey with a NRHP historical significance status designation of 5, Ineligible for National Register listing.

Graham Hill Water Treatment Plant

The GHWTP is located at the southernmost point of the APE where the NCP pipeline terminates. The GHWTP was completed in 1959 and was evaluated for historic significance by Carey & Co. in 2018 as part of the City of Santa Cruz, Graham Hill Water Treatment Plant, Concrete Tanks Replacement Project. The evaluation concluded that the property does not appear eligible for listing in either the NRHP or CRHR.

Three resources listed above have been previously evaluated and found ineligible as historic properties/historical resources, the Newell Creek Bridge (36C0041), the Bean Creek Bridge (36C0141), and the GHWTP, resulting in no potential for adverse effect/impacts to built environment historic properties/historical resources. The San Lorenzo River Bridge (36C0085) has been previously determined eligible for NRHP but the Proposed Project does not include any actions related to the bridge. It will be left in place and is not part of any Proposed Project related construction or implementation activities. As such there is no potential for the bridge to be effected/impacted by the Proposed Project. Additionally, proposed alterations to the NCP will not directly or indirectly result in any adverse effects to the bridge. As there is no possibility that the San Lorenzo River Bridge (36C0085) will be effected/impacted by the proposed undertaking, it is not included in the APE. For this reason, these historic properties/historical resources are not addressed further within this study.

2.3 Building Development and Archival Research

Dudek conducted additional background research to arrive at a general understanding of the settlement and development of the Proposed Project area. Below is a summary of research efforts.

Santa Cruz Public Library

Dudek staff viewed digital source material related to the development of water infrastructure in Santa Cruz County. The materials reviewed during this visit were used in the preparation of Section 3: Historic Context and Section 4: Significance Evaluation of this report.

Santa Cruz Water Department Archives

City staff provided Dudek with a selection of materials related to the general development of water infrastructure in Santa Cruz County and the development of the NCP. These materials were incorporated throughout this report

and used in the preparation of Section 3: Historic Development of the APE and Section 4: Significance Evaluation of this report.

Historical Newspaper Review

Dudek reviewed historical newspapers from Santa Cruz covering the development of the project area. These documents were used in the preparation of Section 3: Historic Development of the APE and Section 4: Significance Evaluation of this report.

Historical Sanborn Map Review

A review of historical Sanborn Map Company fire insurance maps covering the City of Santa Cruz was conducted as part of the archival research effort for the Proposed Project from the following years: 1888, 1892, 1905, 1928, and 1928–1950*.

Historical Aerial Photographs

A review of historical aerial photographs was conducted as part of the archival research effort for the Proposed Project from the following years: 1931, 1940, 1948, 1953, 1968, 1982, 1991, 2005, 2009, 2010, 2012, 2014, and 2016 (NETR 2021; UCSB 2021).

Historical Maps

A review of historical maps was conducted as part of the archival research effort for the Proposed Project from the following years: 1881, 1889, 1902, 1961, 1969, 1975, 1980, 1986, 1995, 2002, 2012, 2015, 2018 (Wright 1881; Hatch 1889; NETR 2021; USGS 1902, 1955, 1968, 1980, 1991).

2.4 Historic Advocacy Outreach

On April 16, 2021, Dudek, Architectural Historian, Fallin Steffen, sent electronic contact letters to the Santa Cruz Museum of Art and History, the Santa Cruz Museum of Natural History, the University of California, Santa Cruz Special Collections at McHenry Library, and the San Lorenzo Valley Museum. The letters briefly described the Proposed Project and requested information about cultural resources near the Project area.

Felicia Van Stolk from the Santa Cruz Museum of Natural History responded on April 22, 2021 that their collections do not contain any records relevant to the possible presence of cultural or historical resources that might be impacted by the proposed project.

Luisa Haddad of the University of California, Santa Cruz Special Collections at McHenry Library responded on April 22, 2021 thanking Dudek for their outreach and providing information related to cultural resources for the University of California, Santa Cruz campus.

Copies of the historic advocacy outreach submitted in conjunction with this project and all responses are located in Appendix E.

2.5 Field Survey

2.5.1 Methods

Dudek Architectural Historian Fallin Steffen, MPS, conducted an intensive pedestrian survey of the APE on December 2 and 9, 2020. The survey entailed walking all portions of the existing pipeline route and documenting buildings and features with notes and photographs, specifically noting character-defining features, spatial relationships, and observed alterations, and examining any historic landscape features along the route. Dudek documented the fieldwork using field notes, digital photography, close-scale field maps, and aerial photographs. Photographs of the subject buildings were taken with a digital camera. All field notes, photographs, and records related to the current study are on file at Dudek's office in Santa Cruz, California.

The first of two pedestrian surveys of the APE on December 2, 2020, was conducted with an escort from the City, Doug Valby, and followed the San Lorenzo Way Section, the Brackney South Section, the Brackney North Section, and the Newell Creek Road Section. All portions represent parts of the existing pipeline alignment slated to be replaced in their current location. The only cultural resource encountered during the December 2 survey was a portion of the former Felton and Pescadero Railroad, of which Brackney and Glen Arbor were former stops. This railroad alignment is within in the Brackney North, Brackney South, and San Lorenzo Way Sections, and has already been impacted/re-purposed by the original NCP installation.

The second of two pedestrian surveys of the APE on December 9, 2020, was conducted with an escort from the City, Doug Valby, and followed along the Pipeline Road Section which passes through Henry Cowell State Park. This section contains an existing alignment of the pipeline that is proposed to be re-routed along Graham Hill Road.

On December 16, 2020, Archeologists Sarah Brewer, BA, and Julie Royer, MA, conducted a survey focused on the public portion of the Graham Hill Road Section.

2.5.2 Results

During the pedestrian surveys, Dudek identified and recorded the NCP and a section of the former Felton and Pescadero Railroad that has already been re-purposed by the original pipeline installation. Additionally, Dudek recorded the Newell Creek Access Road Bridge and the San Lorenzo River Bridge (36C0085). The significance evaluation (Section 4) provides a detailed physical description of the NCP and a historical significance evaluation under all applicable criteria for potential eligibility. A full DPR 523 form set for the NCP is provided in Appendix F.

3 Historical Development of the APE

The following historic context addresses relevant themes concerning the development of the Project APE, beginning with a discussion of the initial formation and growth of the County, followed by a comprehensive overview of the water-related infrastructure development in the San Lorenzo Valley and the City of Santa Cruz. The section concludes with a discussion of the historical development of the NCP.

3.1 Historical Overview of Santa Cruz County

3.1.1 Spanish Period (1769–1822)

The earliest known European exploration of the Monterey Bay was a Spanish envoy mission led by Sebastián Vizcaíno in 1602. The purpose of the voyage was to survey the California coastline to locate feasible ports for shipping, and Vizcaíno had explicit instructions prohibiting the creation of settlements and interacting with local Native Americans. Finding the bay to be commodious, fertile, and extremely favorable for anchorage during eastward voyages from Manila to Acapulco, Vizcaíno named the Bay "Monterey" after the Conde de Monterey, the present Viceroy in Mexico (Chapman 1920: 293-4; Hoover et al. 2002: 225-6).

Despite being mapped as an advantageous berth for Spanish shipping efforts, the epicenter of Spanish settlement in Alta California did not make its way to the Monterey Bay until the second half of the eighteenth century. In an effort to prevent the establishment of English and Russian colonies in northern Alta California, Don Gaspar de Portolá, the Governor of Baja, embarked on a voyage in 1769 to establish military and religious control over the area. This overland expedition by Portolá marks the beginning of California's Historic period, occurring just after King Carlos III of Spain installed the Franciscan Order to direct religious colonization in assigned territories of the Americas. With a band of 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, Portolá established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, Padre-Presidente Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823, including Mission Santa Cruz in 1791 (Hoover et al. 2002: 226; Lehmann 2000: 3; Koch 1973: 3).

On their quest to locate the Monterey Bay from the 160-year-old accounts of Sebastián Vizcaíno, the Portolá expedition first reached the present-day territory of Santa Cruz on October 17, 1769. After mistakenly circumventing the Monterey Bay and reaching the San Francisco Bay, the expedition backtracked to San Diego. The following year on May 31, 1770, a second expedition was organized by Portolá resulting in a successful location of the Monterey Bay. However, it would be an additional 21 years before the Franciscan order would establish Mission Santa Cruz in the area near the San Lorenzo River (Koch 1973: 2–3; Hoover et al. 2002: 447-8).

Father Fermín Lasuén, Corporal Luis Peralta, and five soldiers established Mission Santa Cruz on August 28, 1791, as the twelfth mission in the California Mission system. The Spanish Padres converted local Native Americans to Catholicism largely against their will, after which they were known as neophytes. Neophytes were forced to build the mission church and auxiliary structures from local timber, limestone, and adobe, as well as to cultivate wheat, barley, beans, corn, and lentils for their captors. In 1792, neophytes were directed to excavate a ditch for the purposes of carrying water from Tres Ojos de Agua (Three Eyes of Water), a group of three creeks near the modern entrance to the University of California, Santa Cruz campus, down to the Mission site. This ditch and the footpath beside it established

the foundation for the future orientation of High Street in the City of Santa Cruz today, and offered the Mission a distinct advantage in a geographic area that often experienced water shortages during the summer months (Hoover et al. 2005: 448; Lehmann 2000: 3-4; SCWD n.d: 1).

From the start, Mission Santa Cruz was plagued by substantial issues. The forced conversion of the local native population by the Spanish Padres resulted in repeated rebellions, violence, desertion, and pestilence at Mission Santa Cruz. In 1793, the neophyte population attacked the Mission guards and burned their station to the ground. In 1798, Padre Fernandez reported that 189 of the approximately 230 neophytes living on the Mission grounds had abandoned the Mission, causing the crops to fail and the livestock to be largely neglected. The Mission also experienced problems wrought by a nearby settlement known as Villa de Branciforte (Lehmann 2000: 3-4).

In 1795, Spain established three self-governing Pueblos in Alta California that, unlike the Missions, would remain free from military and religious oversight. Villa de Branciforte was established in 1797 on the opposite bank of the San Lorenzo River from Mission Santa Cruz along the present-day alignment of both Branciforte Avenue and Branciforte Creek. The 40 settlers of Villa de Branciforte were not provided with the resources promised to build housing or cultivate the land and had to make do with crude dwellings of their own design. In 1803, there were 107 inhabitants, but because the population was made up of former soldiers, artisans, and criminals, they lacked the pertinent skill to farm and sustain themselves. Despite population growth in the initial years, the settlement was quickly deemed a failure by Spain (Lehmann 2000: 4-5).

By 1817, the population of Villa de Branciforte had dwindled to 52 people. In 1818, fearing the attack of the French pirate Hippolyte de Bouchard who had recently attacked the Monterey Presidio, the Mission Padres fled from the Mission Santa Cruz and placed the care of the complex with the remaining inhabitants of Villa de Branciforte. Instead of securing the Mission, the inhabitants of the Villa looted the valuable items from the complex while the Padres were away, including furniture, doors, and flatware. Additionally, just under half of the 410 neophytes living at the Mission fled from the complex during the looting chaos and never returned (Lehmann 2000: 4-5).

3.1.2 Mexican Period (1822–1848)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants. In addition to eliminating the system of Spanish nobility in California, the Spanish missions across the territory were secularized during this period (Koch 1973: 10; Lehmann 2000: 4).

The secularization of the Spanish Missions meant that all communal mission property was placed in a trust with the intention of being returned to the local Native American population. In Santa Cruz, the land stolen by the Spanish was returned to Native Americans between 1834 and 1839, but a smallpox epidemic in 1838 and reoccurring bouts of syphilis caused a massive decline in the Native American population from 284 persons in 1837 to only 71 persons in 1839. This meant that very few eligible Native American recipients remained to receive it, and records indicate that overall, only 25 Native Americans held property in the Santa Cruz area between 1834 and 1849 (Lehmann 2000: 4-5).

Extensive land grants were established in the interior during the Mexican Period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated its colonization efforts. Land grants to citizens covered over 150,000 acres of present-day Santa Cruz County. Three land grants

covered the regions of the densely forested Santa Cruz Mountains that falls within Santa Cruz County, including *Rancho Zayante* (1841), *Rancho Cañada del Rincon en el Rio de San Lorenzo* (1843) and *Rancho Carbonera* (1838) (Hoover et al. 2002: 455-457; Robinson 2012: 7).

The scarcity of water in the future City of Santa Cruz intensified towards the end of the Mexican Period with assistance from a formal decree by the Santa Cruz Alcalde, Don Manuel Rodriguez. In 1844, Rodriguez transferred the rights to the water carried by the 1792 aqueduct to the limited control of the mission and eight adjacent grant-holders. After this point, the growing population in the outlying areas of Santa Cruz became exclusively reliant on water taken from shallow wells and surface sources that were subject to seasonal surge and drought cycles, such as the San Lorenzo River (SCWD n.d.: 1).

3.1.3 American Period (1848–Present)

The Mexican American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American Period. Santa Cruz was designated as one of the 27 original counties of California on February 18, 1850, shortly before California officially became a state with the Compromise of 1850. The new State of California recognized the ownership of lands in the state distributed under the Mexican land grants of the previous several decades (Lehmann 2000: 5; Koch 1973: 35).

As the Gold Rush was picking up steam in 1849, a massive influx of people seeking gold steadily flooded the rural counties of California. The gold fields quickly dried up, causing many new arrivals to refocus on other economic opportunities. In Santa Cruz County, insightful entrepreneurs saw the arrival of opportunity-seeking laborers as a means to harvest the abundant natural resources found throughout the area. In the northern areas of the young county, the lumber, mining, fishing, tanning, and leisure industries formed the economic foundation of the County. In the central and southern areas of the County, early settlers took advantage of the fertile soil and temperate climate to establish large farms and dairies. Agricultural products including grain and apples were among the County's earliest and most successful (Lehmann 2000: 7).

As the County moved into the 1900s, agriculture and tourism continued as the region's most prominent economic drivers. By the late 1950s, the population began to expand with aid from the establishment of Cabrillo College in 1959 and the University of California at Santa Cruz in the 1965. These higher education facilities brought both students and jobs as the schools became major sources of community employment throughout the County. During the 1980s, a number of technology companies settled in the area due to its proximity to Silicon Valley. Today, tourism, agriculture, manufacturing, and technology are the key industries that provide the economic base for County's 273,213 residents (U.S. Census Bureau 2019).

3.1.3.1 Development of Early Transportation Corridors in Santa Cruz County

The earliest railroad in the County was built and operated by the Southern Pacific Railroad (SPRR) in 1871, which was situated at the southern-most point of the County connecting the City of Watsonville with the City of Gilroy. In 1873, Fredrick A. Hihn and Claus Spreckels filed incorporation papers for the Santa Cruz Railroad, a narrow-gauge railroad line connecting the City of Watsonville to the City of Santa Cruz. The line, known as the Santa Cruz- Watsonville Railroad, was completed in 1876 and later purchased by a SPRR subsidiary in 1881 (Clark 2008: 309, 331).

As the number of lumber operations in the County grew rapidly, transportation infrastructure developed simultaneously to support the movement of goods from remote processing locations in the Santa Cruz Mountains.

The earliest efforts to transport lumber and lime resulted in the construction of roads like as Graham Hill Road, or "Graham's Grade" as its was first known, which was completed by Isaac Graham in the 1840s leading from the upper reaches of the San Lorenzo Valley to the Santa Cruz Wharf. Graham was an American who arrived in California sometime during the 1830s, and after a brief imprisonment in Tepic, Baja California, he settled on Rancho Zayante in 1841 where he set up enterprises in lumbering, cattle ranching, leather tanning, and distilling. Although the road has been somewhat realigned, it has remained in continual use since its completion in the 1840s (Clark 2008: 130; Robinson 2012: 8).

Navigating the steep, angled roads through the valley while driving heavy, lumber-filled wagons was a dangerous undertaking even for experienced teamsters, but the unpredictability of seasonal weather changes often proved deadly. The unreliability of transporting lumber by wagon prompted the development of a flume along the San Lorenzo River to easily move the lumber to port instead. While the initial plan called for the flume to stretch over 20 miles from the mountains to the coast, seasonal drought of the lower San Lorenzo River and tributary creeks encouraged the need instead for a narrow-gauge railroad to begin at the flume terminus in Felton leading down to the harbor. Work on the Felton Lumber Flume and the Santa Cruz and Felton Railroad (Exhibit 1) was completed simultaneously during 1875. The terminus of the 9-mile flume and the new rail line was in Felton, California, where the lumber originating as far as 2 miles north of Boulder Creek, floated down the water-driven flume and could be loaded onto the train and hauled safely downhill to shore. Overall, the water-powered gravity flume drastically increased the availability of Santa Cruz lumber to a wider market, while the rail line opened the San Lorenzo Valley up to tourism (Hoover et al. 2002: 462; Robinson 2012: 20).

Exhibit 1. An early photograph of the Felton Flume (center) alongside the narrow gauge Santa Cruz and Felton Railroad (engine and tracks at right) (University of California, Santa Cruz Special Collections).

In 1876, construction of the South Pacific Coast Railroad began between Alameda and Santa Cruz via San José. When it was completed in 1880, the narrow-gauge railroad traveled southwest from Los Gatos into the densely forested areas on the Santa Clara side of the Santa Cruz Mountains before emerging into Santa Cruz County through a 6,200-foot tunnel at the summit. The line wound down through the small communities of Laurel, Glenwood, Clems, Doughertys, Zayante,

and Felton before continuing along the tracks leased from Santa Cruz and Felton Railroad through Big Trees, Rincon, and the Powder Works before reaching the terminus in Santa Cruz (Clark 2008: 332).

In 1883, articles of incorporation were filed for the Felton and Pescadero Railroad company, which was intended to connect the town of Felton with the coastal town of Pescadero located in San Mateo County. The announcement of the newly formed company included a reference to the abundant virgin redwood forests of Big Basin that would be made accessible by the new railroad, claiming "the millions of lumber they will produce is beyond reasonable computation" (Santa Cruz Surf 1883: 3)." Bids for the first 7.5 miles of tracks between Felton and Boulder Creek including the "grading and bridging … of roadbed, also for the laying and surfacing of the track" (Santa Cruz Surf 1884: 1) were requested during the summer of 1884 and completed in 1885. The Felton and Pescadero line was almost immediately incorporated into the South Pacific Coast Railroad, and this section constitutes the only part of the Felton and Pescadero railroad that was ever completed. Small communities emerged along this new route including Brackney, Glen Arbor, Ben Lomond, and Brookdale (Santa Cruz Surf 1883: 3, 1884: 1; Clark 2008: 332).

In 1887, the Santa Cruz and Felton Railroad, the South Pacific Coast Railroad, and the Felton Pescadero Railroad incorporated together with several other small subsidiaries into the South Pacific Coast Railway Company, which was then leased to the SPRR. The SPRR converted the original narrow-gauge tracks to broad-gauge beginning in 1905 (Exhibit 2), but the project was spectacularly delayed after the earthquake of 1906 caused widespread damage. It took nearly 3 years before the tracks were adequately repaired and the first broad-gauge train passed from Los Gatos to Santa Cruz in 1909. In 1934, the 7.5-mile section originally built as the Felton and Pescadero Railroad was decommissioned, and the tracks were pulled up. The remainder of the consolidated South Pacific Coast Railway Company was purchased outright by SPRR in 1937 and regular rail service along the line ceased in 1940 (Clark 2008: 111, 332; SC Evening News 1936a: 7).

Exhibit 2. A photograph showing the expansion of either the Santa Cruz and Felton Railroad or the Felton and Pescadero railroad from narrow to broad-gauge in the proximity of Felton, c. 1905 (University of California, Santa Cruz Special Collections).

3.1.3.2 Tourism Industry in Santa Cruz County

Interest in the beauty of the Monterey Bay drew visitors to the County beginning in the 1860s, causing beach tourism to emerge early on as another major industry in the County. Tourism was also responsible for quickening the rate of development along the scenic coastal areas of Santa Cruz County. The completion of railroads in the County, including the Santa Cruz and Felton Railroad in 1875, the Santa Cruz–Watsonville Railroad in 1876, and the South Pacific Coast Railroad in 1880, provided greater mobility into and throughout the County from the Bay Area and inland areas of the state by both residents and tourists alike. As the rise of trains also reconfigured shipping from the Santa Cruz wharf to the new railroads, shipping from the wharf altogether declined due to lack of use and the ease of transport by train, the beachfront areas of the City presented savvy entrepreneurs with new emerging opportunities (Lehmann 2000: 14, 25-6).

By 1893, Harper's Weekly acknowledged the County as a beach destination, promoting beachside institutions like the Neptune Baths built in 1884 by Captain C.F. Miller, and giving the coastal destinations, including Fredrick A. Hihn's Camp Capitola, the push needed to become national tourist destinations. The economic transition away from the early industries of the County towards tourism during this period helped to alleviate the strain placed on the forests in the north of the County, which had experienced widespread deforestation as a result of early logging and lime production activities in that area. By the close of the nineteenth century, few old-growth redwood specimens remained in the forests of the Santa Cruz Mountains, and as it became increasingly clear that these trees were

capable of drawing crowds on their own, their conservation became a dual effort to both save the trees and simultaneously promote Santa Cruz County as a one-stop tourism destination. With the help of the railroads, a tourist to the County could visit the seaside attractions as well as the groves of *Sequoia Sempervirens*, or coastal redwoods, within a single day. While the coastal redwood occupied several areas within the County, a grove located south of Felton alongside the San Lorenzo River known as Felton Big Trees, or Big Trees, and two distinct Big Trees resorts were developed within this area during the late nineteenth century, which were formally separated only by a fence. The Santa Cruz and Felton Railroad line included Big Trees stop, which allowed for ease of access to the otherwise remote locations of these parks (Exhibit 3) (Lehmann 2000: 14).

Exhibit 3. A postcard showing the Big Trees railroad stop along the Santa Cruz and Felton Railroad south of Felton, c. 1920s (University of California, Santa Cruz Special Collections).

The earliest Big Tree resort was established by Joseph Warren Welch on his 350-acre property sometime after 1867. Welch's Big Tree Grove contained conveniences including a lodging house, a saloon, a store, and an outdoor event venue. In 1930, the Welch family sold the property to the County for the creation of a local park, which became known as Santa Cruz County Big Trees Park (Clark 2008: 28).

The second resort was established in 1895 to the south of Welch's resort on property that was owned by the Cowell family. Cowells Big Tree park included guest cabins, a coffeeshop, and a souvenir shop. The park was leased to the Hopkins family in later years before it was finally closed to the public in 1942. In 1954, as a memorial following the death of his father, Samuel H. Cowell donated 1,623-acres of land including the Cowells Big Trees property to the State of California. During the same year, the donation to the State was combined with the former Welch's Big Tree Grove property comprising the Santa Cruz County Big Trees Park to form, the Henry Cowell Redwoods State Park. The new park named after Samuel Cowell's late father, Henry Cowell (Clark 2008: 28).

In 1963, as interest in the now non-operational railroads in the Santa Cruz Mountains grew, Norman Clark established a private amusement park known as Roaring Camp & Big Trees Narrow Gauge Railroad alongside the Henry Cowell Redwood State Park, where it was advertised that "1860s steam locomotives climb the western U.S.'s steepest railroad grades through groves of giant redwoods" (Clark 2008: 282). In 1985, Clark purchased the tracks and ROW for the SPRR between Santa Cruz to Olympia (composed of the former Santa Cruz and Felton Railroad path and a portion of the South Pacific Coast Railroad path) and formed the Big Trees and Pacific Railway Company to provide rail tours between Felton and Santa Cruz (Clark 2008: 282, 331).

3.2 Water Management in North Santa Cruz County

3.2.1 Early Water Management in Santa Cruz County

Several miles north of the evolving city center at the base of the Santa Cruz Mountains, multiple mountain streams and tributaries carve deep channels and valleys through the dense redwood and oak timberlands. The extensive virgin forests and the rich underground deposits of lime in the Santa Cruz Mountains attracted opportunistic settlers and purveyors in the mid- to late-1800s who sought to harness the power of the mountain streams to move the goods located in the remote area to market (Hoover et al. 2002: 456).

The California Gold Rush of 1848 accelerated the desirability of land across the state, and before long, access to water in the drought-prone region took on the highest level of importance. Instead of adopting an equal water access structure in the fashion of the eastern United States, the wealth potential of waterways during the Gold Rush shaped California water law into a "first in time, first in right" system known as Prior Appropriation. Under this system, riparian rights were granted to the first person to use a river or tributary for beneficial consumption like mining, farming, milling, or as-needed domestic use. When land in the Santa Cruz Mountains was subdivided and sold, access to the rivers and streams was enormously important. Not only did it mean that the initial use set out for a waterway was the primary use, it also meant that any subsequent uses could not supersede or negatively affect the chief use. The order that claims were recognized during this period established the foundation of the complicated system of water allocation rights still in use today in the County (Pisani 1984: 246–247).

Many of these powerful mountain streams and tributaries were utilized by early landowners and tenant entrepreneurs to make a profit from the natural resources that formed the early economic basis of the County. Several of these mountain creeks still bear the names of the first men who established mills or permanently settled

beside them. Majors Creek was named for Joseph L. Majors who established a grist mill on the creek prior to serving as the County Treasurer between 1850 and 1853. Liddell Creek was named for George Liddell who moved to the Santa Cruz Mountains and established a sawmill on the creek in 1851. Newell Creek was named for Addison Newell who established a farm in the steep, V-shaped valley on the banks of the creek in 1867 (Koch 1973: 33–34; D. Clark 2008: 174, 187, 215).

For others, the streams presented pure economic opportunity. The first power sawmill in California was built on Rancho Zayante by Isaac Graham in the 1842 and was driven by the waters of Zayante Creek. Isaac E. Davis and Albion P. Jordan of the Davis and Jordan Lime Company purchased a portion of Rancho Cañada del Rincon in 1853 as a promising quarry site. They also utilized the falling water on the property to process local lumber into fuel for their many kilns. The California Powder Works was established in 1865 on the bank of the San Lorenzo River on a portion of Rancho Carbonera. The Powder Works used the river to grind raw materials used in the production of the first smokeless powder manufactured on the west coast of the United States. By 1868, there were a sizable number of business and industries that relied on water from County waterways to operate, including 12 water-powered lumber mills, 10 steam-powered lumber mills, and 9 shingle mills in operation within the County (D. Clark 2008: 130–131; Hoover et al. 2005: 456; Koch 1973: 36–37; Brown 2011: 4).

3.2.2 Water Management in the San Lorenzo Valley

By the late 1800s and early 1900s several small communities were scattered throughout the San Lorenzo Valley. These areas developed as a result of mining and lumber operations, the arrival of multiple railroads into the remote areas of the valley, and the increased popularity as a tourist destination for development of vacation homes. The remote nature of these small subdivisions caused them to rely on small, self-contained water systems. The communities of Ben Lomond, Brookdale, and Boulder Creek for example, formed their own, distinct water systems designed to serve the needs of residents who occupied their vacation homes only a few weeks a year which were supplied by nearby springs and creeks by way of flumes or pipelines. When the County population doubled between 1900 to 1940 from 21,512 to 45,057 persons and more people moved permanently into the valley, the existing water systems became inadequate (SLVWD 2020; SCPL n.d.: 1).

Frequent droughts between 1912 and 1939 convinced San Lorenzo Valley leaders to form a water district to better control water, to serve the needs of the valley. After one failed attempt to form a county water district by election in 1939, the San Lorenzo Valley Water Department (SLVWD) was formed by the voters on April 3, 1941. Negative voter returns from the towns of Felton and Scotts Valley left those areas out of the district boundaries, which included Bear Creek, Boulder Creek, Alba, and Ben Lomond school districts, and part of the Sequoia school district (SLVWD 2020).

By the late 1950s, population growth and new development throughout the Valley had exacerbated an already tenuous water situation within the SLVWD. In 1959, the SLVWD signed an agreement with the City of Santa Cruz, in which the district sold the City its timber and mineral rights to the Newell Creek watershed, in exchange for one-eighth of the water rights from the water stored by Newell Creek Dam following its development in 1960. The development of the Newell Creek Dam and the Newell Creek Pipeline is discussed in detail in Section 3.3 below (SLVWD 2020).

Today, the SLVWD supports a population of approximately 35,000 people across roughly 60 square miles of service area encompassing the towns and communities of Ben Lomond, Boulder Creek, Brookdale, Felton, Lompico, and Zayante. The system also includes sections of the City of Scotts Valley, including two subdivisions (the Pasatiempo Pines and Manana Woods) and two mobile home parks (Vista del Lago and Spring Lakes) (SLVWD 2020; SVWD 2020).

3.2.3 Water Management in the City of Santa Cruz

As water management techniques were being applied to a variety of industries throughout the County, the successful technologies developed and used in early natural resource harvesting such as flumes and pumps prompted local residents in the City of Santa Cruz to consider why these were not being put to use for the benefit of drinking water. The following section provides an outline of specific projects and miles stones related to the development of water management systems in the City of Santa Cruz.

3.2.3.1 Private Development (1864–1916)

Beginning in the 1860s, acute cyclical water shortages and pollution prompted the development of several for-profit water systems in Santa Cruz. By the end of the 1880s, the two surviving major water companies, F.A. Hihn Water Works and the Santa Cruz Water Company, were joined into a single private business that competed with the new municipal water system that began in 1890 for almost three decades before being purchased by the City and integrated into the municipal system in 1916.

3.2.3.1.1 F.A. Hihn Water Works (1864)

In 1864, prompted by the issue of shortage, young entrepreneurs Elihu Anthony and Fredrick A. Hihn implored the Board of County Supervisors to allow them to dig trenches and lay redwood pipes to transport water throughout Santa Cruz. The "wooden tubes" were chosen as an inexpensive alternative to iron pipes (Santa Cruz Weekly Sentinel 1864: 2). The source of the water was an 8,000-gallon reservoir on Anthony's property supplied by water from Scott's Creek, and eager recipients of the water could gain access for a fee. (Brown 2011: 1–2; Santa Cruz Weekly Sentinel 1864: 2).

By 1876, the 1864 system was known as the F.A. Hihn Water Works, and it was the largest provider of water in the newly chartered City, with Dodero and Carbonera Creeks constituting its primary sources. The company predated the incorporation of Santa Cruz by 2 years (Koch 1973: 35; Brown and Dunlap 1956: 14; City of Santa Cruz 2020).

3.2.3.1.2 The Santa Cruz Water Company (1866)

In 1866 a new, fee-based, private water supply company was founded to share in the lucrative profits of the F.A. Hihn Water Works. A man named E. Morgan acquired rights to the waters of the San Lorenzo River in 1866, just prior to the town of Santa Cruz being officially incorporated later that year. He used these rights to install a section of pipework conveying water to the area known then as the "The Flats," which comprises the modern area of Pacific Avenue and Front Street (SCWD n.d.: 1).

In 1876, Morgan sold his system to a wealthy man from San Francisco named H.K. Lowe. Under Lowe's guidance, the Santa Cruz Water Company incorporated in July 1876 and began construction on a pumping station on the San Lorenzo River approximately 1 mile upstream from the City, as well as a new reservoir located on High Street. Morgan retained 50 company shares and became the resident engineer and superintendent of the Santa Cruz Water Company. By the end of 1876, the company had also installed a Branciforte Creek diversion to deliver water via a pipeline to a new reservoir located at the base of School Street. As the City continued to grow and the steam-powered pumping plant installed on the San Lorenzo River became the source of repeated water-quality concerns, the Santa Cruz Water company acquired partial water appropriation rights to the Majors (then called Cojo Creek) in

1881. After the acquisition, the company scrapped the whole San Lorenzo pumping plant for $800 (Santa Cruz Weekly Sentinel 1877a: 1; 1877b: 2; SCWD n.d.: 1).

For the next several years, the Santa Cruz Water Company focused its attention on the construction of a pipeline to divert water from Majors Creek. This effort was very costly, and the company slipped into dire financial condition. In August 1886, the company along with all of its appurtenances was sold to the City, financed through the sale of bonds from the Bank of Santa Cruz and the Anglo-Californian Bank. Hihn bitterly opposed the issuance of the bonds and contested their legality in court. The matter reached the Supreme Court and the election in favor of the bonds was declared invalid in 1887. By this time however, the City had already operated the water system for over a year when it was re-conveyed to private owners in 1887 (Santa Cruz Weekly Sentinel 1882: 3; SCWD n.d.: 1; Santa Cruz Surf 1890a: 1).

The City voted again in March 1888 to put up the bonds necessary to purchase the Santa Cruz Water Company system from the private owners. However, while the City was in the process of securing the bonds for the purchase, the Santa Cruz Water Company system was covertly sold to F.A. Hihn in a private, backroom transaction before the City could obtain legal ownership. Hihn quickly consolidated the Santa Cruz Water Company system with his own system of works. This transaction effectively severed any opportunity the City had of acquiring an established water works system with which to launch their own public water system (Santa Cruz Daily Surf 1888a: 3, 1888b: 2; Santa Cruz Surf 1890a: 1).

F.A. Hihn continued to operate the consolidated system as the Santa Cruz Water Company and expanded the service area east into the Seabright neighborhood until his death in 1913 (SCWD n.d.: 1).

3.2.3.2 Public Development (1890–1917)

During the 1880s, the rising price of these fee-based water systems like the F.A. Hihn Water Works and the Santa Cruz Water Company prompted the City to explore their own, city-owned, public water option. After several disappointing attempts to acquire an existing system of water works, the City revised its approach and began planning to build a diversion system and storage reservoir from the ground up, prompting the development of the first municipal water project in Santa Cruz, the Laguna Creek Dam and the Cowell Reservoir. This project led the way for other ambitious water system development in the City including several other north coast stream diversions and the first pumping plant on the San Lorenzo River. In 1916, the City acquired the rights to the Santa Cruz Water Company and began to tie in the systems as one, forming the basis of the modern City system used today.

3.2.3.2.1 The Laguna Creek Dam and the Cowell Reservoir (1890)

In July 1888, the Common Council secured the water rights to the Laguna Creek. "The Laguna," the *Santa Cruz Sentinel* reported, "is a rushing, roaring mountain stream, entirely rock bound and tree shaded above the falls where it is proposed to take the water out (Santa Cruz Sentinel 1888: 2)." The stream was capable of supplying 1.4 million gallons towards a City-owned water works. Plans were finally in motion for the construction of the first city-owned water works, supplied through a new pipeline by the waters of Laguna Creek, with reserve storage in a new City reservoir on Henry Cowell's ranch property known as the Cowell Street Reservoir, which was located roughly at the present site of the U.C. Santa Cruz Arboretum. The *Santa Cruz Surf* reported with excitement that the new project would mean open, municipal water so that each citizen of Santa Cruz could finally "quench his thirst with free water without 'dropping a nickel in the slot'" (Santa Cruz Surf 1890a: 1).

The bonds required to fund the construction of the City water works were secured within the following year, and in July 1889, a civil engineer named G.S. Schussler issues a report in favor of the project that valued the proposed undertaking at $260K (Santa Cruz Surf 1889a: 3, 1889b: 3).

The prominent San Francisco firm Risdon Iron Works was selected as the contractor, who were known for producing the great iron pipes for steam ships. The *Santa Cruz Surf* reported that work on the dam on Laguna Creek and the dam at the reservoir site would be completed by the San Francisco contracting firm Kelso and Dare (Santa Cruz Surf 1889c: 3).

On September 30, 1890, the *Santa Cruz Surf* reported that the reservoir and the pipeline of the City water works were nearly complete. The article published an in-depth description of the new Laguna Creek Dam (Exhibit 4), stating that (Santa Cruz Surf 1890b: 3):

> The dam across Laguna Creek just above the Henneuse place is one of the finest pieces of rubble stone work in the county and not to be excelled anywhere. The granite rocks used in its construction were taken from the bed of the creek, some of them weighing as much as two tons. The water will first be diverted from the Laguna at this point into a flume 3x4 feet and one hundred feet in length, also built of solid masonry. This is nearly level and terminates in a basin two feet lower, and into which the sand and sediment which may be carried in the water in a time of storm will settle. Gates are provided by means of which this basin can be cleared as often as required. From here the water will enter the 14-inch main through which it will be carried to the storage reservoir. This pipe follows the canyon of the Laguna creek as nearly as possible to the county road a distance of about three miles.

Exhibit 4. The earliest known photograph of the Laguna Creek Masonry Dam published in the Santa Cruz Surf in 1892 (Santa Cruz Surf 1892: 2).

On October 18, 1890, the last pipe connecting the Laguna Creek to the new Cowell Street Reservoir (Exhibit 5) was put into position. The pipeline emptied into the reservoir for storage and eventual distribution to the homes and businesses of Santa Cruz (Santa Cruz Surf 1890c: 3).

Exhibit 5. The earliest known photograph of the Cowell Street Reservoir published in the *Santa Cruz Surf* in 1892 (Santa Cruz Surf 1892: 2).

3.2.3.2.2 Reggiardo Creek Diversion (Flume 1891, Dam 1912)

A 965-foot-long flume was completed in 1891 connecting the west branch of Laguna Creek, colloquially known as Reggiardo Creek, to the main Laguna Creek by emptying out water to the north of the Laguna Creek Dam. The new flume was intended to help supplement the municipal supply from Laguna Creek, as the year-old Laguna Creek Dam was quickly inundated with sediment and less water than expected was being captured by the system overall (Santa Cruz Surf 1892: 2).

In 1912, R.S. Tait, the water superintendent, announced that a dam had been completed on Reggiardo Creek to aid in the supply of daily drinking water sourced from Laguna Creek. The level of Laguna Creek had been significantly reduced by a lack of rainfall in the watershed area, causing the supply of water in the impoundment to drop below sufficient levels to support the community (SC Evening News 1912: 2).

3.2.3.2.3 High Street Distribution Reservoir (1904)

In 1894, the City purchased a parcel of land located on the south side of High Street between present-day Laurent and Storey Streets for the construction of a Distribution Reservoir. The Cowell Reservoir was constructed to hold

60 million gallons, but it was carved into a porous limestone formation known as karst that caused approximately 1 million gallons of leakage daily. The Distribution Reservoir was intended to serve are a secondary reservoir for the Cowell Reservoir to preserve the water that was otherwise lost before it could be pumped into the distribution system (Santa Cruz County Assessor 1894; SCMU 2016: 1).

The site for the Distribution Reservoir overlapped Dodero Spring Creek (then called Meyrick Brook) and provided the added benefit of impounding a percentage of the water from this source while temporarily storing the water impounded from the City Water Works on Laguna and Reggiardo Creeks. The survey and specifications for the new reservoir were completed in 1895 and the Santa Cruz Sentinel reported that the reservoir would have a capacity of 2.5 million gallons and cover three-quarters of an acre. Construction on the reservoir began in 1904 and it was completed later that year (Santa Cruz Sentinel 1895: 3, 1903: 4, 1904: 3).

3.2.3.2.4 Liddell Spring Diversion (1913)

Discussions about securing the title to Liddell Spring and utilizing it as a source of municipal water were gathering support in the City government beginning early in 1913. By July 1913, a pipeline between Liddell Spring and the main municipal pipeline from Laguna Creek was operational, and, at a rate of 590,000 gallons per day, was outproducing all the other existing municipal water sources (SC Evening News 1913a: 1).

3.2.3.2.5 Crossing Street Pump Station (1913)

In 1913, a new well was drilled on the San Lorenzo River at Crossing Street, just north of the present intersection of Highway 1 with the river. It was equipped by a 75-horsepower, 5-inch, three-step centrifugal pump that was installed by the United Iron Works. The pump was capable of pumping 500 gallons per minute and cost $1844 dollars at the time of installation (SC Evening News 1913b: 1).

3.2.3.2.6 Acquisition of the Santa Cruz Water Company System (1913–1916)

Fredrick Hihn passed away in 1913 and his ownership of the Santa Cruz Water Company passed to his children. The City seized the opportunity to acquire the Santa Cruz Water Company system, and in 1916 assumed full legal ownership of the entire system, which included right to water being drawn from Branciforte Creek, Carbonera Creek, Majors Creek, and the San Lorenzo River (SCWD n.d.: 2; Monterey American 1913: 7; SC Evening News 1914: 1).

3.2.3.3 Public Development (1918–1939)

Public development during this period was predominantly focused on the repair and upgrade of existing system components. Although upgrades and additions were added to the several major facilities to increase the ability to store and improve the overall quality of municipal water during this period, with projects such as the Bay Street Reservoir in 1924 and the New Crossing Street Pumping Plant in 1929, the output was not widely increased between 1917 and 1930. Service began expanding into the areas to the east outside of the City with focused initiatives like the East Side Water Extension during this period (Brown and Dunlap 1956: 1-2).

3.2.3.3.1 The Bay Street Reservoir (1924)

The Bay Street reservoir was completed in 1924 and was located 1 mile southeast of the Cowell Street Reservoir on a site to the east from the present intersection of Bay Street and Meder Street. The 35-million-gallon capacity

open-air tank was built to replace the Cowell Street reservoir. The Bay Street reservoir was constructed of stone and lined with concrete and was intended to be much more capable of reserving water accumulated from the surface stream sources for use during the dry summer and fall months (Exhibit 6) (SCMU 2016: 1).

Exhibit 6. Construction of the Bay Street Reservoir in 1924 (SCPL 1924).

3.2.3.3.2 Crossing Street Pumping Plant (1929)

In 1929, the City completed a new, modern pumping plant on the Lorenzo River on the southern side of Crossing Street across from the 1913 Crossing Street Pumping Plant site (Exhibit 7). Once complete, the plant went by the same name as its predecessor until it eventually was known simply as the Municipal Pumping Plant. Today, it is called the Coast Pump Station.

The new facility was designed by City engineer Roy Fowler and consisted of a pumping plant capable of producing 6 million gallons of potable water in a 24-hour period from the San Lorenzo River. The plant operated with the help of "diesel engines, pumps, motors, generators, and all other necessary auxiliary equipment" (SC Evening News 1928: 8). The plant also treated the water with chlorine, making it safer to drink (SCWD n.d.: 3; Brown and Dunlap 1956: 1; SC Evening News 1928: 8, 1929: 7).

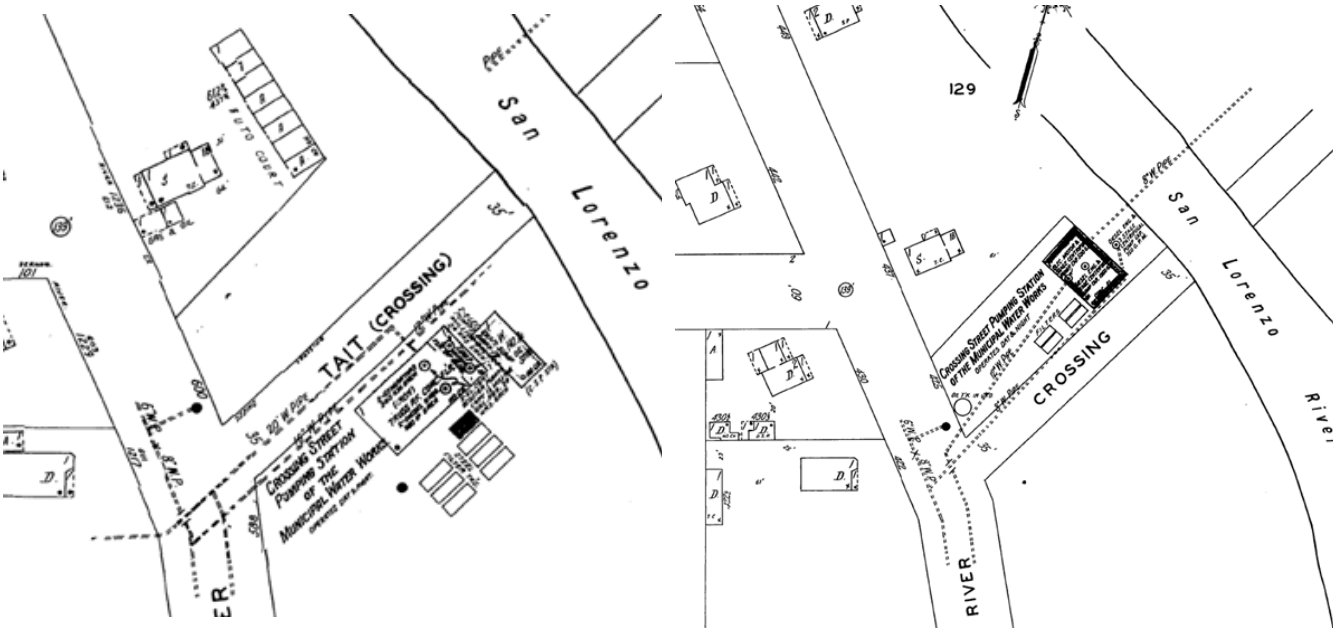
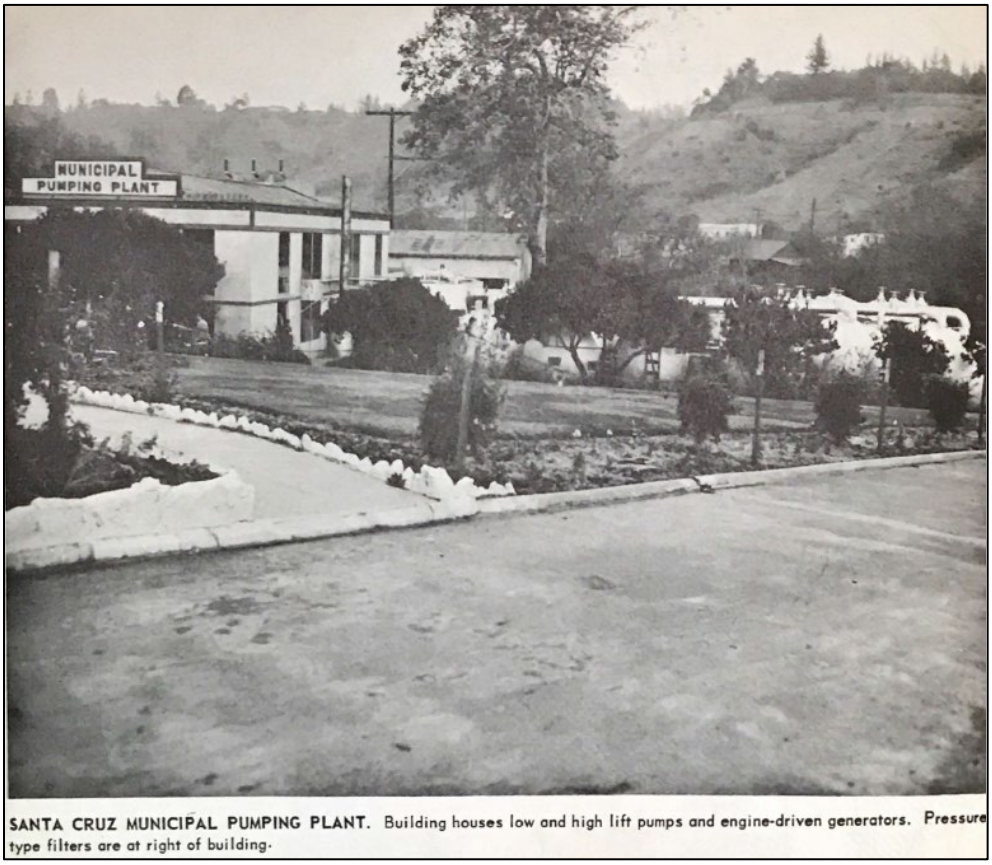


Exhibit 7. Comparison of the 1928 Sanborn Map (left) showing the old Crossing Street Pumping Plant and the 1928-1950 Sanborn Map showing the new facility completed in 1929 in approximately 1945 (right) (Sanborn Map Company 1928: 103, 1928–1950: 103).

The low rainfall in winter 1931 prompted the City to drill four more wells at the site of the Crossing Street Pumping Plant. One of the wells was located at the site of the pumping plant on the west side of the river, while the remaining three were drilled on the east bank. This increased the output of the municipal water supply greatly and allowed for expansion into other parts of the City. In 1934, the City boasted in the *Santa Cruz Sentinel* that 63.4 million gallons of water had earned the City a profit of $11,119 during April 1934 (Brown and Dunlap 1956: 14; SC Evening News 1931: 5; Santa Cruz Sentinel 1934a: 7).

In 1945, Crossing Street was renamed Tait Street for Water Superintendent R.S. Tait. A photograph of the Municipal Pumping Plant included in the 1956 investigative report into the Santa Cruz area water supply projects by engineers Brown and Dunlap demonstrates how the plant appeared during this period (Exhibit 8) (Santa Cruz Sentinel 1945: 8).



SANTA CRUZ MUNICIPAL PUMPING PLANT. Building houses low and high lift pumps and engine-driven generators. Pressure type filters are at right of building.

Exhibit 8. The Municipal Pumping Plant as it appeared in 1956 (Brown and Dunlap 1956: 18).

3.2.3.3.3 East Side City Water Extension (1934)

In 1934, work began on what was known as the East Side Water Extension, to extend the municipal water service into the Seabright and Live Oak areas of Santa Cruz via a new pipeline. Santa Cruz East Side residents C. W. Raisch, E. Brandt, George Ellison, Edith H. Evans, and Nathan Menderson donated the private property to the City needed for a right-of-way, and the pipeline extended from the municipal system to the areas of the City located on the east side of the San Lorenzo River. Additionally, two 1,000,000-gallon tanks were placed in De Laveaga Park in the north of the City as a reservoir for this branch of the system (Santa Cruz Sentinel 1933: 7, 1934b: 9).

3.2.3.4 Private Development (1936–1939)

In areas of the county that were not serviced by the municipal system, private systems such as the Beltz system were developed by residents to provide water for other residents of the area.

3.2.3.4.1 Beltz Water Company (1936)

In 1936, the County granted Iowa native, Charles Lemar Beltz, the rights to begin operating a private water system in the area of the County roughly bounded by Capitola Road to the north, Rodeo Gulch and Corcoran's Lagoon to the west, the bay to the south, and 41st Avenue to the east. The ambitious service area of the Beltz system covered approximately 25% of the Live Oaks district with water sourced from ground wells located throughout the district and conveyed through pipelines situated beside Live Oak roads (Santa Cruz Sentinel 1936: 8, 1947: 1; SC Evening News 1936b: 2).

3.2.3.5 Post-War Water Infrastructure Expansion (1945–1984)

Many of the post-war water projects in Santa Cruz can be characterized as repair of existing infrastructure and expansion of the overall water system to support rapid population growth. The years following World War II provoked westward migration and an increase in birth rates, causing the population of California to increase from 6.95 million to 10.65 million between 1940 and 1950. In Santa Cruz, the growth of the community from 27,430 to 41,680 between 1940 and 1950 caused the common seasonal water shortages during dry months to become problematic in regard to growth and potential for community expansion (SCPL n.d.: 1).

In 1945, the state recognized a water shortage in Santa Cruz and authorized an investigation of available water resources. In 1946, the acute nature of the water crisis prompted the community to request a survey to determine an inventory of the available groundwater supply and plan for growth in the future. Completed In 1948, the survey determined that although the San Lorenzo pumping plant was running at full capacity, 24 hours per day during the dry summer of 1947, the river was so low that the entire run was being diverted through the pumps and into the City mains for consumption (SWRCB 1953: 57; Brown and Dunlap 1956: 1–2).

Prompted by these concerns, in 1953, the State Water Resources Board released a report that inventoried available surface and underground water sources in the County and projected increased water utilization that exceeded the available water in Pajaro Valley, the Soquel Creek area, and the coastal area around and including Santa Cruz. The report identified requirements for supplemental water for Santa Cruz and areas served by the City of Santa Cruz Water Department (SWRCB 1953: 57).

The County formed the Santa Cruz County Flood Control and Water Conservation district in 1955 and hired Creegan & D'Angelo Civil Engineers in 1956 to complete an extensive survey identifying dam sites, groundwater sources, and additional steps to improve control of the water supply throughout the County to compete with the City's proposals. The report asserted that population growth was a major concern for the water supply in the City because "the City of Santa Cruz has current water requirements which equal the capacity of the existing water supply system during a relatively dry era. Should an exceptionally dry season be experienced, there would be a serious water shortage in the City of Santa Cruz" (Creegan and D'Angelo 1957: 8).

Present supplies were determined to be insufficient for standard rates of population growth, including years that rainfall was considered more plentiful. Despite the rate of water consumption in the service area tripling between the mid-1930s and mid-1950s, there had been no additions to the municipal water supply during that time. Creegan & D'Angelo would also serve as the engineers for the Santa Cruz County Flood Control and Water Conservation District Advisory Committee, and ultimately, their recommendation to the council to remedy the current water crisis in the City was a dam on Newell Creek (Santa Cruz Sentinel 1953: 1, 1954: 1, 1958a: 4).

A number of general obligation and revenue bonds helped to fund a wide range of water-related projects in Santa Cruz during this period, including routine maintenance and transmission line replacements, but also projects such as the Graham Hill Treatment Plant (1959), Newell Creek Dam (1960), the Tait Street Diversion (1961) and the Felton Diversion Station (1976). The need for these projects was driven by the need for more water to support a growing, post-war population, but the use of bonds allowed for flexibility to project for future growth. In 1974, the *Santa Cruz Sentinel* surmised that "successful bond issues in 1958, 1963 and in 1967 reflected public confidence in the water administration and a recognition of the needs for more water, apparently, for there was relatively little difficulty getting approval" (Santa Cruz Sentinel 1974: 1–2).

3.2.3.5.1 Newell Creek Dam (1960, modified in 1985)

As a surface water storage on Newell Creek became a distinct reality following the recommendations of Creegan and D'Angelo, City Water Department Director, Weston Webber, voiced his support for the project in 1957. Ultimately, of the five proposed dams, only the Newell Creek Dam would come to fruition (Santa Cruz Sentinel 1957a: 1, 1957b: 13, 1957c: 12).

In 1958, the University of California Regents announced that they were considering the Cowell Ranch in the City of Santa Cruz as the site of a future University of California Campus. The City would be required to provide services and facilities for the prospective University community, which early figures suggested was to include around 2,500 students. In anticipation of the Water Revenue Bond Election in November 1958 to approve the bonds necessary to construct the Newell Creek Dam, a new water treatment plant, and pipelines to transport the water, the Santa Cruz Sentinel published an article outlining the impact of the proposed bonds. In reference to the speculative University in the City, the closing paragraph of the article states that "University officials know that the present water supply of Santa Cruz is inadequate, even for normal needs. Failure to correct this situation could end all chance of the selection of Santa Cruz as the University site." (Santa Cruz Sentinel 1958b: 1, 1961a: 1, 1961b: 1).

On November 5, 1958, the voters of the City of Santa Cruz approved $5.5 million in water revenue bonds necessary for the City to purchase 2,162 acres of land in the Newell Creek watershed from the San Lorenzo Valley Water District and build a dam on the site. Creegan & D'Angelo designed the earthfill dam (SCWD n.d.: 2; Santa Cruz Sentinel 1958a: 4).

Contractors Williams and Burrows Inc. of Belmont, California, began the construction of the Newell Creek Dam and preparation for the creation of Loch Lomond in 1960. The early stages of planning and execution were made more difficult by the narrow valley, allowing only one road for ingress and egress for equipment and supplies. The construction of the 195-foot-tall earthfill dam began with a "grout curtain" that pushed concrete 100 feet into the bedrock to fill any fissures or imperfections, ensuring a structurally sound base. The height and width of the dam's crest was first determined by the reinforced concrete ends. The embankment was then built up using successive layers of random fill from the immediate area, compacted with sheepsfoot tampers above and around the 300 feet of impervious material at the core of the embankment. Four construction personnel lost their lives in October 1960 during the layered construction of the embankment. A brass plaque commemorating these men was commissioned and remains today on the southwest elevation of the Control House (Santa Cruz Sentinel 1960b: 15, 1960e: 1).

The Newell Creek Dam was completed and filling steadily with water by 1961; however, the recreation area on the resulting reservoir was yet to be built. Keeping with the Scottish naming tradition started by Scotsman John Burns when he christened the mountain Ben Lomond in the 1850s, the reservoir was dedicated Loch Lomond during two days of festivities on July 27 and 28, 1963 (Santa Cruz Sentinel 1963: 1).

By 1964, the City distributed a notice to bid on the construction of the Loch Lomond Recreation Development. With the help of a $149,000 state grant, the Loch Lomond Recreation Area was completed by the spring of 1965. It included picnic areas, a concessions building, parking areas, two docks, and a boat launch. An all-weather road leading from Lompico to the Recreation Area was a crucial improvement constructed during this phase of the Project. It allowed visitors to experience the new recreation activities available at Loch Lomond, while simultaneously comprehending the realities of water storage and use in the county (Santa Cruz Sentinel 1964: 3).

3.3 Development of the Newell Creek Pipeline (1961)

Planning for the NCP began in conjunction with the development of the Newell Creek Dam and the GHWTP following the approval of $5.5 million in water revenue bonds by Santa Cruz voters in November 1958. The City selected Brown and Caldwell Civil and Chemical Engineers (Brown and Caldwell) to design the NCP and select the alignment of the proposed structure intended to carry reserved water from the Loch Lomond Reservoir to the GHWTP. Although the NCP was planned to work in tandem with the planned Newell Creek Dam system, Brown and Caldwell were not responsible for planning and design of the Newell Creek Dam and its associated components. Brown and Caldwell were, however, also responsible for the design of the GHWTP, which was completed in 1959 (SCWD n.d.: 2; Santa Cruz Sentinel 1958a: 4).

In October 1959, the City received a ROW agreement from the State of California for approximately 15,000 feet of the NCP to pass through the newly formed Henry Cowell Redwoods State Park south of Felton. The ROW agreement included the stipulation that the City would fund the construction of a graded maintenance road alongside the NCP (today known as Pipeline Road), including the installation of wharf hydrants supplied by the state along the route. The ROW agreement also stipulated that the NCP project would supply the park with untreated water in anticipation of a campground being planned on the southern area of the park. Brown and Caldwell began a survey of this area in late 1959 to determine the most strategic alignment of the NCP, which would be decided based on the existing terrain of the Henry Cowell Redwood State Park (Santa Cruz Sentinel 1959: 7).

The segments of the NCP directly north of Felton were planned along a section of the former Felton and Pescadero Railroad bed that was decommissioned in 1934. This section of the former railroad path heads northwest from Henry Cowell Redwoods State Park where the tracks met the former Santa Cruz and Felton Railroad tracks, beneath Zayante Creek, and diagonally across Graham Hill Road and Mt. Herman Road to the beginning of San Lorenzo Way from whence the NCP traveled northwest. This section of road includes multiple culverts which dated to the construction of the railroad in 1885.

The City requested bids for the construction of the NCP in April 1960. The notice to bidders specified “the construction of approximately 3,700 feet of 27-inch, 44,000 feet of 22-inch, 8,797 feet of 20-inch, and 1,151 feet of 18-inch pipelines with appurtenances; and of approximately 15,000 feet of access road with culverts and other necessary appurtenances” (Santa Cruz Sentinel 1960a: 18). The bid was awarded to the Granite Construction Company of Watsonville. Clearing work for the NCP path began in June 1960, and construction of the NCP began in July 1960 at the GHWTP, which was also designed by Brown and Caldwell and completed in 1959. From there, the NCP extended north along Graham Hill Road (Exhibit 9) before ducking into Henry Cowell Redwood Park at Simms Road. The various widths of the 9.25-mile pipeline used for the project were a concrete cylinder pipe material, which is composed of a steel cylinder lined with cement mortar on the interior and is wrapped with a mild wire and coated with dense cement mortar. The NCP was completed later in 1960 (Santa Cruz Sentinel 1960a: 18, 1960c: 14, 1960d: 5)

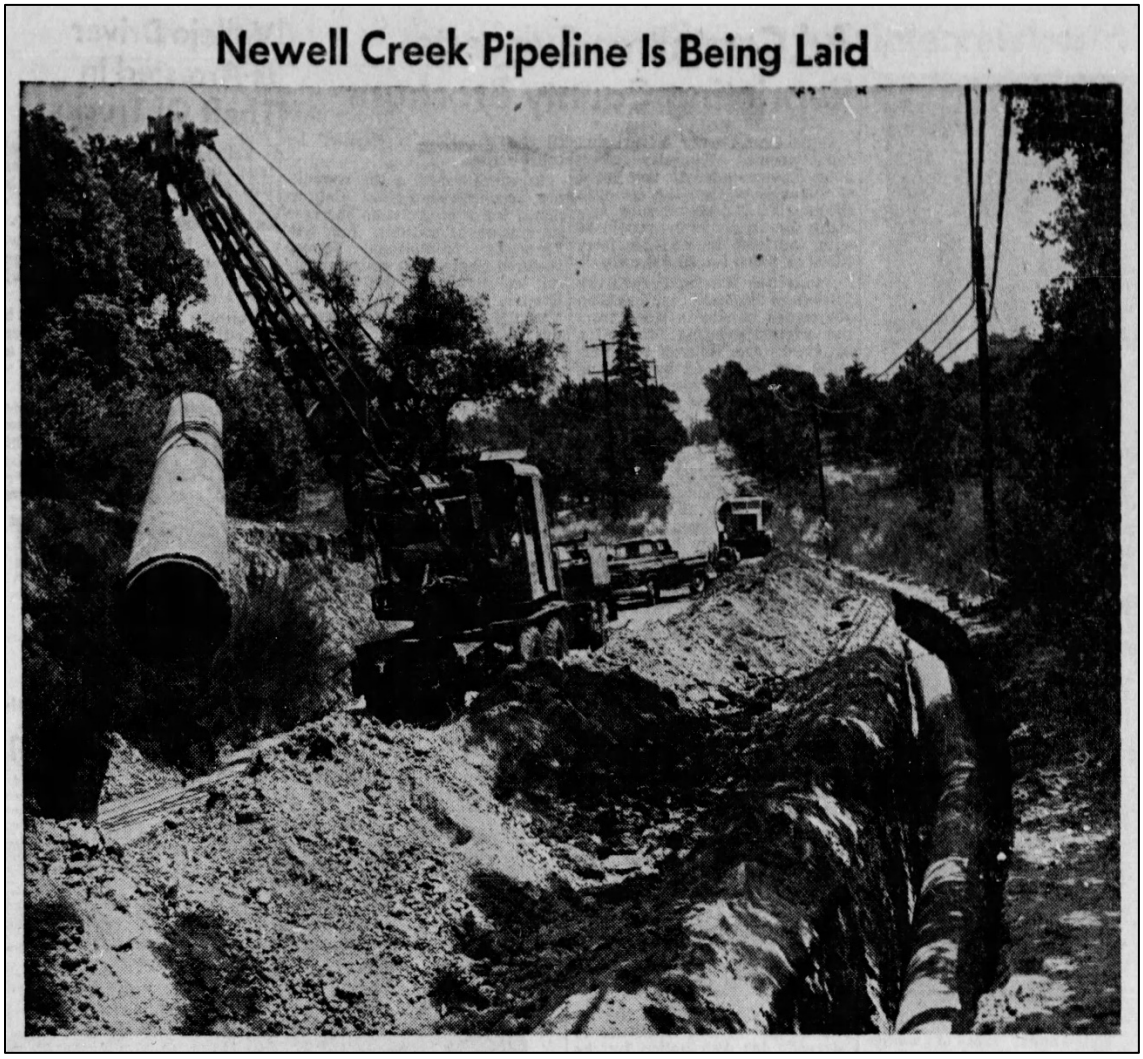


Exhibit 9. A photograph of the Newell Creek Pipeline being laid along Graham Hill Road in July 1960 (Santa Cruz Sentinel 1960d: 5).

In January 1968, the City completed construction of a supplemental pipeline in the Henry Cowell Redwood State Park to distribute water to the public campground being completed in the southern section of the park. The construction of the 8-inch pipe was an obligation stipulated by the state in exchange for the 1958 ROW through the park (Santa Cruz Sentinel 1967: 2).

In January of 1982, a powerful storm caused a major landslide in the Brackney section of the NCP, which caused the disruption of the service for several weeks. The NCP was promptly repaired, but the incident renewed community attention to the potential for the aging components of the municipal system to require upfront repair and maintenance, which prompted community support for funding measures to update and modernize other major infrastructure elements beginning in 1984. In 2017, the Brackney section was again subject to damage caused by heavy rains and land slide activity. In 2020, the northern-most segment of section of the NCP between the Newell Creek Dam and the southern end of the Newell Creek Access Bridge was replaced as part of the Newell Creek Dam Inlet/Outlet Replacement Project (Santa Cruz Sentinel 1982: 1, 8, 1984: 3, 1985: 11; Cardona and Associates 1982; SCWD n.d.: 2).

3.4 Engineers: Brown and Caldwell Civil and Chemical Consulting Engineers (1947-Present)

Engineers Kenneth Brown and David Caldwell founded Brown and Caldwell Civil and Chemical Engineers in 1947 in San Francisco, California. The firm specialized in surveys and consultation related to water supply management and treatment, and in the design of sewer and water treatment infrastructure, water and sewage treatment plants, and delivery pipelines.

The firm is presently still in operation and continues to provide a wide selection of services related to "Safeguarding Water, maintaining infrastructure and restoring habitats" (Brown and Caldwell 2021).

A representative selection of projects completed by Brown and Caldwell is presented below (Colfax Record 1949: 4; Napa Journal 1949: 7; Press Democrat 1951: 1; Ukiah Daily Journal 1957: 9; Daily Independent Journal 1958: 11; Sacramento Bee 1960: 18):

- Auburn Domestic Water Treatment Plant (consulting engineers), Auburn, California (1949)
- Conn Water System Investigation (consulting engineers), Napa County, California (1949)
- Santa Rosa Sewer Plant (consulting and designing engineers), Santa Rosa, California (1951)
- Ukiah Treatment Plant (designing engineers), Ukiah, California (1957)
- South Tahoe Public Utility District Sewage Treatment Plant (consulting engineers), South Lake Tahoe, California (1960)

3.5 Contractors: Granite Construction (1900-Present)

During the mid-to-late nineteenth century, the simultaneous development of railroads across the United States caused the demand for granite stone to increase steadily as it was considered integral to the installation of tracks, which helped to level the railroad tracks and evenly distribute the weight of passing trains. Following the discovery of a granite quarry on James Harvey Logan's ranch property outside of Watsonville, California, John T. Porter, his son, Warren Porter, and A.R. Wilson saw it as a financial opportunity and purchased the quarry from Logan for $10,000. Together they established the Granite Rock Company in 1900 (Granite Construction 2021).

The devastation wrought by the 1906 earthquake presented a unique opportunity for the young company, which found that granite was now in heavy demand as a building material. New laws encouraging the surfacing of roads and sidewalks between 1907 and 1910 prompted further growth, and by 1909, the Granite Rock Company employed 110 men. The onset of World War I, however, quickly presented setbacks as 20% of the nation's production was allocated to wartime needs. The company weathered World War I through the implementation of storehouses along the rail lines to meet the demand for more minor projects (Granite Construction 2021).

The economically slow period prompted the company to restructure following the end of the war and begin branching out into the construction aspect of the trade instead of simply the material supply. The company formed the Granite Construction Company in 1922, which was a subsidiary devoted to the construction arm of the business headed by Walter J. Wilkinson. Although the Great Depression tested the company, the prosperous period following World War II resulted in unprecedented growth for the company. Granite expanded outwards from Watsonville,

establishing branch offices in Monterey, California, in 1945 and Santa Cruz, California, in 1946. The company continued to expand during the second half of the twentieth century, moving into new construction ventures including major highways, dams, water infrastructure, and rapid transit stations in California, but gradually in Texas, Florida, New York, and Washington D.C. Today, the company operates as a diversified company incorporating both the construction and construction material aspects of projects encompassing transportation and water infrastructure (Granite Construction 2021).

A representative selection of projects completed by Granite Construction is presented below (Granite Construction 2021):

- Carnegie Library, Watsonville, California (1903)
- Santa Cruz Courthouse Annex (1907–1910)
- Monterey Odd Fellows Building (1907–1910)
- Road to Glacier Point, Yosemite National Park, California (1936)
- Surfacing of Highway 99 near Elk Grove, California (1955)
- Interstate 80 between San Francisco and Squaw Valley, California (1957)
- Donner Pass, Nevada County, California (1965)
- Rollins Dam, Nevada, and Placer counties (1965)
- Portion of the California Aqueduct (1965)
- Powel Street Station, San Francisco, California (1972)
- San Joaquin Toll Road (CA-73), Orange County, California (1996)

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4 Significance Evaluation

To assess the NCP's historical significance and integrity, the pipeline was recorded and evaluated in consideration of NRHP, CRHR, and SCCHRI designation criteria and integrity requirements. A physical description of the structure and its development history is provided below. The property significance evaluation was prepared by Dudek Architectural Historian Fallin Steffen, MPS, who meets the Secretary of the Interior's Professional Qualification Standards for architectural history. The complete DPR 523 form set is provided in Appendix F.

4.1 Newell Creek Pipeline (1960, Repaired 1982, 2017)

Property Description

The NCP is 9.25 miles long and located in the unincorporated areas of Santa Cruz County. Access to the NCP is provided via Newell Creek Road, Glen Arbor Road, Brackney Road, San Lorenzo Way, Rose Acres Lane, Graham Hill Road, Mount Hermon Road, State Route 9, Pipeline Road (a paved trail through Henry Cowell Redwoods State Park), and via existing City easements. The NCP is oriented roughly north/south and is predominately underground as it passes through densely forested areas and residential properties. The NCP daylights at approximately three locations along the route (Exhibit 10).

Exhibit 10. View of one of the points where a segment of the NCP is visible (red arrow) as it crosses a culvert under Pipeline Road within Henry Cowell State Redwood Park (DSCN6723)

To document various segments of the NCP, including the variety of materials and features, as well as the surrounding setting of each segment, the structure was recorded at multiple points within each of the existing

segments discussed in Table 5 below. Recordation of the NCP began at the northernmost point (Datum P-NCR_1) and continued until the southernmost point (Datum P-GRS_2). The Datum location key and all corresponding photographs are recorded in the DPR forms provided in Appendix F.

Table 5. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	Description	Photograph
Newell Creek Road *(NCR)*	Segment runs along Newell Creek Road from the Newell Creek Access Road Bridge and bypassing the intersection of Newell Creek Road and Glen Arbor Road by heading due south between homes before reemerging at Glen Arbor Road.	 Datum P-NCR_1, view looking north (DSCN6303)
Glen Arbor Road *(GAR)*	The NCP continues south onto Glen Arbor Road and continues south through an existing easement until meeting the north end of the Brackney North Section.	 Datum P-GAR_1, view looking north (DSCN6335)

Table 5. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	Description	Photograph
Brackney North (BN)	Runs along an abandoned Felton and Pescadero Railroad bed alongside the San Lorenzo River between a Glen Arbor Road neighborhood and the Brackney Road neighborhood.	 Datum P-BN_1, view looking northwest (iPad P-BN-1a)
Brackney South (BS)	Extends south from the Brackney North Section abandoned Felton and Pescadero Railroad bed and partially along unpaved easement and before ending at the property boundary at north end of San Lorenzo Way/Rose Acres Lane.	 Datum P-BS_1, view looking north (iPad P-BS-1a)
San Lorenzo Way (SLW)	Runs from north to south end of San Lorenzo Way/Rose Acres Lane and through private property to the edge of Mount Hermon Road.	 Datum P-SLW_1, view looking southeast (DSCN6277)

Table 5. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	Description	Photograph
Felton Booster Pump Station (FBS)	Crosses Mount Hermon Road and runs diagonally through the southwest corner of the commercial parking lot before joining and following Graham Hill Road southeast to the Felton Booster Pump Station.	 Datum P-FBS_2, view looking northwest (iPad P-FBS_2a)
Graham Hill Road North (GHN)	From the Felton Booster Pump Station, crosses beneath Zayante Creek, runs alongside Graham Hill Road before heading southward past the Santa Cruz Lumber Company into Henry Cowell Redwood State Park.	 Datum P-GHN_1, view looking northwest (DSCN6379)
Pipeline Road (PR)	The NCP heads roughly southeast through the park before exiting Henry Cowell State Park and meeting Graham Hill Road at the intersection of Graham Hill Road and Pipeline Road.	 Datum P-PR_3, view looking north (DSCN6592)

Table 5. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	Description	Photograph
Graham Hill Road South (GRS)	Follows Graham Hill Road from southern entrance of Henry Cowell Redwoods State Park to terminus at GHWTP.	 Datum P-GRS_1, view looking north (PC160048)

Appurtenances related to the NCP including air vents, valve access boxes, wharf hydrants, culverts, the cathodic protection box (now abandoned), and a meter pit are also visible along the route. These features are described generally in Table 6 below.

Table 6. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Air Vent: Type A	Metal air vent extending from the ground. The majority of the original vent heads (top) have been replaced with smaller, PVC vent heads (bottom).	 Air vent with original head (DSCN6537)

Table 6. Newell Creek Pipeline Associated Appurtenances

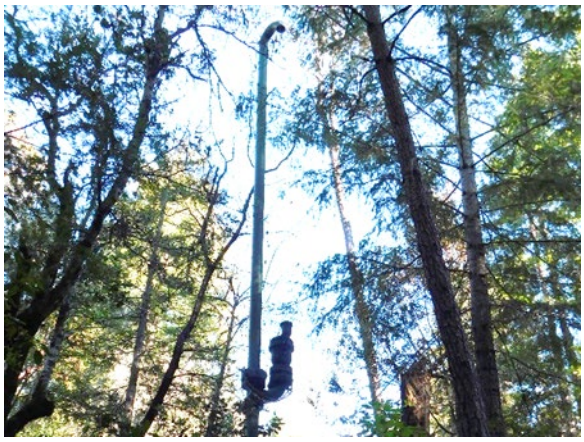
Appurtenances	Description	Photograph
		 Air vent with replaced head (iPad V-NCR_1a)
Air Vent: Type B	Tall (over 10 feet) metal air vent with curved vent head and back flow valve.	 (DSCN6512)
Valve Access Box	Concrete vault box with corresponding metal access covers.	 (iPad P-BN_1b)

Table 6. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Wharf Hydrants	Metal fire hydrant extending from the ground with the upper section painted yellow.	 (DSCN6401)
Culverts	New and historic culverts along the pipeline route are constructed from a variety of materials including concrete (top), corrugated metal, corrugated PVC material, and in one instance within the Brackney South Segment, a wood culvert that was originally constructed in conjunction with the Felton and Pescadero Railroad in 1885 (bottom).	 Concrete Culvert (DSCN6222)  Wooden Culvert (DSCN6231)

Table 6. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Cathodic Protection Box (abandoned) and Meter Pit	The cathodic protection system no longer contains a galvanic anode system and is therefore no longer functioning.	 (DSCN6376)

Identified Alterations

The following list of known alterations was compiled through archival research, a review of previous subject property documentation, and during the pedestrian survey. Unless indicated, the date of these alterations is unknown (Cardona and Associates 1982; Kennedy Jenks 2017):

- Replacement of northern-most segment of section of the pipeline from the Newell Creek Dam to the Newell Creek Access Bridge as part of the Newell Creek Dam Inlet/Outlet Replacement Project (2020)
- Emergency repair and realignment to correct landslide damage within the Brackney North Segment (2017)
- Emergency repair and realignment to correct landslide damage within the Brackney North Segment (1982)
- Disconnection of the Cathodic Protection System (1986)
- Replacement of air vent heads
- Replacement of culvert material

4.1.1 NRHP/CRHR Statement of Significance

NRHP Criterion A: associated with events that have made a significant contribution to the broad patterns of our history

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

Water delivery infrastructure such as water pipelines that are associated with the regional water supply are a common property type throughout the County, the State of California, and the nation. Components of water storage and delivery systems have been considered significant under NRHP Criterion A and CRHR Criterion 1 when they were associated with events that have made a significant contribution to the broad patterns of our history, such as

early advances in water management. Outside of early examples of water management projects, unless the implementation of a water management project can be demonstrated to have contributed significantly to the unique history of the County, state, or nation, development which supports general growth is far too common an association to merit a blanket conclusion of historical significance under NRHP Criterion A or CRHR Criterion 1 within the context of water management systems. The Newell Creek Dam is directly associated with important events that have made a significant contribution to the development of water infrastructure development in Santa Cruz. These important events include concerns over local water shortages in the late 1950s (as documented in state and local water supply reports) leading up to the passage of the Water Revenue Bond in 1958, which approved funding for construction of the Newell Creek Dam in direct response to concerns over water shortages. Archival research also revealed that water shortages in the late 1950s threatened to make Santa Cruz a less than desirable choice for the location of the next University of California, noting that failure to correct water shortage issues could end all chance of the selection of Santa Cruz as the University site. Construction of the Newell Creek Dam gave the City control over the seasonal fluctuations in water availability and became a critical component to the water infrastructure, which supported the sustained growth of the City after World War II (Dudek 2018).

While the NCP was planned simultaneously with the Newell Creek Dam during the late 1950s, the structures were planned by separate engineering companies and constructed by different contractors to work in conjunction with each other as part of the overall, interconnected municipal system. The Graham Hill Water Treatment Plant and the Tait Street Diversion are examples of other system upgrades completed during the same period. The NCP constitutes a ubiquitous, mid-twentieth century addition to the City's existing water system distribution system, and therefore is associated with the period of pervasive expansion which characterized the water systems throughout the nation, state, and County following the end of World War II. As such, this structure is not a physical example of the early water delivery efforts in the County, of which there are extant examples such as the Laguna Creek Dam, nor can it be singularly tied to any one event that has made a significant contribution to the development of the City of Santa Cruz, the County, or the state, as in the case of the Newell Creek Dam.

The NCP, as an expansion of the existing water system, is not associated with any events occurring within the context of County water development that would distinguish the structure from the vast array of water management systems dotting the California landscape. Moreover, research into the history of the NCP revealed no evidence suggesting that the structures are associated with an alternative, more unique event or pattern of events considered historically significant. For these reasons, the subject property does not appear eligible under NRHP Criterion A or CRHR Criterion 1.

NRHP Criterion B: associated with the lives of significant persons in our past.

CRHR Criterion 2: is associated with the lives of persons important in our past.

To be found eligible under Criterion B/2 the property has to be directly tied to an important person and the place where that individual conducted or produced the work for which he or she is known. Archival research failed to indicate any such direct association between individuals that are known to be historic figures at the national, state, or local level and the NCP. The NCP represents the collective efforts of many individuals, rather than the work of any single individual. Therefore, the NCP is not known to have any historical associations with people important to the nation's or state's past. Due to a lack of identified significant associations with important persons in history, the subject property does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

NRHP 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.

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

Overall, the NCP demonstrates simple pipeline construction methods that have been in place regionally since the 1860s. As such, the NCP lacks sufficient distinction to be called significant within any particular water delivery infrastructure type. The NCP was completed in 1960; however, major damage in ensuing years required subsequent alterations, including emergency flood damage repairs in 1983 and 2017, as well as minor realignments and repairs to address leaks and breakages as they arose along the route of the pipeline. These alterations have caused the NCP to retain only diminished integrity of materials and workmanship.

The NCP was planned and designed by Brown and Caldwell Civil and Chemical Engineers of San Francisco, who specialized in the planning and implementation of water delivery and treatment systems. Brown and Caldwell helped to design and implement similar facilities throughout California during the period the NCP was designed and built, and they were also the designers of the GHWTP, which was recommended not eligible for listing in the NRHP, CRHR, and the SCCHRI in 2018. There is no indication that Brown and Caldwell reached the level of notoriety to be considered a masters in the field of engineering, nor does it appear that the NCP is representative of any new advancements or techniques in the field of engineering that were developed by Brown and Caldwell. Overall, the design for the NCP does not appear to be distinctive or innovative. It also does not constitute the first, last or only example of a pipeline designed by Brown and Caldwell for this purpose during the course of their careers.

The Granite Construction Company served as the contractors for the project. In consideration of the firm's work on highly publicized, important projects, such as the construction of the first roads into Yosemite National Park during the 1930s and the California Aqueduct during the 1960s, the NCP cannot be said to qualify as the most representative example of the firm's work overall or even during this period.

Overall, the NCP lacks sufficient engineering distinction to be significant within any particular water delivery and management infrastructure type. Consequently, the subject property does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

NRHP Criterion D: have yielded, or may be likely to yield, information important in history or prehistory.

CRHR Criterion 4: has yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to indicate that the subject property is likely to yield any additional information important to prehistory or history beyond what is already known. The subject property is also not associated with an archaeological site or a known subsurface cultural component. Therefore, the subject property does not appear eligible under NRHP Criterion D or CRHP Criterion 4.

4.1.2 Santa Cruz County Statement of Significance

1. The resource is associated with a person of local, State, or national historical significance.

As stated in NRHP/CRHR Criterion B/2, archival research did not reveal an association between the NCP and any persons who significantly contributed to the development of the City, state, or nation. Therefore, the facility does not appear eligible under County Criterion 1.

2. The resource is associated with an historic event or thematic activity of local, State, or national importance.

As stated in NRHP/CRHR Criterion A/1, the NCP is not associated with any extraordinary event or events occurring within the context of County water development that would distinguish the structure from the vast array of water management systems dotting the California landscape. Moreover, research into the history of the NCP revealed no evidence suggesting that the structures are associated with an alternative, more unique event or pattern of events considered historically significant. For these reasons, the NCP does not appear to be directly associated with events that have made a significant contribution to the development of water infrastructure in the County. Therefore, the subject property does not appear eligible under County Criterion 2.

3. The resource is representative of a distinct architectural style and/or construction method of a particular historic period or way of life, or the resource represents the work of a master builder or architect or possesses high artistic values.

As discussed in NRHP/CRHR Criterion C/3, the NCP has experienced multiple alterations over time in response to required repairs and modern equipment installation to ensure ongoing use. It is representative of simple earthen mid-century pipeline construction methods and lacks sufficient distinction to be considered significant. The structure is also not associated with the work of a master engineer or master builder and does not possess high artistic values. Therefore, the subject property does not appear eligible under County Criterion 3.

4. The resource has yielded, or may likely yield, information important to history.

As discussed under NRHP/CRHR Criterion D/4, there is no evidence to indicate that the NCP is likely to yield any additional information important to prehistory or history beyond what is already known. The NCP is also not associated with an archaeological site or a known subsurface cultural component. Therefore, the subject property does not appear eligible under County Criterion 4.

Lacking significant associations, the NCP does not appear eligible for listing under SCCHRI.

4.1.3 Integrity Considerations and Significance Summary

National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (2002) states that the integrity of a property is based upon the historical significance and character defining features of that property, and that "only after significance is fully established can you proceed to the issue of integrity." Upon conclusion that the NCP does not meet any of the required criteria for significance, the structure's current state of integrity is inconsequential. As such, no assessment of integrity is provided in this evaluation.

In conclusion, the NCP does not appear eligible for listing in the NRHP, the CRHR or the SCCHRI. The structure was evaluated in accordance with Section 15064.5 (a)(2)-(3) of California Environmental Quality Act (CEQA) Guidelines and using the criteria outline in Section 5024.1 of the California Public Resources Code, and does not appear to be a historical resource for the purposes of CEQA. It is also not considered a historic property under Section 106.

4.1 Summary of Eligibility Findings in the APE

In conclusion, two historic era-built environment resources were identified in the APE: the NCP and the Newell Creek Access Road Bridge. The segment of the NCP located in the APE was evaluated for listing in the NRHP, the CRHR, or the SCCHRI and was found ineligible under all Criteria. As such, the NCP does not appear to be a historic property under Section 106 of the NHPA or a historical resource under CEQA.

The Newell Creek Access Road Bridge is a concrete access bridge dating from 1960. The bridge was found eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) as a contributor to the Newell Creek Dam Complex under Criterion A/1 at the local level of significance and eligible for local listing under Santa Cruz County Criterion 2. The character defining features of the bridge are limited to its existing dimensions and its continued use as a contributing component of the Newell Creek Dam Complex. As such, the Newell Creek Access Road Bridge is considered historic property under Section 106 of the NHPA and historical resource under CEQA.

5 Application of the Criteria of Adverse Effect

Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, assess the effects, and seek ways to avoid, minimize, or mitigate any adverse effects on such properties (36 CFR 800.1[a]). Likewise, CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (PRC Section 21084.1; CEQA Guidelines section 15064.5[b]).

As stated in 36 CFR 800.5(a)(1), *Criteria of adverse effect*:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Examples of adverse effects on historic properties include, but are not limited to (36 CFR 800.5(a)(2)):

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

The following analysis applies the Criteria of Adverse Effect to Newel Creek Road Access Bridge, the only historic property located in the APE, by providing details of the physical effects that will occur as a result of the Proposed Project, and subsequently explaining why these effects are not adverse to the relevant historic property.

5.1 Newell Creek Access Road Bridge (1960)

The Newell Creek Access Road Bridge was evaluated for historical significance by Dudek as part of the 2018 Historical Resources Evaluation Report for the Newell Creek Dam Inlet/Outlet Replacement Project. The bridge was found eligible for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) as a contributor to the Newell Creek Dam Complex under Criterion A/1 at the local level of significance and eligible for local listing under Santa Cruz County Criterion 2. However, it is not individually eligible for designation. Therefore, the bridge is considered an historic property under Section 106 of the NHPA and an historical resource under CEQA (Dudek 2018).

The access road bridge consists of three spans supported by two pier systems and two abutment systems. It is 135 feet long (45 feet per span), 30 feet wide, and 25 feet high at its maximum height. The roadbed is 26 feet wide (13 feet per lane) with a 1-foot-wide curb on the upstream (north) side and 3 feet wide on the downstream (south) side. Each curb has a metal guardrail on either side, 2 feet 10 inches high, with metal balusters at regular intervals and concrete end-posts atop the abutments on either end of the bridge. In 2018, the City installed signage that reduced the bridge lanes from two to one to meet HS20-44 live loading requirements (Creegan & D'Angelo 1961).

The character defining features associated with this bridge are limited to its existing dimensions and its continued use as a contributing component of the Newell Creek Dam Complex. The historic property boundary for the bridge is limited to the structure footprint. The location of this structure is depicted on Figure 7, Cultural Resources Area of Potential Effects (Dudek 2019).

5.2 Physical Effects of the Proposed Project

The Proposed Project would address identified deficiencies in the NCP conditions to maintain full system functioning without interruption to protect water supply reliability and service. The following text provides brief descriptions of Project Components that may result in physical effects to the Newell Creek Access Road Bridge, which is the only historic property in the APE.

Replacement of the Segment of the Newell Creek Pipeline Attached to the Newell Creek Access Road Bridge

The NCP currently crosses Newell Creek as an attachment to the upstream (western) side of the Newell Creek Access Road Bridge for approximately 116 feet at the northern-most end of the pipeline alignment (Exhibits 11 and 12). The pipeline is supported across the underside of the bridge by nine curved metal hangars and two metal bearings that are attached to the concrete structure by metal bolts (Exhibit 13). The existing pipeline, hangars, and bearings on the bridge would be removed and replaced with a new 24-inch polyvinyl chloride (PVC), ductile iron or high density polyethylene (HDPE) pipeline, and new hangars and bearings in the same location on the bridge, or on the downstream (eastern) side of the bridge. No alterations to the bridge, the bridge alignment, or the use of the bridge are proposed as part of the project.

Exhibit 11. View of the NCP (red arrow) showing the existing hangars (yellow arrows) supporting the pipeline as it crosses beneath the Newell Creek Access Road Bridge, view looking northeast (DSCN6306)

Exhibit 12. View of the NCP as it crosses beneath the Newell Creek Access Road Bridge, view looking southeast (DSCN2812)

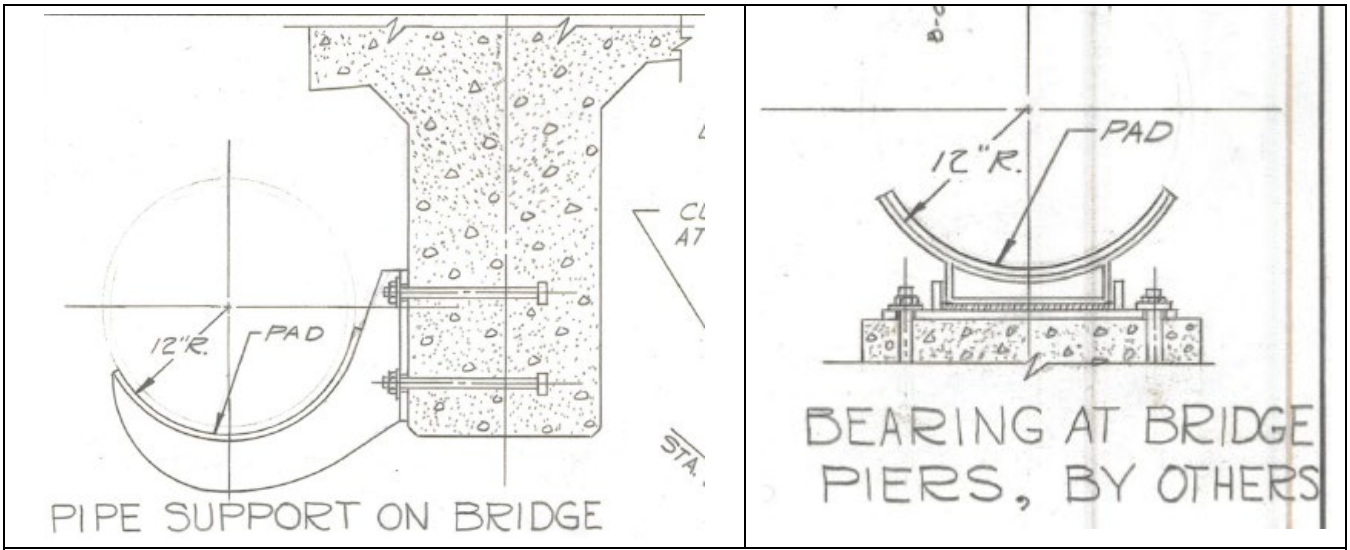


Exhibit 13. Details from the 1960 as-built plans for the NCP showing the existing hangars (left) and bearings (right) supporting the pipeline across the Newell Creek Access Road Bridge (Brown and Caldwell 1960).

5.3 Analysis of Potential Adverse Effects

The Proposed Project activities described above were analyzed in consideration of the adverse effect examples provided in 36 CFR 800.5(a)(2). Specifically, this analysis evaluates the proposed construction modifications noted above that could potentially affect the Newell Creek Access Road Bridge.

(i) Physical destruction of or damage to all or part of the property.

No Adverse Effect.

Project activities that could adversely affect the bridge are limited to the removal of the existing pipeline and support apparatus spanning the bridge. The construction will result in the removal of these materials, which were not originally designed as part of the bridge but rather as components of the NCP that were affixed the existing bridge. The removal of these components would involve non-invasive methods that would allow the bridge to maintain its original orientation, span, materials, and function as a contributing element to the Newell Creek Dam complex. Considering the placement of the new pipeline on the side of the bridge, the new construction would be partially obscured by the existing structure. The new construction will be differentiated from the bridge's historic materials, as modern polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) materials will be used. Considering that the purpose of the new pipeline structure is to aid in the functionality of the overall Santa Cruz water system reliability and service, and the bridge will continue to function as a component of the Newell Creek Dam complex, the historic property will still retain its character defining features that allow it to convey significance under NRHP Criterion A and CRHR Criterion 1, the effect appears not to be adverse.

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines.

No Adverse Effect.

In reference to the proposed installation of the new NCP to the historic bridge, the Secretary's Standards for the Treatment of Historic Properties indicates that installation of a new or replacement mechanical system, if required, should result in the least alteration possible to the historic building or structure and its character-defining features (NPS 2017: 126). In this case, as noted above, the character defining features associated with the Newell Creek Access Road Bridge are limited to its existing dimensions and its continued use as a contributing component of the Newell Creek Dam Complex. The replacement of the pipeline across the bridge will not impact the character-defining features, ensuring that the bridge can continue to function in its historic capacity as a bridge by providing access to the remote Newell Creek Dam complex.

The new NCP design will not physically detract from the design of the Newell Creek Access Road Bridge, nor will it detract from the bridge's ability to function in its original capacity as an access road bridge, with minimal disturbance of historic materials. The use of modern polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) materials for the new pipeline structure will create a clear differentiation between historic materials and new construction. These procedures are in line with Secretary's Standards for the Treatment of Historic Properties guidelines for maintenance of historic concrete structures. The Proposed Project design allows the bridge to continue to convey its significance under Criterion A as a contributing component of the Newell Creek Dam Complex. As such, these activities appear to be consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines. Overall, the Proposed Project appears to be consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68), and applicable guidelines and the Proposed Project would not constitute an adverse effect.

(iii) Removal of the property from its historic location.

No Adverse Effect.

The Newell Creek Access Road Bridge will remain in its historic location, all construction work will be conducted within the structure's historic orientation, and so the location of the historic structure will remain intact.

(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance.

No Adverse Effect.

The Newell Creek Access Road Bridge will maintain its current use as an access bridge within its existing remote setting which contributes to a historic water management complex.

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features.

No Adverse Effect.

While the Newell Creek Access Road Bridge will undergo minor modifications, the action will not introduce visual, atmospheric or audible elements that will diminish the integrity of the structure's significant historic features. The bridge will continue to serve its intended function, in its original alignment and configuration, such that the bridge will continue to convey its significance under NRHP Criterion A and CRHR 1. The modifications to the bridge will not introduce any new incompatible elements that would diminish the integrity of the bridge.

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

No Potential to Effect.

The Newell Creek Access Road Bridge will not be neglected as part of the Proposed Project, rather, it is, and will remain, a functioning component of the Newel Creek Dam complex.

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

No Potential to Effect.

The Newell Creek Access Road Bridge is not federally owned.

In summary, the Proposed Project will have **No Adverse Effect** on the Newell Creek Access Road Bridge located in Santa Cruz County.

5.4 CEQA Impacts Analysis

According to CEQA (section 21084.1), a project that could "cause a substantial adverse change in the significance of an historical resource" may have a significant impact. CEQA Guidelines section 15064.5(b)(1) indicates that a "substantial adverse change in the significance of an historical resource" means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource *would be materially impaired*." Subsection (2) further indicates that the significance of a historical resource is *materially impaired* when a project "demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance" that justify its inclusion in or eligibility for listing in the CRHR or its inclusion in a local register.

The Proposed Project would not demolish, destroy, or relocate the Newell Creek Access Road Bridge. Replacement of the existing NCP with a new pipeline would not diminish the integrity of the Newell Creek Access Road Bridge's significant historic features including its original alignment and configuration. The bridge will continue to serve its intended function, such that the bridge will continue to convey its significance under NRHP Criterion A and CRHR 1. The modifications to the bridge will not introduce any new incompatible elements that would diminish the integrity of the bridge. These alterations would not alter the association between the Newell Creek Access Road Bridge and events and broad patterns of water system infrastructure and water supply planning in the City and county for which the bridge has been determined eligible for listing as a historical resource in the NRHP, CRHR, and local County register. Therefore, the proposed improvements would not adversely impact the physical characteristics that convey the historical significance of the Newell Creek Access Road Bridge as none of the improvements would alter the overall historic integrity of the resource. Therefore, the Proposed Project would result in a less-than-significant impact on historical resources.

5.5 Conclusions

As detailed above, a finding of No Adverse Effect is recommended for the historic Newell Creek Access Road Bridge located in the APE as related to the Proposed Project. As such, no further documentation is required for NRHP/CRHR and locally eligible properties when a finding of No Adverse Effect has been reached. Furthermore, the Proposed Project will not result in significant impact on historical resources under CEQA.

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6 Findings and Conclusions

Two built environment structures were identified in the APE. The segment of the NCP located in the APE was evaluated for listing in the NRHP, the CRHR, or the SCCHRI and was found ineligible under all Criteria. As such, the NCP does not appear to be a historic property under Section 106 of the NHPA or a historical resource under CEQA. The recommended Status Code for the NCP is 6Z.

The Newell Creek Access Road Bridge is considered a contributing feature of the Newell Creek Dam complex, which was designed by engineers Creegan and D'Angelo and completed by contractors Williams and Burrows Inc. in 1960. The Newell Creek Dam and its associated features were determined eligible by SHPO in 2019 under Criterion A/1 at the local level and eligible for local listing under Santa Cruz County Criterion 2 for its contribution to the broad patterns of our history because of its integral role supporting future growth leading directly to the selection of Santa Cruz as the location of a University of California campus in the early 1960s (Dudek 2018).

The Newell Creek Access Road Bridge is considered a historic property under Section 106 of the NHPA and historical resource under CEQA. As recommended in section 5.3, the Newell Creek Access Road Bridge will not sustain adverse effects as a result of project construction or implementation. As such, the Proposed Project would have **no adverse effects** on built environment historic properties under Section 106 of the NHPA. Under CEQA, the finding related to the Newell Creek Access Road Bridge as a built environment historical resource would be **less than significant**.

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7 Bibliography

Brown and Caldwell (Brown and Caldwell Civil and Chemical Engineers). 1960. "Drawings for Construction of Newell Creek Pipeline." City of Santa Cruz Newell Creek Pipeline: 36 Sheets. Santa Cruz Water Department: Santa Cruz, California.

Brown, K.W. and L.B. Dunlap. 1956. Investigation of Water Supply Projects: City of Santa Cruz Water System - Santa Cruz, California. San Francisco, California: Brown and Caldwell Civil and Chemical Engineers. On file at the Santa Cruz Water Department.

Brown, R.C. 2011. "The San Lorenzo Valley Water District: a History." Boulder Creek, California: San Lorenzo Water District.

Cardona and Associates (Cardona and Associates Civil Engineers Environmental Planners). 1982. "Newell Creek Pipeline Relocation Plans and Specifications." Santa Cruz, California. City of Santa Cruz Water Department.

Cartier, R. 1994. *Cultural Resource Evaluation of Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692),* On file at the Northwest Information Center.

Cartier, R., and L. Eckert, J. Goetz, M. Pokriots, and J. Reddington. 1995. *Historic Research and Archaeological Testing Program Evaluation for the Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692a),* On file at the Northwest Information Center.

Chapman, C. 1920. "Sebastian Vizcaino: Exploration of California." *The Southwestern Historical Quarterly* 23(4): 285–301. April 1920. Accessed March 20, 2020. http://www.jstor.org/stable/27794572.

City of Santa Cruz. 2020. "History of Santa Cruz." Accessed April 24, 2020. http://www.cityofsantacruz.com/community/our-city/history-of-santa-cruz.

City of Santa Cruz. 2017. Brackney Landslide Area Pipeline Damage Risk Reduction Project Hazard Mitigation Grant Program (HMGP) Application Package. October 2017. Submitted to California Governor's Office of Emergency Services.

Clark, D.T. 2008. *Santa Cruz County Place Names: A Geographical Dictionary*. Scotts Valley, California: Kestrel Press.

Colfax Record. 1949. "New Water Plant in Auburn." *Colfax Record* (Colfax, California), September 30, 1949: 4. Accessed March 16, 2021. Newspapers.com.

Creegan & D'Angelo (Creegan & D'Angelo Civil Engineers). 1957. *Report on Santa Cruz County Master Plan of Water Development and Preliminary Design of the First Increment of Work for Santa Cruz County Flood Control and Water Conservation District*. Prepared by Creegan and D'Angelo Civil Engineers. On file at Santa Cruz Public Library.

Creegan & D'Angelo. 1961. "Newell Dam Project: Access Road Bridge General Plan." Drawing sheet set 16 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Daily Independent Journal. 1958. "Meet Called to Explain Sanitary Bond Proposal." *Daily Independent Journal* (San Rafael, California), November 5, 1958: 11. Accessed March 16, 2021. Newspapers.com.

Doane, M. and T. Haversat. 1999. Preliminary Archaeological Reconnaissance of the Mount Hermon Christian Conference Center, Mount Hermon, Santa Cruz County, California (S-22415). On file, Northwest Information Center.

Dudek. 2018. *Historical Resources Evaluation Report Newell Creek Dam Inlet/Outlet Replacement Project.*

Dudek. 2019. *Memorandum: Cultural Resources Technical Letter Report for the Newell Creek Access Road Bridge Rehabilitation Project.*

Dudek. 2021. *Archaeological Resources Inventory and Evaluation Report For The Newell Creek Pipeline Improvement Project.*

Granite Construction. 2021. "History." Accessed March 16, 2021. https://www.graniteconstruction.com/history.

Hatch. 1889. "Official Map of Santa Cruz County." University of California, Santa Cruz: University Library Digital Collections.

HDR. 2018. "Newell creek Pipeline Rehab/Replacement Technical Memorandum, Subject: Newell Creek Pipeline Inventory." Santa Cruz Water Program. November 8, 2018.HDR. 2019a. "Newell Creek Pipeline Alternatives Analysis Technical Memorandum." Santa Cruz Water Program. October 9, 2019.

HDR. 2020. "Newell Creek Pipeline Improvements Technical Memorandum." Santa Cruz Water Program. May 19, 2020.

Hoover, M., H. E. Rensch, E. G. Rensch, and W. N. Abeloe. 2002. *Historic Spots in California*. 5th ed. Stanford, California: Stanford University Press.

Kelley, J. 2004a. Historic Property Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447). On file, Northwest Information Center.

Kelley, J. 2004b. Negative Archaeological Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447a). On file, Northwest Information Center.

Kennedy Jenks. 2017. "Brackney Landslide Area Pipeline Damage Risk Reduction Project Engineering Report." Prepared for City of Santa Cruz. October 2017.

Koch, M. 1973. *Santa Cruz County: Parade of the Past*. Fresno, California: Valley Publishers.

Lehmann, S. 2000. "Fully Developed Context Statement for the City of Santa Cruz." Compiled for the City of Santa Cruz. Accessed March 16, 2021. https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/area-plans-planning-documents-projects/historic-context-statement.

Marvin, J. 2004. *Historical Resources Evaluation Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447b)*. On file at the Northwest Information Center.

Monterey American. 1913. "F.A. Hihn is not more – Santa Cruz's 'Grand Old Man' Passes Away." *Monterey American* (Monterey, California), August 25, 1913: 7. Accessed May 29, 2020. Newspapers.com.

Mott MacDonald. 2021. *Alternatives Analysis Draft Memo: Brackney Landslide Area Pipeline Risk Reduction Project.*

Napa Journal. 1949. "Abundant Water Supply for Napa." *Napa Journal* (Napa, California), November 6, 1949: 7. Accessed March 16, 2021. Newspapers.com.

NETR. 2021. Historic Aerial Photographs of the Newell Creek Pipeline Facility, Santa Cruz, CA dating from 1952, 1968, 1982, 1991, 2005, 2009, 2010, 2012, 2014, and 2016. Accessed March 16, 2021. https://www.historicaerials.com/viewer.

NPS (National Park Service). 2017. The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings. Washington, District of Columbia: U.S. Department of the Interior.

Pisani, D.J. 1984. *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931*. Berkeley, California: University of California Press.

Press Democrat. 1951. "Sewer Plant Will Be Built." *Press Democrat* (Santa Rosa, California), March 13, 1951: 1. Accessed March 16, 2021. Newspapers.com.

Robinson, L. 2012. *Images of America: The San Lorenzo Valley.* Charleston, South Carolina: Arcadia Publishing.

Sacramento Bee. 1960. "Tahoe Sewage Plant Nears Completion." *Sacramento Bee* (Sacramento, California), February 8, 1960: 18. Accessed March 16, 2021. Newspapers.com.

Sanborn Map Company. 1928. Santa Cruz, California. Sheet 103. Accessed May 25, 2020.

Sanborn Map Company. 1928–1950. Santa Cruz, California. Sheet 103. Accessed May 25, 2020.

Santa Cruz County Assessor. 1894. *Plat of the City Distributing Reservoir Lot.*

Santa Cruz Daily Surf. 1888a "Another Change." *Santa Cruz Daily Surf* (Santa Cruz, California), March 3, 1888:3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Daily Surf. 1888b. "Water Once More." *Santa Cruz Daily Surf* (Santa Cruz, California), August 8, 1888:2. Accessed March 4, 2020. Newspapers.com. Accessed March 4, 2020.

Santa Cruz Sentinel. 1888. "Free Water." *Santa Cruz Sentinel* (Santa Cruz, California), July 17, 1888: 2. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1895. "An Up-to-Date Establishment." *Santa Cruz Sentinel* (Santa Cruz, California), May 30, 1895: 3. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1903. "Notice Inviting Sealed Proposals." *Santa Cruz Sentinel* (Santa Cruz, California), November 25, 1903: 4. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1904. "Contractor Sargent…" *Santa Cruz Sentinel* (Santa Cruz, California), January 7, 1904: 3. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1933. "Rights-Of-Way for Pipe Line Are All Okeh." *Santa Cruz Sentinel* (Santa Cruz, California), December 13, 1933: 7. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1934a. "Week-End Anglers Out of Luck on the Old San Lorenzo." *Santa Cruz Sentinel* (Santa Cruz, California), February 20, 1934: 7. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1934b. "Rushing Work on Two 1,000,000 Gellon Tanks for East Side Extension." *Santa Cruz Sentinel* (Santa Cruz, California), May 18, 1934: 9. Accessed May 25, 2020. Newspapers.com.

Santa Cruz Sentinel. 1936. "Beltz Granted Water Permits for Live Oak." *Santa Cruz Sentinel* (Santa Cruz, California), March 7, 1936: 8. Accessed May 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1943. "Soquel-Capitola Water System is Bought By Monterey Bay Company." Santa Cruz Sentinel (Santa Cruz, California). October 17, 1943: 1. Newspapers.com. Accessed June 10, 2020.

Santa Cruz Sentinel. 1945. "Propose Changes." *Santa Cruz Sentinel* (Santa Cruz, California), November 12, 1945: 8. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1947. "Charles Beltz, Water company Operator, Dies." *Santa Cruz Sentinel* (Santa Cruz, California), October 27, 1947: 1. Accessed May 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1953. "Flood Control Project Moves Ahead." *Santa Cruz Sentinel* (Santa Cruz, California), May 28, 1953: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1954. "Water Superintendent Recommends Study of Three Area Storage Projects." Santa Cruz Sentinel (Santa Cruz, California), February 19, 1954: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957a. "County Committee to put Emphasis on New Pajaro Valley Survey." Santa Cruz Sentinel (Santa Cruz, California), February 6, 1957: 1. Accessed February 7, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957b. "Map Shows Proposed County Dam Sites, Pipe Lines." Santa Cruz Sentinel (Santa Cruz, California), February 10, 1957: 13. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957c. "The County's Water Problems and Solutions." Santa Cruz Sentinel (Santa Cruz, California), April 15, 1957: 12. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1958a. "Information on the Water Situation in Santa Cruz and Plans to Correct It." *Santa Cruz Sentinel* (Santa Cruz, California), November 2, 1958: 4. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1958b. "Water Bonds Get Overwhelming OK." *Santa Cruz Sentinel* (Santa Cruz, California), November 5, 1958: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1959. "Okay Newell Creek Pipeline Through Cowell State Park." *Santa Cruz Sentinel* (Santa Cruz, California), October 13, 1959: 7. Accessed March 16, 2021. Newspapers.com.

Santa Cruz Sentinel. 1960a. "Public Notice." Santa Cruz Sentinel (Santa Cruz, California). April 15, 1960: 18. Newspapers.com. Accessed March 16, 2021.

Santa Cruz Sentinel. 1960b. "Salvation in the Making." Santa Cruz Sentinel (Santa Cruz, California). September 4, 1960: 15. Newspapers.com. Accessed February 7, 2018.

Santa Cruz Sentinel 1960c: "Begin Clearing for Water Pipe." Santa Cruz Sentinel (Santa Cruz, California). June 16, 1960: 14. Newspapers.com. Accessed March 16, 2021.

Santa Cruz Sentinel 1960d: "Newell Creek Pipeline Is Being Laid." Santa Cruz Sentinel (Santa Cruz, California). July 31, 1960: 5. Newspapers.com. Accessed March 16, 2021

Santa Cruz Sentinel. 1961a. "Regents Listen to Offers For UC Campus." *Santa Cruz Sentinel* (Santa Cruz, California), March 16, 1961: 1. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1961b. "Pros and Cons of University Community Told to Rotary Club by McCaffrey." *Santa Cruz Sentinel* (Santa Cruz, California), October 29, 1961: 9. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1963. "Wee Bit of Scotland Arrives in Ben Lomond." *Santa Cruz Sentinel* (Santa Cruz, California), July 21, 1963: 1. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1964. "Loch Lomond's Temporary Facilities Remain in '64." *Santa Cruz Sentinel (Santa* Cruz, California), March 1, 1964: 3. Accessed June 5, 2018. Newspapers.com.

Santa Cruz Sentinel. 1967. "City Water Line Goes to Campground." *Santa Cruz Sentinel* (Santa Cruz, California), December 17, 1967: 2. Accessed March 16, 2021. Newspapers.com.

Santa Cruz Sentinel. 1974. "City's Water Chief To Retire." *Santa Cruz Sentinel* (Santa Cruz, California), April 4, 1974: 1. Accessed May 26, 2020. Newspapers.com.

Santa Cruz Sentinel. 1982. "Newell Creek Dam Spillway Safety Changes Approved." *Santa Cruz Sentinel* (Santa Cruz, California), January 7, 1982: 1, 8. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1984. "Water Crisis Here Continues." *Santa Cruz Sentinel* (Santa Cruz, California), March 18, 1984: 3. Accessed May 22, 2018. Newspapers.com.

Santa Cruz Surf. 1883. "Another New Railroad." *Santa Cruz Surf* (Santa Cruz, California), June 20, 1883: 3. Newspapers.com.

Santa Cruz Surf. 1884. "The Felton and Pescadero Railroad." *Santa Cruz Surf* (Santa Cruz, California), July 21, 1884: 1. Newspapers.com.

Santa Cruz Surf. 1889a. "From Laguna to Santa Cruz." *Santa Cruz Surf* (Santa Cruz, California), July 15, 1889:3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1889b. "The Estimate." *Santa Cruz Surf* (Santa Cruz, California), August 5, 1889: 3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1889c. "Water Works." *Santa Cruz Surf* (Santa Cruz, California), November 26, 1889: 3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1890a. "The City Water Works." *Santa Cruz Surf* (Santa Cruz, California), April 19, 1890: 1. Accessed March 10, 2020. Newspapers.com.

Santa Cruz Surf. 1890b. "Water! Water!" *Santa Cruz Surf* (Santa Cruz, California), September 30, 1890: 3. Accessed January 15, 2020. Newspapers.com.

Santa Cruz Surf. 1890c. "The Last Pipe." Santa Cruz Surf (Santa Cruz, California), October 18, 1890: 3. Accessed January 15, 2020. Newspapers.com.

Santa Cruz Surf. 1892. "Seven Years. The History of the Water Movement in Santa Cruz." Santa Cruz Surf (Santa Cruz, California), March 12, 1892: 2. Accessed March 3, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1864. "Santa Cruz Water-works!" *Santa Cruz Weekly Sentinel* (Santa Cruz, California), October 15, 1864: 2. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1877a. "Santa Cruz Water Works." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), January 6, 1877: 1. Accessed March 16, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1877b. "Santa Cruz and Its Water Supply." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), October 27, 1877: 2. Accessed March 16, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1882. "The Santa Cruz Water Co." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), June 10, 1882: 3. Accessed March 17, 2020. Newspapers.com.

SC Evening News (Santa Cruz Evening News). 1912. "Will Restrain R. Reggiardo." *Santa Cruz Evening News* (Santa Cruz, California), April 2, 1912: 2. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1913a. "Liddell Spring and Proposed Pumping of River Water Discussed." *Santa Cruz Evening News* (Santa Cruz, California), March 18, 1913: 1. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1913b. "Order for Crossing St. Pump Placed." *Santa Cruz Evening News* (Santa Cruz, California). May 8, 1913: 1. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1914. "First Step Leading to Placing Valuation on Hihn System Taken Today." *Santa Cruz Evening News* (Santa Cruz, California), October 14, 1914: 1. Accessed May 25, 2020. Newspapers.com.

SC Evening News. 1928. "Crossing Plant Plans Passed by the City." *Santa Cruz Evening News* (Santa Cruz, California), April 30, 1928: 8. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1929. "Postpone Pump Plant Ceremony." *Santa Cruz Evening News* (Santa Cruz, California), February 20, 1929: 7. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1931. "City Well Water Is Given Approval by State Official." *Santa Cruz Evening News* (Santa Cruz, California). September 3, 1931: 5. Newspapers.com. Accessed May 27, 2020.

SC Evening News. 1936a. "Project of Railroad Up Coast To San Francisco Was Old Dream of Santa Cruzans Never Fulfilled." *Santa Cruz Evening News* (Santa Cruz, California). November 28, 1936: 7. Accessed March 19, 2021.Newspapers.com.

SC Evening News. 1936b. "Water System Permits Asked for Live Oak." *Santa Cruz Evening News* (Santa Cruz, California), February 25, 1936: 2. Accessed May 4, 2020. Newspapers.com.

SCMU (Santa Cruz Municipal Utilities). 2016. "A History of Our Water Service Infrastructure." No. 61: Spring 2016.

SCPL (Santa Cruz Public Library). n.d. "Population Statistics for Santa Cruz County and Cities, 1850–2010." Accessed May 28, 2020. https://history.santacruzpl.org/omeka/files/original/e5b77c64f95c4c19e0609c475869f5e6.pdf.

SCPL. 1924. "Construction of the Bay Street Reservoir." SCPL Local History. Accessed August 18, 2020. https://history.santacruzpl.org/omeka/items/show/10704.

SCWD (Santa Cruz City Water Department). n.d. "History of the Santa Cruz City Water Department." Santa Cruz Public Libraries Local History Collection. Accessed March 3, 2020. https://history.santacruzpl.org/omeka/items/show/134438#?c=0&m=0&s=0&cv=0.

SLVWD (San Lorenzo Valley Water District). 2020. "History." San Lorenzo Valley Water District. Accessed May 5, 2020. https://www.slvwd.com/about-us/pages/history.

SVWD (Scotts Valley Water District). 2020. "History." Scotts Valley Water District. Accessed May 5, 2020. https://www.svwd.org/about-district/history.

SWRCB (State Water Resources Control Board). 1953. *Bulletin No. 5: Santa Cruz-Monterey Counties Investigation*. State Water Resources Control Board: Sacramento, California.

U.S. Census Bureau. 2019. "Quick Facts: Santa Cruz County, California – Population estimates, July 1, 2019, (V2019)." Accessed March 31, 2021. https://www.census.gov/quickfacts/fact/table/santacruzcountycalifornia#.

UCSB (University of California, Santa Barbara). 2021. Historic Aerial Photographs of the Laguna Creek Diversion Facility, Santa Cruz, CA dating from 1931, 1940, 1948, and 1964. Map & Imagery Laboratory (MIL) UCSB Library. Accessed March 16, 2021. http://mil.library.ucsb.edu/ap_indexes/FrameFinder.

Ukiah Daily Journal. 1957. "Bids To Be Opened Tomorrow on Sewer Plant, Line." *Ukiah Daily Journal* (Ukiah, California), April 1, 1957: 9. Accessed March 16, 2021. Newspapers.com.

Wright. 1881. "Map of Santa Cruz County, 1880-81." University of California, Santa Cruz: University Library Digital Collections.

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Appendix A

Newell Creek Access Road Bridge (Newell Creek Dam Complex Contributor): SHPO Concurrence Letter and DPR forms

State of California • Natural Resources Agency Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION Lisa Ann L. Mangat, *Director*
OFFICE OF HISTORIC PRESERVATION

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

July 8, 2019

In reply refer to: COE_2019_0610_002

Danielle Mullen
Senior Regulatory Project Manager
Regulatory Division
U.S. Army Corps of Engineers
450 Golden Gate Avenue, Suite 0134
P.O. Box 36152
San Francisco, CA 94102-3404

Subject: Section 106 Consultation for the Newell Creek Dam Inlet-Outlet Replacement Project in Ben Lomond, Santa Cruz County, California (Corps File No. 2010-00087S).

Dear Danielle Mullen:

The California State Historic Preservation Officer (SHPO) received a letter on June 10, 2019, initiating consultation for the above-named project. The United States Army Corps of Engineers (COE) is consulting pursuant to 36 CFR Part 800 (as amended 8-05-04), the regulations implementing Section 106 of the National Historic Preservation Act. Along with their letter, the COE provided the following documents to support their finding of effect:

- *Historical Resources Evaluation Report for the Newell Creek Dam Inlet/Outlet Replacement Project City of Santa Cruz, Santa Cruz County, California* (Dudek October 2018).
- *Cultural Resources Report for the Newell Creek Dam Inlet/Outlet Replacement Project, Santa Cruz County, California* (Dudek September 2018).

The COE is proposing to authorize the City of Santa Cruz Water Department (Applicant) to perform the proposed project activities under Section 404 of the Clean Water Act (33 U.S.C § 1344). The proposed project includes construction of three new inlets within the Loch Lomond Reservoir, an outlet structure with valves at the toe of the Newell Creek Dam, a new dam seepage collection and monitoring system, a 14-foot diameter tunnel containing new inlet/outlet pipelines through the right (west) dam abutment and under the dam, a new control house on the dam crest, and a new culvert crossing at the spillway plunge pool. Additionally, the project will include dredging within the reservoir, replacement of a 2000-foot segment of the existing Newell Creek Pipeline, and decommissioning the existing inlet/outlet works. The COE has defined their Area of Potential Effect (APE) as encompassing 60 acres consisting of the existing Newell Creek Dam, the southern portion of the Loch Lomond Reservoir, the spillway plunge pool and

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

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 3S/3CS/5S1

Other Listings
Review Code Reviewer Date

Page 1 **of** 23 ***Resource Name or #:** Newell Creek Dam Complex
P1. Other Identifier: Newell Creek Dam; Loch Lomond Recreation Area

*__P2. Location:__ □ **Not for Publication** ■ **Unrestricted**

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

***b. USGS 7.5' Quad** Felton **Date** 2015 **T** 9S ; **R** 2W ; _ □ **of** ___ □ **of Sec** ; **B.M.**

c. Address Loch Lomond City Santa Cruz Zip 95005

d. UTM: Zone 10S, 582329 mE/ 4106694 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate
Elevation 180 ft. amsl.

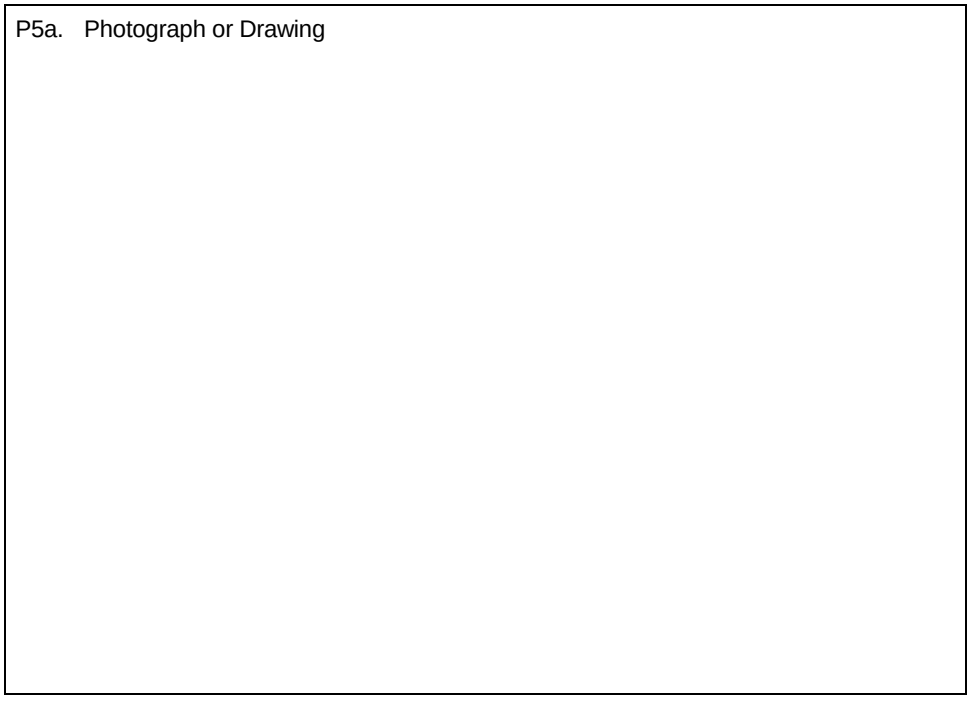
***P3a. Description:**

The Newell Creek Dam is located in Santa Cruz County approximately 10 miles north of the City of Santa Cruz (City). The Project site is located at the northeast extent of Newell Creek Road, in the County of Santa Cruz, California. The site is bounded by Loch Lomond on the northeast, rolling hills to the east and west, and the Newell Creek drainage to the south. The Newell Creek Dam contains seven associated built environment features: the Newell Creek Dam (1958) and its associated spillway (1958, altered 1985), control house (1958) bridge over spillway (1958, replaced 2018), valve and outlet works (1958, 1960), and access road bridge (1958). (See Continuation Sheet)

***P3b. Resource Attributes:** HP21. Dam

***P4. Resources Present:** □ Building ■ Structure □ Object □ Site □ District □ Element of District □ Other

P5a. Photograph or Drawing



P5b. Description of Photo: Crest of Dam, view looking west (IMG 0266)

***P6. Date Constructed/Age and Source:** ■ Historic □ Prehistoric □ Both: 1960

***P7. Owner and Address:**
City of Santa Cruz
1240 N. Rosecrans Ave., Ste. 120
Manhattan Beach, CA 90266

***P8. Recorded by:** (Name, affiliation, and address) Fallin Steffen, Kate Kaiser, Dudek
725 Front Street, Suite 400
Santa Cruz, CA 95060

***P9. Date Recorded:** 2/19/2018

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

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Steffen, Fallin, Kate Kaiser, and Samantha Murray. 2018. *Historical Resources Evaluation Report for the Newell Creek Dam Inlet-outlet Replacement Project, Santa Cruz, California.* Prepared for City of Santa Cruz by Dudek.

***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):

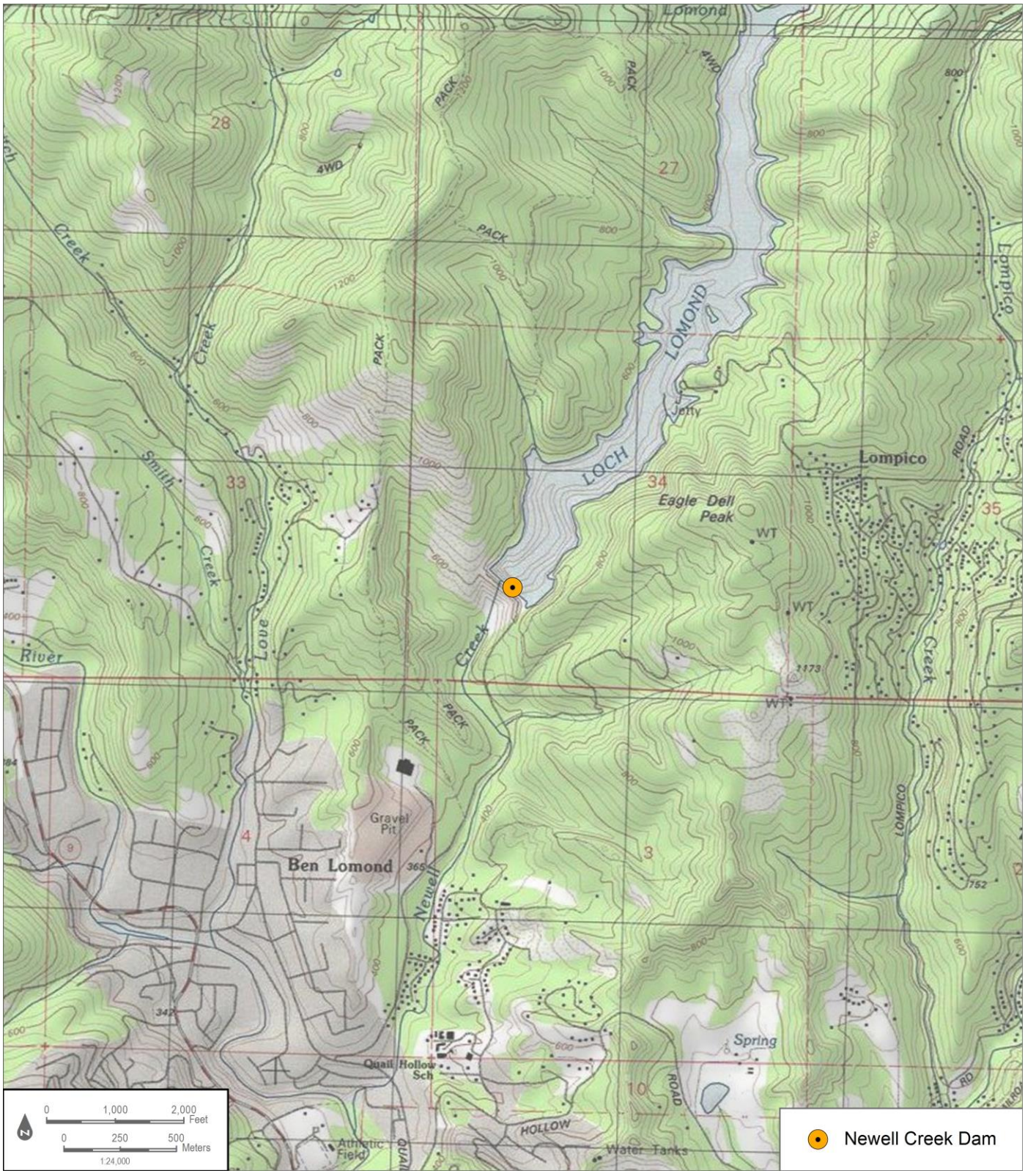
State of California ♁ Natural Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#

Trinomial

Page 2 **of** 23 ***Resource Name or #** (Assigned by recorder) Newell Creek Dam Complex
***Map Name:** Felton, CA, USGS 7.5′ Quad ***Scale:** 1:24,000 ***Date of map:** 2015



BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) Newell Creek Dam Complex ***NRHP Status Code** 3S/3CS/5S1
Page 3 **of** 23

B1. Historic Name: Newell Creek Dam
B2. Common Name: Newell Creek Dam
B3. Original Use: Dam B4. Present Use: Dam
***B5. Architectural Style:** Earthfill Dam
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Constructed in 1960. Recreation area completed by 1965. A pipeline was relocated in 1984 after a section burst and required repairs. In 1985, the spillway wall was extended to comply with updated safety standards and a permanent aerator was installed. The buildings and the dock in the recreation area were systematically removed and replaced between 1981 and 1984. In 2018, the bridge over the spillway was replaced.

***B7. Moved?** ■**No** □**Yes** □**Unknown** **Date:** **Original Location:**
***B8. Related Features:**
B9a. Architect: Creegan and D'Angelo Civil Engineers b. Builder: William & Burrows Inc.
***B10. Significance: Theme** Local Water Development **Area** Santa Cruz City

Period of Significance 1960 - 1985 **Property Type** Dam **Applicable Criteria** NRHP/CRHR A/1 and City 2

Development in the San Lorenzo Valley

Several miles north of the evolving city center at the base of the Santa Cruz Mountains, the San Lorenzo River carves a deep valley through the dense redwood and oak timberlands. The communities located in these outer reaches of present-day Santa Cruz County owe their existence to the various industries that sought to profit from the wealth of raw resources found here. The extent of the virgin forests in the San Lorenzo Valley and the rich underground deposits of lime attracted opportunistic settlers and purveyors who sought to harness the power of the San Lorenzo River and its many tributaries to move their goods to market locally, throughout California, and the world.

The earliest men to profit from the land in the area were the owners of the various Mexican Land Grants that divided the San Lorenzo Valley. The first power sawmill in California was built on Rancho Zayante by owner Isaac Graham and was driven by the waters of Zayante Creek (SCEN 1936; Robinson 2012). Isaac E. Davis and Albion P. Jordan of the Davis and Jordan Lime Company purchased Rancho Cañada del Rincon in 1859 as a promising quarry site. (See Continuation Sheet)

B11. Additional Resource Attributes:
***B12. References:** See Continuation Sheet
B13. Remarks:
***B14. Evaluator:** Fallin Steffen, Dudek
***Date of Evaluation:** 6/28/2018

(This space reserved for official comments.)

***Required information**

***P3a. Description (Continued):**

Several features of the dam, such as the outlet conduit, the intake structure, and the closure block are underwater within the earthen structure of the dam, and/or otherwise not readily visible and recordable for the purposes of this evaluation. There are several non-historic resources also associated with the dam: the weather station, the metal storage container, and the concrete stream ford.

Newell Creek Dam (1958)

The Newel Creek Dam crest itself is roughly 15 feet from the centerline for its entire width (approximately 30 feet wide total). The dam height was 195 feet from the ground surface in the drainage basin. The total length of the crest was approximately 750 feet from the spillway to the northwest terminus. Though not visible during the February field visit, the width of the dam at the toe was originally planned and constructed to be 1,335 feet, not accounting for soil creep and slippage over time. The pitch of the slope on the northeast (upstream/Loch Lomond) side was built at gentle slope of 1 foot drop every 3 feet, or 3:1 ratio. The pitch of the slope on the southwest side (downstream) was much steeper at 2:1 before becoming a gentler slope further downslope at 3:1. The dam is constructed of several different types of fill: impervious fill on the innermost section, random fill over French drain fill in the Loch Lomond side, and pervious fill over upstream-random fill on the downstream side of the dam. The crest of the dam is constructed of the same impervious fill and topped with a prime coat (Creegan & D'Angelo 1961a).

Spillway (1958, Altered 1985)

The spillway consists of several components that work together to only allow water to let out from the dam when the water level reaches over a certain height, relieving pressure against the extant dam structure and controlling the water that threatens to overtop the dam. The components are an inlet channel, which moves water away from the dam crest and toward the spillway, located at the southeastern terminus of the dam. Water in the inlet channel is stopped by the weir crest of the spillway, a concrete wall rising a few feet above the floor of the approach channel and spillway. There is a rounded concrete feature at the top of this wall called the weir. The weir crest extends the width of the spillway and is 16 feet 4.8 inches feet long. The spillway tapers from 65.52 feet wide at the weir crest to 14 feet wide for the length. Its total length is 592 feet and drops 154 feet in elevation from the weir crest to the bottom of the outlet footing. Its original height was 11 feet maximum, 5 feet minimum according to Creegan & D'Angelo's drawings. The original spillway walls were constructed of board-formed concrete, which the basin was concrete slab.

In 1985, the height of the spillway was raised in response to a large storm and subsequent flooding event. The 1985 material is cast concrete of concrete slab, and raised the wall height long its length between 2 feet and 6 feet at the top 250 feet of the spillway near the weir crest and spillway bridge. The steep slope section of the spillway was left unaltered. The slope of the spillway changes from 5% at the top to 48% down the length of the spillway to the outlet. The spillway outlets several feet above an oblong pond at the foot of the dam's downstream (southwest) side. The pond appears natural but has several road features forming a ford and a barrier separating it from the outlet of Newell Creek, which flows from the outlet conduit (Creegan & D'Angelo 1961b, 1984).

Control House (1958)

The control house is a rectangular plan, one-story, single-room building with a shed-style roof. The control house building footprint measures 9 feet 4 inches wide by 20 feet long. The building is constructed of concrete masonry units arranged in stack

bonds on a concrete foundation. Under the foundation and piercing it is the intake structure and conduit. The roof is a lightly framed nominal lumber and plywood roof, clad in rolled asphalt shingle. The roof is pierced near the northwest side by a ventilation pipe. Attached to the southwest elevation is a commemorative plaque for workers who died during the construction of the dam. The building is devoid of fenestration but has a windowless metal door on the southwest (main) elevation and a second metal door on the northeast elevation with the intake structure leading from the Loch Lomond side of the dam up to the doorway (Creegan & D'Angelo 1961c).

Spillway Bridge (1958)

The spillway bridge provides access from the access road to the Newell Creek dam crest road over the spillway. The bridge is constructed of precast and pre-stressed concrete floor slab units and measures 31 feet 9 inches in length, 20 feet 3 inches wide, and 1 foot thick. The roadbed itself is 18 feet wide and the guardrails are on a concrete curb 1 foot 1.5 inches wide on either side of the bridge. The guardrails are constructed of metal and bolted to the outer edge of the curb. They are 4 feet 8.5 inches from the bottom of the curb to the top of the top railing (Creegan & D'Angelo 1961d).

Valve and Outlet Works (1958, 1960)

The outlet works at the downstream toe of the dam consists of an outlet conduit valve, housed in a large board-formed concrete box. The outlet works are the surface features of an underground concrete outlet conduit running under the dam and controlled by the intake system in the control box in tandem with the outlet valve. The underground conduit is 1,331 feet and 10.2 inches long. It consists of a 3-foot-diameter pipe housed in a semi-circular concrete collar, measuring 6 feet 6 inches maximum width, 5 feet 3 inches tall, and providing at least a 1-foot thick concrete housing reinforced with longitudinal steel bars for the 3-foot-diameter pipe. The concrete housing for the valve and associated pipes at the downstream toe of the dam are all that was visible of the overall outlet conduit in the February field visit. The concrete valve housing measured 17 feet 10 inches long, 6 feet 6 inches wide, and 8 feet 11 inches tall. A portion of the valve housing's length is under the toe of the dam, so approximately 12 of the originally planned 17 feet length is visible, and approximately 4 feet of the original height. On the top side of the concrete house are two metal doors that open outward and provide access to the valve pit. A large 12-inch polyvinyl chloride (PVC) clad pipe emerges from the southwest side of the metal valve housing and leads to a smaller metal housing, roughly 6 feet by 4 feet by 3 feet high. The second metal housing is not listed in the Creegan & D'Angelo plans or in subsequent plans or change orders, and its use is unknown. Beyond the metal box, Newell Creek emerges from a pipe and continues its natural course through the steep drainage basin. Around the outlet features are several spare pipes, as well as little concrete and river rock retaining walls that appear to have once held small pools of water. The use of these pools is unknown and likely decorative (Creegan & D'Angelo 1961e).

Access Road Bridge (1958)

The access road bridge follows the American Association of State Highway Officials Standard Specifications for Highway Bridges according to their 1957 design and construction specifications book. The bridge consists of three spans supported by two pier systems and two abutment systems. It is 135 feet long (45 feet per span), 30 feet wide, and 25 feet high at its maximum height. The roadbed is 26 feet wide (13 feet per lane) with a 1-foot-wide curb on the upstream (north) side and 3 feet wide on the downstream (south) side. Each curb has a metal guardrail on either side, 2 feet 10 inches high, with metal balusters at regular intervals and concrete end-posts atop the abutments on either end of the bridge (Creegan & D'Angelo 1961f).

Recreation Area (1965)
Historic aerial photographs suggests that the buildings which currently stand on the site are not the original shore-side concession structure or docks completed in 1965. The historic docks, three in total, were built from wood and projected from the Recreation Area shoreline. Two of the docks were rectangular in shape and had floor planks that extended lengthwise down the dock. The third dock was more narrow than the others and projected out alongside the boat launch area, terminating in a square platform. Between the boat launch dock and the other docks sat the original Concessions building. It was a one-story building with a large overhanging roof directly on the shore of the lake (NETR 2018; SCS 1979a).

While it is unclear when the original Recreation Area structures were demolished between the 1968 and 1991 historic aerial photos, the City Council agenda announcements suggest that there was a great deal of new construction that took place during that period. The City announced the creation of a new master plan for the Recreation Area in June of 1979. In 1981, the City announced the completion of a new lakeside bathroom. Bids and acceptance of a design proposal were posted in the Santa Cruz Sentinel in 1984 for a new Concessions Building. In 1984, the City requested bids for new docking facilities that were completed and announced again in 1985 (NETR 2018; SCS 1979b; SCS 1981; SCS 1984; SCS 1985).

Presently, there is one large dock in the place of the two, rectangular, wooden ones, and it is constructed of sectional floating polyethylene configured into an 'H' shape. The modern Camp Store building is situated at the head of the dock on the shore of the reservoir to the northeast of where the original Concessions building stood. It is a single-story building clad in wood board-and-batten sided with multiple roll-up door openings. A hexagonal shade structure sits facing the camp store, on the opposite side of the dock entrance. The modern restroom facility building is located to the northeast of the boat launch ramp and is a simple, rectangular, wood-sided building. The Motor Shop is situated further from the edge of the reservoir in the parking lot. It is a rectangular building with a rectangular addition jutting from the rear of the building and appears to be modern construction. Both are clad in tan-colored medium-density fiberboard siding.

***B10. Significance (Continued):**

They also utilized the falling water on the property to process local lumber into fuel for their many kilns (Brown 2011). The California Powder Works was established in 1861 on the bank of the San Lorenzo River on a portion of Rancho Carbonera. The location was chosen for its proximity to lumber, the harbor, and the river, which was harnessed to operate the water-powered machinery needed to process raw materials into explosive powder (Brown 2011; Robinson 2012).

The California Gold Rush of 1848 accelerated the desirability of land in the state and before long, access to water in the drought-prone region took on the highest level of importance. Instead of adopting an equal water access structure in the fashion of the eastern United States, the wealth potential of waterways during the Gold Rush shaped California water law into a "first in time, first in right" system known as Prior Appropriation. Under this system, riparian rights were granted to the first person to use a river or tributary for beneficial consumption like mining, farming, milling or as-needed domestic use. When the original Ranchos in the San Lorenzo Valley were subdivided and sold, access to the rivers and streams was enormously important. Not only did it mean that the initial use set out for a waterway was the primary use, it also meant that any subsequent uses could not supersede or negatively affect the chief use. The order that

claims were recognized during this period established the foundation of the complicated system of water allocation rights still in use today in Santa Cruz County (Pisani 1984).

The number of lumber operations in the county was growing rapidly, and by 1868 there were 12 water-powered lumber mills, 10 steam-powered lumber mills, and 9 shingle mills in operation that needed to transport goods down from remote processing locations. Early roads such as Big Trees Road (now Highway 9) and Graham's Grade Road (now Graham Hill Road) winding from the upper reaches of the San Lorenzo Valley to the wharf were arduous and subject to seasonal weather complications. Navigating the steep angled roads while driving a train of lumber-filled wagons was a dangerous undertaking for even the most experienced teamster (Robinson 2011). In 1873, plans were made for a flume along the San Lorenzo River to easily move the lumber to port. The original plan was for the flume to stretch over 20 miles to the coast, but the dearth of feeder creeks in the lower San Lorenzo basin meant that the river was subject to seasonal dry spells. Instead, when work began on the flume in 1875, a small-gauge railroad from the flume end to the harbor started simultaneously.

The massive projects were completed within a year. The terminus of the 9-mile flume and the new rail line was in Felton, California, where the lumber originating as far as 2 miles north of Boulder Creek, floated down the water-driven flume, and could be loaded onto the train and hauled safely downhill to shore. Overall, the water-powered gravity flume drastically increased the availability of Santa Cruz lumber to a wider market, while the rail line opened up the San Lorenzo Valley to tourism.

Plans for the flume and the general development of the far reaches of the Santa Cruz Mountains meant that pioneers were staking claim to areas that previously had seen little activity. Many of the tributary creeks in these areas bear the names of the first men that settled beside them. Newell Creek was a remote tributary of the San Lorenzo River that was named for an early pioneer, Addison Newell. He established a farm in the steep, v-shaped valley on the banks of the creek in 1870.

The Newell Creek Dam and Loch Lomond

The San Lorenzo River, its tributaries, and the other creeks that wind through the greater Santa Cruz area, has historically been subject to seasonal droughts and floods.

In 1860, two innovative pioneers involved with the early development of Santa Cruz, Fredrick A. Hihn and Elihu Anthony, implored the Board of Supervisors to allow them to dig trenches and lay hollowed 12-inch redwood pipes to transport water throughout the City. Due to Santa Cruz's proximity to vast lumber fields in the San Lorenzo Valley, the redwood pipes were chosen as an inexpensive alternative to iron pipes. The source of the water was to be an 8,000-gallon reservoir on the Mission Santa Cruz hill, and eager recipients of the water could gain access for a fee. By the 1870s, the Hihn-Anthony Water Company was the largest provider of water in Santa Cruz, and Doderero and Carbonero Creeks constituted their primary sources (Brown 2011; Brown and Dunlap 1956).

San Lorenzo Valley Water District

By 1899, Boulder Creek in the San Lorenzo Valley (SLV) was the fifth largest shipper of timber in the country. As the SLV was settled in the mid-1800s, populations in Ben Lomond, Brookdale and Boulder Creek formed their own water systems (San Lorenzo Valley Water District, 2009.). As vacation homes increased in the early 1900s, many small subdivisions in the SLV developed their own water systems. These water systems were designed to serve the needs of Bay Area residents who occupied their vacation homes only a few weeks a year. Nearby springs and creeks supplied these water systems through flumes or pipelines. Santa Cruz County population more than doubled from 1900 to 1940; as more people moved into the

valley, the existing water systems became inadequate (San Lorenzo Valley Water District, 2009).

Frequent droughts between 1912 and 1939 convinced Valley leaders to form a water district to better control water, to serve the needs of the valley. After one failed attempt to form a county water district by election in 1939, the San Lorenzo Valley County Water District (SLVWD) was formed by the voters on April 3, 1941. Negative voter returns from the towns of Felton and Scotts Valley left those areas out of the district boundaries, which included Bear Creek, Boulder Creek, Alba, and Ben Lomond school districts, and part of the Sequoia school district (San Lorenzo Valley Water District, 2009.).

After securing unclaimed water rights in Newell Creek and Bear Creek in 1942, the SLVWD developed a master plan that included storage dams on Boulder, Newell, and Bear Creeks, and the upper San Lorenzo River (San Lorenzo Valley Water District, 2009). In 1945, voters failed to approve a bond proposed to pay for the Boulder Creek dam, and when the District again proposed a bond measure to the voters to fund the construction of a dam at Waterman Gap, a citizens group organized to oppose it. The citizens group also opposed the proposed dam at Newell Creek, and another bond measure was defeated in December 1946. The District purchased the 3,400 acre Newell Creek property, but also pursued purchasing additional water supplies (Ibid.). In 1957, the District proposed a bond issue for purchase of Citizen Utilities, and a Newell Creek dam project was approved by the voters. The District continued negotiating with Citizens Utilities, and also approached the City of Santa Cruz about partnering in construction of a dam on Newell Creek. Negotiations with Citizens Utilities failed, but the City of Santa Cruz agreed to partner with the District in building the Newell Creek dam (San Lorenzo Valley Water District, 2009). In 1959, the District signed an agreement with the City of Santa Cruz, in which the District sold the City its timber and mineral rights to the Newell Creek watershed, in exchange for one-eighth of the water rights from the water stored by Newell Creek Dam (Ibid).

City of Santa Cruz Water Department

When the steam-powered pumping plant installed on the San Lorenzo River in 1880 became the source of repeated water-quality concerns, the Duke Morgan Water Company abandoned the plant and then combined with the Hihn-Anthony Water Company in 1888, forming the Santa Cruz Water Company. This company set about increasing supplies by creating a diversion on Laguna Creek and constructing the Cowell Street Reservoir on Empire Grade. The reservoir was built to hold 60 million gallons, but it was carved into a porous limestone formation known as karst that caused approximately one million gallons of leakage daily. Despite combining sources and creating new ones, it was apparent that seasonal fluctuations in the water supply and inadequate storage facilities were not capable of supporting the population needs. Just two years later, the city started its own water system in 1890. The City's water sources consisted of diversions along Laguna Creek, a pipeline from Laguna Creek to town, and the Cowell Street Reservoir. The City and the Santa Cruz Water Company competed to provide the city's water for a few years, until the City of Santa Cruz purchased the Santa Cruz Water Company in 1916, along with all of its sources and infrastructure (SCMU Review 2016; Brown and Dunlap 1956).

After the City acquired the Santa Cruz Water Company's holdings, the City sought to update their water infrastructure. Although upgrades and additions were added to the several major facilities to increase the quality of municipal water, the overall output was not widely increased between 1916 and 1930. The Bay Street Reservoir was built in 1924 to replace the sieve-like Cowell Street Reservoir. The Lorenzo River Pumping Plant filtered the water from the San Lorenzo and treated it with chlorine, making it safer to drink (Brown and Dunlap 1956).

In the period following the installation of the Bay Street Reservoir, Santa Cruz sought many short-term fixes to the repeated droughts and floods. The Santa Cruz Sentinel featured articles pertaining to water shortages and flood damage throughout the county, despite the Water Departments' "…consistent policy of doing the best [they] could with what [they] have…"(SCS 1939). Low rainfall in winter 1931, prompted the City to drill four wells, "one at the pumping plant and three directly across the river" (Brown and Dunlap 1956:14), to supplement water, but it was not sufficient. Further shortages due to drought meant that the coastal creek sources were not available for delivery to the city system. (Brown and Dunlap 1956).

The years following World War II provoked westward migration and an increase in birth rates, causing the population of California to increase from 6.95 million to 10.65 million between 1940 and 1950. The influx of people put stress on the infrastructure throughout the state, but in Santa Cruz, the growth of the community from 27,430 to 41,680 between 1940 and 1950 meant the familiar seasonal water shortages now presented a serious problem. Articles from the Santa Cruz Sentinel during this time highlight the difficulties the shortages caused during the dry, summer months, when water merely dribbled from municipal taps. In 1945, the state recognized a water shortage and authorized an investigation of available water resources, but the movement was slow to start (SWRB 1953). In 1946, the acute nature of the water crisis prompted the community to request a survey to determine an inventory of the available groundwater supply and plan for growth in the future. In 1948, the survey ordered by Water Superintendent John C. Luthin was completed and the findings were submitted to the City Council. The survey determined that although the San Lorenzo pumping plant was running at full capacity, 24 hours per day during the dry summer of 1947, the river was so low that the entire run was being diverted through the pumps and into the city mains for consumption.

In 1953, the State Water Resources Board finally released a report based on their investigations in Santa Cruz and Monterey Counties, which inventoried available surface and underground water sources in Santa Cruz County, and projected increased water utilization that exceeded the available water in Pajaro Valley, the Soquel Creek area, and the coastal area around and including Santa Cruz. The report identified requirements for supplemental water for Santa Cruz and areas served by the City of Santa Cruz Water Department; 16 possible alternative water resources including a dam site alternative on Newell Creek The report noted that "the present water problem is not due to a shortage of total seasonal supply, but rather to lack of facilities for regulating that supply" (SWRB 1953: 57) due to peak demands during times of minimum stream flows. Deficiencies in seasonal rains would necessitate water rationing by the City; such deficiencies were reported to have occurred in five seasons since 1895, a period of nearly 60 years at the time the report was issued. (U.S. Census Bureau 1940; U.S. Census Bureau 1950; Brown and Dunlap 1956; SCS 1946a; SCS 1946b; SCS 1948; SWRB 1953).

As a direct result of the State Water Resources Board publication, in 1954, the City commissioned a report investigating four of the Water Resource Board's suggested reservoir sites at Laguna Creek, San Lorenzo River, Soquel Creek, and Scott Creek. The report cited the City's current water sources as "barely sufficient to keep pace with the demand imposed by a steadily increasing population" (Brown and Dunlap 1956: 1). These sources, as of 1956, included Laguna Creek, the original City's water resource since 1890, Liddell Spring, Reggiardo Creek, Majors Creek, the San Lorenzo River, and two unnamed wells. Newell Creek Dam and Loch Lomond Reservoir were not among the suggested sites in Brown and Caldwell's 1956 water supply report, and the report suggested Doyle Gulch as the ideal location for a new city water source (Brown and Dunlap 1956; SWRB 1953).

The City Water Superintendent began to investigate reservoir projects at Zayante Creek, Newell Creek, Doyle Gulch, Scott Creek, and Aptos Creek. Meanwhile, the County formed the

Santa Cruz County Flood Control and Water Conservation district in 1955 and hired Creegan & D'Angelo Civil Engineers in 1956 to complete an extensive survey identifying dam sites, groundwater sources, and additional steps to improve control of the water supply throughout the county to compete with the City's proposals. The report asserted that population growth was a major concern for the water supply in the City because "the City of Santa Cruz has current water requirements which equal the capacity of the existing water supply system during a relatively dry era. Should an exceptionally dry season be experienced, there would be a serious water shortage in the City of Santa Cruz." (Creegan and D'Angelo 1957:8). Present supplies were determined to be insufficient for standard rates of population growth, including years that rainfall was considered more plentiful. Despite the rate of water consumption in the service area tripling between the mid-1920s and mid-1950s, there had been no additions to the City municipal water supply during that time. Creegan & D'Angelo would also serve as the engineers for the Santa Cruz County Flood Control and Water Conservation District Advisory Committee, and ultimately, their recommendations to the council to remedy the current water crisis in the City was a dam on Newell Creek (SCS 1953, 1954a, CSC 2007; SCS 1958).

As a surface water storage on Newell Creek became a distinct reality following the recommendations of Creegan and D'Angelo, City Water Department Director, Weston Webber, voiced his support for the project in 1957 claiming that "A dry winter or a spurt in population might well throw Santa Cruz on water rationing in the future...The San Lorenzo River and the coast sources are not only fixed, but too limited…Surface storage is the only way out." (SCS 1957) Creegan & D'Angelo's proposal at Newell Creek competed with multiple other proposals throughout the region. Ultimately, of the five proposed dams, only the Newell Creek Dam would come to fruition. The reasons behind why the remaining dams were not completed are unknown, although frequent discussions about the overall cost of the projects in the SCS suggest budgetary restraints (Brown 2011; 1957a, 1957b, 1957c).

In 1958, the University of California Regents announced that they were considering the Cowell Ranch in the City of Santa Cruz as the site of a future University of California Campus. The City would be required to provide services and facilities for the prospective University community, which early figures suggested was to include around 2,500 students. In anticipation of the Water Revenue Bond Election in November 1958 to approve the bonds necessary to construct the Newell Creek Dam, a new water treatment plant, and pipelines to transport the water, the Santa Cruz Sentinel published an article outlining the impact of the proposed bonds. In reference to the speculative University in the City, the closing paragraph of the article states that "University officials know that the present water supply of Santa Cruz is inadequate, even for normal needs. Failure to correct this situation could end all chance of the selection of Santa Cruz as the University site." (SCS 1961b; SCS 1961a; SCS 1958).

On November 5, 1958, the voters of the City of Santa Cruz approved $5.5 million in water revenue bonds necessary for the City to purchase 2,162 acres of land in the Newell Creek watershed from the San Lorenzo Valley Water District and build a dam on the site. Creegan & D'Angelo designed the earthfill dam. Additional improvements included a pipeline, a treatment plant on Graham Hill Road, and two pumping stations. (SCWD 1986; Brown 2011; SPH Associates Consulting Engineers 2010; SCS 1958).

Construction of Newell Creek Dam

Contractors Williams and Burrows Inc. of Belmont, California, began the construction of the Newell Creek Dam and preparation for the creation of Loch Lomond in 1960. The early stages of planning and execution were made more difficult by the narrow valley, allowing only one road for ingress and egress for equipment and supplies. The construction of the 195-foot-tall earthfill dam began with a "grout curtain" that pushed concrete 100 feet into the bedrock to fill any fissures or imperfections, ensuring a structurally sound

base. The height and width of the dam's crest was first determined by the reinforced concrete ends. The embankment was then built up using successive layers of random fill from the immediate area, compacted with sheepsfoot tampers above and around the 300 feet of impervious material at the core of the embankment. Four construction personnel lost their lives in October 1960 during the layered construction of the embankment. While the men were drilling out soft areas in the rock to be filled with concrete to prevent water seepage, an abutment sheer wall collapsed and a massive avalanche slid down onto them. A brass plaque commemorating these men was commissioned and remains today on the southwest elevation of the Control House (SCS 1960a; SCS 1960b; SCWD 2015).

The Newell Creek Dam was completed and filling steadily with water by 1961; however, the recreation area on the resulting reservoir was yet to be built. Keeping with the Scottish naming tradition started by Scotsman John Burns when he christened the mountain Ben Lomond in the 1850s, the reservoir was dedicated Loch Lomond during two days of festivities on July 27 and 28, 1963 (SCS 1963).

By 1964, the City distributed a notice to bid on the construction of the Loch Lomond Recreation Development. With the help of a $149,000 state grant, the Loch Lomond Recreation Area was completed by the spring of 1965. It included picnic areas, a concessions building, parking areas, two docks, and a boat launch. An all-weather road leading from Lompico to the Recreation Area was a crucial improvement constructed during this phase of the Project. It allowed visitors to experience the new recreation activities available at Loch Lomond, while simultaneously comprehending the realities of water storage and use in the county (SCS 1964).

In January of 1982, a powerful storm caused flooding throughout the Santa Cruz County. It was discovered that a main pipeline from Loch Lomond had burst and was leaking at an alarming rate. Although the damaged section of pipeline was relocated and repaired by the end of the year, it renewed community attention to the 20-year-old dam and the potential for its components to fail under stress (SCS 1982; Cardona and Associates 1982).

In 1984, the Santa Cruz Water Department received $11.7 million dollars through private Certificates of Participation in order to fund upgrades and modernizations to the water infrastructure system throughout the City. A Division of Safety of Dams survey had recently demonstrated that the spillway at Newell Creek Dam did not meet the newest safety criteria for probable maximum flood conditions, so a portion of the funds were allotted toward upgrade to the dam's spillway wall. The upgrades implemented in 1985, included heightening the Newell Creek Dam spillway wall and the installation of a permanent aerator system. The spillway wall helps to protect the dam embankment in the event of an overflow by directing water safely through the spillway channel and away from the earthfill embankment, and heightening the walls ensures that it could withstand damage from a probable maximum flood equal to approximately five times the intensity of the 1982 flood (SCWD 1986; SCS 1984a).

Property Type: Earthen Dams

For thousands of years, people have stored water and altered their natural environment to their benefit. The oldest known dams date back to 6,000 years ago in present-day Jordan, where farmers constructed earthen mounds to capture rainfall. Dams are typically constructed to serve three main purposes: to hold back or store water, to produce energy, and to control flooding. While technological advancements have improved capacity, safety, and reduced failures, the design of dams has not deviated from several successful engineering methods (Billington et al. 2005).

Dams are classified in terms of materials and form. In California, dams are typically one

of several construction methodologies: rockfill, earthen, masonry, and/or concrete. In California, the topography and geology of a region often drives the construction of a dam, resulting in a vernacular design that often does not adhere to one specific method. Earthen dams were a common choice for dams planned and implemented throughout Northern California during the 1930s, 40s, and 50s. The customizable principles of the design suited many terrains in the varied landscape and additionally reduced transportation and materials costs to remote, inaccessible areas by utilizing local soil for fill. North of Santa Cruz County in Santa Clara County, 9 of 10 dams built between 1935 and 1957 to impound water for municipal use are earthfill dams. Both of the dams located south of Santa Cruz in Monterey County are earthfill dams as well (Corns et al. 1988; SCVWD 2018; MCWRA 2018).

Keeping with the predominant trend in the area at the time it was designed, the Newell Creek Dam is a zoned earthen embankment dam that rests on a pervious foundation. Earthen dams have been employed in communities throughout the world for centuries as a method to control and store the flow of waterways. They are the most common variety of dam because their construction exploits local resources for structure and materials. An earthfill or earthen dam is a type of dam comprised of appropriate soils borrowed from either a local area and/or the result of preparatory excavations. These soils are layered and compacted to form an embankment. There are three principle embankment types: homogenous, diaphragm, and zoned. The suitability of one over the other is determined by site-specific factors including geographic setting, geologic substrate, and availability of local fill material. Homogenous embankments consist of one impervious material throughout the whole embankment mound. Diaphragm embankments are comprised of a layers of pervious material(s) with either an impermeable blanket on the upstream side or an impermeable diaphragmatic layer of earth, cement, or concrete. Zoned embankment types have an impervious central core that is flanked by pervious material zones of sand, gravel, rocks, or a combination of several. In order to control the level of reservoirs created by earthen dams, supplemental structures are required to house the outlet(s) and spillway (USDIBR 1987; USACE 2004).

Creegan & D'Angelo Civil Engineers

Patrick Creegan & Elmer D'Angelo established Creegan & D'Angelo Civil Engineers in 1956 in San Jose, California. The company still operates today under the name Creegan + D'Angelo Infrastructure Engineers from their offices in Monterey, California, and Fairfield, California. The foundation of their business is in civil engineering, covering structural engineering for residential and commercial buildings. They also specialize in water management including planning, design, storage, and disposal strategies; land planning; development and management services; and transportation and public works infrastructure planning.

In addition to Newell Creek Dam and Loch Lomand in Santa Cruz, Creegan + D'Angelo has planned and implemented successful water management projects in multiple Monterey Bay Area locations and throughout California. The following projects demonstrate the range of their projects within the field of water management and distribution:

- Round Hill-Douglas County Sewer Improvement Project. Tahoe, California.
- Davenport Sanitation District Wastewater Management System. Davenport, California.
- Aquifer Storage and Recovery. Monterey Peninsula, California.
- Sand City Desalination Water Supply Project. Sand City, California.
- San Benito Water Distribution System. San Benito County, California.
- North San Jose / Alviso Reservoir. San Jose, California.
- Yosemite Sanitary Sewer Replacement. Yosemite National Park, California.

NRHP and CRHR Criteria

NRHP Criterion A: associated with events that have made a significant contribution to the broad patterns of our history.

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

The Newell Creek Dam Complex is directly associated with events that have made a significant contribution to the development history of water infrastructure in the City of Santa Cruz Water Department service area. The Newell Creek Dam is significant under Criterion A/1 for its association with water infrastructure, which was essential to maintaining the municipal water supply during periods of seasonal water shortages and droughts. The availability of water played a critical role in the early planning, development, and sustained growth of the City, including a factor in the choice of Santa Cruz as the site for a University of California Campus. When the Newell Creek Dam was in its elemental planning stages in 1957, it was one of six reservoir projects recommended by the project engineers, Creegan & D'Angelo, for the long-term water supply reliability for the City and Santa Cruz County. However, the Newell Creek Dam was the only such project that was realized. Loch Lomond Reservoir is the resulting impoundment of Newell Creek by the Newell Creek Dam and it is an important supplementary source of drinking water for Santa Cruz City. The period of significance, beginning in 1958 with approval of $5.5 million in water revenue bonds necessary for the City to purchase land to build the Newell Creek Dam site and ends in 1965 when the Loch Loman Recreation Area was completed. In summary, the subject property is directly associated with important events that have made a significant contribution to the development of water infrastructure development in Santa Cruz. These important events include concerns over local water shortages in the late 1950s (as documented in state and local water supply reports) leading up to the passage of the Water Revenue Bond in 1958, which approved funding for construction of the Newell Creek Dam in direct response to concerns over water shortages. Archival research also revealed that water shortages in the late 1950s threatened to make Santa Cruz a less than desirable choice for the location of the next University of California, noting that failure to correct water shortage issues could end all chance of the selection of Santa Cruz as the University site (SCS 1961b; SCS 1961a; SCS 1958). Construction of the Newell Creek Dam gave the City control over the seasonal fluctuations in water availability and became a critical component to the water infrastructure, which supported the sustained growth of the City after World War II. **Therefore, the subject property appears eligible at the local level under NRHP/CRHP Criteria A/1 at the local level of significance.**

NRHP Criterion B: associated with the lives of significant persons in our past.

CRHR Criterion 2: is associated with the lives of persons important in our past.

Archival research on the subject property failed to reveal associations with any persons significant in the history of Santa Cruz, the state, or the nation. The property does not appear to be associated with any person(s) whose contributions demonstrate historic importance at the local, state, or national level. Therefore, the subject property does not appear eligible under NRHP/CRHR Criteria B/2.

NRHP 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.

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

The subject property is a utilitarian, zoned earthfill dam, a common form of dam that is found throughout California, the United States, and the world. It was designed by Creegan & D'Angelo Civil Engineers in 1958 and constructed by William and Burrows Inc. in 1960. Although Creegan & D'Angelo have contributed a large number of designs to the body of engineered municipal water containment projects in California, the creative merit of their designs is not significant enough to have made an impact on the development of the genre as a whole. Contractors William and Burrows Inc. contributed to the field of architecture by erecting structures of various kinds throughout the San Francisco Bay Area, but overall they did not significantly impact the field of dam design or construction techniques. Archival research suggests that the Newell Creek Dam is typical of its construction type for an earthfill dam, and does not embody any distinctive characteristics of a type, period, or method of construction apart from variances dictated by its specific geographical location. There are little inherent artistic or design values associated with the dam or its associated features, and repeated repairs and routine maintenance have replaced original materials, resulting in loss of integrity. For all of the reasons described herein, the subject property does not appear eligible under NRHP/CRHR Criteria C/3.

NRHP Criterion D: have yielded, or may be likely to yield, information important in history or prehistory.

CRHR Criterion 4: has yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to indicate that the subject property is likely to yield and additional information important to prehistory or history beyond what is already know. The subject property is also not associated with an archaeological site or a known subsurface cultural component. Therefore, the subject property does not appear eligible under NRHP/CRHP Criteria D/4.

County of Santa Cruz Criteria

For the same reasons already discussed in application of NRHP and CRHR criteria, the Newell Creek Dam Complex appears eligible under Criterion 2 of the County of Santa

Cruz criteria, as described in Section 16.42.050(C) of the Title 16 Environment and Resource Protection, Chapter 16.42 Historic Preservation.

1. The resource is associated with a person of local, State or national historical significance;

   As stated in Criterion B/2, archival research did not reveal an association between the Newell Creek Dam and any persons who significantly contributed to the development of the city, state, or nation.

2. The resource is associated with an historic event or thematic activity of local, State or national importance.

   As stated in Criterion A/1, the Newell Creek Dam is associated with events that have made a significant contribution to the development history of water infrastructure in Santa Cruz County, including local water shortages in the late 1950s (as documented in state and local water supply reports) leading up to the passage of the Water Revenue Bond in 1958, which approved funding for construction of the Newell Creek Dam in direct response to concerns over water shortages. Archival research also revealed that water shortages in the late 1950s threatened to make Santa Cruz a less than desirable choice for the location of the next University of California, noting that failure to correct water shortage issues could end all chance of the selection of Santa Cruz as the University site (SCS 1961b; SCS 1961a; SCS 1958). Construction of the Newell Creek Dam gave the City control over the seasonal fluctuations in water availability and became a critical component to the water infrastructure, which supported the sustained growth of the City after World War II. Therefore, it qualifies under County of Santa Cruz Criterion 2.

3. The resource is representative of a distinct architectural style and/or construction method of a particular historic period or way of life, or the resource represents the work of a master builder or architect or possesses high artistic values.

   As discussed in Criterion C/3, the Newell Creek Dam is an archetypical, zoned earthfill dam. Its design does not possess any special aesthetic merit because it was constructed simply and lacks distinctive characteristics beyond those dictated by the surrounding terrain.

   Creegan & D'Angelo Civil Engineers designed the Newell Creek Dam in 1958, 2 years after starting their firm in 1956. Although it is representative of an early Creegan & D'Angelo project, archival research did not reveal that the designers/engineers exercised any degree of influence over their peers within the time period associated with the dam and its features.

4. The resource has yielded, or may likely yield, information important to history.

   As discussed under Criterion D/4, there is no evidence to indicate that the subject property is likely to yield and additional information important to prehistory or history beyond what is already know. The subject property is also

not associated with an archaeological site or a known subsurface cultural component.

Integrity

In accordance with the NRHP guidelines, properties that are eligible for listing in the NRHP must be significant under one or more of the criteria and must have sufficient integrity to convey their significance. These rules apply whether the property is considered for individual listing or as a contributing resource within a historic district. In assessing historic integrity, the NRHP recognizes seven aspects or qualities that, in various combinations, define integrity. In order to retain historic integrity "a property will always possess several, and usually most, of the aspects" (NPS 2002).

The CRHR generally follows the integrity guidelines for the NRHP, but it recognizes that it is possible that historical resources that may not retain sufficient integrity to meet the criteria for listing in the NRHP may still be eligible for listing in the CRHR. A resource that has lost its historic character or appearance may still have sufficient integrity for the CRHR if it maintains the potential to yield significant scientific or historical information or specific data.

The seven aspects of integrity are:

- **Location** – the location where the historic property was constructed or the place where the historic event occurred.
- **Design** – the combination of elements that create the form, plan, space, structure, and style of a property.
- **Setting** – the physical environment of a historic property or the character of the place in which the property played its historic role.
- **Materials** – the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- **Workmanship** – the physical evidence of crafts of a particular culture or people during any given period in history or prehistory.
- **Feeling** – a property's expression of the aesthetic or historic sense of a particular period of time.
- **Association** – the direct link between an important historic event or person and a historic property.

The subject property was found to retain sufficient integrity to convey significance in the areas of location, design, setting, feeling, and association. The property retains integrity of location, setting, and feeling, as the vicinity surrounding the Newell Creek Dam Complex has retained its rural presence and character. Although the dam and its associated features does not exhibit distinctive artistic characteristics, the integrity of the original design endures as an archetypal earthen embankment dam. The Newell Creek Dam and the resultant Loch Lomond reservoir remains an important source of drinking water storage for the City and therefore maintains its association with the development of water infrastructure in Santa Cruz.

Evaluation Findings

After thorough consideration of NRHP, CRHR, and County evaluation criteria, the Newell

Creek Dam and its associated features appear eligible for the NRHP and CRHR under Criterion A/1 at the local level of significance and eligible for local listing under Santa Cruz County Criterion 2 for its associations with local water development. Therefore, it is considered an historic property under Section 106 of the NHPA and an historical resource under CEQA.

***B12. References:**

ASC (Aero Services Corporation). 1956. "Flight CJA-4R-107." Courtesy of UC Santa Barbara Collection.

Billington, David, Donald Jackson, and Martin Melosi. 2005. The History of Large Federal Dams: Planning, Design and Construction on the Era of Big Dams. Denver, Colorado: United States Department of the Interior, Bureau of Reclamation.

Brown, K.W. and L.B. Dunlap. 1956 Investigation of Water Supply Projects: City of Santa Cruz Water System - Santa Cruz, California. San Francisco, California: Brown and Caldwell Civil and Chemical Engineers. On file at the Santa Cruz Water Department.

Brown, Randall C. 2011. The San Lorenzo Valley Water District: a History. Boulder Creek, California: San Lorenzo Water District.

Butler. 1992. Archaeological and Historical Resources Survey and Impact Assessment: A Supplemental Report for a Timber Harvesting Plan.

Cardona and Associates Civil Engineers Environmental Planners. 1982. "Newell Creek Pipeline Relocation Plans and Specifications" Santa Cruz, California. City of Santa Cruz Water Department.

CAS (Cartwright Aerial Survey). 1963. "Flight SCR-3-36." Courtesy of UC Santa Barbara Collection.

CDF (California Division of Forestry). 1948. "Flight CDF5-2-93." Courtesy of UC Santa Barbara Collection.

CSC (City of Santa Cruz). 2007. 2007-2012 Local Hazard Mitigation Plan; Chapter 6: Floods and Associated Coastal Storms. City of Santa Cruz: Santa Cruz, California. Accessed July 13, 2018 http://www.cityofsantacruz.com/home/showdocument?id=8660.

Chapman, Charles. 1920. "Sebastian Vizcaino: Exploration of California." The Southwestern Historical Quarterly 23(4). April 1920. Accessed June 1, 2018. http://www.jstor.org/stable/27794572.

Cleland, R.G. 2005. The Cattle on a Thousand Hills: Southern California, 1850-80. 2nd ed. San Marino, California: The Huntington Library.

Corns, Charles, Ernest Schrader, and Glenn Tarbox. 1988. "Gravity Dam Design and Analysis." In Advanced Dam Engineering for Design, Construction and Rehabilitation. New York, New York: Springer Publishing.

Creegan & D'Angelo. 1957. Report on Santa Cruz County Master Plan of Water Development and Preliminary Design of the First Increment of Work for Santa Cruz County Flood Control and Water Conservation District. Creegan and D'Angelo Civil Engineers. On file at Santa Cruz Public Library.

Creegan & D'Angelo. 1961a. "Newell Dam Project: Maximum Section & Miscellaneous Details." Drawing sheet set 3 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1961b. "Spillway Plan & Profile." Drawing sheet set 8 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1961c. "Newell Dam Project: Control House & Details." Drawing sheet set 7 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1961d. "Newell Dam Project: Spillway Bridge." Drawing sheet set 10 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1961e. "Newell Dam Project: Outlet Works Sections & Details." Drawing sheet set 5 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1961f. "Newell Dam Project: Access Road Bridge General Plan." Drawing sheet set 16 of 37. Santa Cruz, California: City of Santa Cruz Water Department.

Creegan & D'Angelo. 1984. "Newell Dam Spillway Modification." Drawing sheet set 1 of 1. Santa Cruz, California: City of Santa Cruz Water Department.

Dallas, S.F. 1955. "The Hide and Tallow Trade in Alta California 1822–1848." PhD dissertation, Bloomington: Indiana University.

Harmon, Jerry G., and Kelly R. McPherson.1998. "U.S. Geological Survey Water-Resources

Investigations Report 00-4016: Storage Capacity and Sedimentation of Loch Lomond Reservoir, Santa Cruz, California."

Koch, Margaret. 1973. Santa Cruz County: Parade of the Past. Fresno, California: Valley Publishers.

Kyle, Douglas E. 2002. Historic Spots in California. 5th ed. Stanford, California: Stanford University Press.

Lehmann, Susan. 2000. "Fully Developed Context Statement for the City of Santa Cruz."

MCWRA (Monterey County Water Resources Agency). 2018. "Dams and Reservoirs." Accessed June 22, 2018. http://www.co.monterey.ca.us/government/government-links/water-resources-agency/projects-facilities/dams-and-reservoirs#wra.

NETR. 2018. "Historic Aerials Online." Accessed June 5, 2018. https://www.historicaerials.com/viewer.

NPS (U.S. Department of the Interior, National Park Service). 2002. "National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation." Accessed May 29, 2018. https://www.nps.gov/NR/publications/bulletins/pdfs/nrb15.pdf.

NPS. 2014. "National Historic Landmark Nomination Process: Glossary." Accessed June 10, 2018. https://www.nps.gov/nhl/apply/glossary.htm#NoncontributingResources.

OAC (Online Archive of California). 2018. "Diseño del Rancho Cañada del Rincon en el Rio de San Lorenzo de Santa Cruz: Calif." Hand-drawn Map. UC Berkeley, Bancroft Library. Accessed June 4, 2018. https://oac.cdlib.org/ark:/13030/hb6z09p08c/?order=3&brand=oac4.

Pisani, Donald J. 1984. From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931. Berkeley, California: University of California Press.

Robinson, Lisa. 2011. The San Lorenzo Valley Flume. Boulder Creek, California.

Robinson, Lisa. 2012. The San Lorenzo Valley. Charleston, South Carolina: Arcadia Publishing.

SCWD (City of Santa Cruz Water Department). 1986. "History of the Santa Cruz City Water Department." Santa Cruz Public Libraries Local History Collection. Accessed June 6, 2018. https://history.santacruzpl.org/omeka/items/show/134438#?c=0&m=0&s=0&cv=0.

SCWD. 2016. "2015 Urban Water Management Plan." Report. Santa Cruz, California: City of Santa Cruz. Accessed July 9, 2018. http://www.cityofsantacruz.com/home/showdocument?id=55047

SCWD. 2018. "Newell Watershed." Accessed May 29, 2018. http://www.cityofsantacruz.com/government/city-departments/water/watershed/newell-watershed.

SCEN (Santa Cruz Evening News). 1936. "Issac Graham, Swashbuckling Soldier of Fortune, Swaggered Through Pioneer Days of Santa Cruz."August 1, 1936. Newspapers.com. Accessed June 7, 2018. https://www.newspapers.com/image/51339253/.

SCMU (Santa Cruz Municipal Utilities) Review. 2016. "A History of Our Water Service Infrastructure." No. 61: Spring 2016.

SCPL (Santa Cruz Public Library). 2018. "Online Local History Photograph Collection." Accessed June 2018. https://history.santacruzpl.org/omeka/collections/show/9.

SCS (Santa Cruz Sentinel). 1939. "Santa Cruz City Endeavors To Stay in the Water Business and Finally Succeeds." February 26, 1939. Pg 4. Newspapers.com. Accessed June 19, 2018. http://www.newspapers.com/image/51846902.

SCS.1946a. "Use of Water in Live Oak to be Curtailed." May 10, 1946. Pg 1. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/image/57082325.

SCS. 1946b. "Supervisors to Act Soon on Water Survey." October 9, 1946. Pg 1. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/image/57358052.

SCS. 1948. "Possible Shortage of Three Million Gallons a Day Seen for Peak of Summer Need." March 14, 1948. Pg 1. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/

image/60125722.

SCS. 1953. "Flood Control Project Moves Ahead". May 28, 1953. Pg 1. Newspapers.com. Accessed July 10, 2018. https://www.newspapers.com/image/58421415/.

SCS. 1954a. "Water Superintendent Recommends Study of Three Area Storage Projects". February 19, 1954. Pg 1. Newspapers.com. Accessed July 10, 2018. https://www.newspapers.com/image/58954184/.

SCS. 1954b. "Danger of Fire Still High at County Dump Near Ben Lomond". August 11, 1954. Pg1. Newspapers.com. Accessed June 5, 2018. http://www.newspapers.com/image/60105938.

SCS. 1957a. "County committee to put Emphasis on New Pajaro Valley Survey." February 6, 1957. Pg 1. Newspapers.com. Accessed February 7, 2018. http://www.newspapers.com/image/53801609.

SCS. 1957b. "Map Shows Proposed County Dam Sites, Pipe Lines." February 10, 1957. Pg 13. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/image/53801679.

SCS. 1957c. "The County's Water Problems and Solutions." April 15, 1957. Pg 12. Newspapers.com. Accessed July 10, 2018. https://www.newspapers.com/image/53786181

SCS. 1957d. Water Problem Faces City in Future. September 1, 1957. Pg. 3. Newspapers.com. Accessed July 13, 2018. https://www.newspapers.com/image/53980193.

SCS. 1958a. Information on the Water Situation in Santa Cruz and Plans to Correct It. November 2, 1958, pg.4. Newspapers.com. Accessed July 13, 2018. https://www.newspapers.com/image/53797941.

SCS. 1958b. "Water Bonds Get Overwhelming OK." November 5, 1958. Pg. 1. Newspapers.com. Accessed July 10, 2018. https://www.newspapers.com/image/53798008/

SCS. 1960a. "Salvation in the Making." September 4, 1960. Pg. 15. Newspapers.com. Accessed February 7, 2018. http://www.newspapers.com/image/52035095.

SCS. 1960b. "Safety Engineer Noticed Danger Spot Moments before Avalanche Killed Four." October 26, 1960. Pg. 1. Newspapers.com. Accessed May 22, 2018. http://www.newspapers.com/image/52017427.

SCS. 1961a. Regents Listen to Offers For UC Campus. March 16, 1961. Pg. 1. Newspapers.com. Accessed July 13, 2018. https://www.newspapers.com/image/60193781.

SCS. 1961b. Pros and Cons of University Community Told to Rotary Club by McCaffrey. October 29, 1961. Pg. 9. Newspapers.com. Accessed July 13, 2018. https://www.newspapers.com/image/60501180.

SCS. 1963. "Wee Bit of Scotland Arrives in Ben Lomond." July 21, 1963. Pg 1. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/image/59699508.

SCS. 1964. "Loch Lomond's Temporary Facilities Remain in '64." March 1, 1964. Pg 3. Newspapers.com. Accessed June 5, 2018. http://www.newspapers.com/image/59393567.

SCS. 1979a. "Loch Lomond: Undiscovered by Natives ." April 15, 1979. Pg 13. Newspapers.com. Accessed July 2, 2018. http://www.newspapers.com/image/62660705.

SCS. 1979b. "SC Water Budget Is Up Slightly." June 6, 1979. Pg 8. Newspapers.com. Accessed July 2, 2018. http://www.newspapers.com/image/62648233.

SCS. 1981. "Public Notice." September 6, 1981. Pg 51. Newspapers.com. Accessed July 2, 2018. http://www.newspapers.com/image/62872336.

SCS. 1982. "Newell Creek Dam Spillway Safety Changes Approved." January 7, 1982. Pgs 1, 8. Newspapers.com. Accessed May 29, 2018. http://www.newspapers.com/image/62402755.

SCS. 1984a. "Water Crisis Here Continues." March 18, 1984. Pg 3. Newspapers.com. Accessed May 22, 2018. http://www.newspapers.com/image/62841304.

SCS. 1984b. "Public Notice." November 25, 1984. Pg 60. Newspapers.com. Accessed July 2, 2018. http://www.newspapers.com/image/62702617.

SCS. 1985. "Public Notice." May 12, 1985. Pg 66. Newspapers.com. Accessed July 2, 2018. http://www.newspapers.com/image/62493451.

SCVWD (Santa Clara Valley Water Department) 2018. "Local Dams and Reservoirs." Accessed June 22, 2018. https://www.valleywater.org/your-water/local-dams-and-reservoirs.

SPH Associates Consulting Engineers. 2010. "Loch Lomond Reservoir Source Development Study." San Lorenzo Valley Water District.

SWRB (State Water Resources Board). 1953. Santa Cruz-Monterey Counties Investigation. Publication of the State Water Resources Board. Bulletin No. 5. Sacramento, CA: State Water Resources Board. Accessed July 10, 2018. http://wdl.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_5/Bulletin_5__1953.pdf

U.S. Census Bureau. 1940. "1940 Census Records." Accessed June 7, 2018. https://www.archives.gov/research/census/1940.

U.S. Census Bureau. 1950. "1950 Census Records." Accessed June 7, 2018. https://www.archives.gov/research/census/1950.

USDIRB (U.S. Department of the Interior: Bureau of Reclamation). 1987. "Design of Small Dams." 3rd ed. Washington D.C.: U.S. Government Printing.

USACE (U.S. Army Corps of Engineers). 2004. "General Design and Construction Considerations for Earth and Rock-Fill Dams." Accessed June 7, 2018. https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-2300.pdf.

Waugh, John C. 2003. On the Brink of Civil War: The Compromise of 1850 and How It Changed the Course of American History. Wilmington, Delaware: Scholarly Resources Inc.

plunge pool crossing, the existing outlet and seepage channel, the control house, Newell Creek Road, haul and access routes, and staging areas.

Historic property identification efforts included a records search, a pedestrian archaeological survey, and an architectural survey of the APE between February and September 2018 by the Applicant's consultant. These efforts did not identify any previously recorded cultural resources within the APE; however, the architectural survey identified and recorded the Newell Creek Dam Complex and its associated features within the APE. No archaeological resources were identified within the APE. A Dudek architectural historian evaluated the Newell Creek Dam Complex, recommending it eligible for listing on the National Register of Historic Places (NRHP) under Criterion A, at the local level of significance. The COE has agreed with this recommendation.

The COE contacted the Native American Heritage Commission (NAHC) and received a list of Native American contacts for the project location. The COE contacted all of the listed contacts by letter on April 8, 2019. No responses have been received to date.

The COE has indicated that the proposed undertaking would not significantly alter the character defining features of the Newell Creek Dam Complex and would not cause an adverse effect to the resource. Therefore, the COE has proposed a finding of *no adverse effect* for this undertaking, pursuant to 36 CFR 800.5(b). The COE is requested SHPO review and comment on their determination of eligibility and proposed finding of effect. After reviewing the submitted materials, the following comments are offered:

- I agree that the Newell Creek Dam Complex is eligible for listing on the NRHP under Criterion A at the local level of significance.
- Pursuant to 36 CFR 800.5(c)(1), **I do not object** to a finding of *no adverse effect* for this undertaking.

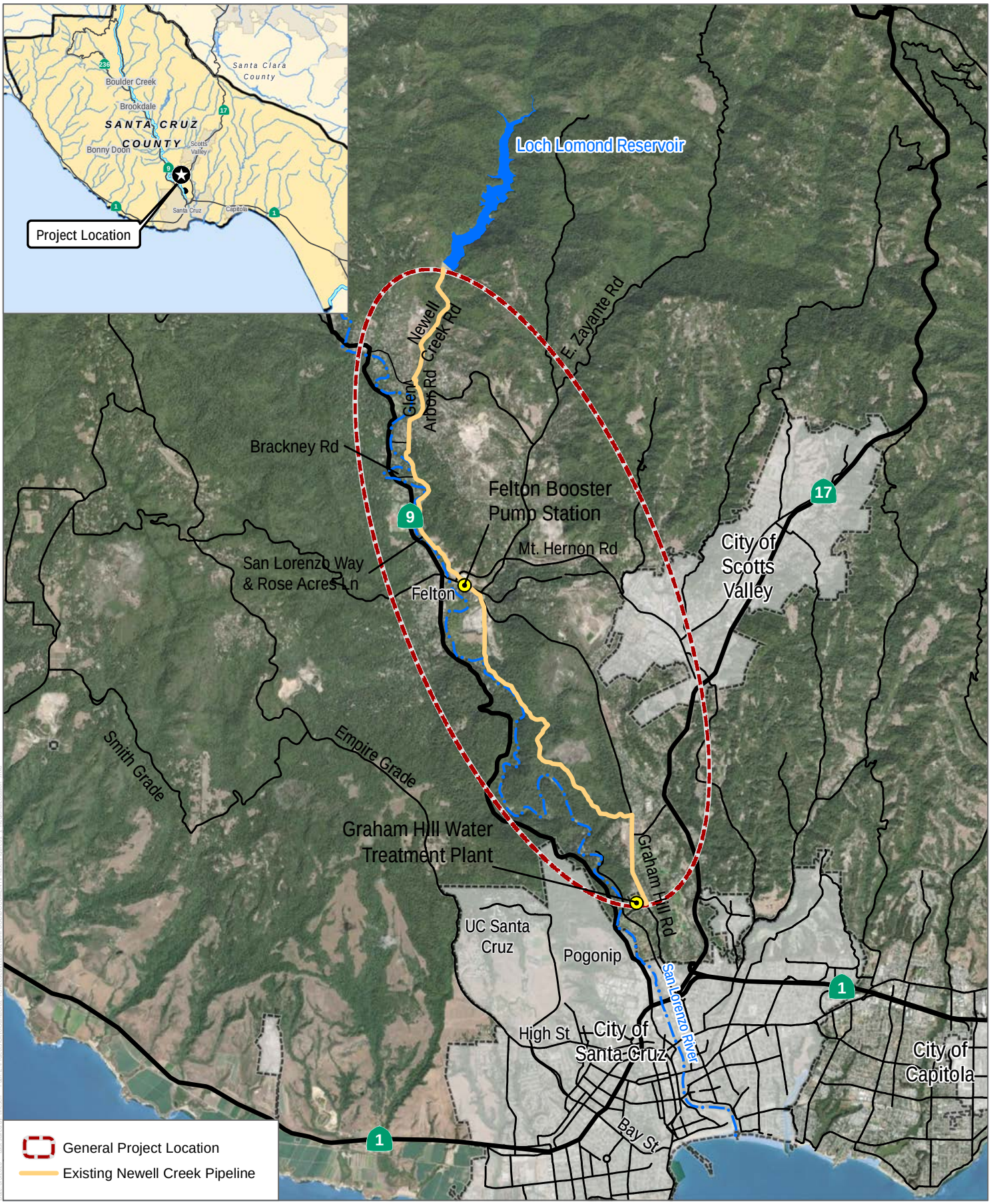
If you have any questions, please contact Jessica Tudor Elliott at (916) 445-7016 or jessica.tudor@parks.ca.gov, or Ed Carroll at (916)445-7006 or ed.carroll@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Appendix B

Project Maps, Project Plans, and Area of Potential Effect Maps



SOURCE: ESRI 2020, City of Santa Cruz 2020

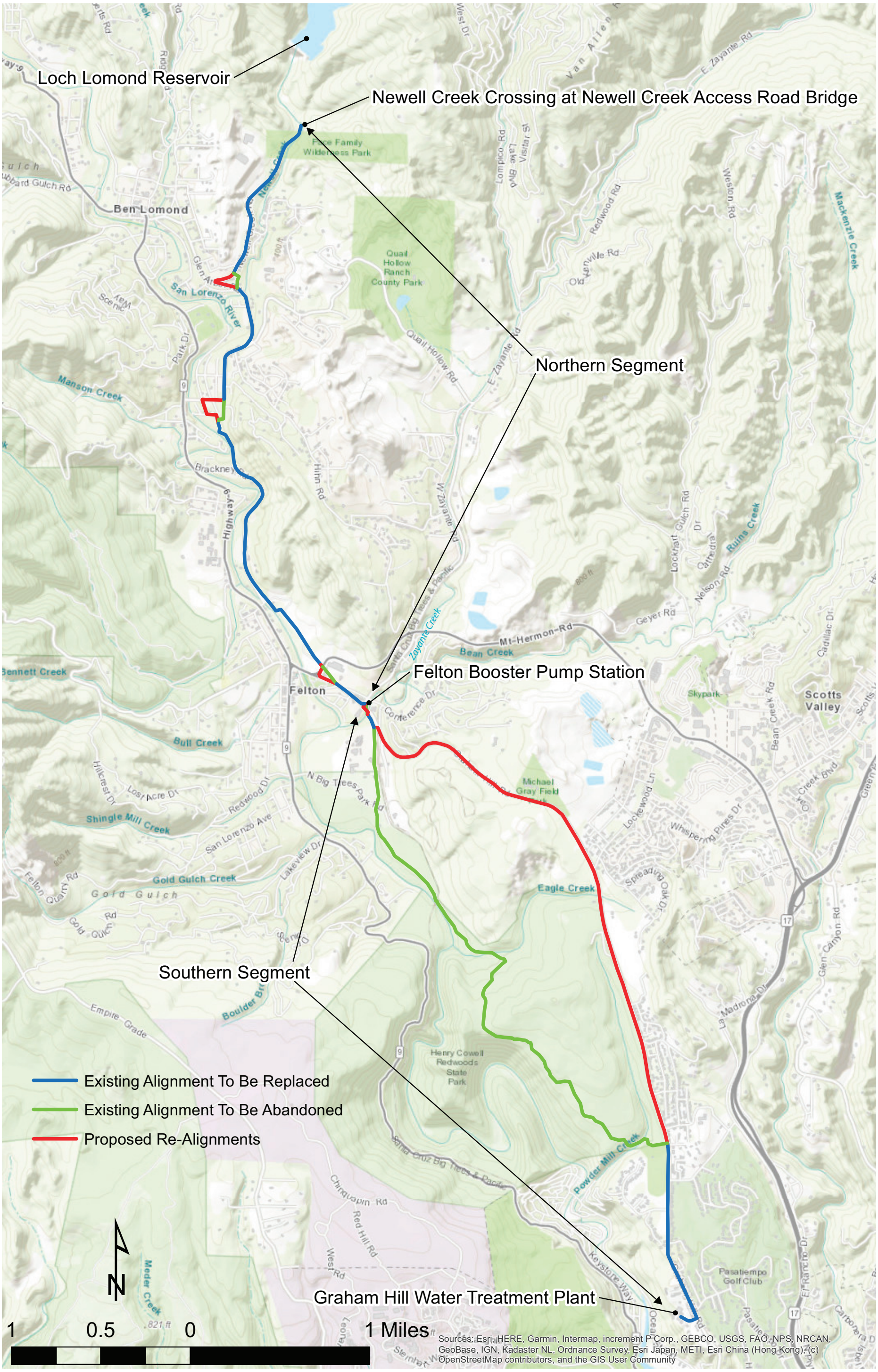
DUDEK

0 3,750 7,500 Feet

FIGURE 1

Project Location

Newell Creek Pipeline Improvement Project



SOURCE: City of Santa Cruz Water Department 2020

FIGURE 2

Proposed Newell Creek Pipeline Improvement Project Overview

Loch Lomond Reservoir

Newell Creek Crossing at Newell Creek Access Road Bridge

Newell Creek Road Section

Newell Creek Crossing at Glen Arbor Road Bridge

Glen Arbor Road Section

Brackney North Section
(Brackney Landslide Area Pipeline Risk Reduction Project)

Brackney South Section

San Lorenzo Way Section

Felton Booster Section

Felton Booster Pump Station

Existing Alignment To Be Replaced

Existing Alignment To Be Abandoned

Proposed Re-Alignments

0.5 0.25 0 0.5 Miles

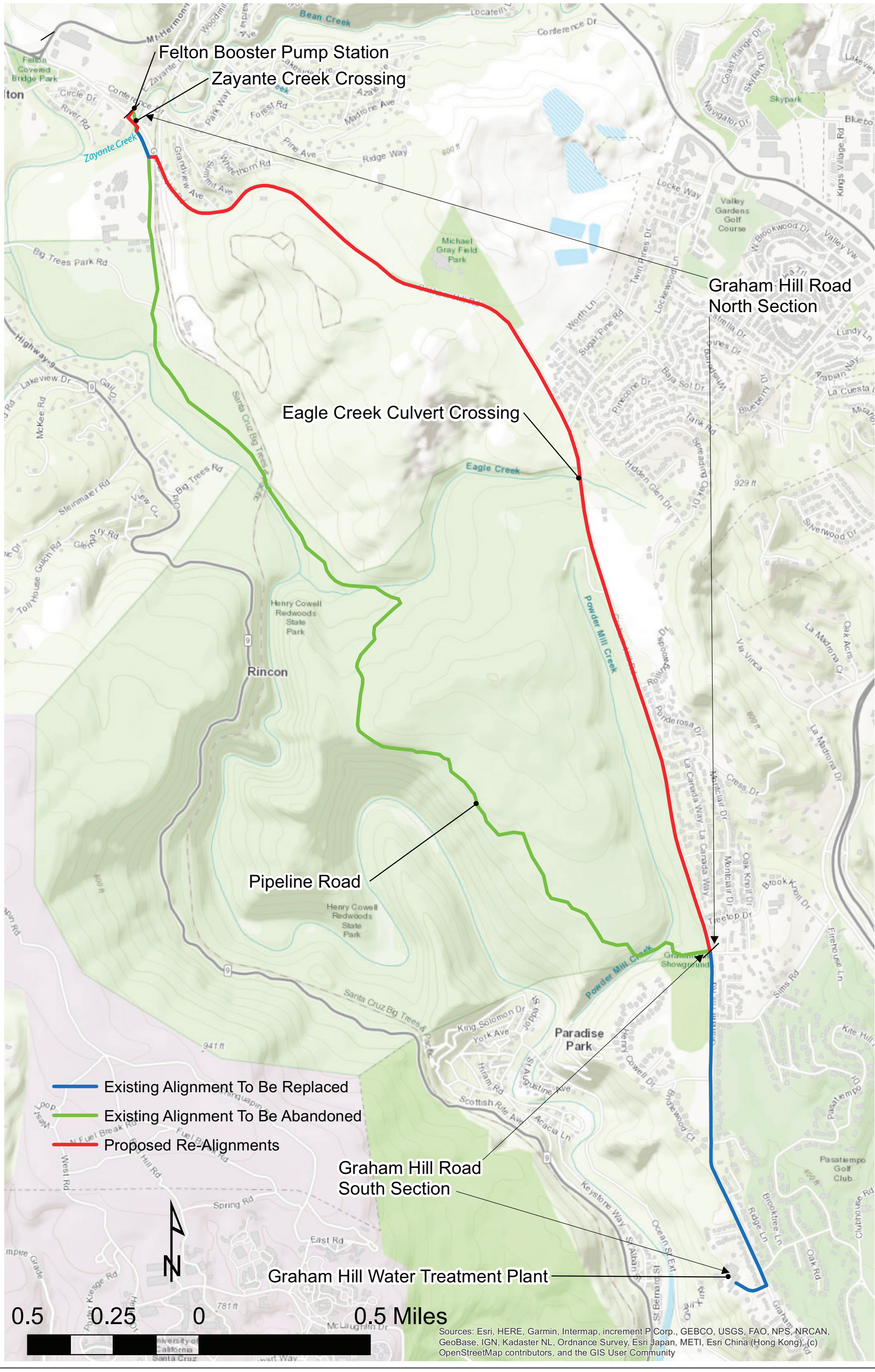
SOURCE: City of Santa Cruz Water Department 2020

FIGURE 3

Proposed Newell Creek Pipeline Improvement Project Northern Segment

Newell Creek Pipeline Improvement Project

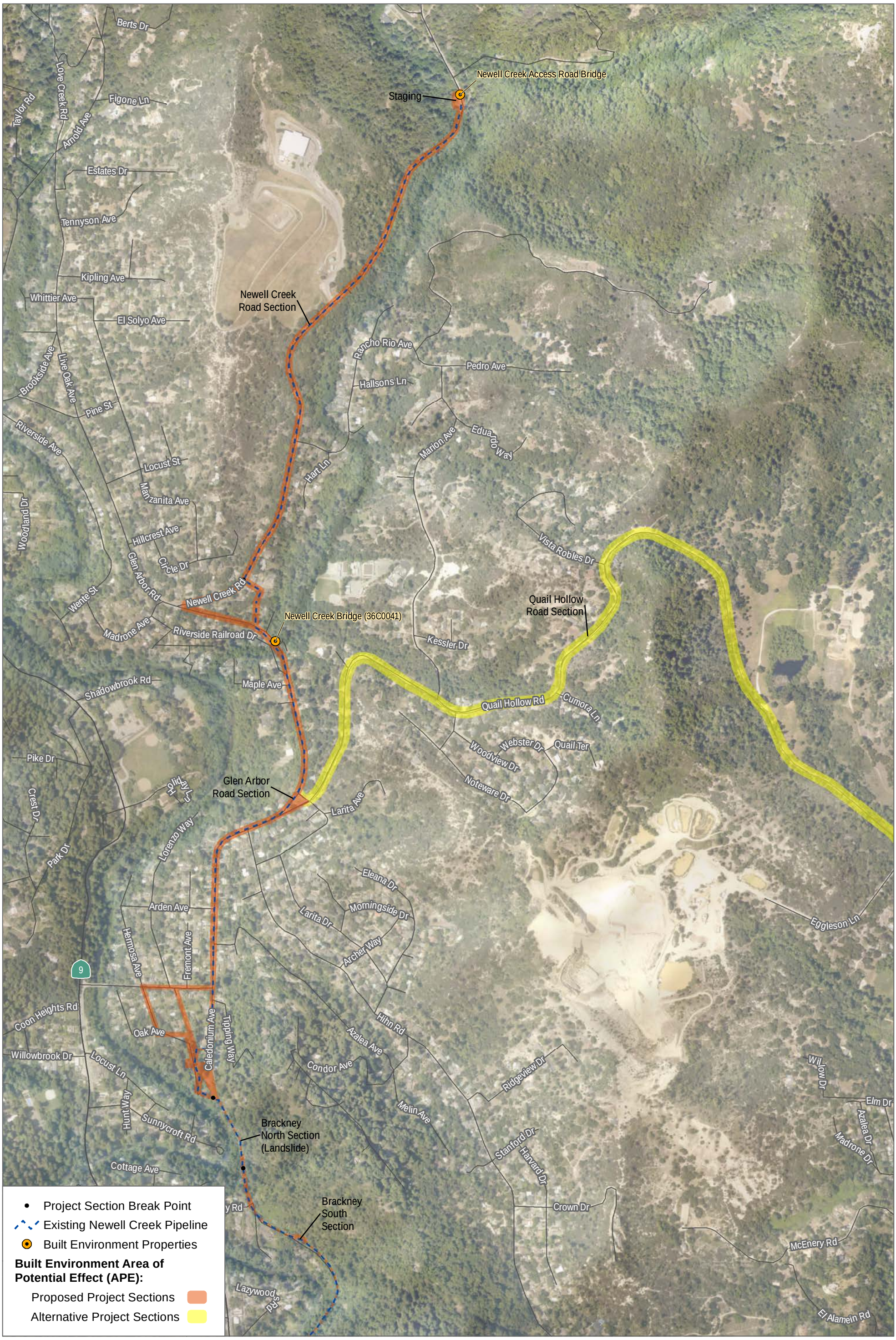
DUDEK



SOURCE: City of Santa Cruz Water Department 2020

FIGURE 4

Proposed Newell Creek Pipeline Improvement Project Southern Segment



SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

FIGURE 3-1

Built Environment Area of Potential Effect: Newell Creek Road, Glen Arbor Road, Brackney North, and Alternative Sections

Newell Creek Pipeline Improvement Project

DUDEK

0 400 800 Feet

SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

FIGURE 3-2

Built Environment Area of Potential Effect: Brackney North, Brackney South, San Lorenzo Way, Felton Booster and Alternative Sections

DUDEK

0 400 800 Feet

Newell Creek Pipeline Improvement Project

SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

0 400 800 Feet

FIGURE 3-3

Built Environment Area of Potential Effect: Graham Hill North, Pipeline Road, and Alternative Sections

Newell Creek Pipeline Improvement Project

SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

0 400 800 Feet

FIGURE 3-4

Built Environment Area of Potential Effect: Graham Hill North and Alternative Sections

Newell Creek Pipeline Improvement Project

SOURCE: ESRI 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

0 400 800 Feet

FIGURE 3-5

Built Environment Area of Potential Effect: Graham Hill North, Pipeline Road, Graham Hill South, and Alternative Sections

Newell Creek Pipeline Improvement Project

Appendix C

Preparer's Qualifications

Kathryn Haley, MA

Senior Architectural Historian

Kathryn Haley is a senior architectural historian with over 17 years of professional experience in historic/cultural resource management. Ms. Haley has worked on a wide variety of projects involving historic research, field inventory, and site assessment conducted for compliance with Section 106, NEPA, and CEQA. Ms. Haley specializes in California Register of Historical Resources (CRHR), the National Register of Historic Places (NRHP), evaluations of built environment resources, including water management structures (levees, canals, dams, ditches), buildings (residential, industrial, and commercial), and linear resources (railroad alignments, roads, and bridges). She specializes in managing large-scale surveys of built environment resources including historic district evaluations. She meets the Secretary of the Interior's Professional Qualification Standards for historian and architectural historian. Moreover, Ms. Haley has served as project manager, coordinator, historian, and researcher for a wide variety of projects. With regard to experience with water related projects, she has prepared numerous Cultural Resources Inventory and Evaluation Reports in Section 106 compliance and through the permitting process with the U.S. Army Corps of Engineers (USACE).

Education

California State University, Sacramento
MA, Public History, 2004

California State University, Sacramento
BA, History, 2001

Professional Affiliations

California Council for the Promotion of History (former Treasurer)

California Preservation Foundation

Dudek Project Experience

Municipal Waterways Maintenance Project CEQA Compliance and USACE permitting- City of San Diego, San Diego, California. January 2019 - Ongoing.
Dudek developed the Municipal Waterways Maintenance Plan (MWMP) in close coordination with the City of San Diego and prepared a program EIR for the City's on-going stormwater facility maintenance program. The Municipal Waterways Maintenance Plan details the planned maintenance activities, specific facility maintenance locations, biological compensatory mitigation sites, agency permitting procedures, and includes site-specific facility maintenance plans and/or technical summaries for stormwater conveyance channels, ditches, structures, and basins throughout eight watersheds within the City's municipal boundaries. Dudek prepared a program EIR for the maintenance program, including cultural resources as one of the associated technical studies. Ms. Haley provided senior level guidance on built environment resources for the project and QA/QC on the technical documentation.

Laguna Creek Diversion Retrofit Project, CEQA Compliance and U.S. Army Corps of Engineers (USACE) permitting – City of Santa Cruz, Bonny Doon, California. June 2020 – Ongoing
As lead architectural historian, Ms. Haley co-authored the Cultural Resources Inventory, Evaluation and Finding of Effect Report for the Laguna Creek Diversion Retrofit Project. The purpose of the project is to retrofit the existing 1890 Laguna Creek Diversion Facility in Bonny Doon, California with a new intake and sediment control system. Ms. Haley co-authored the historical significance evaluation of the Laguna Creek Diversion Facility and is associated components. The significance evaluation determined that the Laguna Creek Dam appears individually eligible as a historic resource/property under NRHP/CRHR Criterion A/1, and Santa Cruz County Criterion 2 as a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California and is significant for its association with early advances in water management in California, specifically through creation of the City of Santa Cruz's first municipal water distribution system. The project effects assessment recommended that the project would have a less than significant impact on historical resources (CEQA)/no adverse effect on historic properties.

Santa Cruz Water Rights Project CEQA Compliance – City of Santa Cruz, Santa Cruz County, California. July 2020 – Ongoing
As lead architectural historian, Ms. Haley co-authored the Cultural Resources Inventory and Evaluation Report for the Santa Cruz Water Rights Project. The purpose of the proposed project which includes 11 proposed undertakings related to water rights and infrastructure improvements for five water districts in 11 non-contiguous locations in Santa Cruz County, California. As the project includes both project level and programmatic level components, the City requested the document comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and the California Environmental Quality Act (CEQA) as federal permits may be needed and/or federal funding may be used for some of the undertakings in the future. Ms. Haley proved QA/QC on the historical significance evaluations of the two historic era properties (over 45 years of age) identified within the APE. Both properties were found not eligible for designation under NRHP, CRHR and local designation criteria. Ms. Haley also wrote the project and program-level impact analysis in the CEQA EIR cultural resources section for built environment resources.

Santa Cruz Wharf Maintenance Project, CEQA Compliance and USACE permitting- City of Santa Cruz, Santa Cruz, California. January 2020.
The purpose of this project is to replace and/or repair storm-damaged piles supporting the Santa Cruz Municipal Wharf in Santa Cruz, California. As lead architectural historian, Ms. Haley provided QA/QC and prepared the finding of effect analysis for the cultural resources technical report for Santa Cruz Wharf Maintenance Project. Ms. Haley assisted in preparing the significance evaluation that recommended the Wharf as eligible under NRHP Criterion A for its continued associations with the industrial development, transportation, commerce, and recreation development of Santa Cruz and under C as a distinctive engineering structure known to be the longest wooden pier structure located along the United States Coast of the Pacific Ocean. Ms. Haley prepared a detailed effects assessment determined that the proposed Wharf Maintenance project would have a less than significant impact on historical resources (CEQA)/no adverse effect on historic properties (Section 106). No mitigation or management recommendations were necessary to support the no adverse effect finding.

Previous Related Project Experience

Feather River Levee Project CEQA/NEPA Compliance—Sutter Butte Flood Control Agency, Butte and Sutter Counties, California (2012 to 2016). The purpose of this project was to assist Sutter Butte Flood Control Agency (SBFCA) through the Section 106 compliance and permitting process with the USACE in order to help facilitate construction improvements along a 40-mile segment of the Feather River Levee in Sutter and Butte Counties. Ms. Haley led the effort to record, evaluate, and document historic built environment resource located in the project area of potential effect (APE) in consultation with the USACE, and the SHPO in compliance with the Programmatic Agreement (PA) for this specific project. Ms. Haley worked extensively with the USACE in the process of documenting the historic era built environment resources located in the APE as well as preparing FOE analysis for significant built environment resources. She also helped to establish efficient and appropriate mitigation measures for properties adversely affected by the project.

Southport Early Implementation Project Environmental Interim Preliminary Planning—West Sacramento Flood Control Agency/HDR Engineering, Yolo County, California (2014 to 2016). Ms. Haley served as lead architectural historian for the Southport Levee project in the City of West Sacramento. Conducted an intensive-level architectural/built environment survey of the project area. Prepared an inventory and evaluation report of resources identified as requiring evaluation under NRHP Criteria. In consultation with USACE, the SHPO, assisted in the preparation of a programmatic agreement and historic properties treatment plan to address cultural resources issues that may arise during project implementation. Cultural work was prepared according to guidelines set forth in the PA for compliance with Section 106.

Knights Landing Outfall Gate Project, Cultural Resources Inventory and Evaluation Report—Reclamation District 108, Yolo County, California (2015). Ms. Haley served as lead architectural historian for the Knights Landing Outfall Gate Project along the Sacramento River near the community of Knights Landing in Yolo County. Conducted an intensive-level architectural/built environment survey of the project area. Prepared an inventory and evaluation report of resources identified as requiring evaluation under NRHP and CRHR Criteria. All work was completed in consultation with USACE, BOR, and the SHPO.

Fallin Elizabeth Steffen, MPS

Architectural Historian

Fallin Steffen is an Architectural Historian with 5 years' experience in historic preservation, architectural conservation, and cultural resource management in the Monterey Bay Area and northern California. Ms. Steffen's professional experience encompasses a variety of projects for local agencies, private developers, and homeowners in both highly urbanized and rural areas, including reconnaissance- and intensive-level surveys, preparation of appropriate historic contexts, and historical significance evaluations in consideration of the NRHP, CRHR, and local designation criteria. Additionally, Ms. Steffen was appointed as a Commissioner to the Santa Cruz City Historic Preservation Commission assisting City Staff with design review and conformance with the Secretary of the Interior Standards for proposed residential, commercial and municipal projects involving historic properties.

Education

Tulane University, New Orleans, LA
Masters of Preservation Studies, 2015

University of California, Santa Cruz, CA
B.A. History of Art & Visual Culture, 2010

Professional Affiliations

California Preservation Foundation

Ms. Steffen meets the Secretary of the Interior's Professional Qualification Standards for Architectural History. She is experienced with interdisciplinary projects spanning private and public development, transportation, and water infrastructure, and maintains experience forming educational sessions about the identification of and best practices for the preservation of historic resources.

Previous Related Project Experience

Salsipuedes Creek Levee Culvert Replacement Project, CEQA Compliance and U.S. Army Corps of Engineers (USACE) permitting, County of Santa Cruz, California. August 2020.
The Santa Cruz County Department of Public Works retained Dudek to complete a cultural resources inventory and evaluation report for a project to replace two aging culverts in the right bank of the Salsipuedes Creek Levee in an unincorporated area northwest of Watsonville, California. The report was prepared in compliance with Section 106 and in support of the permitting process with the USACE. Ms. Steffen co-authored the built environment components of the cultural report including the historical significance evaluation of the Salsipuedes Creek Levee segment identified within the APE. The property was found not eligible for designation under NRHP, CRHR and local designation criteria.

Santa Cruz Water Rights Project CEQA Compliance – City of Santa Cruz, Santa Cruz County, California. July 2020 – Ongoing
As architectural historian, Ms. Steffen co-authored the Cultural Resources Inventory and Evaluation Report for the Santa Cruz Water Rights Project. The purpose of the proposed project which includes 11 proposed undertakings related to water inter rights and infrastructure improvements for five water districts in 11 discontiguous locations in Santa Cruz County, California. As the project includes both project level and programmatic level components, the City requested the document comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and the California Environmental Quality Act (CEQA) as federal permits may be needed and/or federal funding may be used for some of the undertakings in the future. Ms. Steffen co-authored historical significance evaluations of the two historic era properties (over 45 years of age) identified within the APE. Both properties were found not eligible for designation under NRHP, CRHR and local designation criteria.

Laguna Creek Diversion Retrofit Project, CEQA Compliance and U.S. Army Corps of Engineers (USACE) permitting – City of Santa Cruz, Bonny Doon, California. June 2020 – Ongoing
As architectural historian, Ms. Steffen conducted the fieldwork and co-authored the Cultural Resources Inventory, Evaluation and Finding of Effect Report for the Laguna Creek Diversion Retrofit Project. The purpose of the project is to

retrofit the existing 1890 Laguna Creek Diversion Facility in Bonny Doon, California with a new intake and sediment control system. Ms. Steffen co-authored the historical significance evaluation of the Laguna Creek Diversion Facility and is associated components. The significance evaluation determined that the Laguna Creek Dam appears individually eligible as a historic resource/property under NRHP/CRHR Criterion A/1, and Santa Cruz County Criterion 2 as a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California and is significant for its association with early advances in water management in California, specifically through creation of the City of Santa Cruz's first municipal water distribution system. All other associated facility buildings and structures were found not eligible under all NRHP, CRHR, and local designation criteria, and the project effects assessment recommends that the project would have a less than significant impact on historical resources (CEQA)/no adverse effect on historic properties.

Santa Cruz Wharf Maintenance Project CEQA Compliance and USACE permitting- City of Santa Cruz, Santa Cruz, California. January 2020.
The purpose of this project is to replace and/or repair storm-damaged piles supporting the Santa Cruz Municipal Wharf in Santa Cruz, California. As lead architectural historian, Ms. Steffen conducted fieldwork and co-authored the Evaluation and Finding of Effect Report for the Santa Cruz Wharf Maintenance Project. The report was prepared in compliance with Section 106 and in support of the permitting process with the USACE. Although the Wharf had previously evaluated under CRHR and local Criteria by another historian in recent years, no NRHP Criteria evaluation existed. Ms. Steffen co-authored all documentation related to Wharf including the significance evaluation that recommended the Wharf as eligible under NRHP Criterion A for its continued associations with the industrial development, transportation, commerce, and recreation development of Santa Cruz and under C as a distinctive engineering structure known to be the longest wooden pier structure located along the United States Coast of the Pacific Ocean. Additionally, a detailed effects assessment determined that the proposed Wharf Maintenance project would have a less than significant impact on historical resources (CEQA)/no adverse effect on historic properties (Section 106). No mitigation or management recommendations were necessary to support the no adverse effect finding.

Newell Creek Road Access Bridge Rehabilitation Memorandum Report, City of Santa Cruz, California. February 2019.
Dudek was retained by the City of Santa Cruz Water Department to review the proposed Newell Creek Access Road Bridge Rehabilitation project for potential impacts on historical resources during the course of repairs to the bridge's piers. The bridge was identified as a contributor to the Newell Creek Dam district as part of the 2018 historical resources evaluation report of the Newell Creek Dam complex. Ms. Steffen served as architectural historian for the project, conducting the intensive pedestrian survey of the project site and authoring the memorandum report ensuring that the project conformed to the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Historic Context Statement for Reservoirs, City of San Diego Public Utilities Department, California. December 2018.
Ms. Steffen served as architectural historian and co-author of the historic context statement for El Captain Dam and reservoir. Dudek is also preparing detailed impacts assessments for proposed modification to dams, as required by DSOD. The project involves evaluation of at least 10 dams for historical significance in consideration of NRHP, CRHR, and City designation criteria and integrity requirements, and requires extensive archival research and pedestrian survey. Upon completion of the project, the City will have a streamlined document for the management of their historic dam and reservoir infrastructure.

Newel Creek Dam Inlet/Outlet Replacement Project, City of Santa Cruz, California. October 2018.
Ms. Steffen served as architectural historian for the project and co-authored the historical resources evaluation report for the Newell Creek Dam Inlet/Outlet Replacement Project. The City of Santa Cruz retained Dudek to complete the report in support of the proposed project to replace the existing inlet/outlet works on the 1960 Newell Creek Dam in Santa Cruz County, California. The report included a California Historical Resources Information System (CHRIS) records search addressing the proposed APE plus a 0.50-mile radius, a pedestrian survey of the project site for built-environment resources, a historical significance evaluation of the seven historic era structures identified within the APE, and an assessment of project-related impacts to historical resources in conformance with the California Environmental Quality Act (CEQA) and project effects to historic properties in conformance with Section 106 of the NHPA. The significance evaluation determined that the Newell Creek Dam complex appears eligible as a historic resource/property under NRHP/CRHR Criterion A/1, and Santa Cruz County Criterion 2 for its association with local water management in California. The project effects assessment concluded that the project would have a less than significant impact on historical resources/no adverse effect on historic properties.

Appendix D

Confidential Records Search Results

Appendix E

Historic Advocacy Outreach

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 16, 2021

Ashley Holmes
Santa Cruz Museum of Art and History
705 Front Street
Santa Cruz, CA 95060

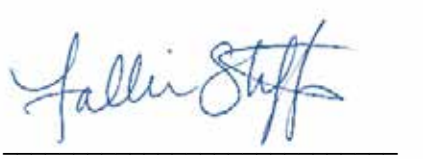
Subject: Newell Creek Pipeline Improvement Project

Dear Ms. Holmes:

Dudek has been retained by the City of Santa Cruz Water Department to conduct a cultural resources study for the Newell Creek Pipeline Improvement Project (Proposed Project). The Newell Creek Pipeline (NCP) conveys untreated water from the City's Felton Diversion to Loch Lomond Reservoir for storage and also conveys impounded water from Loch Lomond to the to the Graham Hill Water Treatment Plant (GHWTP) by way of the Felton Booster Pump Station (FBPS) located at the intersection of Graham Hill Road and East Zayante Road. The NCP is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion of the NCP that extends onto the GHWTP property, which is located within the City of Santa Cruz (City), but is surrounded by unincorporated lands (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address the identified deficiencies in existing pipeline conditions, as well as provide improved access for maintenance and repair. The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24- inch polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing SCWD easements. The Proposed Project would improve long-term reliability of the SCWD water supply infrastructure between Loch Lomond Reservoir and the GHWTP such that it can continue to function as an integral part of the City's overall water supply system.

As part of our study, we are consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be affected by the Proposed Project. Your efforts in this process will provide invaluable information for the proper identification and treatment of such resources. If you have any information regarding known cultural resources in the Proposed Project area, please feel free to contact me via phone or email (listed below), or you can contact Doug Valby, Associate Civil Engineer with the City of Santa Cruz Water Department, by phone at (831) 212-5501 or by email at dvalby@cityofsantacruz.com. All comments, emails, or letters received will be included in the reports generated by this study. Thank you for your time regarding our request.

Sincerely,



Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Proposed Newell Creek Pipeline Improvement Project Overview

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 16, 2021

Felicia Van Stolk
Santa Cruz Museum of Natural History
1305 E Cliff Drive
Santa Cruz, CA 95062

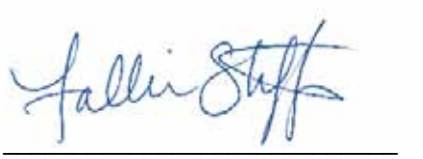
Subject: Newell Creek Pipeline Improvement Project

Dear Ms. Van Stolk:

Dudek has been retained by the City of Santa Cruz Water Department to conduct a cultural resources study for the Newell Creek Pipeline Improvement Project (Proposed Project). The Newell Creek Pipeline (NCP) conveys untreated water from the City's Felton Diversion to Loch Lomond Reservoir for storage and also conveys impounded water from Loch Lomond to the to the Graham Hill Water Treatment Plant (GHWTP) by way of the Felton Booster Pump Station (FBPS) located at the intersection of Graham Hill Road and East Zayante Road. The NCP is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion of the NCP that extends onto the GHWTP property, which is located within the City of Santa Cruz (City), but is surrounded by unincorporated lands (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address the identified deficiencies in existing pipeline conditions, as well as provide improved access for maintenance and repair. The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24- inch polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing SCWD easements. The Proposed Project would improve long-term reliability of the SCWD water supply infrastructure between Loch Lomond Reservoir and the GHWTP such that it can continue to function as an integral part of the City's overall water supply system.

As part of our study, we are consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be affected by the Proposed Project. Your efforts in this process will provide invaluable information for the proper identification and treatment of such resources. If you have any information regarding known cultural resources in the Proposed Project area, please feel free to contact me via phone or email (listed below), or you can contact Doug Valby, Associate Civil Engineer with the City of Santa Cruz Water Department, by phone at (831) 212-5501 or by email at dvalby@cityofsantacruz.com. All comments, emails, or letters received will be included in the reports generated by this study. Thank you for your time regarding our request.

Sincerely,



Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Proposed Newell Creek Pipeline Improvement Project Overview

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 16, 2021

San Lorenzo Valley Museum
12547 CA-9
Boulder Creek, CA 95006

Subject: Newell Creek Pipeline Improvement Project

To Whom it May Concern:

Dudek has been retained by the City of Santa Cruz Water Department to conduct a cultural resources study for the Newell Creek Pipeline Improvement Project (Proposed Project). The Newell Creek Pipeline (NCP) conveys untreated water from the City's Felton Diversion to Loch Lomond Reservoir for storage and also conveys impounded water from Loch Lomond to the to the Graham Hill Water Treatment Plant (GHWTP) by way of the Felton Booster Pump Station (FBPS) located at the intersection of Graham Hill Road and East Zayante Road. The NCP is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion of the NCP that extends onto the GHWTP property, which is located within the City of Santa Cruz (City), but is surrounded by unincorporated lands (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address the identified deficiencies in existing pipeline conditions, as well as provide improved access for maintenance and repair. The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24- inch polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing SCWD easements. The Proposed Project would improve long-term reliability of the SCWD water supply infrastructure between Loch Lomond Reservoir and the GHWTP such that it can continue to function as an integral part of the City's overall water supply system.

As part of our study, we are consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be affected by the Proposed Project. Your efforts in this process will provide invaluable information for the proper identification and treatment of such resources. If you have any information regarding known cultural resources in the Proposed Project area, please feel free to contact me via phone or email (listed below), or you can contact Doug Valby, Associate Civil Engineer with the City of Santa Cruz Water Department, by phone at (831) 212-5501 or by email at dvalby@cityofsantacruz.com. All comments, emails, or letters received will be included in the reports generated by this study. Thank you for your time regarding our request.

Sincerely,

Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Proposed Newell Creek Pipeline Improvement Project Overview

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 16, 2021

University of California, Santa Cruz
McHenry Library Special Collections and Archives
1156 High Street
Santa Cruz, CA 95064

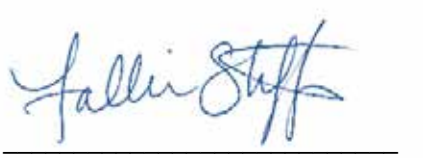
Subject: Newell Creek Pipeline Improvement Project

To Whom it May Concern:

Dudek has been retained by the City of Santa Cruz Water Department to conduct a cultural resources study for the Newell Creek Pipeline Improvement Project (Proposed Project). The Newell Creek Pipeline (NCP) conveys untreated water from the City's Felton Diversion to Loch Lomond Reservoir for storage and also conveys impounded water from Loch Lomond to the to the Graham Hill Water Treatment Plant (GHWTP) by way of the Felton Booster Pump Station (FBPS) located at the intersection of Graham Hill Road and East Zayante Road. The NCP is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion of the NCP that extends onto the GHWTP property, which is located within the City of Santa Cruz (City), but is surrounded by unincorporated lands (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address the identified deficiencies in existing pipeline conditions, as well as provide improved access for maintenance and repair. The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24- inch polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing SCWD easements. The Proposed Project would improve long-term reliability of the SCWD water supply infrastructure between Loch Lomond Reservoir and the GHWTP such that it can continue to function as an integral part of the City's overall water supply system.

As part of our study, we are consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be affected by the Proposed Project. Your efforts in this process will provide invaluable information for the proper identification and treatment of such resources. If you have any information regarding known cultural resources in the Proposed Project area, please feel free to contact me via phone or email (listed below), or you can contact Doug Valby, Associate Civil Engineer with the City of Santa Cruz Water Department, by phone at (831) 212-5501 or by email at dvalby@cityofsantacruz.com. All comments, emails, or letters received will be included in the reports generated by this study. Thank you for your time regarding our request.

Sincerely,

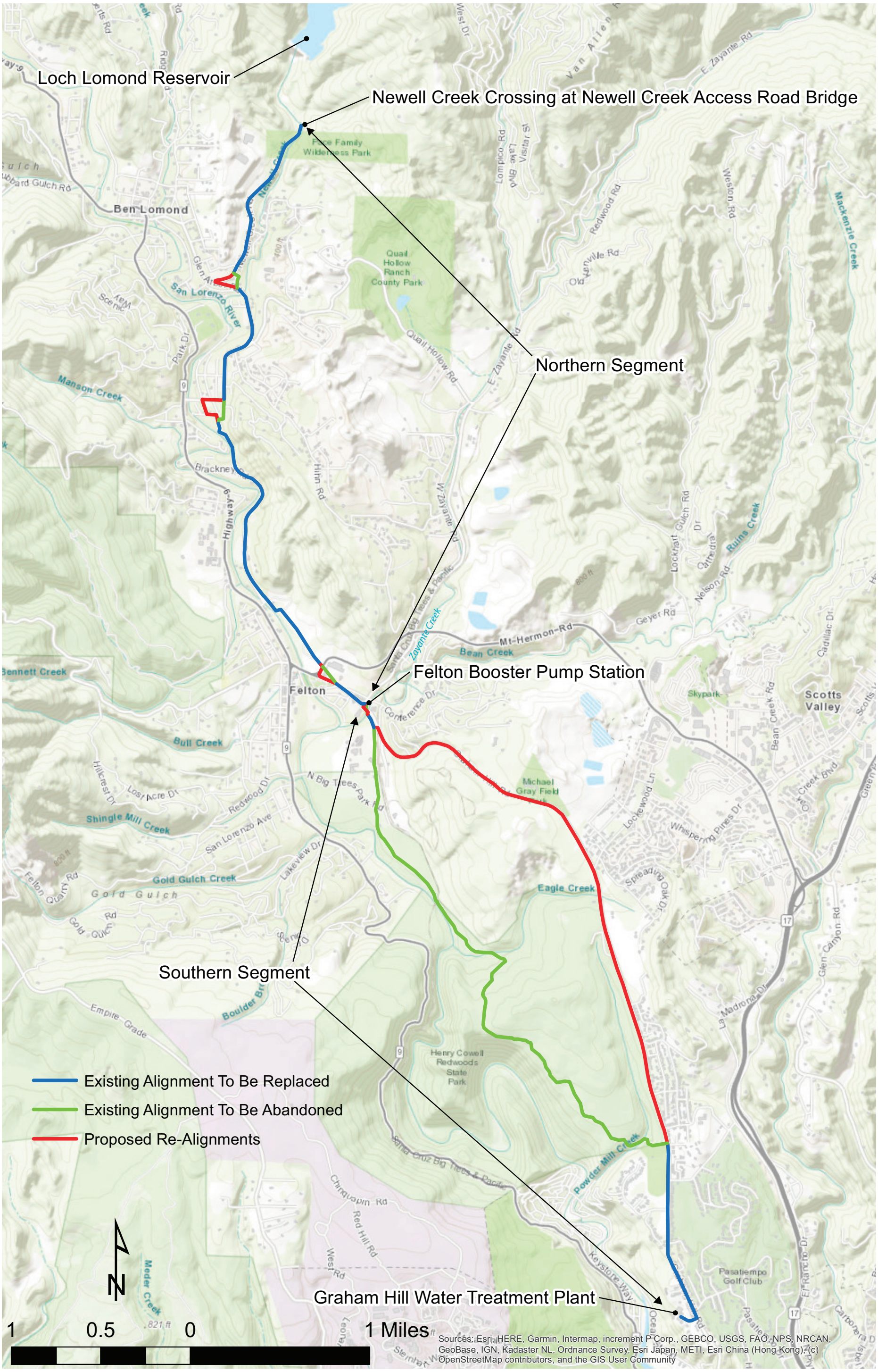


Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Proposed Newell Creek Pipeline Improvement Project Overview



SOURCE: City of Santa Cruz Water Department 2020

FIGURE 1

Proposed Newell Creek Pipeline Improvement Project Overview

From: Fallin Steffen
To: Felicia Van Stolk
Subject: FW: Newell Creek Pipeline Improvement Project
Date: Friday, April 16, 2021 2:48:34 PM
Attachments: SCMNH.pdf

Hello Ms. Van Stolk,

I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

Fallin Steffen, MPS
Architectural Historian
C: 831.400.8882
www.dudek.com

From: Fallin Steffen
To: Ashley Holmes
Subject: Newell Creek Pipeline Improvement Project
Date: Friday, April 16, 2021 2:47:08 PM
Attachments: MAH.pdf

Hello Ms. Holmes,

I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

Fallin Steffen, MPS
Architectural Historian
C: 831.400.8882
www.dudek.com

From: Fallin Steffen
To: "slvhm@cruzio.com"; "slvmuseum@sbcglobal.net"
Subject: Newell Creek Pipeline Improvement Project
Date: Friday, April 16, 2021 2:50:40 PM
Attachments: SLVM.pdf

To Whom It May Concern,

I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

Fallin Steffen, MPS
Architectural Historian
C: 831.400.8882
www.dudek.com

From: Fallin Steffen
To: "speccoll@library.ucsc.edu"
Subject: Newell Creek Pipeline Improvement Project
Date: Friday, April 16, 2021 2:51:51 PM
Attachments: UCSC.pdf

To Whom It May Concern,

I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

Fallin Steffen, MPS
Architectural Historian
C: 831.400.8882
www.dudek.com

From:	Luisa Haddad
To:	Fallin Steffen
Cc:	abnorton@ucsc.edu; began@ucsc.edu; gravier@ucsc.edu; jpigza@ucsc.edu; dundon@ucsc.edu; tmora1@ucsc.edu; orlando@ucsc.edu; ihreti@ucsc.edu; jaffer@ucsc.edu
Subject:	[Special Collections & Archives] Newell Creek Pipeline Improvement Project
Date:	Thursday, April 22, 2021 2:46:39 PM

Response from Luisa Haddad

Apr 22 2021, 02:45pm via System

Dear Fallin Steffen,

Thank you for contacting Special Collections & Archives regarding cultural and historical resources in your project's boundaries.

Information about archaeological and cultural resources for the campus are maintained by the Physical planning, Development and Operations department. We do appreciate your providing this information for us to add to our University Archives.

Best wishes,

Luisa Haddad

Public Services Coordinator

Original Question

Apr 16 2021, 02:52pm via Email from fsteffen@dudek.com

Newell Creek Pipeline Improvement Project

To Whom It May Concern,

I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

Fallin Steffen, MPS

Architectural Historian

C: 831.400.8882

www.dudek.com

Attached Files

- UCSC.pdf

Public Services Coordinator Special Collections and Archives McHenry Library University of California, Santa Cruz

From: Felicia Van Stolk
To: Fallin Steffen
Subject: Re: FW: Newell Creek Pipeline Improvement Project
Date: Thursday, April 22, 2021 12:12:30 PM

Hello Fallin,

Thank you for your inquiry. Our collections do not contain records relevant to the possible presence of any cultural or historical resources that might be impacted by the proposed project.

Please let me know if you have any further questions.

Felicia B. Van Stolk
Executive Director
felicia@santacruzmuseum.org
(831) 420-6115 x 11 | Mon-Fri
She/Her/Hers

Santa Cruz Museum of Natural History
Connecting people with nature and science to inspire stewardship of the natural world.
santacruzmuseum.org | Facebook | Instagram | Twitter

On Fri, Apr 16, 2021 at 2:48 PM Fallin Steffen <fsteffen@dudek.com> wrote:

> Hello Ms. Van Stolk,
>
> I am reaching out today on behalf of Dudek and the City of Santa Cruz Water Department to provide you with some information about the Newell Creek Pipeline Improvement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.
>
> Thank you,
>
> **Fallin Steffen, MPS**
>
> Architectural Historian
>
> 

C: 831.400.8882

www.dudek.com

Appendix F

DPR forms for Newell Creek Pipeline

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

Page 1 **of** 44 ***Resource Name or #:** (Assigned by recorder) Newell Creek Pipeline
P1. Other Identifier:
***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**
***a. County** Santa Cruz **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Felton **Date** 1998 **T** 9S; 10S; 11S; **R** 2W; **S** 34; 03, 04, 08, 18; Mt. Diablo **B.M.**
c. Address _____ City _____ Zip _____
d. UTM: (Give more than one for large and/or linear resources) Multiple Datums (See Continuation Sheet)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

The existing Newell Creek Pipeline (NCP) is located in the Santa Cruz Mountains in the unincorporated area of Santa Cruz County, except for the portion that extends onto the City's Graham Hill Water Treatment Plant (GHWTP) property (See Location Map and Continuation Sheets for information on the location of the resource).

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

The NCP is 9.25 miles long and located in the unincorporated areas of Santa Cruz County. Access to the NCP is provided via Newell Creek Road, Glen Arbor Road, Brackney Road, San Lorenzo Way, Rose Acres Lane, Graham Hill Road, Mount Hermon Road, State Route 9, Pipeline Road (a paved trail through Henry Cowell Redwoods State Park), and via existing City easements **(See Continuation Sheet).**

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

***P4. Resources Present:** ☐ Building ■ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)
P5b. Description of Photo: (view, date, accession #) Figure 1. Datum P-PR 2, view looking east

***P6. Date Constructed/Age and Source:** ■ Historic ☐ Prehistoric ☐ Both
1960 (Santa Cruz Sentinel 1960d)

***P7. Owner and Address:**
City of Santa Cruz
809 Center Street
Santa Cruz, CA 95060

***P8. Recorded by:** (Name, affiliation, and address) Fallin Steffen, MPS
Dudek
725 Front Street, 400
Santa Cruz, CA 95060

***P9. Date Recorded:**
December 2, 9, and 16, 2020

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

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Dudek. 2021. Historical Resources Inventory and Evaluation Report for the Newell Creek Pipeline Improvement Project.

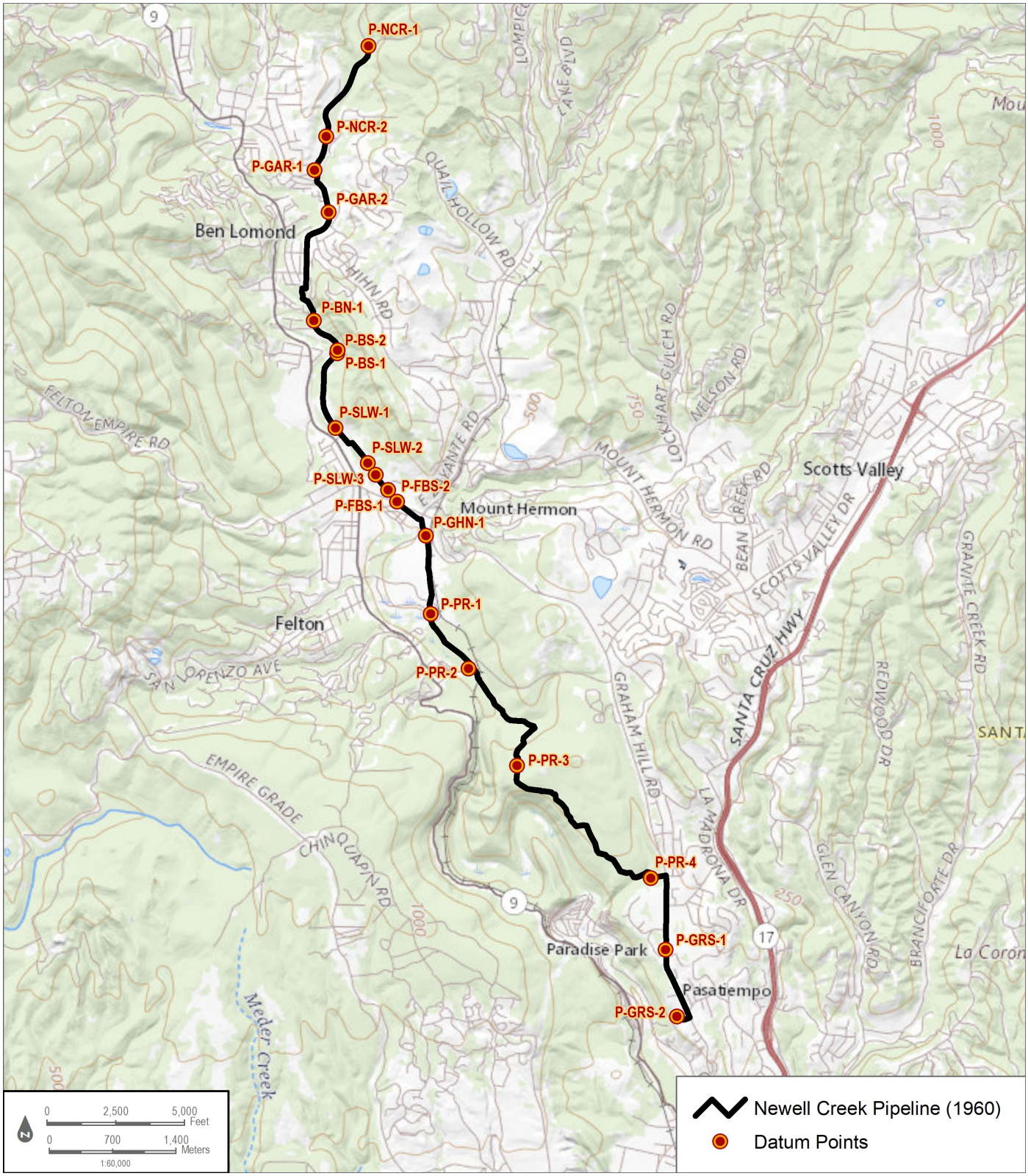
***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record
☐Archaeological Record ☐District Record ■Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List): _____

State of California ◆ Natural Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

 ***Resource Name or #** (Assigned by recorder) Newell Creek Pipeline
***Map Name:** USGS The National Map ***Scale:** 1:24,000 ***Date of map:** May 2020



State of California ◆ The Resources Agency Primary #
DEPARTMENT OF PARKS AND RECREATION HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) Newell Creek Pipeline ***NRHP Status Code** 6Z
Page ___ **of** 44

B1. Historic Name: Newell Creek Pipeline
B2. Common Name:
B3. Original Use: Water conveyance B4. Present Use: Water conveyance
***B5. Architectural Style:** Pipeline
***B6. Construction History:** (Construction date, alterations, and date of alterations)

The Newell Creek Pipeline was completed in 1960. Alterations to the pipeline include: emergency repair and realignment to correct landslide damage within the Brackney North Segment in 1982; disconnection of the Cathodic Protection System in 1986; emergency repair and realignment to correct landslide damage within the Brackney North Segment in 2017; replacement of northern-most segment of section of the pipeline from the Newell Creek Dam to the Newell Creek Access Bridge as part of the Newell Creek Dam Inlet/Outlet Replacement Project in 2020; and replacement of air vent heads and culverts at unknown times.

***B7. Moved?** ■No ☐Yes ☐Unknown **Date:** **Original Location:**
***B8. Related Features:**

B9a. Architect: Brown and Caldwell Civil and Chemical Engineers b. Builder: Granite Construction

***B10. Significance: Theme** **Area**

Period of Significance **Property Type** **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 Newell Creek Pipeline is ineligible for listing in the NRHP and the CRHR due to a lack of historical associations and engineering merit. For these same reasons, the property also does not rise to the level of significance for local designation in the SCCHRI. Therefore, the Newell Creek Pipeline is not considered an historic property under Section 106 of the NHPA nor an historical resource under CEQA.

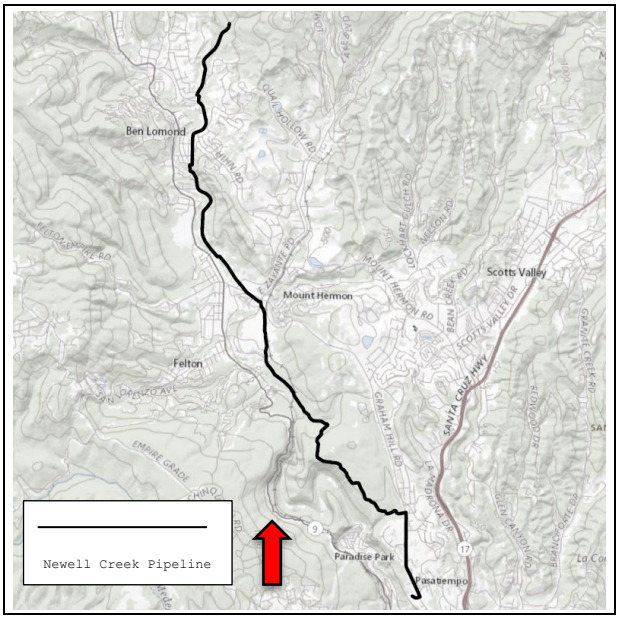
(See Continuation Sheet)

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

***B12. References:** **(See Continuation Sheet)**

B13. Remarks:

***B14. Evaluator:** Fallin Steffen, M.P.S., Dudek
***Date of Evaluation:** 04/09/2021



(This space reserved for official comments.)

State of California ♁ The Resources Agency Primary #
DEPARTMENT OF PARKS AND RECREATION HRI#

LINEAR FEATURE RECORD

Trinomial _____

Page 4 **of** 44 ***Resource Name or #** (Assigned by recorder) Newell Creek Pipeline

L1. Historic and/or Common Name: Newell Creek Pipeline

L2a. Portion Described: ■ Entire Resource □ Segment □ Point Observation **Designation:** Datum

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

See Location Map and Continuation Sheets for information on the Datum Points

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.) See P3a. Description and Continuation Sheets

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

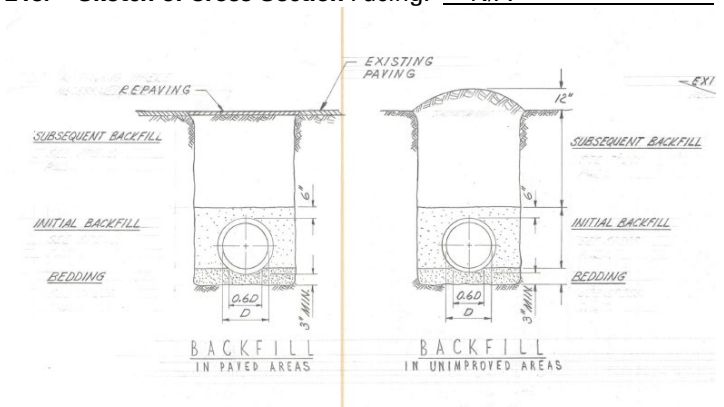
a. Top Width: Pipeline Diameter Ranges from 18 to 27 inches

b. Bottom Width: N/A

c. Height or Depth: N/A

d. Length of Segment: 9.5 Miles

L4e. Sketch of Cross-Section Facing: N/A



L5. Associated Resources: N/A

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.):
The NCP is oriented roughly north/south and is predominately underground as it passes through densely forested areas and residential properties. The NCP daylights at approximately three locations along the route.

L7. Integrity Considerations: The NCP retains its historic alignment, original length, and continues to function as a water pipeline. As such, the NCP retains integrity of location, design, and association. The setting surrounding the NCP has been altered through dense residential and commercial development since 1960 when the structure was completed. As a result, the NCP retains only diminished integrity of setting and feeling. In addition to large repairs to sections of the NCP in 1982 and 2017, the NCP has been periodically maintained, which has resulted in the replacement of original materials including associated appurtenances. Due to this, the NCP no longer retains integrity of materials and workmanship.

L8b. Description of Photo, Map, or Drawing (View, scale, etc.) Figure 2. NCP pipeline segment environment, view looking northwest from Datum P-BN_1

L9. Remarks:

L10. Form Prepared by: (Name, affiliation, and address) Fallin Steffen, M.P.S.
Dudek
725 Front Street, 400
Santa Cruz, CA 95060

L11. Date: 04/09/2021

***P2. Location (continued):**
To document various aspects of the NCP segment, including the variety of materials and features, the pipeline was recorded at 19 different points of access along the pipeline path (Datum P-NCR_1 through Datum P-GRS_2). Recordation of the pipeline began at the northernmost point (Datum P-NCR_1), and continued until the southernmost point (Datum D). The Datum location key is provided in the Location Map and all corresponding photographs are provided below in Table 1.

All Datums are located in Zone 10S.

Datum P-NCR_1: 582367.68 mE/ 4106033.53 mN;
Datum P-NCR_2: 581928.34 mE/ 4105020.06 mN;
Datum P-GAR_1: 581807.50 mE/ 4104640.22 mN;
Datum P-GAR_2: 581977.27 mE/ 4104182.31 mN;
Datum P-BN_1: 581844.95 mE/ 4102975.90 mN;
Datum P-BS_1: 4102658.76 mE/ 4102658.76 mN;
Datum P-BS_2: 582112.16 mE/ 4102624.01 mN;
Datum P-SLW_1: 582114.86 mE/ 4101796.69 mN;
Datum P-SLW_2: 582485.20 mE/ 4101415.53 mN;
Datum P-SLW_3: 582485.20 mE/ 4101289.26 mN;
Datum P-FBS_1: 582715.60 mE/ 4101124.21 mN;
Datum P-FBS_2: 4101124.21 mE/ 4100999.07 mN;
Datum P-GHN_1: 583148.82 mE/ 4100630.41 mN;
Datum P-PR_1: 583224.72 mE/ 4099767.31 mN;
Datum P-PR_2: 583659.84 mE/ 583659.84 mN;
Datum P-PR_3: 584224.86 mE/ 4098114.86 mN;
Datum P-PR_4: 585741.81 mE/ 4096908.65 mN;
Datum P-GRS_1: 585926.33 mE/ 4096120.67 mN;
Datum P-GRS_2: 586216.74 mE/ 4095379.71mN;

***P3a. Description (continued):**
To document various segments of the NCP, including the variety of materials and features, as well as the surrounding setting of each segment, the structure was recorded at multiple points within each of the existing segments discussed in Table 1 below. Recordation of the NCP began at the northernmost point (Datum P-NCR_1) and continued until the southernmost point (Datum P-GRS_2).

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
Newell Creek Road *(NCR)*	Segment runs along Newell Creek Road from the Newell Creek Access Road Bridge and bypassing the intersection of Newell Creek Road and Glen Arbor Road by heading due south between homes before reemerging at Glen Arbor Road.	 **Datum P-NCR_1,** view looking north (DSCN6303)  **Datum P-NCR_2,** view looking south (DSCN6333)
Glen Arbor Road *(GAR)*	The NCP continues south onto Glen Arbor Road and continues south through an existing easement until meeting the north end of the Brackney North Section.	 **Datum P-GAR_1,** view looking north (DSCN6335)

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
		 **Datum P-GAR_2,** view looking south(iPad P-GAR_2a)
Brackney North (BN)	Runs along an abandoned Felton and Pescadero Railroad bed alongside the San Lorenzo River between a Glen Arbor Road neighborhood and the Brackney Road neighborhood.	 **Datum P-BN_1,** view looking northwest (iPad P-BN-1a)

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
Brackney South (BS)	Extends south from the Brackney North Section abandoned Felton and Pescadero Railroad bed and partially along unpaved easement and before ending at the property boundary at north end of San Lorenzo Way/Rose Acres Lane.	 **Datum P-BS_1,** view looking north (iPad P-BS-1a)  **Datum P-BS_2,** view looking north (iPad P-BS-2b)

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
San Lorenzo Way (SLW)	Runs from north to south end of San Lorenzo Way/Rose Acres Lane and through private property to the edge of Mount Hermon Road.	 **Datum P-SLW_1,** view looking southeast (DSCN6277)  **Datum P-SLW_2,** view looking south (iPad P-SLW_2a)  **Datum P-SLW_3,** view looking southeast (DSCN6301)

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
Felton Booster Pump Station (FBS)	Crosses Mount Hermon Road and runs diagonally through the southwest corner of the commercial parking lot before joining and following Graham Hill Road southeast to the Felton Booster Pump Station.	 **Datum P-FBS_1,** view looking south (iPad P-FBS_1b)  **Datum P-FBS_2,** view looking northwest (iPad P-FBS_2a)
Graham Hill Road North (GHN)	From the Felton Booster Pump Station, crosses beneath Zayante Creek, runs alongside Graham Hill Road before heading southward past the Santa Cruz Lumber Company into Henry Cowell Redwood State Park.	

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
		Datum P-GHN_1, view looking northwest (DSCN6379)
Pipeline Road (PR)	The NCP heads roughly southeast through the park before exiting Henry Cowell State Park and meeting Graham Hill Road at the intersection of Graham Hill Road and Pipeline Road.	 **Datum P-PR_1,** view looking north (DSCN6343)  **Datum P-PR_2,** view looking north (DSCN6719) 

Table 1. Newell Creek Pipeline Existing Segment Survey Summary

Existing Segment (*Abbr.*)	**Description**	**Associated Datum Point Photographs**
		Datum P-PR_3, view looking north (DSCN6592)  **Datum P-PR_4,** view looking east (DSCN6396)
Graham Hill Road South (GRS)	Follows Graham Hill Road from southern entrance of Henry Cowell Redwoods State Park to terminus at GHWTP.	 **Datum P-GRS_1,** view looking north (PC160048)  **Datum P-GRS_1,** view looking southeast (PC160053)

Appurtenances related to the NCP including air vents, valve access boxes, wharf hydrants, culverts, the cathodic protection box (now abandoned), and a meter pit are also visible along the route. These features are described generally in Table 2 below.

Table 2. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Air Vent: Type A	Metal air vent extending from the ground. The majority of the original vent heads (top) have been replaced with smaller, PVC vent heads (bottom).	 Air vent with original head (DSCN6537)  Air vent with replaced head (iPad V-NCR_1a)

Table 2. Newell Creek Pipeline Associated Appurtenances

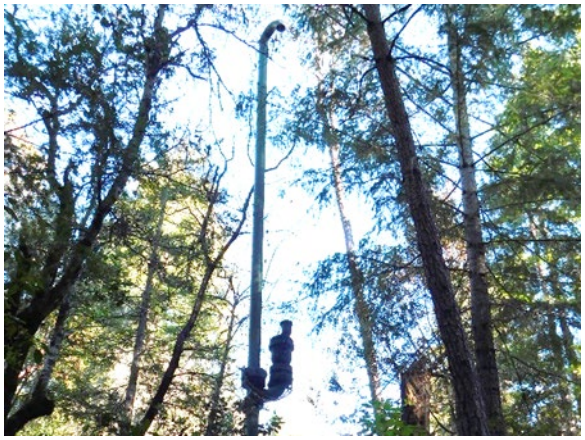
Appurtenances	Description	Photograph
Air Vent: Type B	Tall (over 10 feet) metal air vent with curved vent head and back flow valve.	 (DSCN6512)
Valve Access Box	Concrete vault box with corresponding metal access covers.	 (iPad P-BN_1b)

Table 2. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Wharf Hydrants	Metal fire hydrant extending from the ground with the upper section painted yellow.	 (DSCN6401)
Culverts	New and historic culverts along the pipeline route are constructed from a variety of materials including concrete (top), corrugated metal, corrugated PVC material, and in one instance within the Brackney South Segment, a wood culvert that was originally constructed in conjunction with the Felton and Pescadero Railroad in 1885 (bottom).	 Concrete Culvert (DSCN6222)  Wooden Culvert (DSCN6231)

Table 2. Newell Creek Pipeline Associated Appurtenances

Appurtenances	Description	Photograph
Cathodic Protection Box (abandoned) and Meter Pit	The cathodic protection system no longer contains a galvanic anode system and is therefore no longer functioning.	 (DSCN6376)

***B10. Significance:**

Historical Overview of Santa Cruz County

Spanish Period (1769–1822)

The earliest known European exploration of the Monterey Bay was a Spanish envoy mission led by Sebastián Vizcaíno in 1602. The purpose of the voyage was to survey the California coastline to locate feasible ports for shipping, and Vizcaíno had explicit instructions prohibiting the creation of settlements and interacting with local Native Americans. Finding the bay to be commodious, fertile, and extremely favorable for anchorage during eastward voyages from Manila to Acapulco, Vizcaíno named the Bay "Monterey" after the Conde de Monterey, the present Viceroy in Mexico (Chapman 1920: 293-4; Hoover et al. 2002: 225-6).

Despite being mapped as an advantageous berth for Spanish shipping efforts, the epicenter of Spanish settlement in Alta California did not make its way to the Monterey Bay until the second half of the eighteenth century. In an effort to prevent the establishment of English and Russian colonies in northern Alta California, Don Gaspar de Portolá, the Governor of Baja, embarked on a voyage in 1769 to establish military and religious control over the area. This overland expedition by Portolá marks the beginning of California's Historic period, occurring just after King Carlos III of Spain installed the Franciscan Order to direct religious colonization in assigned territories of the Americas. With a band of 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, Portolá established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, Padre-Presidente Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823, including Mission Santa Cruz (Hoover et al. 2002: 226; Lehmann 2000: 3; Koch 1973: 3).

On their quest to locate the Monterey Bay from the 160-year-old accounts of Sebastián Vizcaíno, the Portolá expedition first reached the present-day territory of Santa Cruz on October 17, 1769. After mistakenly circumventing the Monterey Bay and reaching the San Francisco Bay, the expedition backtracked to San Diego. The following year on May 31, 1770, a second expedition was organized by Portolá resulting in a successful location of the Monterey Bay. However, it would be an additional 21 years before the Franciscan order would establish Mission Santa Cruz in the area near the San Lorenzo River (Koch 1973: 2-3; Hoover et al. 2002: 447-8).

Father Fermín Lasuén, Corporal Luis Peralta, and five soldiers established Mission Santa Cruz on August 28, 1791, as the twelfth mission in the California Mission system. The Spanish Padres converted local Native Americans to Catholicism largely against their will, after which they were known as neophytes. Neophytes were forced to build the mission church and auxiliary structures from local timber, limestone, and adobe, as well as to cultivate wheat, barley, beans, corn, and lentils for their captors. In 1792, neophytes were directed to excavate a ditch for the purposes of carrying water from Tres Ojos de Agua (Three Eyes of Water), a group of three creeks near the modern entrance to the University of California, Santa Cruz campus, down to the Mission site. This ditch and the footpath beside it established the foundation for the future orientation of High Street in the City of Santa Cruz today, and offered the Mission a distinct advantage in a geographic area that often experienced water shortages during the summer months (Hoover et al. 2005: 448; Lehmann 2000: 3-4; SCWD n.d: 1).

From the start, Mission Santa Cruz was plagued by substantial issues. The forced conversion of the local native population by the Spanish Padres resulted in repeated rebellions, violence, desertion, and pestilence at Mission Santa Cruz. In 1793, the neophyte population attacked the Mission guards and burned their station to the ground. In 1798, Padre Fernandez reported that 189 of the approximately 230 neophytes living on the Mission grounds had abandoned the Mission, causing the crops to fail and the livestock to be largely neglected. The Mission also experienced problems wrought by a nearby settlement known as Villa de Branciforte (Lehmann 2000: 3-4).

In 1795, Spain established three self-governing Pueblos in Alta California that, unlike the Missions, would remain free from military and religious oversight. Villa de Branciforte was established in 1797 on the opposite bank of the San Lorenzo River from Mission Santa Cruz along the present-day alignment of both Branciforte Avenue and Branciforte Creek. The 40 settlers of Villa de Branciforte were not provided with the resources promised to build housing or cultivate the land and had to make do with crude dwellings of their own design. In 1803, there were 107 inhabitants, but because the population was made up of former soldiers, artisans, and criminals, they lacked the pertinent skill to farm and sustain themselves. Despite population growth in the initial years, the settlement was quickly deemed a failure by Spain (Lehmann 2000: 4-5).

By 1817, the population of Villa de Branciforte had dwindled to 52 people. In 1818, fearing the attack of the French pirate Hippolyte de Bouchard who had recently attacked the Monterey Presidio, the Mission Padres fled from the Mission Santa Cruz and placed the care of the complex with the remaining inhabitants of Villa de Branciforte. Instead of securing the Mission, the inhabitants of the Villa looted the valuable items from the complex while the Padres were away, including furniture, doors and flatware. Additionally, just under half of the 410 neophytes living at the Mission fled from the complex during the looting chaos and never returned (Lehmann 2000: 4-5).

Mexican Period (1822–1848)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants. In addition to eliminating the system of Spanish nobility in California, the Spanish missions across the territory were secularized during this period (Koch 1973: 10; Lehmann 2000: 4).

The secularization of the Spanish Missions meant that all communal mission property was placed in a trust with the intention of being returned to the local Native American population. In Santa Cruz, the land stolen by the Spanish was returned to Native Americans between 1834 and 1839, but a smallpox epidemic in 1838 and reoccurring bouts of syphilis caused a massive decline in the Native American population from 284 persons in 1837 to only 71 persons in 1839. This meant that very few eligible Native American recipients remained to receive it, and records indicate that overall, only 25 Native Americans held property in the Santa Cruz area between 1834 and 1849 (Lehmann 2000: 4-5).

Extensive land grants were established in the interior during the Mexican Period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated its colonization efforts. Land grants to citizens covered over 150,000 acres of present-day Santa Cruz County. Three land grants covered the regions of the densely forested Santa Cruz Mountains that falls within Santa Cruz County, including *Rancho Zayante* (1841), *Rancho Cañada del Rincon en el Rio*

de San Lorenzo (1843) and *Rancho Carbonera* (1838) (Hoover et al. 2002: 455-457; Robinson 2012: 7).

The scarcity of water in the future City of Santa Cruz intensified towards the end of the Mexican Period with assistance from a formal decree by the Santa Cruz Alcalde, Don Manuel Rodriguez. In 1844, Rodriguez transferred the rights to the water carried by the 1792 aqueduct to the limited control of the mission and eight adjacent grant-holders. After this point, the growing population in the outlying areas of Santa Cruz became exclusively reliant on water taken from shallow wells and surface sources that were subject to seasonal surge and drought cycles, such as the San Lorenzo River (SCWD n.d.: 1).

American Period (1848–Present)
The Mexican American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American Period. Santa Cruz was designated as one of the 27 original counties of California on February 18, 1850, shortly before California officially became a state with the Compromise of 1850. The new State of California recognized the ownership of lands in the state distributed under the Mexican land grants of the previous several decades (Lehmann 2000: 5; Koch 1973: 35).

As the Gold Rush was picking up steam in 1849, a massive influx of people seeking gold steadily flooded the rural counties of California. The gold fields quickly dried up, causing many new arrivals to refocus on other economic opportunities. In Santa Cruz County, insightful entrepreneurs saw the arrival of opportunity-seeking laborers as a means to harvest the abundant natural resources found throughout the area. In the northern areas of the young county, the lumber, mining, fishing, tanning, and leisure industries formed the economic foundation of the County. In the central and southern areas of the County, early settlers took advantage of the fertile soil and temperate climate to establish large farms and dairies. Agricultural products including grain and apples were among the County's earliest and most successful (Lehmann 2000: 7).

As the County moved into the 1900s, agriculture and tourism continued as the region's most prominent economic drivers. By the late 1950s, the population began to expand with aid from the establishment of Cabrillo College in 1959 and the University of California at Santa Cruz in the 1965. These higher education facilities brought both students and jobs as the schools became major sources of community employment throughout the County. During the 1980s, a number of technology companies settled in the area due to its close proximity to Silicon Valley. Today, tourism, agriculture, manufacturing, and technology are the key industries that provide the economic base for County's 273,213 residents (U.S. Census Bureau 2019).

Development of Early Transportation Corridors in Santa Cruz County
The earliest railroad in the County was built and operated by the Southern Pacific Railroad (SPRR) in 1871, which was situated at the southern-most point of the County connecting the City of Watsonville with the City of Gilroy. In 1873, Fredrick A. Hihn and Claus Spreckels filed incorporation papers for the Santa Cruz Railroad, a narrow-gauge railroad line connecting the City of Watsonville to the City of Santa Cruz. The line, known as the Santa Cruz- Watsonville Railroad, was completed in 1876 and later purchased by a SPRR subsidiary in 1881 (Clark 2008: 309, 331).

As the number of lumber operations in the County grew rapidly, transportation infrastructure developed simultaneously to support the movement of goods from remote processing locations in the Santa Cruz Mountains. The earliest efforts to transport lumber and lime resulted in the construction of roads like as Graham Hill Road, or "Graham's Grade" as its was first known, which was completed by Isaac Graham in the 1840s leading from the upper reaches of the San Lorenzo Valley to the Santa Cruz Wharf. Graham was an American who arrived in California sometime during the 1830s, and after a brief imprisonment in Tepic, Baja California, he settled on Rancho Zayante in 1841 where he set up enterprises in lumbering, cattle ranching, leather tanning, and distilling. Although the road has been somewhat realigned, it has remained in continual use since its completion in the 1840s (Clark 2008: 130; Robinson 2012: 8).

Navigating the steep, angled roads through the valley while driving heavy, lumber-filled wagons was a dangerous undertaking even for experienced teamsters, but the unpredictability of seasonal weather changes often proved deadly. The unreliability of transporting lumber by wagon prompted the development of a flume along the San Lorenzo River to easily move the lumber to port instead. While the initial plan called for the flume to stretch over 20 miles from the mountains to the coast,

seasonal drought of the lower San Lorenzo River and tributary creeks encouraged the need instead for a narrow-gauge railroad to begin at the flume terminus in Felton leading down to the harbor. Work on the Felton Lumber Flume and the Santa Cruz and Felton Railroad (Figure 3) was completed simultaneously during 1875. The terminus of the 9-mile flume and the new rail line was in Felton, California, where the lumber originating as far as 2 miles north of Boulder Creek, floated down the water-driven flume and could be loaded onto the train and hauled safely downhill to shore. Overall, the water-powered gravity flume drastically increased the availability of Santa Cruz lumber to a wider market, while the rail line opened the San Lorenzo Valley up to tourism (Hoover et al. 2002: 462; Robinson 2012: 20).

Figure 3. An early photograph of the Felton Flume (center) alongside the narrow gauge Santa Cruz and Felton Railroad (engine and tracks at right) (University of California, Santa Cruz Special Collections).

In 1876, construction of the South Pacific Coast Railroad began between Alameda and Santa Cruz via San José. When it was completed in 1880, the narrow-gauge railroad traveled southwest from Los Gatos into the densely forested areas on the Santa Clara side of the Santa Cruz Mountains before emerging into Santa Cruz County through a 6,200-foot tunnel at the summit. The line wound down through the small communities of Laurel, Glenwood, Clems, Doughertys, Zayante, and Felton before continuing along the tracks leased from Santa Cruz and Felton Railroad through Big Trees, Rincon, and the Powder Works before reaching the terminus in Santa Cruz (Clark 2008: 332).

In 1883, articles of incorporation were filed for the Felton and Pescadero Railroad company, which was intended to connect the town of Felton with the coastal town of Pescadero located in San Mateo County. The announcement of the newly formed company included a reference to the abundant virgin redwood forests of Big Basin that would be made accessible by the new railroad, claiming "the millions of lumber they will produce is beyond reasonable computation" (Santa Cruz Surf 1883: 3)." Bids for the first 7.5 miles of tracks between Felton and Boulder Creek including the "grading and bridging … of roadbed, also for the laying and surfacing of the track" (Santa Cruz Surf 1884: 1) were requested during the summer of 1884 and completed in 1885. The Felton and Pescadero line was almost immediately incorporated into the South Pacific Coast Railroad, and this section constitutes the only part of the Felton and Pescadero railroad that was ever completed. Small communities emerged along this new route including Brackney, Glen Arbor, Ben Lomond, and Brookdale (Santa Cruz Surf 1883: 3, 1884: 1; Clark 2008: 332).

In 1887, the Santa Cruz and Felton Railroad, the South Pacific Coast Railroad, and the Felton Pescadero Railroad incorporated together with several other small subsidiaries into the South Pacific

Coast Railway Company, which was then leased to the SPRR. The SPRR converted the original narrow-gauge tracks to broad-gauge beginning in 1905 (Figure 4), but the project was spectacularly delayed after the earthquake of 1906 caused widespread damage. It took nearly 3 years before the tracks were adequately repaired and the first broad-gauge train passed from Los Gatos to Santa Cruz in 1909. In 1934, the 7.5-mile section originally built as the Felton and Pescadero Railroad was decommissioned, and the tracks were pulled up. The remainder of the consolidated South Pacific Coast Railway Company was purchased outright by SPRR in 1937 and regular rail service along the line ceased in 1940 (Clark 2008: 111, 332; SC Evening News 1936a: 7).

Figure 4. A photograph showing the expansion of either the Santa Cruz and Felton Railroad or the Felton and Pescadero railroad from narrow to broad-gauge in the proximity of Felton, c. 1905 (University of California, Santa Cruz Special Collections).

Tourism Industry in Santa Cruz County

Interest in the beauty of the Monterey Bay drew visitors to the County beginning in the 1860s, causing beach tourism to emerge early on as another major industry in the County. Tourism was also responsible for quickening the rate of development along the scenic coastal areas of Santa Cruz County. The completion of railroads in the County, including the Santa Cruz and Felton Railroad in 1875, the Santa Cruz–Watsonville Railroad in 1876, and the South Pacific Coast Railroad in 1880, provided greater mobility into and throughout the County from the Bay Area and inland areas of the state by both residents and tourists alike. As the rise of trains also reconfigured shipping from the Santa Cruz wharf to the new railroads, shipping from the wharf altogether declined due to lack of use and the ease of transport by train, the beachfront areas of the City presented savvy entrepreneurs with new emerging opportunities (Lehmann 2000: 14, 25-6).

By 1893, Harper's Weekly acknowledged the County as a beach destination, promoting beachside institutions like the Neptune Baths built in 1884 by Captain C.F. Miller, and giving the coastal destinations, including Fredrick A. Hihn's Camp Capitola, the push needed to become national tourist destinations. The economic transition away from the early industries of the County towards tourism during this period helped to alleviate the strain placed on the forests in the north of the County, which had experienced widespread deforestation as a result of early logging and lime production

activities in that area. By the close of the nineteenth century, few old-growth redwood specimens remained in the forests of the Santa Cruz Mountains, and as it became increasingly clear that these trees were capable of drawing crowds on their own, their conservation became a dual effort to both save the trees and simultaneously promote Santa Cruz County as a one-stop tourism destination. With the help of the railroads, a tourist to the County could visit the seaside attractions as well as the groves of *Sequoia Sempervirens*, or coastal redwoods, within a single day. While the coastal redwood occupied several areas within the County, a grove located south of Felton alongside the San Lorenzo River known as Felton Big Trees, or Big Trees, and two distinct Big Trees resorts were developed within this area during the late nineteenth century, which were formally separated only by a fence. The Santa Cruz and Felton Railroad line included Big Trees stop, which allowed for ease of access to the otherwise remote locations of these parks (Figure 5) (Lehmann 2000: 14).

Figure 5. A postcard showing the Big Trees railroad stop along the Santa Cruz and Felton Railroad south of Felton, c. 1920s (University of California, Santa Cruz Special Collections).

The earliest Big Tree resort was established by Joseph Warren Welch on his 350-acre property sometime after 1867. Welch's Big Tree Grove contained conveniences including a lodging house, a saloon, a store, and an outdoor event venue. In 1930, the Welch family sold the property to the County for the creation of a local park, which became known as Santa Cruz County Big Trees Park (Clark 2008: 28).
The second resort was established in 1895 to the south of Welch's resort on property that was owned by the Cowell family. Cowells Big Tree park included guest cabins, a coffeeshop, and a souvenir shop. The park was leased to the Hopkins family in later years before it was finally closed to the public in 1942. In 1954, as a memorial following the death of his father, Samuel H. Cowell donated 1,623-acres of land including the Cowells Big Trees property to the State of California. During the same year, the donation to the State was combined with the former Welch's Big Tree Grove property comprising the Santa Cruz County Big Trees Park to form, the Henry Cowell Redwoods State Park. The new park named after Samuel Cowell's late father, Henry Cowell (Clark 2008: 28).

In 1963, as interest in the now non-operational railroads in the Santa Cruz Mountains grew, Norman Clark established a private amusement park known as Roaring Camp & Big Trees Narrow Gauge Railroad alongside the Henry Cowell Redwood State Park, where it was advertised that "1860s steam locomotives climb the western U.S.'s steepest railroad grades through groves of giant redwoods" (Clark 2008: 282). In 1985, Clark purchased the tracks and ROW for the SPRR between Santa Cruz to Olympia (composed of the former Santa Cruz and Felton Railroad path and a portion of the South Pacific Coast Railroad path) and formed the Big Trees and Pacific Railway Company to provide rail tours between Felton and Santa Cruz (Clark 2008: 282, 331).

Water Management in North Santa Cruz County

Early Water Management in Santa Cruz County
Several miles north of the evolving city center at the base of the Santa Cruz Mountains, multiple mountain streams and tributaries carve deep channels and valleys through the dense redwood and oak timberlands. The extensive virgin forests and the rich underground deposits of lime in the Santa Cruz Mountains attracted opportunistic settlers and purveyors in the mid- to late-1800s who sought to harness the power of the mountain streams to move the goods located in the remote area to market (Hoover et al. 2002: 456).

The California Gold Rush of 1848 accelerated the desirability of land across the state, and before long, access to water in the drought-prone region took on the highest level of importance. Instead of adopting an equal water access structure in the fashion of the eastern United States, the wealth potential of waterways during the Gold Rush shaped California water law into a "first in time, first in right" system known as Prior Appropriation. Under this system, riparian rights were granted to the first person to use a river or tributary for beneficial consumption like mining, farming, milling, or as-needed domestic use. When land in the Santa Cruz Mountains was subdivided and sold, access to the rivers and streams was enormously important. Not only did it mean that the initial use set out for a waterway was the primary use, it also meant that any subsequent uses could not supersede or negatively affect the chief use. The order that claims were recognized during this period established the foundation of the complicated system of water allocation rights still in use today in the County (Pisani 1984: 246–247).

Many of these powerful mountain streams and tributaries were utilized by early landowners and tenant entrepreneurs to make a profit from the natural resources that formed the early economic basis of the County. Several of these mountain creeks still bear the names of the first men who established mills or permanently settled beside them. Majors Creek was named for Joseph L. Majors who established a grist mill on the creek prior to serving as the County Treasurer between 1850 and 1853. Liddell Creek was named for George Liddell who moved to the Santa Cruz Mountains and established a sawmill on the creek in 1851. Newell Creek was named for Addison Newell who established a farm in the steep, V-shaped valley on the banks of the creek in 1867 (Koch 1973: 33–34; D. Clark 2008: 174, 187, 215). For others, the streams presented pure economic opportunity. The first power sawmill in California was built on Rancho Zayante by Isaac Graham in the 1842 and was driven by the waters of Zayante Creek. Isaac E. Davis and Albion P. Jordan of the Davis and Jordan Lime Company purchased a portion of Rancho Cañada del Rincon in 1853 as a promising quarry site. They also utilized the falling water on the property to process local lumber into fuel for their many kilns. The California Powder Works was established in 1865 on the bank of the San Lorenzo River on a portion of Rancho Carbonera. The

Powder Works used the river to grind raw materials used in the production of the first smokeless powder manufactured on the west coast of the United States. By 1868, there were a sizable number of business and industries that relied on water from County waterways to operate, including 12 water-powered lumber mills, 10 steam-powered lumber mills, and 9 shingle mills in operation within the County (D. Clark 2008: 130–131; Hoover et al. 2005: 456; Koch 1973: 36–37; Brown 2011: 4).

Water Management in the San Lorenzo Valley

By the late 1800s and early 1900s several small communities were scattered throughout the San Lorenzo Valley. These areas developed as a result of mining and lumber operations, the arrival of multiple railroads into the remote areas of the valley, and the increased popularity as a tourist destination for development of vacation homes.. The remote nature of these small subdivisions caused them to rely on small, self-contained water systems. The communities of Ben Lomond, Brookdale, and Boulder Creek for example, formed their own, distinct water systems designed to serve the needs of residents who occupied their vacation homes only a few weeks a year which were supplied by nearby springs and creeks by way of flumes or pipelines. When the County population doubled between 1900 to 1940 from 21,512 to 45,057 persons and more people moved permanently into the valley, the existing water systems became inadequate (SLVWD 2020; SCPL n.d.: 1).

Frequent droughts between 1912 and 1939 convinced San Lorenzo Valley leaders to form a water district to better control water, to serve the needs of the valley. After one failed attempt to form a county water district by election in 1939, the San Lorenzo Valley Water Department (SLVWD) was formed by the voters on April 3, 1941. Negative voter returns from the towns of Felton and Scotts Valley left those areas out of the district boundaries, which included Bear Creek, Boulder Creek, Alba, and Ben Lomond school districts, and part of the Sequoia school district (SLVWD 2020).

By the late 1950s, population growth and new development throughout the Valley had exacerbated an already tenuous water situation within the SLVWD. In 1959, the SLVWD signed an agreement with the City of Santa Cruz, in which the district sold the City its timber and mineral rights to the Newell Creek watershed, in exchange for one-eighth of the water rights from the water stored by Newell Creek Dam following its development in 1960. The development of the Newell Creek Dam and the Newell Creek Pipeline is discussed in detail in Section 3.3 below (SLVWD 2020).

Today, the SLVWD supports a population of approximately 35,000 people across roughly 60 square miles of service area encompassing the towns and communities of Ben Lomond, Boulder Creek, Brookdale, Felton, Lompico, and Zayante. The system also includes sections of the City of Scotts Valley, including two subdivisions (the Pasatiempo Pines and Manana Woods) and two mobile home parks (Vista del Lago and Spring Lakes) (SLVWD 2020; SVWD 2020).

Water Management in the City of Santa Cruz

As water management techniques were being applied to a variety of industries throughout the County, the successful technologies developed and used in early natural resource harvesting such as flumes and pumps prompted local residents in the City of Santa Cruz to consider why these were not being put to use for the benefit of drinking water. The following section provides an outline of specific projects and miles stones related to the development of water management systems in the City of Santa Cruz.

Private Development (1864–1916)

Beginning in the 1860s, acute cyclical water shortages and pollution prompted the development of several for-profit water systems in Santa Cruz. By the end of the 1880s, the two surviving major water companies, F.A. Hihn Water Works and the Santa Cruz Water Company, were joined into a single private business that competed with the new municipal water system that began in 1890 for almost three decades before being purchased by the City and integrated into the municipal system in 1916.

F.A. Hihn Water Works (1864)

In 1864, prompted by the issue of shortage, young entrepreneurs Elihu Anthony and Fredrick A. Hihn implored the Board of County Supervisors to allow them to dig trenches and lay redwood pipes to transport water throughout Santa Cruz. The "wooden tubes" were chosen as an inexpensive alternative to iron pipes (Santa Cruz Weekly Sentinel 1864: 2). The source of the water was an 8,000-gallon reservoir on Anthony's property supplied by water from Scott's Creek, and eager recipients of the water could gain access for a fee. (Brown 2011: 1–2; Santa Cruz Weekly Sentinel 1864: 2).

By 1876, the 1864 system was known as the F.A. Hihn Water Works, and it was the largest provider of water in the newly chartered City, with Dodero and Carbonera Creeks constituting its primary sources. The company predated the incorporation of Santa Cruz by 2 years (Koch 1973: 35; Brown and Dunlap 1956: 14; City of Santa Cruz 2020).

The Santa Cruz Water Company (1866)
In 1866 a new, fee-based, private water supply company was founded to share in the lucrative profits of the F.A. Hihn Water Works. A man named E. Morgan acquired rights to the waters of the San Lorenzo River in 1866, just prior to the town of Santa Cruz being officially incorporated later that year. He used these rights to install a section of pipework conveying water to the area known then as the "The Flats," which comprises the modern area of Pacific Avenue and Front Street (SCWD n.d.: 1).

In 1876, Morgan sold his system to a wealthy man from San Francisco named H.K. Lowe. Under Lowe's guidance, the Santa Cruz Water Company incorporated in July 1876 and began construction on a pumping station on the San Lorenzo River approximately 1 mile upstream from the City, as well as a new reservoir located on High Street. Morgan retained 50 company shares and became the resident engineer and superintendent of the Santa Cruz Water Company. By the end of 1876, the company had also installed a Branciforte Creek diversion to deliver water via a pipeline to a new reservoir located at the base of School Street. As the City continued to grow and the steam-powered pumping plant installed on the San Lorenzo River became the source of repeated water-quality concerns, the Santa Cruz Water company acquired partial water appropriation rights to the Majors (then called Cojo Creek) in 1881. After the acquisition, the company scrapped the whole San Lorenzo pumping plant for $800 (Santa Cruz Weekly Sentinel 1877a: 1; 1877b: 2; SCWD n.d.: 1).

For the next several years, the Santa Cruz Water Company focused its attention on the construction of a pipeline to divert water from Majors Creek. This effort was very costly and the company slipped into dire financial condition. In August 1886, the company along with all of its appurtenances was sold to the City, financed through the sale of bonds from the Bank of Santa Cruz and the Anglo-Californian Bank. Hihn bitterly opposed the issuance of the bonds and contested their legality in court. The matter reached the Supreme Court and the election in favor of the bonds was declared invalid in 1887. By this time however, the City had already operated the water system for over a year when it was re-conveyed to private owners in 1887 (Santa Cruz Weekly Sentinel 1882: 3; SCWD n.d.: 1; Santa Cruz Surf 1890a: 1).

The City voted again in March 1888 to put up the bonds necessary to purchase the Santa Cruz Water Company system from the private owners. However, while the City was in the process of securing the bonds for the purchase, the Santa Cruz Water Company system was covertly sold to F.A. Hihn in a private, backroom transaction before the City could obtain legal ownership. Hihn quickly consolidated the Santa Cruz Water Company system with his own system of works. This transaction effectively severed any opportunity the City had of acquiring an established water works system with which to launch their own public water system (Santa Cruz Daily Surf 1888a: 3, 1888b: 2; Santa Cruz Surf 1890a: 1).

F.A. Hihn continued to operate the consolidated system as the Santa Cruz Water Company and expanded the service area east into the Seabright neighborhood until his death in 1913 (SCWD n.d.: 1).

Public Development (1890–1917)
During the 1880s, the rising price of these fee-based water systems like the F.A. Hihn Water Works and the Santa Cruz Water Company prompted the City to explore their own, city-owned, public water option. After several disappointing attempts to acquire an existing system of water works, the City revised its approach and began planning to build a diversion system and storage reservoir from the ground up, prompting the development of the first municipal water project in Santa Cruz, the Laguna Creek Dam and the Cowell Reservoir. This project led the way for other ambitious water system development in the City including several other north coast stream diversions and the first pumping plant on the San Lorenzo River. In 1916, the City acquired the rights to the Santa Cruz Water Company and began to tie in the systems as one, forming the basis of the modern City system used today.

The Laguna Creek Dam and the Cowell Reservoir (1890)
In July 1888, the Common Council secured the water rights to the Laguna Creek. "The Laguna," the

Santa Cruz Sentinel reported, "is a rushing, roaring mountain stream, entirely rock bound and tree shaded above the falls where it is proposed to take the water out (Santa Cruz Sentinel 1888: 2)." The stream was capable of supplying 1.4 million gallons towards a City-owned water works. Plans were finally in motion for the construction of the first city-owned water works, supplied through a new pipeline by the waters of Laguna Creek, with reserve storage in a new City reservoir on Henry Cowell's ranch property known as the Cowell Street Reservoir, which was located roughly at the present site of the U.C. Santa Cruz Arboretum. The *Santa Cruz Surf* reported with excitement that the new project would mean open, municipal water so that each citizen of Santa Cruz could finally "quench his thirst with free water without 'dropping a nickel in the slot'" (Santa Cruz Surf 1890a: 1).

The bonds required to fund the construction of the City water works were secured within the following year, and in July 1889, a civil engineer named G.S. Schussler issues a report in favor of the project that valued the proposed undertaking at $260K (Santa Cruz Surf 1889a: 3, 1889b: 3).

The prominent San Francisco firm Risdon Iron Works was selected as the contractor, who were known for producing the great iron pipes for steam ships. The *Santa Cruz Surf* reported that work on the dam on Laguna Creek and the dam at the reservoir site would be completed by the San Francisco contracting firm Kelso and Dare (Santa Cruz Surf 1889c: 3).

On September 30, 1890, the *Santa Cruz Surf* reported that the reservoir and the pipeline of the City water works were nearly complete. The article published an in-depth description of the new Laguna Creek Dam (Figure 6), stating that (Santa Cruz Surf 1890b: 3):

> The dam across Laguna Creek just above the Henneuse place is one of the finest pieces of rubble stone work in the county and not to be excelled anywhere. The granite rocks used in its construction were taken from the bed of the creek, some of them weighing as much as two tons. The water will first be diverted from the Laguna at this point into a flume 3x4 feet and one hundred feet in length, also built of solid masonry. This is nearly level and terminates in a basin two feet lower, and into which the sand and sediment which may be carried in the water in a time of storm will settle. Gates are provided by means of which this basin can be cleared as often as required. From here the water will enter the 14-inch main through which it will be carried to the storage reservoir. This pipe follows the canyon of the Laguna creek as nearly as possible to the county road a distance of about three miles.

Figure 6. The earliest known photograph of the Laguna Creek Masonry Dam published in the Santa Cruz Surf in 1892 (Santa Cruz Surf 1892: 2).

On October 18, 1890, the last pipe connecting the Laguna Creek to the new Cowell Street Reservoir (Figure 7) was put into position. The pipeline emptied into the reservoir for storage and eventual distribution to the homes and businesses of Santa Cruz (Santa Cruz Surf 1890c: 3).

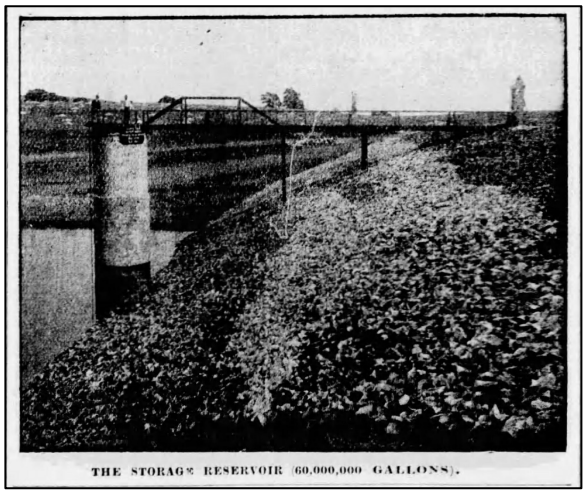


Figure 7. The earliest known photograph of the Cowell Street Reservoir published in the *Santa Cruz Surf* in 1892 (Santa Cruz Surf 1892: 2).

Reggiardo Creek Diversion (Flume 1891, Dam 1912)
A 965-foot-long flume was completed in 1891 connecting the west branch of Laguna Creek, colloquially known as Reggiardo Creek, to the main Laguna Creek by emptying out water to the north of the Laguna Creek Dam. The new flume was intended to help supplement the municipal supply from Laguna Creek, as the year-old Laguna Creek Dam was quickly inundated with sediment and less water than expected was being captured by the system overall (Santa Cruz Surf 1892: 2).

In 1912, R.S. Tait, the water superintendent, announced that a dam had been completed on Reggiardo Creek in order to aid in the supply of daily drinking water sourced from Laguna Creek. The level of Laguna Creek had been significantly reduced by a lack of rainfall in the watershed area, causing the supply of water in the impoundment to drop below sufficient levels to support the community (SC Evening News 1912: 2).

High Street Distribution Reservoir (1904)
In 1894, the City purchased a parcel of land located on the south side of High Street between present-day Laurent and Storey Streets for the construction of a Distribution Reservoir. The Cowell Reservoir was constructed to hold 60 million gallons, but it was carved into a porous limestone formation known as karst that caused approximately 1 million gallons of leakage daily. The Distribution Reservoir was intended to serve are a secondary reservoir for the Cowell Reservoir to preserve the water that was otherwise lost before it could be pumped into the distribution system (Santa Cruz County Assessor 1894; SCMU 2016: 1).

The site for the Distribution Reservoir overlapped Dodero Spring Creek (then called Meyrick Brook) and provided the added benefit of impounding a percentage of the water from this source while temporarily storing the water impounded from the City Water Works on Laguna and Reggiardo Creeks. The survey and specifications for the new reservoir were completed in 1895 and the Santa Cruz Sentinel reported that the reservoir would have a capacity of 2.5 million gallons and cover three-quarters of an acre. Construction on the reservoir began in 1904 and it was completed later that year (Santa Cruz Sentinel 1895: 3, 1903: 4, 1904: 3).

Liddell Spring Diversion (1913)
Discussions about securing the title to Liddell Spring and utilizing it as a source of municipal

water were gathering support in the City government beginning early in 1913. By July 1913, a pipeline between Liddell Spring and the main municipal pipeline from Laguna Creek was operational, and, at a rate of 590,000 gallons per day, was out-producing all the other existing municipal water sources (SC Evening News 1913a: 1).

Crossing Street Pump Station (1913)
In 1913, a new well was drilled on the San Lorenzo River at Crossing Street, just north of the present intersection of Highway 1 with the river. It was equipped by a 75-horsepower, 5-inch, three-step centrifugal pump that was installed by the United Iron Works. The pump was capable of pumping 500 gallons per minute and cost $1844 dollars at the time of installation (SC Evening News 1913b: 1).

Acquisition of the Santa Cruz Water Company System (1913–1916)
Fredrick Hihn passed away in 1913 and his ownership of the Santa Cruz Water Company passed to his children. The City seized the opportunity to acquire the Santa Cruz Water Company system, and in 1916 assumed full legal ownership of the entire system, which included right to water being drawn from Branciforte Creek, Carbonera Creek, Majors Creek, and the San Lorenzo River (SCWD n.d.: 2; Monterey American 1913: 7; SC Evening News 1914: 1).

Public Development (1918–1939)
Public development during this period was predominantly focused on the repair and upgrade of existing system components. Although upgrades and additions were added to the several major facilities to increase the ability to store and improve the overall quality of municipal water during this period, with projects such as the Bay Street Reservoir in 1924 and the New Crossing Street Pumping Plant in 1929, the output was not widely increased between 1917 and 1930. Service began expanding into the areas to the east outside of the City with focused initiatives like the East Side Water Extension during this period (Brown and Dunlap 1956: 1-2).

The Bay Street Reservoir (1924)
The Bay Street reservoir was completed in 1924 and was located 1 mile southeast of the Cowell Street Reservoir on a site to the east from the present intersection of Bay Street and Meder Street. The 35-million-gallon capacity open-air tank was built to replace the Cowell Street reservoir. The Bay Street reservoir was constructed of stone and lined with concrete and was intended to be much more capable of reserving water accumulated from the surface stream sources for use during the dry summer and fall months (Figure 8) (SCMU 2016: 1).

Figure 8. Construction of the Bay Street Reservoir in 1924 (SCPL 1924).

Crossing Street Pumping Plant (1929)

In 1929, the City completed a new, modern pumping plant on the Lorenzo River on the southern side of Crossing Street across from the 1913 Crossing Street Pumping Plant site (Figure 9). Once complete, the plant went by the same name as its predecessor until it eventually was known simply as the Municipal Pumping Plant. Today, it is called the Coast Pump Station. The new facility was designed by City engineer Roy Fowler and consisted of a pumping plant capable of producing 6 million gallons of potable water in a 24-hour period from the San Lorenzo River. The plant operated with the help of "diesel engines, pumps, motors, generators, and all other necessary auxiliary equipment" (SC Evening News 1928: 8). The plant also treated the water with chlorine, making it safer to drink (SCWD n.d.: 3; Brown and Dunlap 1956: 1; SC Evening News 1928: 8, 1929: 7).

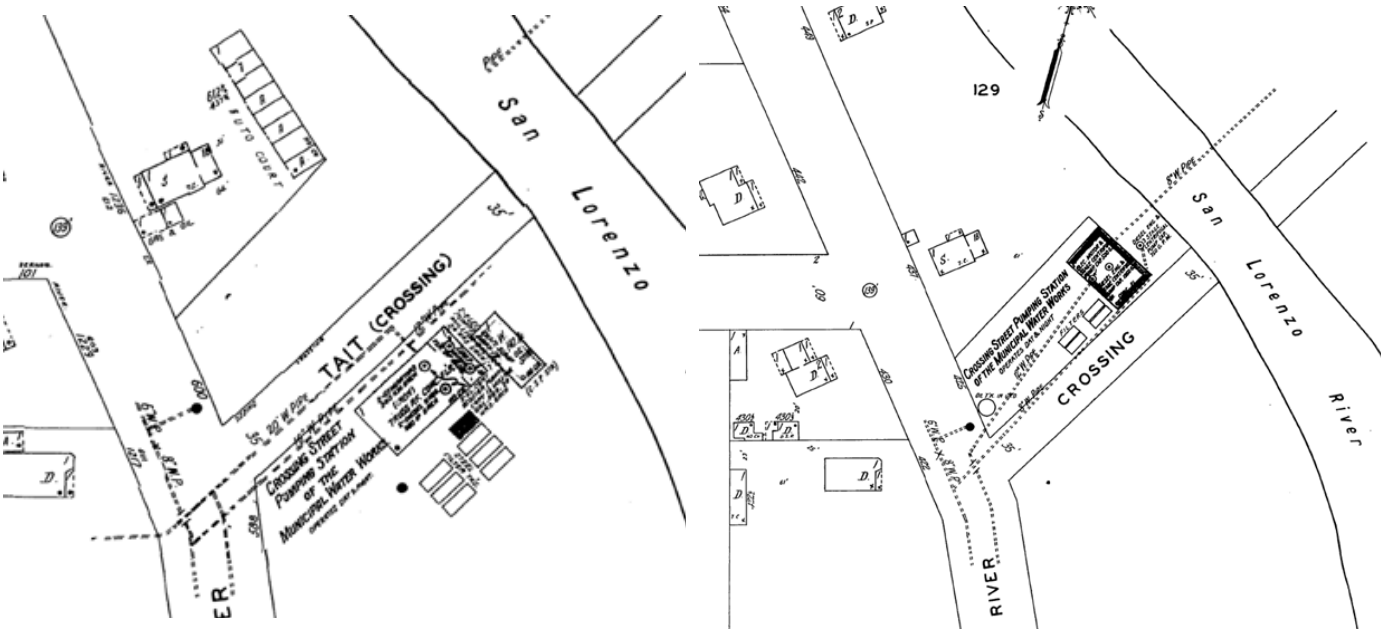
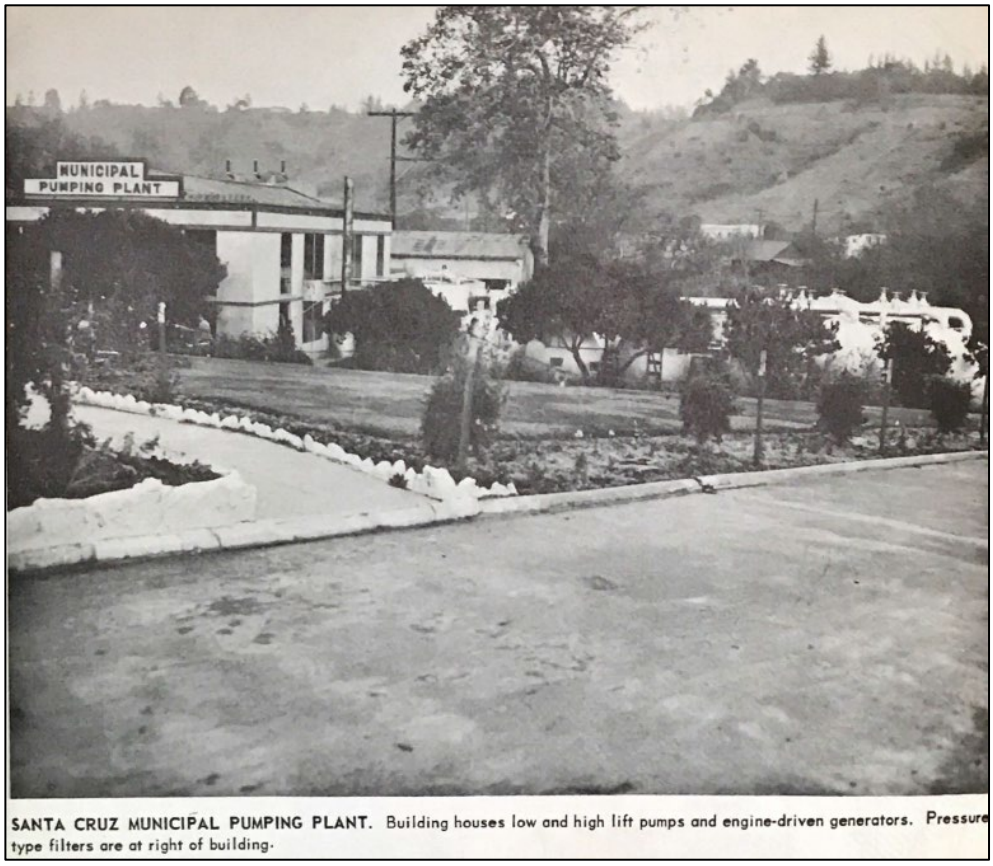


Figure 9. Comparison of the 1928 Sanborn Map (left) showing the old Crossing Street Pumping Plant and the 1928-1950 Sanborn Map showing the new facility completed in 1929 in approximately 1945 (right) (Sanborn Map Company 1928: 103, 1928-1950: 103).

The low rainfall in winter 1931 prompted the City to drill four more wells at the site of the Crossing Street Pumping Plant. One of the wells was located at the site of the pumping plant on the west side of the river, while the remaining three were drilled on the east bank. This increased the output of the municipal water supply greatly and allowed for expansion into other parts of the City. In 1934, the City boasted in the *Santa Cruz Sentinel* that 63.4 million gallons of water had earned the City a profit of $11,119 during April 1934 (Brown and Dunlap 1956: 14; SC Evening News 1931: 5; Santa Cruz Sentinel 1934a: 7).

In 1945, Crossing Street was renamed Tait Street for Water Superintendent R.S. Tait. A photograph of the Municipal Pumping Plant included in the 1956 investigative report into the Santa Cruz area water supply projects by engineers Brown and Dunlap demonstrates how the plant appeared during this period (Figure 10) (Santa Cruz Sentinel 1945: 8).



SANTA CRUZ MUNICIPAL PUMPING PLANT. Building houses low and high lift pumps and engine-driven generators. Pressure type filters are at right of building.

Figure 10. The Municipal Pumping Plant as it appeared in 1956 (Brown and Dunlap 1956: 18).

East Side City Water Extension (1934)
In 1934, work began on what was known as the East Side Water Extension, to extend the municipal water service into the Seabright and Live Oak areas of Santa Cruz via a new pipeline. Santa Cruz East Side residents C. W. Raisch, E. Brandt, George Ellison, Edith H. Evans, and Nathan Menderson donated the private property to the City needed for a right-of-way, and the pipeline extended from the municipal system to the areas of the City located on the east side of the San Lorenzo River. Additionally, two 1,000,000-gallon tanks were placed in De Laveaga Park in the north of the City as a reservoir for this branch of the system (Santa Cruz Sentinel 1933: 7, 1934b: 9).

Private Development (1936–1939)
In areas of the county that were not serviced by the municipal system, private systems such as the Beltz system were developed by residents to provide water for other residents of the area.

Beltz Water Company (1936)
In 1936, the County granted Iowa native, Charles Lemar Beltz, the rights to begin operating a private water system in the area of the County roughly bounded by Capitola Road to the north, Rodeo Gulch and Corcoran's Lagoon to the west, the bay to the south, and 41st Avenue to the east. The ambitious service area of the Beltz system covered approximately 25% of the Live Oaks district with water sourced from ground wells located throughout the district and conveyed through pipelines situated beside Live Oak roads (Santa Cruz Sentinel 1936: 8, 1947: 1; SC Evening News 1936b: 2).

Post-War Water Infrastructure Expansion (1945–1984)

Many of the post-war water projects in Santa Cruz can be characterized as repair of existing infrastructure and expansion of the overall water system to support rapid population growth. The years following World War II provoked westward migration and an increase in birth rates, causing the population of California to increase from 6.95 million to 10.65 million between 1940 and 1950. In Santa Cruz, the growth of the community from 27,430 to 41,680 between 1940 and 1950 caused the common seasonal water shortages during dry months to become problematic in regard to growth and potential for community expansion (SCPL n.d.: 1).

In 1945, the state recognized a water shortage in Santa Cruz and authorized an investigation of available water resources. In 1946, the acute nature of the water crisis prompted the community to request a survey to determine an inventory of the available groundwater supply and plan for growth in the future. Completed In 1948, the survey determined that although the San Lorenzo pumping plant was running at full capacity, 24 hours per day during the dry summer of 1947, the river was so low that the entire run was being diverted through the pumps and into the City mains for consumption (SWRCB 1953: 57; Brown and Dunlap 1956: 1–2).

Prompted by these concerns, in 1953, the State Water Resources Board released a report that inventoried available surface and underground water sources in the County and projected increased water utilization that exceeded the available water in Pajaro Valley, the Soquel Creek area, and the coastal area around and including Santa Cruz. The report identified requirements for supplemental water for Santa Cruz and areas served by the City of Santa Cruz Water Department (SWRCB 1953: 57).

The County formed the Santa Cruz County Flood Control and Water Conservation district in 1955 and hired Creegan & D'Angelo Civil Engineers in 1956 to complete an extensive survey identifying dam sites, groundwater sources, and additional steps to improve control of the water supply throughout the County to compete with the City's proposals. The report asserted that population growth was a major concern for the water supply in the City because "the City of Santa Cruz has current water requirements which equal the capacity of the existing water supply system during a relatively dry era. Should an exceptionally dry season be experienced, there would be a serious water shortage in the City of Santa Cruz" (Creegan and D'Angelo 1957: 8).

Present supplies were determined to be insufficient for standard rates of population growth, including years that rainfall was considered more plentiful. Despite the rate of water consumption in the service area tripling between the mid-1930s and mid-1950s, there had been no additions to the municipal water supply during that time. Creegan & D'Angelo would also serve as the engineers for the Santa Cruz County Flood Control and Water Conservation District Advisory Committee, and ultimately, their recommendation to the council to remedy the current water crisis in the City was a dam on Newell Creek (Santa Cruz Sentinel 1953: 1, 1954: 1, 1958a: 4).

A number of general obligation and revenue bonds helped to fund a wide range of water-related projects in Santa Cruz during this period, including routine maintenance and transmission line replacements, but also projects such as the Graham Hill Treatment Plant (1959), Newell Creek Dam (1960), the Tait Street Diversion (1961) and the Felton Diversion Station (1976). The need for these projects was driven by the need for more water to support a growing, post-war population, but the use of bonds allowed for flexibility to project for future growth. In 1974, the *Santa Cruz Sentinel* surmised that "successful bond issues in 1958, 1963 and in 1967 reflected public confidence in the water administration and a recognition of the needs for more water, apparently, for there was relatively little difficulty getting approval" (Santa Cruz Sentinel 1974: 1–2).

Newell Creek Dam (1960, modified in 1985)
As a surface water storage on Newell Creek became a distinct reality following the recommendations of Creegan and D'Angelo, City Water Department Director, Weston Webber, voiced his support for the project in 1957. Ultimately, of the five proposed dams, only the Newell Creek Dam would come to fruition (Santa Cruz Sentinel 1957a: 1, 1957b: 13, 1957c: 12).

In 1958, the University of California Regents announced that they were considering the Cowell Ranch in the City of Santa Cruz as the site of a future University of California Campus. The City would be required to provide services and facilities for the prospective University community, which early figures suggested was to include around 2,500 students. In anticipation of the Water Revenue Bond Election in November 1958 to approve the bonds necessary to construct the Newell Creek Dam, a new

water treatment plant, and pipelines to transport the water, the Santa Cruz Sentinel published an article outlining the impact of the proposed bonds. In reference to the speculative University in the City, the closing paragraph of the article states that "University officials know that the present water supply of Santa Cruz is inadequate, even for normal needs. Failure to correct this situation could end all chance of the selection of Santa Cruz as the University site." (Santa Cruz Sentinel 1958b: 1, 1961a: 1, 1961b: 1).

On November 5, 1958, the voters of the City of Santa Cruz approved $5.5 million in water revenue bonds necessary for the City to purchase 2,162 acres of land in the Newell Creek watershed from the San Lorenzo Valley Water District and build a dam on the site. Creegan & D'Angelo designed the earthfill dam (SCWD n.d.: 2; Santa Cruz Sentinel 1958a: 4).

Contractors Williams and Burrows Inc. of Belmont, California, began the construction of the Newell Creek Dam and preparation for the creation of Loch Lomond in 1960. The early stages of planning and execution were made more difficult by the narrow valley, allowing only one road for ingress and egress for equipment and supplies. The construction of the 195-foot-tall earthfill dam began with a "grout curtain" that pushed concrete 100 feet into the bedrock to fill any fissures or imperfections, ensuring a structurally sound base. The height and width of the dam's crest was first determined by the reinforced concrete ends. The embankment was then built up using successive layers of random fill from the immediate area, compacted with sheepsfoot tampers above and around the 300 feet of impervious material at the core of the embankment. Four construction personnel lost their lives in October 1960 during the layered construction of the embankment. A brass plaque commemorating these men was commissioned and remains today on the southwest elevation of the Control House (Santa Cruz Sentinel 1960b: 15, 1960e: 1).

The Newell Creek Dam was completed and filling steadily with water by 1961; however, the recreation area on the resulting reservoir was yet to be built. Keeping with the Scottish naming tradition started by Scotsman John Burns when he christened the mountain Ben Lomond in the 1850s, the reservoir was dedicated Loch Lomond during two days of festivities on July 27 and 28, 1963 (Santa Cruz Sentinel 1963: 1).

By 1964, the City distributed a notice to bid on the construction of the Loch Lomond Recreation Development. With the help of a $149,000 state grant, the Loch Lomond Recreation Area was completed by the spring of 1965. It included picnic areas, a concessions building, parking areas, two docks, and a boat launch. An all-weather road leading from Lompico to the Recreation Area was a crucial improvement constructed during this phase of the Project. It allowed visitors to experience the new recreation activities available at Loch Lomond, while simultaneously comprehending the realities of water storage and use in the county (Santa Cruz Sentinel 1964: 3).

Development of the Newell Creek Pipeline (1961)

Planning for the NCP began in conjunction with the development of the Newell Creek Dam and the GHWTP following the approval of $5.5 million in water revenue bonds by Santa Cruz voters in November 1958. The City selected Brown and Caldwell Civil and Chemical Engineers (Brown and Caldwell) to design the NCP and select the alignment of the proposed structure intended to carry reserved water from the Loch Lomond Reservoir to the GHWTP. Although the NCP was planned to work in tandem with the planned Newell Creek Dam system, Brown and Caldwell were not responsible for planning and design of the Newell Creek Dam and its associated components. Brown and Caldwell were, however, also responsible for the design of the GHWTP, which was completed in 1959 (SCWD n.d.: 2; Santa Cruz Sentinel 1958a: 4).

In October 1959, the City received a ROW agreement from the State of California for approximately 15,000 feet of the NCP to pass through the newly formed Henry Cowell Redwoods State Park south of Felton. The ROW agreement included the stipulation that the City would fund the construction of a graded maintenance road alongside the NCP (today known as Pipeline Road), including the installation of wharf hydrants supplied by the state along the route. The ROW agreement also stipulated that the NCP project would supply the park with untreated water in anticipation of a campground being planned on the southern area of the park. Brown and Caldwell began a survey of this area in late 1959 to determine the most strategic alignment of the NCP, which would be decided based on the existing terrain of the Henry Cowell Redwood State Park (Santa Cruz Sentinel 1959: 7).

The segments of the NCP directly north of Felton were planned along a section of the former Felton and Pescadero Railroad bed that was decommissioned in 1934. This section of the former railroad path heads northwest from Henry Cowell Redwoods State Park where the tracks met the former Santa Cruz and Felton Railroad tracks, beneath Zayante Creek, and diagonally across Graham Hill Road and Mt. Herman Road to the beginning of San Lorenzo Way from whence the NCP traveled northwest. This section of road includes multiple culverts which dated to the construction of the railroad in 1885.

The City requested bids for the construction of the NCP in April 1960. The notice to bidders specified "the construction of approximately 3,700 feet of 27-inch, 44,000 feet of 22-inch, 8,797 feet of 20-inch, and 1,151 feet of 18-inch pipelines with appurtenances; and of approximately 15,000 feet of access road with culverts and other necessary appurtenances" (Santa Cruz Sentinel 1960a: 18). The bid was awarded to the Granite Construction Company of Watsonville. Clearing work for the NCP path began in June 1960, and construction of the NCP began in July 1960 at the GHWTP, which was also designed by Brown and Caldwell and completed in 1959. From there, the NCP extended north along Graham Hill Road (Figure 11) before ducking into Henry Cowell Redwood Park at Simms Road. The various widths of the 9.25-mile pipeline used for the project were a concrete cylinder pipe material, which is composed of a steel cylinder lined with cement mortar on the interior and is wrapped with a mild wire and coated with dense cement mortar. The NCP was completed later in 1960 (Santa Cruz Sentinel 1960a: 18, 1960c: 14, 1960d: 5)

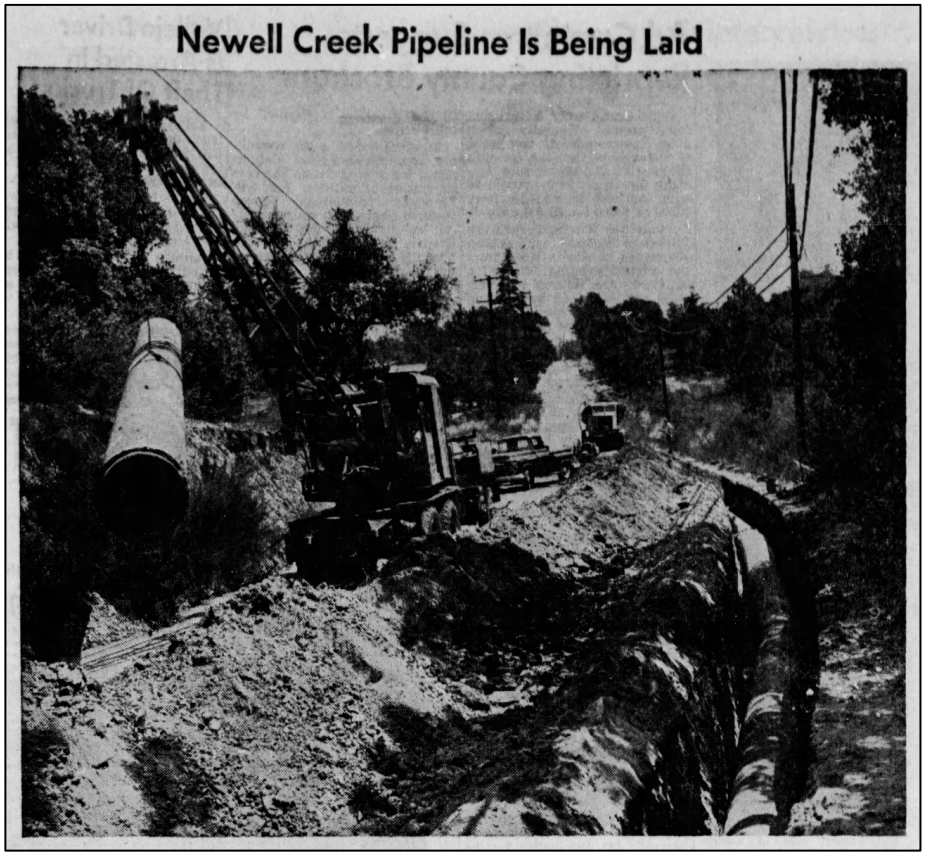


Figure 11. A photograph of the Newell Creek Pipeline being laid along Graham Hill Road in July 1960 (Santa Cruz Sentinel 1960d: 5).

In January 1968, the City completed construction of a supplemental pipeline in the Henry Cowell Redwood State Park to distribute water to the public campground being completed in the southern section of the park. The construction of the 8-inch pipe was an obligation stipulated by the state in exchange for the 1958 ROW through the park (Santa Cruz Sentinel 1967: 2).

In January of 1982, a powerful storm caused a major landslide in the Brackney section of the NCP, which caused the disruption of the service for several weeks. The NCP was promptly repaired, but the incident renewed community attention to the potential for the aging components of the municipal system to require upfront repair and maintenance, which prompted community support for funding measures to update and modernize other major infrastructure elements beginning in 1984. In 2017, the Brackney section was again subject to damage caused by heavy rains and land slide activity. In 2020, the northern-most segment of section of the NCP between the Newell Creek Dam and the southern end of the Newell Creek Access Bridge was replaced as part of the Newell Creek Dam Inlet/Outlet Replacement Project (Santa Cruz Sentinel 1982: 1, 8, 1984: 3, 1985: 11; Cardona and Associates 1982; SCWD n.d.: 2).

Engineers: Brown and Caldwell Civil and Chemical Consulting Engineers (1947-Present)

Engineers Kenneth Brown and David Caldwell founded Brown and Caldwell Civil and Chemical Engineers in 1947 in San Francisco, California. The firm specialized in surveys and consultation related to water supply management and treatment, and also in the design of sewer and water treatment infrastructure, water and sewage treatment plants, and delivery pipelines.
The firm is presently still in operation and continues to provide a wide selection of services related to "Safeguarding Water, maintaining infrastructure and restoring habitats" (Brown and Caldwell 2021).

A representative selection of projects completed by Brown and Caldwell is presented below (Colfax Record 1949: 4; Napa Journal 1949: 7; Press Democrat 1951: 1; Ukiah Daily Journal 1957: 9; Daily Independent Journal 1958: 11; Sacramento Bee 1960: 18):

- Auburn Domestic Water Treatment Plant (consulting engineers), Auburn, California (1949)
- Conn Water System Investigation (consulting engineers), Napa County, California (1949)
- Santa Rosa Sewer Plant (consulting and designing engineers), Santa Rosa, California (1951)
- Ukiah Treatment Plant (designing engineers), Ukiah, California (1957)
- South Tahoe Public Utility District Sewage Treatment Plant (consulting engineers), South Lake Tahoe, California (1960)

Contractors: Granite Construction (1900-Present)

During the mid-to-late nineteenth century, the simultaneous development of railroads across the United States caused the demand for granite stone to increase steadily as it was considered integral to the installation of tracks, which helped to level the railroad tracks and evenly distribute the weight of passing trains. Following the discovery of a granite quarry on James Harvey Logan's ranch property outside of Watsonville, California, John T. Porter, his son, Warren Porter, and A.R. Wilson saw it as a financial opportunity and purchased the quarry from Logan for $10,000. Together they established the Granite Rock Company in 1900 (Granite Construction 2021).

The devastation wrought by the 1906 earthquake presented a unique opportunity for the young company, which found that granite was now in heavy demand as a building material. New laws encouraging the surfacing of roads and sidewalks between 1907 and 1910 prompted further growth, and by 1909, the Granite Rock Company employed 110 men. The onset of World War I, however, quickly presented setbacks as 20% of the nation's production was allocated to wartime needs. The company weathered World War I through the implementation of storehouses along the rail lines to meet the demand for more minor projects (Granite Construction 2021).

The economically slow period prompted the company to restructure following the end of the war and begin branching out into the construction aspect of the trade instead of simply the material supply. The company formed the Granite Construction Company in 1922, which was a subsidiary devoted to the construction arm of the business headed by Walter J. Wilkinson. Although the Great Depression tested the company, the prosperous period following World War II resulted in unprecedented growth for the company. Granite expanded outwards from Watsonville, establishing branch offices in Monterey, California, in 1945 and Santa Cruz, California, in 1946. The company continued to expand during the second half of the twentieth century, moving into new construction ventures including major highways,

dams, water infrastructure, and rapid transit stations in California, but gradually in Texas, Florida, New York, and Washington D.C. Today, the company operates as a diversified company incorporating both the construction and construction material aspects of projects encompassing transportation and water infrastructure (Granite Construction 2021).

A representative selection of projects completed by Granite Construction is presented below (Granite Construction 2021):

- Carnegie Library, Watsonville, California (1903)
- Santa Cruz Courthouse Annex (1907–1910)
- Monterey Odd Fellows Building (1907–1910)
- Road to Glacier Point, Yosemite National Park, California (1936)
- Surfacing of Highway 99 near Elk Grove, California (1955)
- Interstate 80 between San Francisco and Squaw Valley, California (1957)
- Donner Pass, Nevada County, California (1965)
- Rollins Dam, Nevada and Placer counties (1965)
- Portion of the California Aqueduct (1965)
- Powel Street Station, San Francisco, California (1972)
- San Joaquin Toll Road (CA-73), Orange County, California (1996)

NRHP/CRHR Statement of Significance

NRHP Criterion A: associated with events that have made a significant contribution to the broad patterns of our history
CRHR Criterion 1: is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
Water delivery infrastructure such as water pipelines that are associated with the regional water supply are a common property type throughout the County, the State of California, and the nation. Components of water storage and delivery systems have been considered significant under NRHP Criterion A and CRHR Criterion 1 when they were associated with events that have made a significant contribution to the broad patterns of our history, such as early advances in water management. Outside of early examples of water management projects, unless the implementation of a water management project can be demonstrated to have contributed significantly to the unique history of the County, state, or nation, development which supports general growth is far too common an association to merit a blanket conclusion of historical significance under NRHP Criterion A or CRHR Criterion 1 within the context of water management systems. The Newell Creek Dam is directly associated with important events that have made a significant contribution to the development of water infrastructure development in Santa Cruz. These important events include concerns over local water shortages in the late 1950s (as documented in state and local water supply reports) leading up to the passage of the Water Revenue Bond in 1958, which approved funding for construction of the Newell Creek Dam in direct response to concerns over water shortages. Archival research also revealed that water shortages in the late 1950s threatened to make Santa Cruz a less than desirable choice for the location of the next University of California, noting that failure to correct water shortage issues could end all chance of the selection of Santa Cruz as the University site. Construction of the Newell Creek Dam gave the City control over the seasonal fluctuations in water availability and became a critical component to the water infrastructure, which supported the sustained growth of the City after World War II (Dudek 2018).

While the NCP was planned simultaneously with the Newell Creek Dam during the late 1950s, the structures were planned by separate engineering companies and constructed by different contractors to work in conjunction with each other as part of the overall, interconnected municipal system. The NCP constitutes a ubiquitous, mid-twentieth century addition to the City's existing water system distribution system, and therefore is associated with the period of pervasive expansion which characterized the water systems throughout the nation, state, and County following the end of World War II. As such, this structure is not a physical example of the early water delivery efforts in the County, of which there are extant examples such as the Laguna Creek Dam, nor can it be singularly tied to any one event that has made a significant contribution to the development of the City of Santa Cruz, the County, or the state, as in the case of the Newell Creek Dam.

The NCP, as an expansion of the existing water system, is not associated with any events occurring within the context of County water development that would distinguish the structure from the vast array of water management systems dotting the California landscape. Moreover, research into the history of the NCP revealed no evidence suggesting that the structures are associated with an alternative, more unique event or pattern of events considered historically significant. For these reasons, the subject property does not appear eligible under NRHP Criterion A or CRHR Criterion 1.

NRHP Criterion B: associated with the lives of significant persons in our past.
CRHR Criterion 2: is associated with the lives of persons important in our past.
To be found eligible under Criterion B/2 the property has to be directly tied to an important person and the place where that individual conducted or produced the work for which he or she is known. Archival research failed to indicate any such direct association between individuals that are known to be historic figures at the national, state, or local level and the NCP. The NCP represents the collective efforts of many individuals, rather than the work of any single individual. Therefore, the NCP is not known to have any historical associations with people important to the nation's or state's past. Due to a lack of identified significant associations with important persons in history, the subject property does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

NRHP 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.
CRHR Criterion 3: embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
Overall, the NCP demonstrates simple pipeline construction methods that have been in place regionally since the 1860s. As such, the NCP lacks sufficient distinction to be called significant within any particular water delivery infrastructure type. The NCP was completed in 1960; however, major damage in ensuing years required subsequent alterations, including emergency flood damage repairs in 1983 and 2017, as well as minor realignments and repairs to address leaks and breakages as they arose along the route of the pipeline. These alterations have caused the NCP to retain only diminished integrity of materials and workmanship.

The NCP was planned and designed by Brown and Caldwell Civil and Chemical Engineers of San Francisco, who specialized in the planning and implementation of water delivery and treatment systems. Brown and Caldwell helped to design and implement similar facilities throughout California during the period the NCP was designed and built, and they were also the designers of the GHWTP, which was recommended not eligible for listing in the NRHP, CRHR, and the SCCHRI in 2018. There is no indication that Brown and Caldwell reached the level of notoriety to be considered a masters in the field of engineering, nor does it appear that the NCP is representative of any new advancements or techniques in the field of engineering that were developed by Brown and Caldwell. Overall, the design for the NCP does not appear to be distinctive or innovative. It also does not constitute the first, last or only example of a pipeline designed by Brown and Caldwell for this purpose during the course of their careers.

The Granite Construction Company served as the contractors for the project. In consideration of the firm's work on highly publicized, important projects, such as the construction of the first roads into Yosemite National Park during the 1930s and the California Aqueduct during the 1960s, the NCP cannot be said to qualify as the most representative example of the firm's work overall or even during this period.

Overall, the NCP lacks sufficient engineering distinction to be significant within any particular water delivery and management infrastructure type. Consequently, the subject property does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

NRHP Criterion D: have yielded, or may be likely to yield, information important in history or prehistory.
CRHR Criterion 4: has yielded, or may be likely to yield, information important in prehistory or history.
There is no evidence to indicate that the subject property is likely to yield any additional

information important to prehistory or history beyond what is already known. The subject property is also not associated with an archaeological site or a known subsurface cultural component. Therefore, the subject property does not appear eligible under NRHP Criterion D or CRHP Criterion 4.

SCCHRI Statement of Significance

1. The resource is associated with a person of local, State or national historical significance.
As stated in NRHP/CRHR Criterion B/2, archival research did not reveal an association between the NCP and any persons who significantly contributed to the development of the City, state, or nation. Therefore, the facility does not appear eligible under County Criterion 1.

2. The resource is associated with an historic event or thematic activity of local, State or national importance.
As stated in NRHP/CRHR Criterion A/1, the NCP is not associated with any extraordinary event or events occurring within the context of County water development that would distinguish the structure from the vast array of water management systems dotting the California landscape. Moreover, research into the history of the NCP revealed no evidence suggesting that the structures are associated with an alternative, more unique event or pattern of events considered historically significant. For these reasons, the NCP does not appear to be directly associated with events that have made a significant contribution to the development of water infrastructure in the County. Therefore, the subject property does not appear eligible under County Criterion 2.

3. The resource is representative of a distinct architectural style and/or construction method of a particular historic period or way of life, or the resource represents the work of a master builder or architect or possesses high artistic values.
As discussed in NRHP/CRHR Criterion C/3, the NCP has experienced multiple alterations over time in response to required repairs and modern equipment installation to ensure ongoing use. It is representative of simple earthen mid-century pipeline construction methods and lacks sufficient distinction to be considered significant. The structure is also not associated with the work of a master engineer or master builder and does not possess high artistic values. Therefore, the subject property does not appear eligible under County Criterion 3.

4. The resource has yielded, or may likely yield, information important to history.
As discussed under NRHP/CRHR Criterion D/4, there is no evidence to indicate that the NCP is likely to yield any additional information important to prehistory or history beyond what is already known. The NCP is also not associated with an archaeological site or a known subsurface cultural component. Therefore, the subject property does not appear eligible under County Criterion 4.

Integrity Discussion
In addition to meeting one or more of the above criteria, an eligible resource must retain integrity, which is expressed in seven aspects: location, design, setting, workmanship, materials, feeling, and association. All properties change over the course of time. Consequently, it is not necessary for a property to retain all its historic physical features or characteristics. However, the property must retain the essential physical features that enable it to convey its historic identity. The essential physical features are those features that define both why a property is significant and when it was significant.

The NCP retains its historic alignment, original length, and continues to function as a water pipeline. As such, the NCP retains integrity of location, design, and association. The setting surrounding the NCP has been altered through dense residential and commercial development since 1960 when the structure was completed. As a result, the NCP retains only diminished integrity of setting and feeling. In addition to large repairs to sections of the NCP in 1982 and 2017, the NCP has been periodically maintained, which has resulted in the replacement of original materials including associated appurtenances. Due to this, the NCP no longer retains integrity of materials and workmanship. Additionally, as previously mentioned, the northern 2,000 feet of the NCP is being replaced as part of the Newell Creek Dam Inlet/Outlet Replacement Project that is currently under construction.

Summary of Evaluation Findings

The segment of the NCP was evaluated for listing in the NRHP, the CRHR, or the SCCHRI and was found ineligible under all Criteria. As such, the NCP does not appear to be a historic property under Section 106 of the NHPA or a historical resource under CEQA.

***B12. References (Continued):**

Brown and Caldwell (Brown and Caldwell Civil and Chemical Engineers). 1960. "Drawings for Construction of Newell Creek Pipeline." City of Santa Cruz Newell Creek Pipeline: 36 Sheets. Santa Cruz Water Department: Santa Cruz, California.

Brown, K.W. and L.B. Dunlap. 1956. Investigation of Water Supply Projects: City of Santa Cruz Water System - Santa Cruz, California. San Francisco, California: Brown and Caldwell Civil and Chemical Engineers. On file at the Santa Cruz Water Department.

Brown, R.C. 2011. "The San Lorenzo Valley Water District: a History." Boulder Creek, California: San Lorenzo Water District.

Cardona and Associates (Cardona and Associates Civil Engineers Environmental Planners). 1982. "Newell Creek Pipeline Relocation Plans and Specifications." Santa Cruz, California. City of Santa Cruz Water Department.

Cartier, R. 1994. *Cultural Resource Evaluation of Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692)*, On file at the Northwest Information Center.

Cartier, R., and L. Eckert, J. Goetz, M. Pokriots, and J. Reddington. 1995. *Historic Research and Archaeological Testing Program Evaluation for the Redtree Properties, APN 71-201-43 and APN 71-331-05, -06, in the City of Felton, Santa Cruz County (S-16692a)*, On file at the Northwest Information Center.

Chapman, C. 1920. "Sebastian Vizcaino: Exploration of California." *The Southwestern Historical Quarterly* 23(4): 285–301. April 1920. Accessed March 20, 2020. http://www.jstor.org/stable/27794572.

City of Santa Cruz. 2020. "History of Santa Cruz." Accessed April 24, 2020. http://www.cityofsantacruz.com/ community/our-city/history-of-santa-cruz.

City of Santa Cruz. 2017. Brackney Landslide Area Pipeline Damage Risk Reduction Project Hazard Mitigation Grant Program (HMGP) Application Package. October 2017. Submitted to California Governor's Office of Emergency Services.

Clark, D.T. 2008. *Santa Cruz County Place Names: A Geographical Dictionary*. Scotts Valley, California: Kestrel Press.

Colfax Record. 1949. "New Water Plant in Auburn." *Colfax Record* (Colfax, California), September 30, 1949: 4. Accessed March 16, 2021. Newspapers.com.

Creegan & D'Angelo (Creegan & D'Angelo Civil Engineers). 1957. *Report on Santa Cruz County Master Plan of Water Development and Preliminary Design of the First Increment of Work for Santa Cruz County Flood Control and Water Conservation District*. Prepared by Creegan and D'Angelo Civil Engineers. On file at Santa Cruz Public Library.

Daily Independent Journal. 1958. "Meet Called to Explain Sanitary Bond Proposal." *Daily Independent Journal* (San Rafael, California), November 5, 1958: 11. Accessed March 16, 2021. Newspapers.com.

Doane, M. and T. Haversat. 1999. Preliminary Archaeological Reconnaissance of the Mount Hermon Christian Conference Center, Mount Hermon, Santa Cruz County, California (S-22415). On file, Northwest Information Center.

Dudek. 2018. *Historical Resources Evaluation Report Newell Creek Dam Inlet/Outlet Replacement Project.*

Dudek. 2021. *Archaeological Resources Inventory and Evaluation Report For The Newell Creek Pipeline Improvement Project.*

Granite Construction. 2021. "History." Accessed March 16, 2021. https://www.graniteconstruction.com/history.

Hatch. 1889. "Official Map of Santa Cruz County." University of California, Santa Cruz: University Library Digital Collections.

HDR. 2018. "Newell creek Pipeline Rehab/Replacement Technical Memorandum, Subject: Newell Creek Pipeline Inventory." Santa Cruz Water Program. November 8, 2018.HDR. 2019a. "Newell Creek Pipeline Alternatives Analysis Technical Memorandum." Santa Cruz Water Program. October 9, 2019.

HDR. 2020. "Newell Creek Pipeline Improvements Technical Memorandum." Santa Cruz Water Program. May 19, 2020.

Hoover, M., H. E. Rensch, E. G. Rensch, and W. N. Abeloe. 2002. *Historic Spots in California*. 5th ed. Stanford, California: Stanford University Press.

Kelley, J. 2004a. Historic Property Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447). On file, Northwest Information Center.

Kelley, J. 2004b. Negative Archaeological Survey Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447a). On file, Northwest Information Center.

Kennedy Jenks. 2017. "Brackney Landslide Area Pipeline Damage Risk Reduction Project Engineering Report." Prepared for City of Santa Cruz. October 2017.

Koch, M. 1973. *Santa Cruz County: Parade of the Past*. Fresno, California: Valley Publishers.

Lehmann, S. 2000. "Fully Developed Context Statement for the City of Santa Cruz." Compiled for the City of Santa Cruz. Accessed March 16, 2021. https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/area-plans-planning-documents-projects/historic-context-statement.

Marvin, J. 2004. *Historical Resources Evaluation Report, Graham Hill Road Improvements Project Near Felton, Santa Cruz County, California (S-28447b)*. On file at the Northwest Information Center.

Monterey American. 1913. "F.A. Hihn is not more – Santa Cruz's 'Grand Old Man' Passes Away." *Monterey American* (Monterey, California), August 25, 1913: 7. Accessed May 29, 2020. Newspapers.com.

Mott MacDonald. 2021. *Alternatives Analysis Draft Memo: Brackney Landslide Area Pipeline Risk Reduction Project.*

Napa Journal. 1949. "Abundant Water Supply for Napa." *Napa Journal* (Napa, California), November 6, 1949: 7. Accessed March 16, 2021. Newspapers.com.

NETR. 2021. Historic Aerial Photographs of the Newell Creek Pipeline Facility, Santa Cruz, CA dating from 1952, 1968, 1982, 1991, 2005, 2009, 2010, 2012, 2014, and 2016. Accessed March 16, 2021. https://www.historicaerials.com/viewer.

Pisani, D.J. 1984. *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931*. Berkeley, California: University of California Press.

Press Democrat. 1951. "Sewer Plant Will Be Built." *Press Democrat* (Santa Rosa, California), March 13, 1951: 1. Accessed March 16, 2021. Newspapers.com.

Robinson, L. 2012. *Images of America: The San Lorenzo Valley.* Charleston, South Carolina: Arcadia Publishing.

Sacramento Bee. 1960. "Tahoe Sewage Plant Nears Completion." *Sacramento Bee* (Sacramento, California), February 8, 1960: 18. Accessed March 16, 2021. Newspapers.com.

Sanborn Map Company. 1928. Santa Cruz, California. Sheet 103. Accessed May 25, 2020.

Sanborn Map Company. 1928–1950. Santa Cruz, California. Sheet 103. Accessed May 25, 2020.

Santa Cruz County Assessor. 1894. *Plat of the City Distributing Reservoir Lot.*

Santa Cruz Daily Surf. 1888a "Another Change." *Santa Cruz Daily Surf* (Santa Cruz, California), March 3, 1888:3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Daily Surf. 1888b. "Water Once More." *Santa Cruz Daily Surf* (Santa Cruz, California), August 8, 1888:2. Accessed March 4, 2020. Newspapers.com. Accessed March 4, 2020.

Santa Cruz Sentinel. 1888. "Free Water." *Santa Cruz Sentinel* (Santa Cruz, California), July 17, 1888: 2. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1895. "An Up-to-Date Establishment." *Santa Cruz Sentinel* (Santa Cruz, California), May 30, 1895: 3. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1903. "Notice Inviting Sealed Proposals." *Santa Cruz Sentinel* (Santa Cruz, California), November 25, 1903: 4. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1904. "Contractor Sargent…" *Santa Cruz Sentinel* (Santa Cruz, California), January 7, 1904: 3. Accessed September 30, 2020. Newspapers.com.

Santa Cruz Sentinel. 1933. "Rights-Of-Way for Pipe Line Are All Okeh." *Santa Cruz Sentinel* (Santa Cruz, California), December 13, 1933: 7. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1934a. "Week-End Anglers Out of Luck on the Old San Lorenzo." *Santa Cruz Sentinel* (Santa Cruz, California), February 20, 1934: 7. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1934b. "Rushing Work on Two 1,000,000 Gellon Tanks for East Side Extension." *Santa Cruz Sentinel* (Santa Cruz, California), May 18, 1934: 9. Accessed May 25, 2020. Newspapers.com.

Santa Cruz Sentinel. 1936. "Beltz Granted Water Permits for Live Oak." *Santa Cruz Sentinel* (Santa Cruz, California), March 7, 1936: 8. Accessed May 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1943. "Soquel-Capitola Water System is Bought By Monterey Bay Company." Santa Cruz Sentinel (Santa Cruz, California). October 17, 1943: 1. Newspapers.com. Accessed June 10, 2020.

Santa Cruz Sentinel. 1945. "Propose Changes." *Santa Cruz Sentinel* (Santa Cruz, California), November 12, 1945: 8. Accessed May 28, 2020. Newspapers.com.

Santa Cruz Sentinel. 1947. "Charles Beltz, Water company Operator, Dies." *Santa Cruz Sentinel* (Santa Cruz, California), October 27, 1947: 1. Accessed May 4, 2020. Newspapers.com.

Santa Cruz Sentinel. 1953. "Flood Control Project Moves Ahead." *Santa Cruz Sentinel* (Santa Cruz, California), May 28, 1953: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1954. "Water Superintendent Recommends Study of Three Area Storage Projects." Santa Cruz Sentinel (Santa Cruz, California), February 19, 1954: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957a. "County Committee to put Emphasis on New Pajaro Valley Survey." Santa Cruz Sentinel (Santa Cruz, California), February 6, 1957: 1. Accessed February 7, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957b. "Map Shows Proposed County Dam Sites, Pipe Lines." Santa Cruz Sentinel (Santa Cruz, California), February 10, 1957: 13. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1957c. "The County's Water Problems and Solutions." Santa Cruz Sentinel (Santa Cruz, California), April 15, 1957: 12. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1958a. "Information on the Water Situation in Santa Cruz and Plans to Correct It." *Santa Cruz Sentinel* (Santa Cruz, California), November 2, 1958: 4. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1958b. "Water Bonds Get Overwhelming OK." *Santa Cruz Sentinel* (Santa Cruz, California), November 5, 1958: 1. Accessed July 10, 2018. Newspapers.com.

Santa Cruz Sentinel. 1959. "Okay Newell Creek Pipeline Through Cowell State Park." *Santa Cruz Sentinel* (Santa Cruz, California), October 13, 1959: 7. Accessed March 16, 2021. Newspapers.com.

Santa Cruz Sentinel. 1960a. "Public Notice." Santa Cruz Sentinel (Santa Cruz, California). April 15, 1960: 18. Newspapers.com. Accessed March 16, 2021.

Santa Cruz Sentinel. 1960b. "Salvation in the Making." Santa Cruz Sentinel (Santa Cruz, California). September 4, 1960: 15. Newspapers.com. Accessed February 7, 2018.

Santa Cruz Sentinel 1960c: "Begin Clearing for Water Pipe." Santa Cruz Sentinel (Santa Cruz, California). June 16, 1960: 14. Newspapers.com. Accessed March 16, 2021.

Santa Cruz Sentinel 1960d: "Newell Creek Pipeline Is Being Laid." Santa Cruz Sentinel (Santa Cruz, California). July 31, 1960: 5. Newspapers.com. Accessed March 16, 2021

Santa Cruz Sentinel. 1961a. "Regents Listen to Offers For UC Campus." *Santa Cruz Sentinel* (Santa Cruz, California), March 16, 1961: 1. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1961b. "Pros and Cons of University Community Told to Rotary Club by McCaffrey." *Santa Cruz Sentinel* (Santa Cruz, California), October 29, 1961: 9. Accessed July 13, 2018. Newspapers.com.

Santa Cruz Sentinel. 1963. "Wee Bit of Scotland Arrives in Ben Lomond." *Santa Cruz Sentinel* (Santa Cruz, California), July 21, 1963: 1. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1964. "Loch Lomond's Temporary Facilities Remain in '64." *Santa Cruz Sentinel (Santa* Cruz, California), March 1, 1964: 3. Accessed June 5, 2018. Newspapers.com.

Santa Cruz Sentinel. 1967. "City Water Line Goes to Campground." *Santa Cruz Sentinel* (Santa Cruz, California), December 17, 1967: 2. Accessed March 16, 2021. Newspapers.com.

Santa Cruz Sentinel. 1974. "City's Water Chief To Retire." *Santa Cruz Sentinel* (Santa Cruz, California), April 4, 1974: 1. Accessed May 26, 2020. Newspapers.com.

Santa Cruz Sentinel. 1982. "Newell Creek Dam Spillway Safety Changes Approved." *Santa Cruz Sentinel* (Santa Cruz, California), January 7, 1982: 1, 8. Accessed May 29, 2018. Newspapers.com.

Santa Cruz Sentinel. 1984. "Water Crisis Here Continues." *Santa Cruz Sentinel* (Santa Cruz, California), March 18, 1984: 3. Accessed May 22, 2018. Newspapers.com.

Santa Cruz Surf. 1883. "Another New Railroad." *Santa Cruz Surf* (Santa Cruz, California), June 20, 1883: 3. Newspapers.com.

Santa Cruz Surf. 1884. "The Felton and Pescadero Railroad." *Santa Cruz Surf* (Santa Cruz, California), July 21, 1884: 1. Newspapers.com.

Santa Cruz Surf. 1889a. "From Laguna to Santa Cruz." *Santa Cruz Surf* (Santa Cruz, California), July 15, 1889:3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1889b. "The Estimate." *Santa Cruz Surf* (Santa Cruz, California), August 5, 1889: 3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1889c. "Water Works." *Santa Cruz Surf* (Santa Cruz, California), November 26, 1889: 3. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Surf. 1890a. "The City Water Works." *Santa Cruz Surf* (Santa Cruz, California), April 19, 1890: 1. Accessed March 10, 2020. Newspapers.com.

Santa Cruz Surf. 1890b. "Water! Water!" *Santa Cruz Surf* (Santa Cruz, California), September 30, 1890: 3. Accessed January 15, 2020. Newspapers.com.

Santa Cruz Surf. 1890c. "The Last Pipe." Santa Cruz Surf (Santa Cruz, California), October 18, 1890: 3. Accessed January 15, 2020. Newspapers.com.

Santa Cruz Surf. 1892. "Seven Years. The History of the Water Movement in Santa Cruz." Santa Cruz Surf (Santa Cruz, California), March 12, 1892: 2. Accessed March 3, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1864. "Santa Cruz Water-works!" *Santa Cruz Weekly Sentinel* (Santa Cruz, California), October 15, 1864: 2. Accessed March 4, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1877a. "Santa Cruz Water Works." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), January 6, 1877: 1. Accessed March 16, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1877b. "Santa Cruz and Its Water Supply." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), October 27, 1877: 2. Accessed March 16, 2020. Newspapers.com.

Santa Cruz Weekly Sentinel. 1882. "The Santa Cruz Water Co." *Santa Cruz Weekly Sentinel* (Santa Cruz, California), June 10, 1882: 3. Accessed March 17, 2020. Newspapers.com.

SC Evening News (Santa Cruz Evening News). 1912. "Will Restrain R. Reggiardo." *Santa Cruz Evening News* (Santa Cruz, California), April 2, 1912: 2. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1913a. "Liddell Spring and Proposed Pumping of River Water Discussed." *Santa Cruz Evening News* (Santa Cruz, California), March 18, 1913: 1. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1913b. "Order for Crossing St. Pump Placed." *Santa Cruz Evening News* (Santa Cruz, California). May 8, 1913: 1. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1914. "First Step Leading to Placing Valuation on Hihn System Taken Today." *Santa Cruz Evening News* (Santa Cruz, California), October 14, 1914: 1. Accessed May 25, 2020. Newspapers.com.

SC Evening News. 1928. "Crossing Plant Plans Passed by the City." *Santa Cruz Evening News* (Santa Cruz, California), April 30, 1928: 8. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1929. "Postpone Pump Plant Ceremony." *Santa Cruz Evening News* (Santa Cruz, California), February 20, 1929: 7. Accessed May 28, 2020. Newspapers.com.

SC Evening News. 1931. "City Well Water Is Given Approval by State Official." *Santa Cruz Evening News* (Santa Cruz, California). September 3, 1931: 5. Newspapers.com. Accessed May 27, 2020.

SC Evening News. 1936a. "Project of Railroad Up Coast To San Francisco Was Old Dream of Santa Cruzans Never Fulfilled." *Santa Cruz Evening News* (Santa Cruz, California). November 28, 1936: 7. Accessed March 19, 2021.Newspapers.com.

SC Evening News. 1936b. "Water System Permits Asked for Live Oak." *Santa Cruz Evening News* (Santa Cruz, California), February 25, 1936: 2. Accessed May 4, 2020. Newspapers.com.

SCMU (Santa Cruz Municipal Utilities). 2016. "A History of Our Water Service Infrastructure." No. 61: Spring 2016.

SCPL (Santa Cruz Public Library). n.d. "Population Statistics for Santa Cruz County and Cities, 1850–2010." Accessed May 28, 2020. https://history.santacruzpl.org/omeka/files/original/e5b77c64f95c4c19e0609c475869f5e6.pdf.

SCPL. 1924. "Construction of the Bay Street Reservoir." SCPL Local History. Accessed August 18, 2020. https://history.santacruzpl.org/omeka/items/show/10704.

SCWD (Santa Cruz City Water Department). n.d. "History of the Santa Cruz City Water Department." Santa Cruz Public Libraries Local History Collection. Accessed March 3, 2020. https://history.santacruzpl.org/omeka/items/show/134438#?c=0&m=0&s=0&cv=0.

SLVWD (San Lorenzo Valley Water District). 2020. "History." San Lorenzo Valley Water District. Accessed May 5, 2020. https://www.slvwd.com/about-us/pages/history.

SVWD (Scotts Valley Water District). 2020. "History." Scotts Valley Water District. Accessed May 5, 2020. https://www.svwd.org/about-district/history.

SWRCB (State Water Resources Control Board). 1953. *Bulletin No. 5: Santa Cruz-Monterey Counties Investigation*. State Water Resources Control Board: Sacramento, California.

U.S. Census Bureau. 2019. "Quick Facts: Santa Cruz County, California – Population estimates, July 1, 2019, (V2019)." Accessed March 31, 2021. https://www.census.gov/quickfacts/fact/table/santacruzcountycalifornia#.

UCSB (University of California, Santa Barbara). 2021. Historic Aerial Photographs of the Laguna Creek Diversion Facility, Santa Cruz, CA dating from 1931, 1940, 1948, and 1964. Map & Imagery Laboratory (MIL) UCSB Library. Accessed March 16, 2021. http://mil.library.ucsb.edu/ap_indexes/FrameFinder.

Ukiah Daily Journal. 1957. "Bids To Be Opened Tomorrow on Sewer Plant, Line." *Ukiah Daily Journal* (Ukiah, California), April 1, 1957: 9. Accessed March 16, 2021. Newspapers.com.

Wright. 1881. "Map of Santa Cruz County, 1880-81." University of California, Santa Cruz: University Library Digital Collections.