DRAFT ENVIRONMENTAL IMPACT REPORT **APPENDICES**

Laguna Creek Diversion Retrofit Project

Prepared for

City of Santa Cruz Water Department
212 Locust Street, Suite C • Santa Cruz, CA 95060

SEPTEMBER 2020

CITY OF SANTA CRUZ Water Department

Our Water, Our Future

Prepared by

DUDEK

725 Front Street, Suite 400
Santa Cruz, CA 95060

SCH NO. 2020030456

Contact: Jessica Martinez-McKinney

DRAFT
ENVIRONMENTAL IMPACT REPORT

APPENDICES

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State Clearinghouse Number 2020030456

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Appendix A

Notice of Preparation and Scoping Comments

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212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice

RE: Laguna Creek Diversion Retrofit Project

To Interested Agencies and Persons:

The City of Santa Cruz (City) as the Lead Agency for the Laguna Creek Diversion Retrofit Project (Proposed Project) has issued this Notice of Preparation (NOP) pursuant to the California Environmental Quality Act (CEQA) to notify interested parties that an Environmental Impact Report (EIR) for the Proposed Project will be prepared. The EIR will evaluate potential environmental impacts of the Proposed Project. The City is soliciting public input regarding the scope and content of environmental information to be included in the EIR.

The NOP provides information about the public review and comment period, project location, project description and the probable environmental effects of the Proposed Project, and is posted on the City's website at cityofsantacruz.com/waterenvdocs.

Public Review and Comment

Because your agency may need to use the EIR prepared by our agency when considering your permit or other approval for the Proposed Project, if any is required, please respond with written comments regarding the proposed scope and the intended content of the EIR as it relates to your agency's area of statutory responsibility or your areas of concern or expertise. We are requesting that all comments be provided in writing to enable us to address the comments as intended in the EIR. Written comments are also requested from organizations and other interested parties regarding the scope and evaluation of potential environmental issues associated with the Proposed Project.

Written responses are due within 30 days of the receipt of this notice, as provided by state law. As such, a 30-day public review and scoping period is established from **March 16, 2020, to April 15, 2020**. Comments may be submitted by mail, email, or by attending the Public Scoping Meeting (see details below) and submitting a written comment. All comments should indicate a contact person for the agency or organization, if applicable.

All written responses are requested to be received by 5:00 p.m. on Monday, April 15, 2020, and should be sent to the following address:

Jessica Martinez-McKinney, Associate Planner II
City of Santa Cruz Water Department
212 Locust Street, Suite C
Santa Cruz, CA 95060
Email: jmartinezmckinney@cityofsantacruz.com

One public scoping meeting regarding the Proposed Project and EIR will be held. You or members of your agency or organization are invited to attend to provide written comments on the scope and content of environmental information to be included in the EIR. The meeting will be held as follows:

Tuesday, March 31, 2020 at 5:30 p.m. at Santa Cruz Police Department Community Room, 155 Center Street, in Santa Cruz

Project Location and Existing Facilities

The Proposed Project, located in the Davenport Quadrangle (U.S. Geological Survey), involves the City's Laguna Creek Diversion Facility (Facility), which serves as an important source of raw water for the City's North Coast System. The Facility directs water from Laguna Creek into the North Coast System by way of the Laguna Pipeline, just north of the Smith Grade roadway in unincorporated Santa Cruz County, in the community of Bonny Doon and approximately 12 miles northwest of downtown Santa Cruz (see Figure 1 in attachments to this NOP). The Facility is one of four surface water collection/diversion sources supplying raw water to the City's North Coast System. The Facility is approximately 0.1 mile upstream of the confluence with Reggiardo Creek and 4.0 miles upstream of the Pacific Ocean. The North Coast System provides approximately 15% to 35% of City's overall water supply, and enhances systemwide operational flexibility due to its favorable water quality and year-round reliability.

Access to the Facility is provided by unimproved roads off Smith Grade. The Facility is located on privately owned land (Assessor's Parcel Number 062-101-03) with deeded access and rights to the City for the Facility per an agreement from January 1889. The Facility is near the northwestern section of Wilder Ranch State Park (in a section closed to the public), and is surrounded by forested land and scattered residential development.

The Facility was originally constructed circa 1890 as a stone masonry dam and minor improvements have been installed subsequently, including the screened intake structure, a cover on the diversion flume, sediment control bypass valves in the dam, and a control building.

The dam is approximately 60 feet long and 12 feet high and spans the entire width of the creek channel. The dam creates an impoundment upstream that passively directs water into a screened intake structure connected to a diversion flume. A schematic diagram of the existing Facility is shown in Figure 2.

The diversion flume is approximately 100 feet long and channels diverted water into the Laguna Pipeline, a transmission pipeline that conveys water via gravity to the City's Coast Pump Station from which it is pumped for treatment at the City's Graham Hill Water Treatment Plant.

The Facility includes two sediment control bypass valves in the dam that are operated pneumatically to move sediment movement past the dam. The rate at which water is diverted from the creek to the Laguna Pipeline is controlled either manually or via the City's SCADA system by an electronic diversion control valve and measured by a propeller-type flowmeter. This system allows adjustments to the diversion rate to ensure adequate flow is maintained downstream of the Facility. A control building houses operational equipment. Piping from the flume also allows for flow to be returned to the stream to meet in-stream flow requirements, as needed. The creek passes under Smith Grade approximately 400 feet downstream from the Facility through a culvert maintained by Santa Cruz County.

As shown in Figure 1, the Proposed Project site consists of the Facility—the existing dam, intake structure, diversion flume, pipeline, control building, and downstream plunge pool—as well as the surrounding area, including the three existing unimproved access roadways from Smith Grade.

Existing Water Diversion Operations

The City has historically diverted water from Laguna Creek as needed throughout the year based on established pre-1914 senior water rights. However, since 2013, the City has limited its diversions in order to maintain beneficial in-stream flows suitable for various salmonid life stages within the downstream anadromous reaches of Laguna Creek, based on ongoing agreements with the California Department of Fish and Wildlife. While the City is capable of diverting up to approximately 7 cubic feet per second based on current infrastructure, during the various salmonid life stages water is limited and often unavailable, as flows naturally recede below agreed in-stream flow levels. There is no typical diversion rate or diversion season, as the available flows are highly dependent on rainfall volume and timing.

Purpose and Need for the Project

While the Facility has several operational deficiencies related to management of sediment, fisheries protection, and maintenance challenges—issues that have been studied by the City—the overall condition of the Facility is satisfactory, with no signs of major deterioration, and it has adequate strength and stability for continued service.[1,2] Even so, since the early 2000s, the California Department of Fish and Wildlife has corresponded with the City requesting improvements to sediment management and fisheries protection at the Facility. To that end, the City's draft Anadromous Salmonid Habitat Conservation Plan includes improvements at the Facility as a biological objective and as a covered activity, and improvements were analyzed at a programmatic level in the 2005 Program EIR for the North Coast System Repair and Replacement Project.[3]

To address the aforementioned operational and maintenance issues, the City has developed the project-level definition of the Proposed Project, which is the subject of this project-level EIR. A description of these operational and maintenance issues and how the Proposed Project would address them is outlined as follows:

- <u>In-stream Transport of Sediment</u>. The dam impedes natural movement of sediment downstream. While two sediment control bypass valves can be operated during periods of sediment transport (e.g., during storms) to allow sediment to pass through the dam, they are intermittently clogged and have limited capacity, resulting in sediment buildup behind the dam.

1 Black & Veatch. 2018. Laguna and Majors Diversions Condition Assessment Report. October 22, 2018.
2 Wood Rodgers. 2002. North Coast Rehabilitation Project Laguna and Majors Creeks Diversion Facilities. November 18, 2002.
3 Entrix. 2005. *Program Environmental Impact Report for the North Coast System Repair and Replacement Project*. Final. October 2005.

Periodic dredging and sediment removal is required to conduct maintenance activities and to clear the intake screens of sediment. The Proposed Project would address this issue by changing the type and orientation of the water intake so that sediment would not obstruct water intake through the screen and sediment would be able to pass downstream unimpeded. The new system would be designed to transport sediment past the dam in sync with the hydrology of the creek by using the stream energy present during high stream flows.

- Fish Protection Consistent with Regulatory Requirements. The existing intake screen is aged, buried in sediment, and near structural failure. The screen was designed to prevent entrainment of debris within the diverted water and has a woven-wire opening of approximately 0.5 inch. Weekly maintenance and cleaning of the existing intake screen is required to clear sediment from the intake structure when the Facility is in service.

  The existing screen panels do not meet current regulatory requirements for screening of non-anadromous fish species. While federally or state-listed anadromous fish species are not present in the Proposed Project area due to several downstream natural barriers, Laguna Creek does contain rainbow trout *(Oncorhynchus mykiss)* populations, and therefore appropriate fish screening will be provided by the Proposed Project.

  The Proposed Project would provide better controls of the water levels downstream so that fish are not stranded by rapid changes in water levels when the City diverts Laguna Creek and maintains the water intake.

- Maintenance, Safety, and Access. The Proposed Project would address operational and maintenance issues by providing a flexible approach to manage the quantity and quality of water that can be diverted, minimize the use of power, and provide for economical and operational feasibility. The Proposed Project would also allow for better remote control of diversions and would include improvements for safe access to the Facility.

Project Description

The Proposed Project would retrofit the existing Facility to provide for natural sediment transport past the diversion and to protect fish species and habitat, as described above. As shown in Figures 2 and 3, the Proposed Project would be comprised of the following primary components:

- New Intake Structure and Screen. The Proposed Project would use Coanda screen technology. A Coanda screen consists of finely spaced wedge-shaped wires that deflect a portion of the water to a collection chamber below the screen. The Coanda screen would be placed at the downstream side of the dam with the face of the screen sloped downward such that water would pass over it at high velocity. The Coanda screen technology involves no moving parts, provides screening of fine materials, and is self-cleaning, which minimizes issues with clogging and cleaning maintenance (see Figure 3 for images of the Coanda screen technology).

- New Intake Structure Appurtenances**.** New control valves would allow for diversion rates to be regulated at fine intervals. Water would be diverted into new diversion piping that would connect to the existing Laguna Pipeline. A water collection chamber would be installed to collect water for diversion into the new diversion piping. The water collection chamber would likely accumulate fine sediments, so a bypass piping system and control valve would be installed to clear the water collection chamber of sediment for either return to the creek or for manual removal.

- New Valve Control Vault**.** A concrete vault and other minor structures would be installed along the creek bank to house the new intake structure appurtenances. The valve vault would be installed in a location that is accessible by staff for maintenance and operation.
- Riprap Apron**.** Limited reinforcement of the dam and streambank may be necessary and may entail installation of a riprap apron at the base of the dam and/or placement of riprap or armoring materials along the creek to protect the vault and Facility.
- New Monitoring and Control Equipment**.** New monitoring and control equipment including water quality sensors, water meters, valve actuators, and telecommunications would be connected to the existing electrical distribution system on site.
- Existing Intake and Sediment Control Bypass Valves. The existing intake structure would be retained with modifications to allow for emergency diversion of water around the dam if needed for future maintenance activities. The proposed modifications would include installing piping inside the intake and backfilling with concrete around it. The sediment control bypass valves may be abandoned in place or capped to allow flexibility for future use.
- New Access and Safety Provisions. The Proposed Project may include access and safety improvements such as stairways and guard rails at various locations within the Facility including along the streambank, at the new intake structure, across the dam, and at the valve vault.

The Proposed Project would not increase the diversion rates at the Facility, which would remain consistent with those described above for the existing Facility (see Existing Water Diversion Operations above). The Proposed Project would continue to allow the City to operate its diversion while enhancing its ability to meet its in-stream flow requirements.

Construction

Upon completion of this environmental review and approval by the City of the Proposed Project, construction is anticipated to occur in 2021 and would take place over approximately 2 to 3 months during the low-flow period (June to October). Construction activities would generally include the following phases: pre-construction and site mobilization; construction of a cofferdam and stream flow bypass system; dam preparation and foundation work; concrete formwork and installation of the intake screen, piping, and valves; modification of existing intake and sediment control valves; startup and testing; site restoration; and commissioning.

A temporary cofferdam would be placed upstream and downstream of the dam with temporary connecting piping allowing for the bypass of steam flow around the dam so that the construction area is isolated from the flowing creek. Minor channel grading and sediment removal may be required upstream and downstream of the dam. Grading and contouring may be required along the streambank. The new intake structure, screen, and associated appurtenances would be constructed in the creek channel and streambank. The Proposed Project may require demolition of a portion of the dam or modifications to the dam for the installation of the new intake structure, appurtenances, and monitoring equipment. Improvements to the existing access roads from Smith Grade may entail limited tree removal for widening of the roads, compaction, grading, and placement of aggregate. Construction staging areas would generally be along the existing access roads on the site.

Probable Environmental Effects of the Proposed Project

After completing a preliminary review of the Proposed Project, as described in Section 15060(d) of the CEQA Guidelines, the City has determined that an EIR should be prepared to assess the potentially significant environmental impacts of the Proposed Project. Because the preparation of an EIR is clearly required for the Proposed Project, an Initial Study will not be prepared.

The EIR will address environmental impacts of the Proposed Project's construction and operation activities, and will propose mitigation measures to address significant impacts that are identified. The following describes the anticipated environmental issues that will be addressed in the EIR.

- Air Quality and Greenhouse Gas Emissions. Effects on air quality and greenhouse gas emissions would primarily be associated with construction activities and would be temporary and short term. However, both construction and operational emissions of criteria pollutants and greenhouse gasses will be estimated using the California Emissions Estimator Model emissions model and compared to the Monterey Bay Air Resources District emissions-based thresholds to assess potential impacts.
- Biological Resources. Potential impacts on biological resources could result from construction of a cofferdam and stream flow bypass system; installation of the intake screen, piping, and valves; modification of existing intake and sediment control valves; minor channel grading, contouring, and sediment removal upstream and downstream of the dam; dewatering activities; and access road improvements. Potential direct and indirect impacts to sensitive vegetation communities, special-status plant and wildlife species, and jurisdictional aquatic resources associated with both construction and operation of the Proposed Project will be assessed. A general biological survey of the study area, focused habitat assessments, aquatic resources jurisdictional delineation, and preparation of a technical biological resources report will be completed to support the EIR analysis.
- Cultural and Tribal Resources. Potential impacts to cultural and tribal resources could occur during ground-disturbing construction activities. In addition, the dam will be evaluated under all applicable federal, state, and local significance criteria. If found eligible, potential impacts from proposed modifications to the dam will be assessed and mitigation will be recommended, if warranted. Potential impacts to archaeological and tribal resources will also be evaluated. A cultural resources inventory and evaluation report will be prepared to support the EIR analysis.
- Energy. A temporary increase in the consumption of energy would be required during construction and limited use of power would be required for operations. The impact analysis will assess if the Proposed Project would result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency.
- Geology and Soils. Construction of the Proposed Project could result in site-specific impacts on or from local geology and soils conditions. Potential impacts related to geologic, seismic, and soils constraints will be assessed based on information provided in project geotechnical studies. Potential impacts to paleontological resources will also be evaluated.
- Hazards and Hazardous Materials. Potential impacts related to hazards and hazardous materials will be evaluated including the potential hazardous materials associated with

transport, use, and disposal of hazardous materials during construction and potential hazardous emissions or hazardous materials use during construction and operations.

- Hydrology and Water Quality. Potential impacts related to hydrology and water quality will be assessed including temporary and permanent impacts to hydrology and water quality as a result of in-stream construction and access road improvements.
- Land Use and Planning. Potential land use and planning impacts will be assessed. The analysis will evaluate potential conflicts with the County's Local Coastal Program and/or California Coastal Act, as relevant to the Proposed Project.
- Noise and Vibration. Potential construction-period noise and vibration impacts to sensitive receivers (residences) in the vicinity of the Proposed Project will be assessed with modeling based on noise measurements taken at the site and review of construction phases and equipment usage. Operational noise would not be expected to change with the Proposed Project and therefore will not be analyzed in detail in the EIR.
- Transportation. Construction-related vehicle trips will be estimated and temporary construction-related traffic will be evaluated to identify any hazardous conditions on roadways or inadequacies in emergency access that may result during construction of the Proposed Project. Given that operation of the Proposed Project would not result in substantial changes in staffing at the site, vehicle miles traveled will not be evaluated in detail in the EIR. Vehicle miles traveled is the new transportation metric for evaluating changes in project vehicle trips developed in response to Senate Bill 743 and the associated revisions to the CEQA Guidelines that became effective December 2018.
- Impacts Not Found Significant. The EIR will also explain why other effects were determined to not be potentially significant and were not discussed in detail in the EIR. For example, the Facility is not visible from public viewpoints, would not damage scenic resources, or produce light and glare; therefore, no significant aesthetic impacts are anticipated. The retrofit would not result in additional service/utility demands related to police or fire protection, schools, parks and recreation, water demand/supply, or wastewater generation. Agriculture and forestry resources, population and housing, mineral resources, and wildfire are also expected to not be significant and therefore will be discussed in this section.
- Other Sections. The EIR will include additional topics as required by the CEQA Guidelines including growth inducement, cumulative impacts, and alternatives.

  The Proposed Project would not expand the City's service area and would not increase the capacity to deliver water to meet the water supply needs in the existing service area. Therefore, construction of the Proposed Project would not likely result in growth-inducing impacts. Nevertheless, the potential for these types of impacts to result will be examined. In addition, the EIR will address whether the Proposed Project could result in cumulative impacts that are significant when combined with the impacts of other City projects or projects occurring in the area at the same time.

  The EIR will describe and evaluate a reasonable range of alternatives to the Proposed Project. The alternatives would feasibly attain most of the Proposed Project's basic objectives while simultaneously avoiding or substantially lessening any significant effects of the Proposed Project. The "No Project" alternative will also be evaluated as required by CEQA.

Further Information

For environmental review information or questions about the Proposed Project, please contact Jessica Martinez-McKinney at jmartinezmckinney@cityofsantacruz.com.

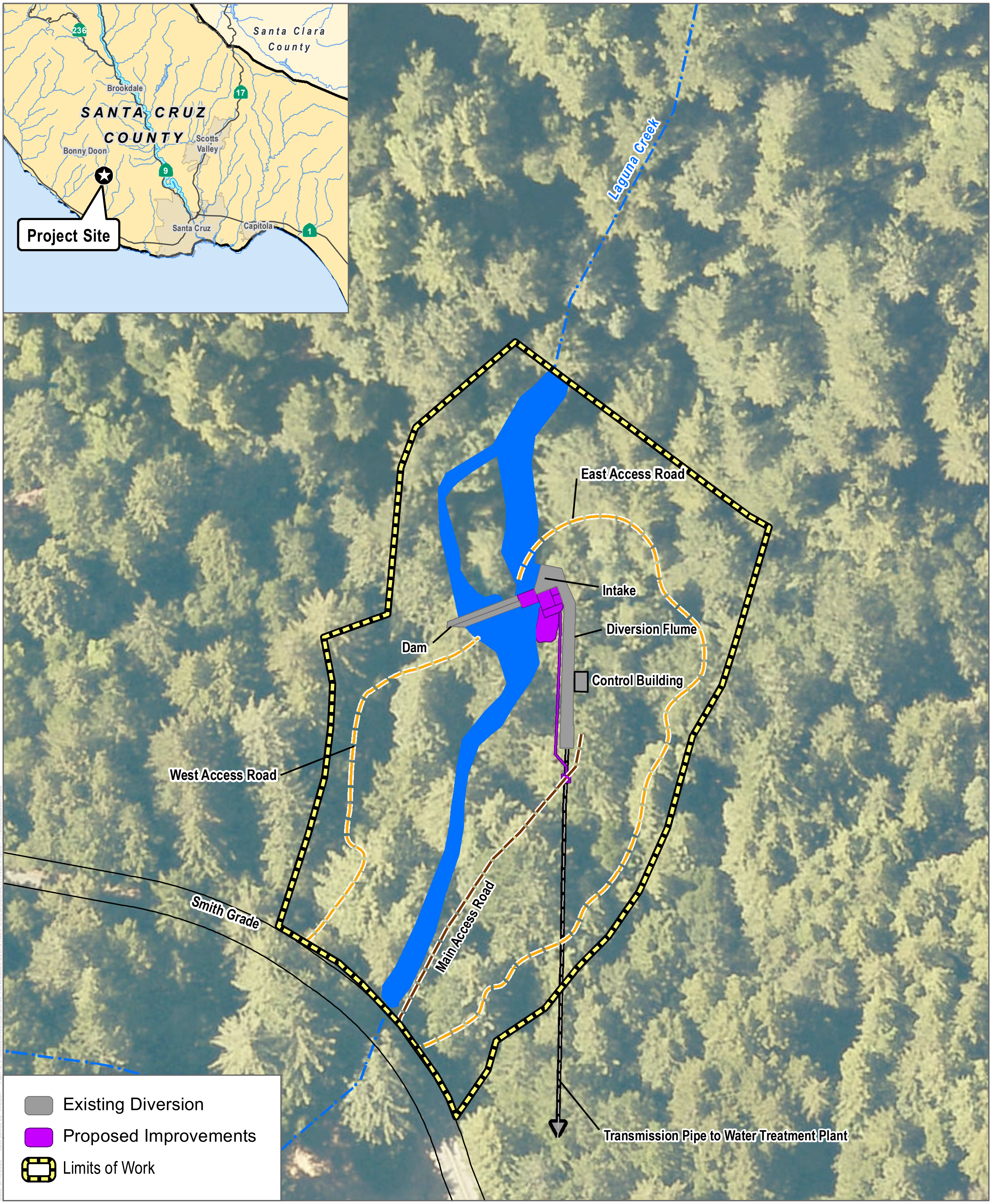
Sincerely,

Jessica Martinez-McKinney

Jessica Martinez-McKinney
Associate Planner II

Attachments

Figure 1: Project Location and Vicinity
Figure 2: Existing Schematic and Proposed Facility Improvements (Plan View)
Figure 3: Coanda Screen Examples and Proposed Facility Improvements (Cross-section)



SOURCE: ESRI 2020, City of Santa Cruz 2019, USGS 2019

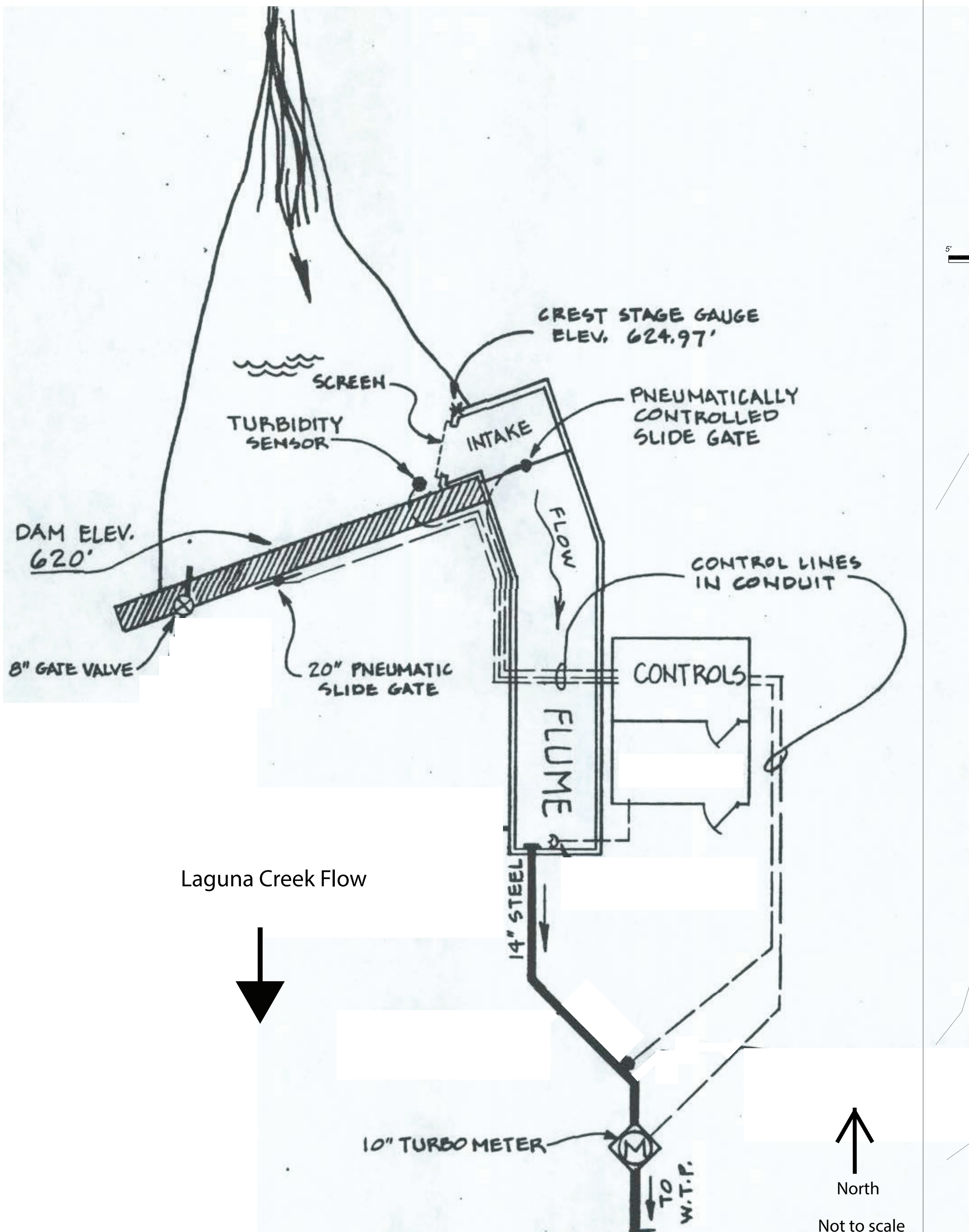
FIGURE 1

Project Location and Vicinity

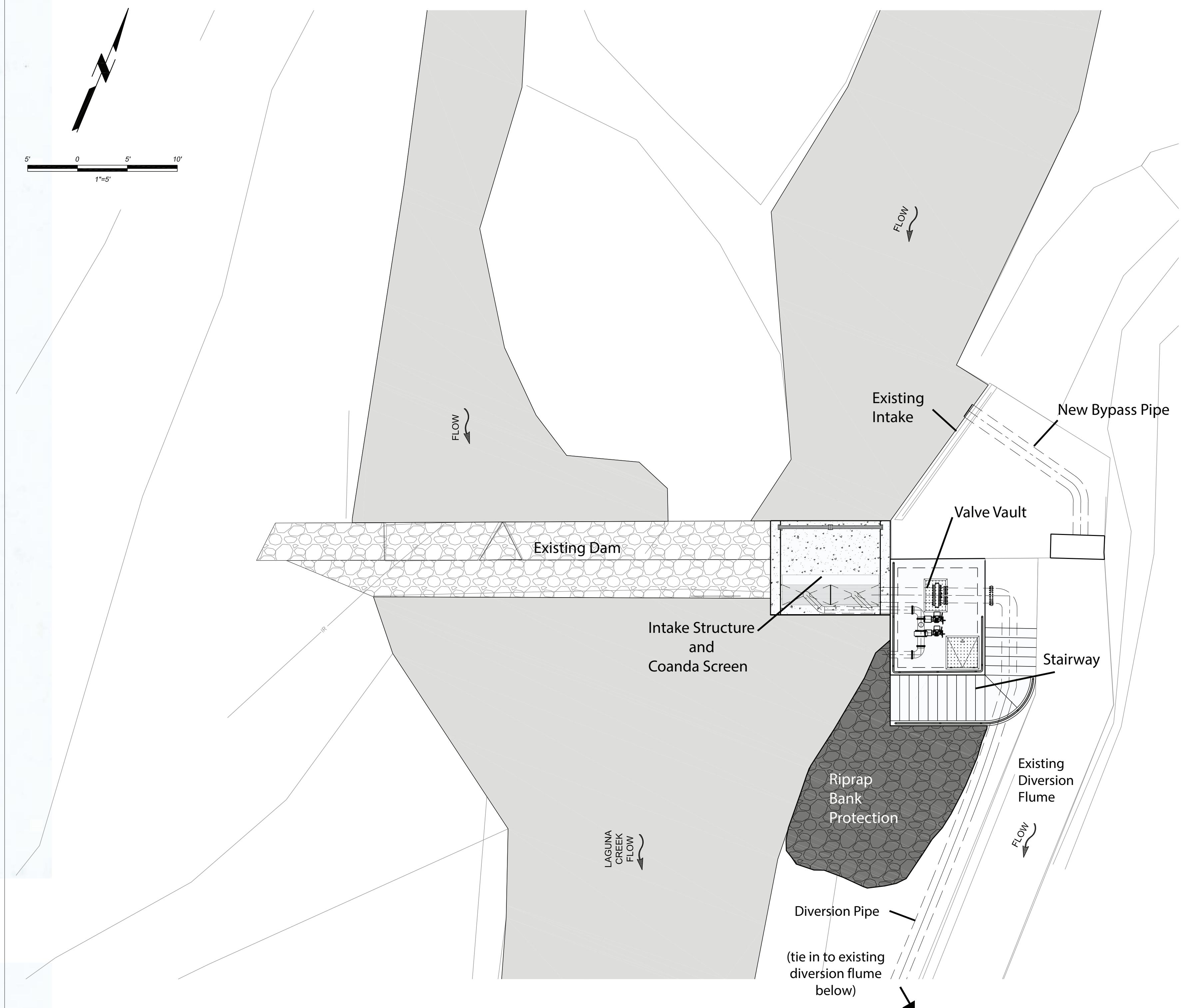
Laguna Creek Diversion Retrofit Project - EIR Notice of Preparation

DUDEK

0 40 80 Feet



Existing Schematic for the Facility, circa 1964 (subsequent minor modifications not shown)



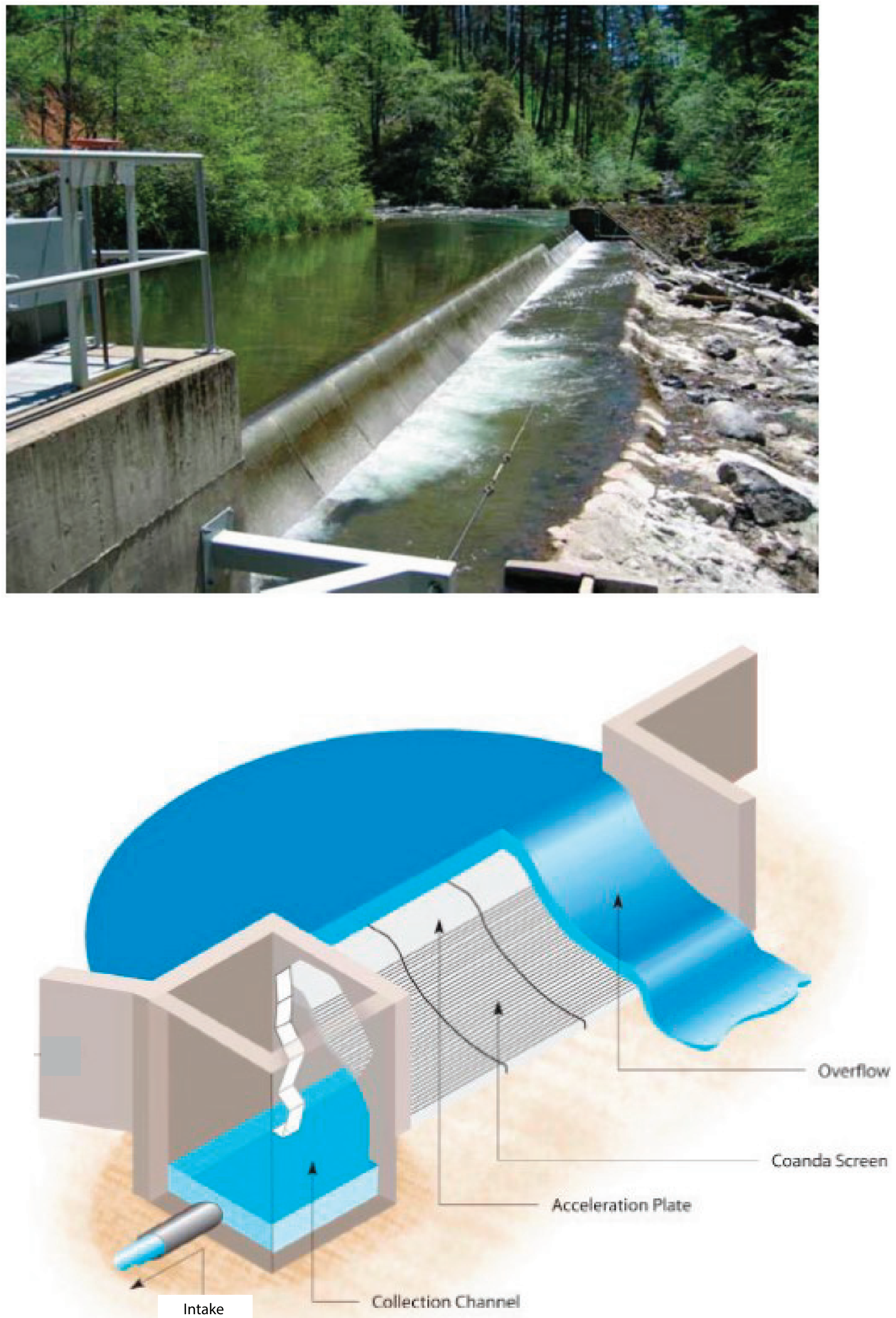
Proposed Improvements (Plan View)

SOURCE: City of Santa Cruz 2019

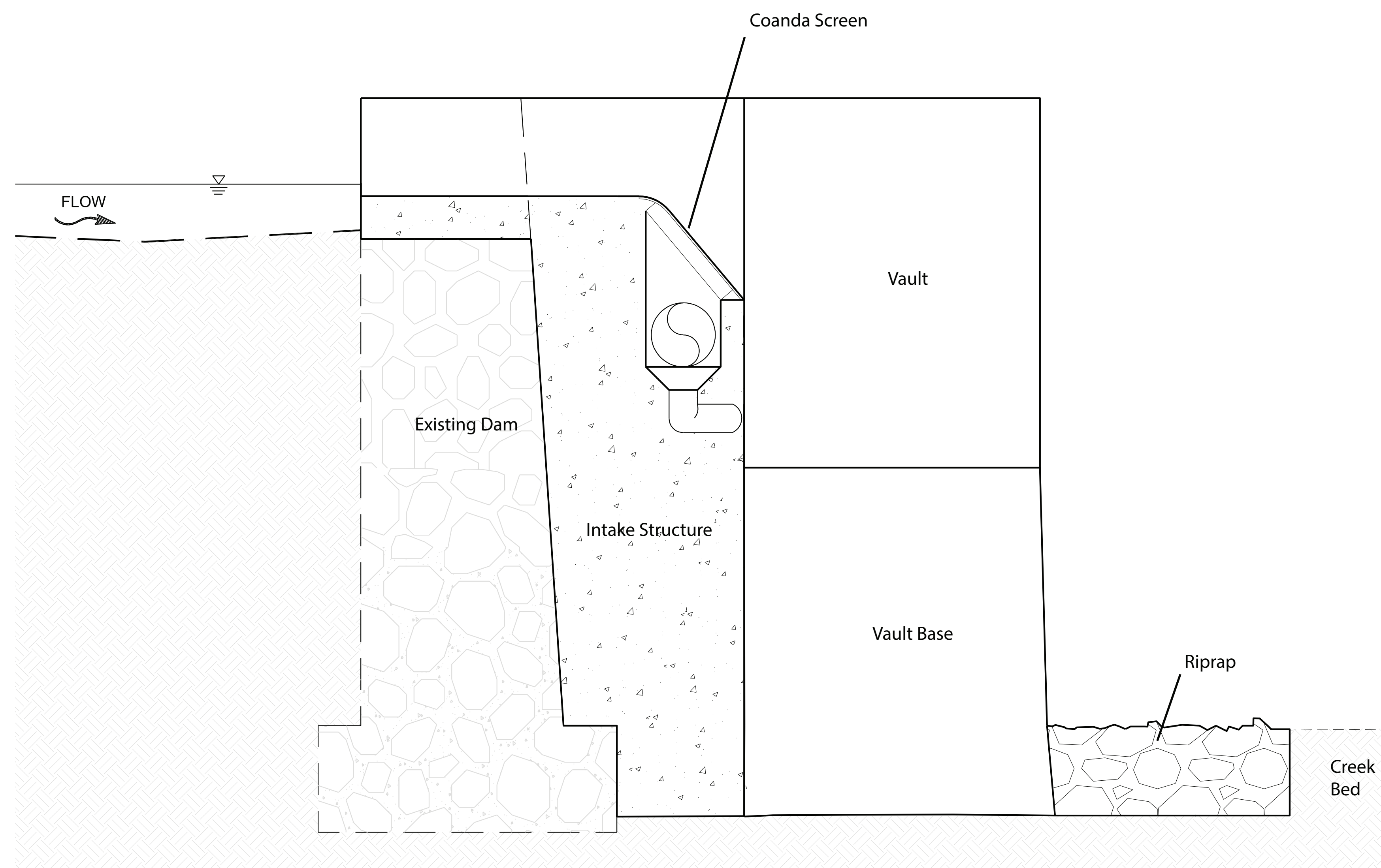
DUDEK

FIGURE 2

Existing Schematic and Proposed Facility Improvements (Plan View)



Coanda Screen Examples Photo and Schematic Diagram



Proposed Facility Improvements (Cross-section)

SOURCE: City of Santa Cruz 2019

DUDEK

FIGURE 3

Coanda Screen Examples and Proposed Facility Improvements (Cross-section)

Laguna Crk Diversion Retrofit Project-SCH202003456-MartinezMckinney-OEY040620

Hultman, Debbie@Wildlife [Debbie.Hultman@wildlife.ca.gov]

Sent: Tuesday, April 07, 2020 10:27 AM
To: Jessica Martinez-McKinney
Cc: state.clearinghouse@opr.ca.gov; Oey, Monica@Wildlife [Monica.Oey@wildlife.ca.gov]; Adair, Randi@Wildlife [Randi.Adair@wildlife.ca.gov]; Weightman, Craig@Wildlife [Craig.Weightman@wildlife.ca.gov]
Attachments: Laguna Crk Diversion Retro~1.pdf (322 KB)

Ms. Martinez-Mckinney,

Please see the attached letter for your records. If you have any questions, contact Ms. Monica Oey, cc'd above.

Thank you,

Debbie Hultman | Assistant to the Regional Manager
California Department of Fish and Wildlife – Bay Delta Region
2825 Cordelia Road, Ste. 100, Fairfield, CA 94534
707.428.2037 | debbie.hultman@wildlife.ca.gov

State of California – Natural Resources Agency
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

April 6, 2020

Ms. Jessica Martinez-Mckinney
Associate Planner II
City of Santa Cruz
212 Locust Street, Suite C
Santa Cruz, CA 95060
jmartinezmckinney@cityofsantacruz.com

Subject: Laguna Creek Diversion Retrofit Project, Notice of Preparation, SCH #202003456, City and County of Santa Cruz

Dear Ms. Martinez-Mckinney:

The California Department of Fish and Wildlife (CDFW) has reviewed the Notice of Preparation (NOP) prepared by the City of Santa Cruz for the Laguna Creek Diversion Retrofit Project (Project) located in the County of Santa Cruz. CDFW is submitting comments on the NOP regarding potentially significant impacts to biological resources associated with the Project.

CDFW ROLE

CDFW is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.) pursuant to CEQA Guidelines section 15386 for commenting on projects that could impact fish, plant, and wildlife resources (e.g., biological resources). CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as permits issued under the California Endangered Species Act (CESA), the Native Plant Protection Act, the Lake and Streambed Alteration (LSA) Program, and other provisions of the Fish and Game Code that afford protection to the state's fish and wildlife trust resources.

PROJECT DESCRIPTION SUMMARY

The proposed Project will retrofit the existing Laguna Creek diversion structure to provide in-stream sediment transport past the diversion and be deposited downstream.

The proposed Project will include: a new intake structure and a Coanda screen; new valve control vault; streambank protection and armoring; new monitoring and control equipment; and modifications to the existing intake and sediment control bypass valves.

ENVIRONMENTAL SETTING

The special-status species that have the potential to occur in or near the Project area, include, but are not limited to:

- California giant salamander (*Dicamptodon ensatus*) – a state species of special concern;
- California red-legged frog (*Rana draytonii*) – federally listed as threatened under the Endangered Species Act (ESA) and a state species of special concern; and
- Santa Cruz black salamander (*Aneides niger*) – a state species of special concern.

COMMENTS AND RECOMMENDATIONS

CDFW offers the following comments and recommendations to assist the City of Santa Cruz in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct, and indirect impacts on biological resources.

COMMENT 1: Full Project Description of Project Features

The CEQA Guidelines (§§15124 and 15378) require that the draft Environmental Impact Report (EIR) incorporate a full Project description, including reasonably foreseeable future phases of the Project, and require that it contain sufficient information to evaluate and review the Project's environmental impact.

To fully address the Project's impacts to biological resources, please include complete descriptions of the following features within the draft EIR:

- Detailed descriptions and cross sections of armored streambank and apron; and
- Operation and maintenance of the new system, including but not limited to, timing of sediment releases.

COMMENT 2: Species Baseline

CDFW recommends that the Project's draft EIR provide baseline habitat assessments for special-status plant, fish and wildlife species located and potentially located within the Project area and surrounding lands, including all rare, threatened, or endangered species (CEQA Guidelines, §15380).

Habitat assessments and species profiles should include information from multiple sources: aerial imagery, historical and recent survey data, field reconnaissance, scientific literature and reports, and findings from "positive occurrence" databases such as California Natural Diversity Database (CNDDB). Based on the data and information from the habitat assessment, the CEQA document can then adequately assess which special-status species are likely to occur in the Project area.

COMMENT 3: Riprap

CDFW recommends exploring all other stabilization techniques (e.g., native vegetation plantings) before installing riprap. If riprap is deemed necessary, CDFW recommends planting riprap with native vegetation or identifying if riprap can be covered with sediment or stream simulation bed material to provide habitat for fish and wildlife.

Installation of riprap may have direct and cumulative adverse impacts on fish and wildlife resources within Laguna Creek. Riprap could alter stream flow (e.g., stream deflection), cause stream erosion, and decrease fish and wildlife habitat. If riprap is installed as part of the Project, please discuss these effects in the analysis and include mitigation to address significant impacts.

COMMENT 4: California Giant Salamander (CGS)

Issue: CGS live within and near streams in coastal forests of southern Santa Cruz County to southern Mendocino and Lake County (Kucera 1997). The Project area contains habitat for CGS, and there is potential for CGS to occur within the Project area. To reduce impacts to CGS to a level that is less-than-significant, avoidance and minimization measures are necessary.

Specific impact: Without appropriate avoidance and minimization measures for CGS, potentially significant impacts associated with Project activities include accidental entrapment, reduced reproductive success, and direct mortality of individuals.

Evidence impact would be significant: Aquatic adults and larvae are known to hide within spaces between streambed rocks and terrestrial adults are known to occur under surface litter and in underground tunnels (Kucera 1997). Project activities will occur within the streambed and streambank where CGS are potentially located. Additionally, noise, sediment removal, movement of workers, and temporary dewatering have the potential to significantly impact CGS.

Recommended Potentially Feasible Mitigation Measures
To evaluate potential impacts to CGS, CDFW recommends incorporating the following mitigation measures into the draft EIR prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 1: CGS Pre-Construction Survey
CDFW recommends that a qualified wildlife biologist conduct focus surveys for CGS 48 hours prior to Project implementation.

Recommended Mitigation Measure 2: CGS Relocation
CDFW recommends that if CGS individuals are found at the Project area during the pre-construction survey or during Project activities, they should be allowed to move out of the area on their own. If a CGS is unable to move out of the project area on its own, a qualified wildlife biologist should relocate CGS out of the Project area into habitat similar to where it was found.

COMMENT 5: California Red-Legged Frog (CRLF)

Issue: CRLF primarily inhabit ponds but can also be found in other waterways, including marshes, streams, and lagoons, and the species will also breed in ephemeral waters (Thomson et al. 2016). The Project area contains habitat and CRLF have the potential to occur in the Project area. Avoidance and minimization measures are necessary to reduce impacts to CRLF to a level that is less-than-significant.

Specific impact: Without appropriate avoidance and minimization measures for CRLF, potentially significant impacts associated with the Project's activities include burrow collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of eggs, larvae and/or young, and direct mortality of individuals.

Evidence impact would be significant: CRLF populations throughout the State have experienced ongoing and drastic declines and many have been extirpated. Habitat loss from growth of cities and suburbs, invasion of nonnative plants, impoundments, water diversions, stream maintenance for flood control, degraded water quality, and introduced predators, such as bullfrogs are the primary threats to CRLF (Thomson et al. 2016, USFWS 2017). Project activities have the potential to significantly impact CRLF.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to CRLF, CDFW recommends incorporating the following mitigation measures into the draft EIR prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 3: CRLF Pre-Construction Surveys
CDFW recommends that a qualified wildlife biologist conduct surveys for CRLF in accordance with the U.S. Fish and Wildlife Service (USFWS) "Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog" (USFWS 2005) to determine if CRLF are within or adjacent to the Project area.

Recommended Mitigation Measure 4: CRLF Avoidance
CDFW recommends that initial ground-disturbing activities be timed to avoid the period when CRLF are most likely to be moving through upland areas (November 1 and March 31). When ground-disturbing activities must take place between November 1 and March 31, CDFW recommends a qualified wildlife biologist monitor construction activity daily for CRLF and ensure that Project activities avoid CRLF.

COMMENT 6: Santa Cruz Black Salamander (SCBS)

Issue: SCBS are found within mixed deciduous woodland, coniferous forests, and coastal grasslands within the Santa Cruz Mountains (Reilly and Wake 2015). They are typically found in moist soils such as under rocks and damp logs. The Project area contains habitat for SCBS and have the potential for SCBS to occur within the Project area. To reduce impacts to SCBS to a level that is less-than-significant, avoidance and minimization measures are necessary.

Specific impact: Without appropriate avoidance and minimization measures for SCBS, potentially significant impacts associated with the Project's activities include accidental entrapment, reduced reproductive success, and direct mortality of individuals.

Evidence impact would be significant: SCBS is endemic to California and its range is restricted within the Santa Cruz Mountains (Reilly and Wake 2015). Project activities will occur within the Santa Cruz Mountains where SCBS have the potential to occur. Additionally, noise, sediment removal, movement of workers, and temporary dewatering have the potential to significantly impact SCBS.

Recommended Potentially Feasible Mitigation Measures
To evaluate potential impacts to SCBS, CDFW recommends incorporating the following mitigation measures into the draft EIR prepared for this Project, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 5: SCBS Pre-Construction Survey
CDFW recommends that a qualified wildlife biologist conduct a focus pre-construction survey for SCBS 48-hours prior to Project implementation.

Recommended Mitigation Measure 6: SCBS Relocation
CDFW recommends that if any SCBS are discovered at the Project area during the pre-construction surveys or during Project activities, they should be allowed to move out of the area on their own. If a SCBS is unable to move out of the Project area on its own, a qualified wildlife biologist will relocate SCBS out of the Project area into habitat similar to where it was found.

COMMENT 7: Nesting Birds

CDFW encourages that Project implementation occur during the bird non-nesting season; however, if ground disturbing or vegetation disturbing activities must occur during the breeding season (February through September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act of 1918 or Fish and Game Code section 3503.

To evaluate and avoid for potential impacts to nesting bird species, CDFW recommends incorporating the following mitigation measures into the Project's draft EIR, and that these measures be made conditions of approval for the Project.

Recommended Mitigation Measure 7: Nesting Bird Surveys
CDFW recommends that a qualified avian biologist conduct pre-activity surveys for active nests no more than seven (7) days prior to the start of ground or vegetation disturbance and every 14 days during Project activities to maximize the probability that nests that could potentially be impacted are detected. CDFW also recommends that surveys cover a sufficient area around the Project area to identify nests and determine their status. A sufficient area means any area potentially affected by the Project. Prior to initiation of ground or vegetation disturbance, CDFW recommends that a qualified avian biologist conduct a survey to establish a behavioral baseline of all identified nests. Once Project activities begins, CDFW recommends having the qualified avian biologist continuously monitor nests to detect behavioral changes resulting from the Project. If behavioral changes

occur, CDFW recommends halting the work causing that change and consulting with CDFW for additional avoidance and minimization measures.

Recommended Mitigation Measure 8: Nesting Bird Buffers
If continuous monitoring of identified nests by a qualified avian biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified avian biologist has determined that the birds have fledged and are no longer reliant upon the nest or on-site parental care for survival. Variance from these no disturbance buffers is possible when there is compelling biological or ecological reason to do so, such as when the Project area would be concealed from a nest site by topography. CDFW recommends that a qualified avian biologist advise and support any variance from these buffers.

REGULATORY REQUIREMENTS

California Endangered Species Act
Please be advised that a CESA Permit must be obtained if the Project has the potential to result in “take” of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA Permit is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species [CEQA section 21001(c), 21083, and CEQA Guidelines section 15380, 15064, 15065]. Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency’s FOC does not eliminate the Project proponent’s obligation to comply with Fish and Game Code section 2080.

Lake and Streambed Alteration (LSA) Program
Notification is required, pursuant to CDFW’s LSA Program (Fish and Game Code section 1600 et. seq.) for any Project-related activities that will substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW, as a Responsible Agency under CEQA, will consider the CEQA document for the Project. CDFW may not execute the final LSA Agreement until it has complied with CEQA (Public Resources Code section 21000 et seq.) as the responsible agency.

FILING FEES

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code section 711.4; Pub. Resources Code, section 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

Thank you for the opportunity to comment on the Project's NOP. If you have any questions regarding this letter or for further coordination with CDFW, please contact Ms. Monica Oey, Environmental Scientist, at (707) 428-2088 or monica.oey@wildlife.ca.gov; or Ms. Randi Adair, Senior Environmental Scientist (Supervisory), at (707) 576-2786 or randi.adair@wildlife.ca.gov.

Sincerely

DocuSigned by:
Gregg Erickson
BE74D4C93C604EA...

Gregg Erickson
Regional Manager
Bay Delta Region

cc: State Clearinghouse #202003456

REFERENCES

Kucera, T. 1997. California Wildlife Habitat Relationships System. California Department of Fish and Wildlife California Interagency Wildlife Task Group. A004 pp.

Reilly, S.B. and D.B. Wake. 2015. Cryptic Diversity and Biogeographical Patterns within the Black Salamander (*Aneides flavipunctatus*) Complex. Journal of Biogeography. Vol. 42: 280-291 pp.

Thomson, R. C., A.N. Wright, and H.B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern. California Department of Fish and Wildlife and University of California Press.

United States Fish and Wildlife Service (USFWS). 2005. Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog. March 2005. 26 pp.

USFWS. 2017. Species Account for California Red-legged frog. March 2017. 1 pp.

Laguna Creek Diversion Retrofit EIR NOP

Mosher, Matthew@CALFIRE [Matthew.Mosher@fire.ca.gov]
Sent: Tuesday, April 14, 2020 10:18 AM
To: Jessica Martinez-McKinney
Cc: Sampson, Richard@CALFIRE [Richard.Sampson@fire.ca.gov]
Attachments: Laguna Creek Diversion Ret~1.pdf (141 KB)

Hi Jessica,

Attached are CAL FIRE's comments on the Laguna Creek Diversion Retrofit EIR NOP.

Thanks,

Matthew Mosher
Environmental Scientist
CAL FIRE San Mateo – Santa Cruz Unit
6059 Highway 9
Felton CA, 95018
O.831.335.6722
C.831.212.3140

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
P.O. Box 944246
SACRAMENTO, CA 94244-2460
(916) 653-7772
Website: www.fire.ca.gov

Date: April 14, 2020
Laguna Creek Diversion Retrofit Project EIR NOP

Jessica Martinez-McKinney, Associate Planner II
City of Santa Cruz Water Department
212 Locust Street, Suite C
Santa Cruz, CA 95060
jmartinezmckinney@cityofsantacruz.com

The Laguna Creek Diversion Retrofit Project EIR Notice of Preparation (NOP) has been reviewed by the Resource Management office of the San Mateo-Santa Cruz Unit of the California Department of Forestry and Fire Protection (CAL FIRE). Please see our comments below.

Tree Removal

The land proposed for this project can be classified as "Timberland" as defined under Public Resources Code (PRC) section 4526. The NOP specifies that limited tree removal would occur for widening of roads, compaction, grading and placement of aggregate. Based on the information provided, it is unclear if any commercial tree species would be removed as part of this project (ponderosa pine, Douglas fir, or coast redwood). A review of aerial imagery of the project site appears to show coast redwood occurring adjacent to the roads and the dam. A timber harvest plan, timberland conversion permit or conversion exemption would be required prior to the cutting of any commercial tree species. A consulting Register Professional Forester could assist you in this determination.

Fire Hazard

This project has been identified as being adjacent to wildlands. PRC 4291 requires the creation of a 100' fire break or fire protection area around and adjacent to habitable buildings or structures. While the project does not include construction of habitable buildings or structures and thus is not required to incorporate defensible space, CAL FIRE still recommends creation of 100' of fire protection area around infrastructure associated with the diversion dam in order to provide protection of important infrastructure during wildfire.

Sudden Oak Death

Sudden Oak Death (SOD), *Phytophthora ramorum,* is commonly found in forests of the Santa Cruz Mountains. During tree removal operations for this project, care should be taken to prevent the spread of this disease. Numerous sources of information have been developed to identify and manage this pest. One such site, maintained by the California Oak Mortality Task Force is available on the internet: http://nature.berkeley.edu/comtf/

If you need any assistance or information, please contact me at the telephone number or e-mail address listed below.

Sincerely,

Signed Original, on File

Richard Sampson
Forester II – Unit Forester
Unit Environmental Coordinator
RPF #2422
(831) 335-6742
Richard.sampson@fire.ca.gov

By:
Matthew Mosher
Environmental Scientist

Cc:
Christopher Browder
Deputy Chief, Environmental Protection

STATE OF CALIFORNIA Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

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

March 17, 2020

Jessica Martinez-Mckinney, Associate Planner II
City of Santa Cruz
212 Locust Street, Suite C
Santa Cruz, CA 95060

Re: 2020030456, Laguna Creek Diversion Retrofit Project, Santa Cruz County

Dear Ms. Martinez-Mckinney:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   - **a.** A brief description of the project.
   - **b.** The lead agency contact information.
   - **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   - **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   - **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   - **a.** Alternatives to the project.
   - **b.** Recommended mitigation measures.
   - **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   - **a.** Type of environmental review necessary.
   - **b.** Significance of the tribal cultural resources.
   - **c.** Significance of the project's impacts on tribal cultural resources.
   - **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   - **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
   - **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez

Nancy Gonzalez-Lopez
Staff Services Analyst

cc: State Clearinghouse

RE: Notice of Preparation: Laguna Creek Diversion Retrofit Project

Jessica Martinez-McKinney
Sent: Tuesday, March 17, 2020 2:57 PM
To: MRT [marty@got.net]

Hi Marty -

Thank you for the clarification, sounds like this is not a formal comment, I didn't want to make an incorrect assumption one way or another.

To answer your question the Anadromous Salmonids HCP at this time has not been issued to the City of Santa Cruz. I am not in a position to share the HCP, since the draft documents are privileged and confidential. When it is finalized we would be happy to share it with you.

Thanks,

Jessica Martinez-McKinney
Associate Planner
City of Santa Cruz Water Department
212 Locust St., Suite C / Santa Cruz, CA 95060
(831) 420-5322 (direct) | (831) 222-0069 (cell)
cityofsantacruz.com/water

From: MRT [marty@got.net]
Sent: Tuesday, March 17, 2020 9:27 AM
To: Jessica Martinez-McKinney
Subject: Re: Notice of Preparation: Laguna Creek Diversion Retrofit Project

well since it's a question not a comment I am not sure how to answer.
Not intended to be a comment rather a request for documents that would inform comments.
Good job on the NOP BTW.

Marty

> On Mar 17, 2020, at 7:46 AM, Jessica Martinez-McKinney <jmartinezmckinney@cityofsantacruz.com> wrote:
>
> Hello and Good Morning Marty -
>
> Since we are currently in the public review period for the Laguna Creek Diversion Retrofit Project NOP it would be helpful to know whether your email is a formal CEQA comment.
>
> Many thanks and I hope you are well.
>
> **Jessica Martinez-McKinney**
> *Associate Planner*
> **City of Santa Cruz Water Department**
> 212 Locust St., Suite C / Santa Cruz, CA 95060
> (831) 420-5322 (direct) | (831) 222-0069 (cell)
> cityofsantacruz.com/water
>
> ---
>
> **From:** MRT [marty@got.net]
> **Sent:** Monday, March 16, 2020 12:00 PM
> **To:** Jessica Martinez-McKinney
> **Subject:** Re: Notice of Preparation: Laguna Creek Diversion Retrofit Project
>
> Hi Jessica,
>
> Do you know where I can access the HCP and subsequent monitoring reports?

Thanks,
Marty

On Mar 16, 2020, at 10:06 AM, Jessica Martinez-McKinney
<jmartinezmckinney@cityofsantacruz.com> wrote:

Dear Interested Parties:

Please see the attached Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice for the Laguna Creek Diversion Retrofit Project.

Thank you,

Jessica Martinez-McKinney
Associate Planner
City of Santa Cruz Water Department
212 Locust St., Suite C / Santa Cruz, CA 95060
(831) 420-5322 (direct) | (831) 222-0069 (cell)
cityofsantacruz.com/water

RE: Public scoping meeting: Laguna Creek Diversion

Jessica Martinez-McKinney
Sent: Thursday, April 02, 2020 7:37 AM
To: Tony Hoffman [tonyhoffman1955@gmail.com]

Good Morning Tony:

Thank you for reaching out regarding the Laguna Creek Diversion Retrofit Project. I'm sorry to hear that you experienced trouble logging into the phone call. I would like to share the presentation materials which are posted on our website here. Other information is on the main Laguna page at this link.

Tony, since we are in the public review period it would be helpful to know if your email is a formal CEQA comment, if so we will respond in the Draft Environmental Impact Report in the appropriate section. The draft Environmental Impact Report will be available for public review later this fall.

Regards,

Jessica Martinez-McKinney
Associate Planner
City of Santa Cruz Water Department
212 Locust St., Suite C / Santa Cruz, CA 95060
(831) 420-5322 (direct) | (831) 222-0069 (cell)
cityofsantacruz.com/water

Note: I am teleworking, however my availability has not changed. I can still be reached by either email or phone. Be well!

From: Tony Hoffman [tonyhoffman1955@gmail.com]
Sent: Wednesday, April 01, 2020 5:40 PM
To: Jessica Martinez-McKinney
Subject: Public scoping meeting: Laguna Creek Diversion

Greetings Jessica:

I tried to attend yesterday's online meeting regarding the Laguna Creek Diversion EIR. I could not get onto the meeting … probably my fault.

Were there any significant concerns or issues?

I have one: when these guys come up around the dam, they put up survey stakes all over the place - and never take them down. So the area has little orange flags all around, some having been there for years. Could I request that the stakes and flags be removed after the project is over?

Tony Hoffman

I live on 3000 Smith Grade

RE:

Jessica Martinez-McKinney
Sent: Wednesday, March 18, 2020 1:58 PM
To: Patrick Orozco [yanapvoic97@gmail.com]

Hi Patrick -

Thank you very much for reaching out to me and for identifying these sites. We appreciate your feedback and will incorporate your comments in the project report.

In the meantime, I'd like to let you know that the sites you mentioned below are not within our project area and are not within a ¼-mile of the Area of Potential Effects.

Best,

Jessica Martinez-McKinney
Associate Planner
City of Santa Cruz Water Department
212 Locust St., Suite C / Santa Cruz, CA 95060
(831) 420-5322 (direct) | (831) 222-0069 (cell)
cityofsantacruz.com/water

From: Patrick Orozco [yanapvoic97@gmail.com]
Sent: Wednesday, March 18, 2020 11:51 AM
To: Jessica Martinez-McKinney
Subject:

HELLO JESSICA
I RECEIVED YOUR LETTER ON A EIR FOR LAGUNA CREEK. I KNOW OF THE INDIAN SITES THERE. SCR 58, 13,14,15,16,AND 17TH I ASK FOR NO DISTURBANCE ON THESE SITES. PATRICK OROZCO

From: Robert Vallone [robert.vallone@gmail.com]
Sent: Wednesday, April 15, 2020 1:53 PM
To: Jessica Martinez-McKinney
Subject: Feedback on proposed EIR for Laguna Creek Diversion Retrofit Project

Jessica,
As the owner of the property containing the Laguna Creek Dam and Diversion Facility (Parcel 062-101-03) I wanted to take this opportunity to formally comment on the Notice of Preparation (NOP) of an EIR for the project that you sent via mail on March 16, 2020, comments due 5pm 4/15/20.

Comments:
Thank you for providing the list of 11 environmental issues you anticipate covering in the upcoming EIR and in particular the detailed description of each issue and the potential impacts and mitigation issues for each one. Based on my careful review of this detailed information I am very satisfied that you and the water department have anticipated all of the potential impacts that I would have - in fact your list is even more thorough and contains issues and details that I had not previously considered. As such, I am quite confident that the upcoming EIR will adequately address all potential environmental issues.

I look forward to reviewing the EIR when it becomes available - is there a rough anticipated timeframe for it to be available for review?

In addition, I want to take this opportunity to thank you for the phone meeting we had on 3/20/20 where we reviewed the proposed project design in more detail and discussed the more detailed information you provided on the project and we reviewed the Draft 30p Design PDF in great detail. I really appreciate the time you spent to solicit, discuss, and understand my concerns about the construction phase of the proposed project. We are tracking those issues in a separate email thread, but I wanted to acknowledge and thank you for them here as well.

I am very impressed by the competence and professionalism of the Santa Cruz Water Department as represented in my communications with you. I am very confident and optimistic that the good spirit of communication, coordination and collaboration we have established will continue throughout the the proposed Laguna Creek Diversion Retrofit Project and beyond.
Thank you,
Robert Vallone
Owner 3030 Smith Grade Road
Parcel 062-101-03

Appendix B

Air Quality and Greenhouse Gas Emissions Calculations

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Air Quality, Greenhouse Gas, and Energy Inputs

The California Emissions Estimator Model (CalEEMod) was used to estimate project-generated construction criteria air pollutant and GHG emissions. Key inputs for each component modeled included: project schedule (start and end date), phasing (phase type and sequencing), vehicle trips (workers, vendor trucks, and haul trucks), import/export quantities, and equipment (type, quantity, and usage).

Project construction activities would generally include the following phases: (1) access road improvements, site preparation, and mobilization; (2) cofferdam and temporary stream bypass system; (3) Coanda screen intake structure including dam preparation, foundation work, and concrete formwork and installation of the intake screen, piping, and valves; (4) modifications to the existing intake and sediment control valves; (5) valve vault installation; (6) electrical installations; (7) access stairs and riprap apron; and (8) startup and testing, site restoration, and construction closeout.

- **Construction hours**: 7 a.m. to 5 p.m. on weekdays
- **Duration**: Approximately 3 months
- **Timing**: Between June 1, 2021 to October 1, 2021

Construction Assumptions

Table 1. Construction Equipment List

Offroad Equipment Type	Horsepower	Load Factor
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	221	0.50
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Dumpers/Tenders	16	0.38
Excavators	50	0.38
Forklifts	89	0.20
Generator Sets	84	0.74
Graders	187	0.41
Off-Highway Tractors	124	0.44
Off-Highway Trucks	402	0.38
Other Construction Equipment	172	0.42
Other General Industrial Equipment	88	0.34
Other Material Handling Equipment	168	0.40
Plate Compactors	8	0.43
Pressure Washers	13	0.30
Pumps	84	0.74
Rough Terrain Forklifts	100	0.40
Rubber Tired Loaders	203	0.36
Tractors/Loaders/Backhoes	97	0.37
Welders	46	0.45

Table 2. Construction Scenario Assumptions

Potential Construction Phase	Start Date	Finish Date	One-Way Vehicle Trips			Equipment		
			Average Daily Workers	*Average Daily Vendor Trucks*	*Total Haul Trucks*	*Type*	*Quantity*	*Usage Hours*
Access Road Improvements, Site Preparation, and Mobilization								
Site Preparation – Clear and Grub and Mobilization	3-Aug-21	10-Aug-21	3 to 5	<1	2	Excavators	1	8
						Tractors/ Loaders/ Backhoes	1	8
Grading	3-Aug-21	10-Aug-21	1	<1	7	Graders	1	8
Cofferdam and Temporary Stream Bypass System								
Cofferdams Installation	10-Aug-21	31-Aug-21	3 to 5	<1	0	Tractors/ Loaders/ Backhoes	1	8
Pipe Installation	7-Sep-21	4-Oct-21	3 to 5	<1	0	Excavators	1	8
						Pumps	1	8
						Tractors/ Loaders/ Backhoes	1	8
(Installation of Dewatering and Leakage Control Pump Systems)	25-Aug-21	31-Aug-21	1	<1	0	Pumps	2	8
						Generator Sets	4	8
						Tractors/ Loaders/ Backhoes	1	8
						Welders	1	8
New Coanda Screen Intake and Valve Vault Structures								
Excavation	7-Sep-21	16-Sep-21	1	<1	4	Excavators	1	8
						Tractors/ Loaders/ Backhoes	1	8
Doweling and Anchorage	7-Sep-21	16-Sep-21	1	<1	0	Bore/Drill Rig	1	8
(Installation of Rebar and Pouring concrete)	7-Sep-21	16-Sep-21	3 to 5	<1	10	Excavator	1	8
						Cement and Mortar Mixers	1	8
						Line Pumps	1	8

Table 2. Construction Scenario Assumptions

Potential Construction Phase	Start Date	Finish Date	One-Way Vehicle Trips			Equipment		
			Average Daily Workers	*Average Daily Vendor Trucks*	*Total Haul Trucks*	*Type*	*Quantity*	*Usage Hours*
Installation of Coanda Screen and Valve Vault	16-Sep-21	21-Sep-21	1	<1	1	Excavator	1	8
						Cement and Mortar Mixers	1	8
						Tractors/ Loaders/ Backhoes	1	8
Diversion Pipeline Installation	24-Sep-21	4-Oct-21	2 to 4	<1	0	Concrete/ Industrial Saws	1	8
						Excavators	1	8
						Forklifts	1	8
						Pumps	1	8
						Tractors/ Loaders/ Backhoes	1	8
Modifications to Existing Intake and Sediment Control Values								
Pipe Installation	24-Sep-21	4-Oct-21	1 to 2	<1	0	Concrete/ Industrial Saws	1	8
						Excavators	1	8
						Tractors/ Loaders/ Backhoes	1	8
Backfill Structure	4-Oct-21	13-Oct-21	2 to 3	<1	6	Cement and Mortar Mixers	1	8
						Concrete/ Industrial Saws	1	8
Electrical Installations								
Electrical Conduit Installation	16-Sep-21	4-Oct-21	1	1	0	Concrete/ Industrial Saws	1	8
						Excavators	1	8
						Forklifts	1	8
						Pumps	1	8
						Tractors/ Loaders/ Backhoes	1	8
Access Stairs and Riprap Apron								
Access Stairs	31-Aug-21	21-Sep-21	3 to 4	1	2	Cement and Mortar Mixers	1	8

Table 2. Construction Scenario Assumptions

Potential Construction Phase	Start Date	Finish Date	One-Way Vehicle Trips			Equipment		
			Average Daily Workers	*Average Daily Vendor Trucks*	*Total Haul Trucks*	*Type*	*Quantity*	*Usage Hours*
Install Riprap	24-Sep-21	13-Oct-21	3 to 4	1	3	Tractors/ Loaders/ Backhoes	1	8
Startup and Testing, Site Restoration, and Construction Closeout								
Start Up and Testing	4-Oct-21	13-Oct-21	2 to 3	<1	0	Generator Sets	1	8
Site Restoration	11-Oct-21	18-Oct-21	2 to 3	<1	0	Tractors/ Loaders/ Backhoes	1	8
Site Cleanup	11-Oct-21	18-Oct-21	2 to 3	<1	0	Tractors/ Loaders/ Backhoes	1	8

Access Road Improvements, Site Preparation, and Mobilization

- Three private, unpaved roads on the site may be improved to allow access of equipment to the site, which may entail limited tree removal to accommodate road widening, grading, compaction, and placement of aggregate
- Total area graded/disturbed: 30 cubic yards
- Quantities of cut and fill; import and export (tons or cubic yards): Road rock 75 tons, off haul root balls 20 cubic yards
- Distance of hauled import for materials: 20 miles one-way assumed; assumptions used for haul import for phases below as well
- Distance of hauled export for materials: City of Santa Cruz Resource Recovery Facility (landfill) at 650 Dimeo Lane in Santa Cruz (10 miles); used for haul export for phases below as well

Cofferdam and Temporary Stream Bypass System

- System would consist of two cofferdams—one installed upstream and one downstream of the dam consisting of—and a 12-inch-diameter, approximately 240-foot-long bypass pipe
- Dewatering and leakage control pump systems would be installed in the construction work areas. Between the upstream cofferdam and the dam, a sump pit would be excavated to at least 1 foot below the lowest excavation point which would be in front of the existing intake structure so that the construction area could be isolated from the flowing creek
- Quantities of cut and fill; import and export (tons or cubic yards): Based on a reasonable angle of repose starting approximately 20 feet away and 3 feet deep from the above-mentioned areas, an estimated 34 cubic yards of sediment would need to be removed

New Coanda Screen Intake Structure

- Excavation of stream materials upstream and downstream of the dam to allow the dam to be notched as well as the bedrock to be exposed
- Anchoring of the structure's foundation to the bedrock and dam
- Installation of rebar and pouring concrete for the structure
  - Total concrete placement is expected to be approximately 40 cubic yards
- Placement of the Coanda screen and other intake components
- The design criteria used for the Coanda screen are based on Appendix S of the California Salmonid Stream Habitat Restoration Manual, Fish Screen Criteria from the California Department of Fish and Game, June 19, 2000 version. The Fish Screen Criteria include considerations for structure placement, approach velocity, sweeping velocity, screen openings and porosity, and screen construction. The criterion would be applied to the Proposed Project and implemented as required during project permitting with CDFW

Modifications to Existing Intake and Sediment Control Values

- The existing intake structure would be closed and abandoned in place and a pipe for emergency diversion would be installed before the structure is backfilled with concrete
  - Pipe length (linear feet) and width: 24-inch diameter , 25 feet long
- A temporary formwork would be installed at the face of the intake and concrete to be cast inside the structure so it ends up with a solid concrete face (width 15-feet × height 4.5 feet) when the form is stripped
- Holes would be drilled in the existing intake structure to fill the void space with 33 cubic yards of concrete
- Quantity of demolished/removed material to be exported (tons): 5 cubic yards
- Quantities of cut and fill; import and export (tons or cubic yards): 5 cubic yards

Valve Vault Installation

- The valve vault would be embedded into the streambank near the new intake but would be exposed or visible on the stream channel side
- The foundation would have a stem wall configuration and the vault and its foundation would be cast in place
- The foundation would be anchored to bedrock with rebar
  - Total concrete placement is expected to be 22 cubic yards
- Blowoff drain that would connect to the bottom of the Coanda collection chamber and piping and valves would be installed
- New diversion piping with diversion butterfly valve would be connected to the Coanda collection chamber and extend parallel past the existing diversion flume to the existing Laguna Pipeline where it would connect to the transmission pipeline via the pre-cast drop inlet
  - Need pipe length (linear feet) and width: 18-inch diameter, approximately 120 feet
- After vault construction is complete, valve stems, pedestals, and electric actuators installed

- A sump pump with grating and discharge piping, aluminum hatch for the vault, and handrails would be installed
- The space between the new valve vault and the existing covered diversion flume would be backfilled with controlled low strength material
    - Approximately 6 cubic yards of material

Electrical Installations

- Conduits from the existing control building to the valve vault followed by installation of the required electrical and communication panels
    - Conduit length: 120 linear feet
- New lighting and grounding would also be installed as required

Access Stairs and Riprap Apron

- A stairway would be installed from the downstream pool up to the top of the valve vault
    - 5 cubic yards of concrete would be needed for the stairs
- Riprap apron would be installed and along the streambank where slope protection is required
    - 30 cubic yards of material

Startup and Testing, Site Restoration, and Construction Closeout

- Final erosion control BMPs would be installed
- The cofferdam and bypass system would be removed
- Demobilization of temporary facilities
- Replanting and irrigation as needed

LCDR

Monterey Bay Unified APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.10	Acre	2.10	91,476.00	0

1.2 Other Project Characteristics

Urbanization Rural **Wind Speed (m/s)** 2.8 **Precipitation Freq (Days)** 54

Climate Zone 5 **Operational Year** 2022

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - Construction phasing information provided by the project applicant.

Land Use - Project land use information provided by the project applicant.

Construction Phase - Construction phasing information provided by the project applicant.

Off-road Equipment - Off-road equipment information provided by the project applicant.

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Off-road Equipment - Off-road equipment information provided by the project applicant.

Trips and VMT - Construction trip information provided by the project applicant

Fleet Mix - CalEEMod Defaults.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Parking	5489	0
tblConstructionPhase	NumDays	6.00	9.00
tblConstructionPhase	NumDays	3.00	6.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	PrecipitationFrequency	53	54
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	0.00	6.00
tblTripsAndVMT	HaulingTripNumber	0.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	14.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00

tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	20.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	2.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0574	0.5018	0.6052	1.0600e-003	8.3300e-003	0.0265	0.0348	1.9700e-003	0.0254	0.0274	0.0000	91.8008	91.8008	0.0163	0.0000	92.2076
Maximum	**0.0574**	**0.5018**	**0.6052**	**1.0600e-003**	**8.3300e-003**	**0.0265**	**0.0348**	**1.9700e-003**	**0.0254**	**0.0274**	**0.0000**	**91.8008**	**91.8008**	**0.0163**	**0.0000**	**92.2076**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0574	0.5018	0.6052	1.0600e-003	8.3300e-003	0.0265	0.0348	1.9700e-003	0.0254	0.0274	0.0000	91.8007	91.8007	0.0163	0.0000	92.2075
Maximum	**0.0574**	**0.5018**	**0.6052**	**1.0600e-003**	**8.3300e-003**	**0.0265**	**0.0348**	**1.9700e-003**	**0.0254**	**0.0274**	**0.0000**	**91.8007**	**91.8007**	**0.0163**	**0.0000**	**92.2075**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**8-2-2021**	**9-30-2021**	0.3833	0.3833
		Highest	0.3833	0.3833

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	5.9200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.9200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	5.9200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.9200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sit Preperation - Access Road	Site Preparation	8/3/2021	8/10/2021	5	6	
2	Grading - Access Road	Grading	8/3/2021	8/10/2021	5	6	

3	Cofferdams Installation	Grading	8/11/2021	8/23/2021	5	9	
4	Installation of Control Systems	Trenching	8/25/2021	8/31/2021	5	5	
5	Access Stairs	Trenching	8/31/2021	9/21/2021	5	16	
6	Vault Structures: Excvation	Trenching	9/7/2021	9/16/2021	5	8	
7	Vault Structures: Doweling and Anchorage	Trenching	9/7/2021	9/16/2021	5	8	
8	Vault Structures: Concrete Pour	Trenching	9/7/2021	9/16/2021	5	8	
9	Electrical Installation: Electrical conduit	Trenching	9/16/2021	10/4/2021	5	13	
10	Pipe Installation	Trenching	9/17/2021	10/4/2021	5	12	
11	Vault Structures: Coanda Screen	Trenching	9/17/2021	9/22/2021	5	4	
12	Vault Structures: Diversion Pipeline	Trenching	9/24/2021	10/22/2021	5	21	
13	Sediment Control: Pipe Installation	Trenching	9/24/2021	10/4/2021	5	7	
14	Install Riprap	Trenching	9/24/2021	10/13/2021	5	14	
15	Sediment Control: Backfill Structure	Trenching	10/4/2021	10/13/2021	5	8	
16	Start up and Testing	Trenching	10/4/2021	10/19/2021	5	12	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sit Preperation - Access Road	Excavators	1	8.00	158	0.38
Sit Preperation - Access Road	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading - Access Road	Graders	1	8.00	187	0.41
Cofferdams Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Generator Sets	4	8.00	84	0.74
Installation of Control Systems	Pumps	2	8.00	84	0.74
Installation of Control Systems	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Welders	1	8.00	46	0.45

Access Stairs	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Excvation	Excavators	1	8.00	158	0.38
Vault Structures: Excvation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Doweling and Anchorage	Bore/Drill Rigs	1	8.00	221	0.50
Vault Structures: Concrete Pour	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Concrete Pour	Excavators	1	8.00	158	0.38
Vault Structures: Concrete Pour	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Concrete/Industrial Saws	1	8.00	81	0.73
Electrical Installation: Electrical conduit	Excavators	1	8.00	158	0.38
Electrical Installation: Electrical conduit	Forklifts	1	8.00	89	0.20
Electrical Installation: Electrical conduit	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipe Installation	Excavators	1	8.00	158	0.38
Pipe Installation	Pumps	1	8.00	84	0.74
Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Coanda Screen	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Coanda Screen	Excavators	1	8.00	158	0.38
Vault Structures: Coanda Screen	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Diversion Pipeline	Concrete/Industrial Saws	1	8.00	81	0.73
Vault Structures: Diversion Pipeline	Excavators	1	8.00	158	0.38
Vault Structures: Diversion Pipeline	Forklifts	1	8.00	89	0.20
Vault Structures: Diversion Pipeline	Pumps	1	8.00	84	0.74
Vault Structures: Diversion Pipeline	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Pipe Installation	Concrete/Industrial Saws	1	8.00	81	0.73
Sediment Control: Pipe Installation	Excavators	1	8.00	158	0.38
Sediment Control: Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Install Riprap	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Backfill Structure	Cement and Mortar Mixers	1	8.00	9	0.56
Sediment Control: Backfill Structure	Concrete/Industrial Saws	1	8.00	81	0.73
Start up and Testing	Generator Sets	1	8.00	84	0.74

Start up and Testing	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sit Preperation - Access Road	2	10.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading - Access Road	1	2.00	0.00	14.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Cofferdams Installation	1	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Installation of Control Systems	8	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Access Stairs	1	8.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Excvation	2	2.00	0.00	8.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Doweling and	1	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Concrete Pour	3	10.00	0.00	20.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Electrical Installation: Electrical conduit	5	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipe Installation	3	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Coanda Screen	3	2.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Diversion Pipeline	5	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Pipe Installation	3	4.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Install Riprap	1	8.00	0.00	6.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Backfill Structure	2	6.00	0.00	12.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Start up and Testing	3	6.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Sit Preperation - Access Road - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2500e-003	0.0122	0.0166	2.0000e-005		6.5000e-004	6.5000e-004		6.0000e-004	6.0000e-004	0.0000	2.1802	2.1802	7.1000e-004	0.0000	2.1978
Total	**1.2500e-003**	**0.0122**	**0.0166**	**2.0000e-005**	**0.0000**	**6.5000e-004**	**6.5000e-004**	**0.0000**	**6.0000e-004**	**6.0000e-004**	**0.0000**	**2.1802**	**2.1802**	**7.1000e-004**	**0.0000**	**2.1978**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	5.4000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1529	0.1529	1.0000e-005	0.0000	0.1531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.6000e-004	1.4000e-003	0.0000	3.7000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3306	0.3306	1.0000e-005	0.0000	0.3309
Total	**1.9000e-004**	**7.0000e-004**	**1.5000e-003**	**0.0000**	**4.0000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.4835**	**0.4835**	**2.0000e-005**	**0.0000**	**0.4839**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2500e-003	0.0122	0.0166	2.0000e-005		6.5000e-004	6.5000e-004		6.0000e-004	6.0000e-004	0.0000	2.1802	2.1802	7.1000e-004	0.0000	2.1978

Total	**1.2500e-003**	**0.0122**	**0.0166**	**2.0000e-005**	**0.0000**	**6.5000e-004**	**6.5000e-004**	**0.0000**	**6.0000e-004**	**6.0000e-004**	**0.0000**	**2.1802**	**2.1802**	**7.1000e-004**	**0.0000**	**2.1978**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	5.4000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1529	0.1529	1.0000e-005	0.0000	0.1531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.6000e-004	1.4000e-003	0.0000	3.7000e-004	0.0000	3.7000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3306	0.3306	1.0000e-005	0.0000	0.3309
Total	**1.9000e-004**	**7.0000e-004**	**1.5000e-003**	**0.0000**	**4.0000e-004**	**0.0000**	**4.1000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.4835**	**0.4835**	**2.0000e-005**	**0.0000**	**0.4839**

3.3 Grading - Access Road - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3600e-003	0.0178	5.3000e-003	2.0000e-005		5.6000e-004	5.6000e-004		5.2000e-004	5.2000e-004	0.0000	1.7464	1.7464	5.6000e-004	0.0000	1.7605
Total	**1.3600e-003**	**0.0178**	**5.3000e-003**	**2.0000e-005**	**1.5900e-003**	**5.6000e-004**	**2.1500e-003**	**1.7000e-004**	**5.2000e-004**	**6.9000e-004**	**0.0000**	**1.7464**	**1.7464**	**5.6000e-004**	**0.0000**	**1.7605**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-005	1.8800e-003	3.4000e-004	1.0000e-005	1.2000e-004	1.0000e-005	1.3000e-004	3.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.5352	0.5352	2.0000e-005	0.0000	0.5358
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0661	0.0661	0.0000	0.0000	0.0662
Total	**8.0000e-005**	**1.9100e-003**	**6.2000e-004**	**1.0000e-005**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**5.0000e-005**	**1.0000e-005**	**6.0000e-005**	**0.0000**	**0.6014**	**0.6014**	**2.0000e-005**	**0.0000**	**0.6020**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3600e-003	0.0178	5.3000e-003	2.0000e-005		5.6000e-004	5.6000e-004		5.2000e-004	5.2000e-004	0.0000	1.7464	1.7464	5.6000e-004	0.0000	1.7605
Total	**1.3600e-003**	**0.0178**	**5.3000e-003**	**2.0000e-005**	**1.5900e-003**	**5.6000e-004**	**2.1500e-003**	**1.7000e-004**	**5.2000e-004**	**6.9000e-004**	**0.0000**	**1.7464**	**1.7464**	**5.6000e-004**	**0.0000**	**1.7605**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	5.0000e-005	1.8800e-003	3.4000e-004	1.0000e-005	1.2000e-004	1.0000e-005	1.3000e-004	3.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.5352	0.5352	2.0000e-005	0.0000	0.5358
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.8000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0661	0.0661	0.0000	0.0000	0.0662
Total	**8.0000e-005**	**1.9100e-003**	**6.2000e-004**	**1.0000e-005**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**5.0000e-005**	**1.0000e-005**	**6.0000e-005**	**0.0000**	**0.6014**	**0.6014**	**2.0000e-005**	**0.0000**	**0.6020**

3.4 Cofferdams Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.4000e-004	8.5300e-003	0.0102	1.0000e-005		5.0000e-004	5.0000e-004		4.6000e-004	4.6000e-004	0.0000	1.2284	1.2284	4.0000e-004	0.0000	1.2383
Total	**8.4000e-004**	**8.5300e-003**	**0.0102**	**1.0000e-005**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**4.6000e-004**	**4.6000e-004**	**0.0000**	**1.2284**	**1.2284**	**4.0000e-004**	**0.0000**	**1.2383**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	2.4000e-004	2.1000e-003	1.0000e-005	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4958	0.4958	2.0000e-005	0.0000	0.4963
Total	**2.5000e-004**	**2.4000e-004**	**2.1000e-003**	**1.0000e-005**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4958**	**0.4958**	**2.0000e-005**	**0.0000**	**0.4963**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.4000e-004	8.5300e-003	0.0102	1.0000e-005		5.0000e-004	5.0000e-004		4.6000e-004	4.6000e-004	0.0000	1.2284	1.2284	4.0000e-004	0.0000	1.2383
Total	**8.4000e-004**	**8.5300e-003**	**0.0102**	**1.0000e-005**	**0.0000**	**5.0000e-004**	**5.0000e-004**	**0.0000**	**4.6000e-004**	**4.6000e-004**	**0.0000**	**1.2284**	**1.2284**	**4.0000e-004**	**0.0000**	**1.2383**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	2.4000e-004	2.1000e-003	1.0000e-005	5.6000e-004	0.0000	5.6000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.4958	0.4958	2.0000e-005	0.0000	0.4963
Total	**2.5000e-004**	**2.4000e-004**	**2.1000e-003**	**1.0000e-005**	**5.6000e-004**	**0.0000**	**5.6000e-004**	**1.5000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4958**	**0.4958**	**2.0000e-005**	**0.0000**	**0.4963**

3.5 Installation of Control Systems - 2021

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Off-Road	6.7000e-003	0.0562	0.0655	1.1000e-004		3.0300e-003	3.0300e-003		3.0100e-003	3.0100e-003	0.0000	9.6311	9.6311	7.2000e-004	0.0000	9.6492
Total	**6.7000e-003**	**0.0562**	**0.0655**	**1.1000e-004**		**3.0300e-003**	**3.0300e-003**		**3.0100e-003**	**3.0100e-003**	**0.0000**	**9.6311**	**9.6311**	**7.2000e-004**	**0.0000**	**9.6492**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0551	0.0551	0.0000	0.0000	0.0551
Total	**3.0000e-005**	**3.0000e-005**	**2.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0551**	**0.0551**	**0.0000**	**0.0000**	**0.0551**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Off-Road	6.7000e-003	0.0562	0.0655	1.1000e-004		3.0300e-003	3.0300e-003		3.0100e-003	3.0100e-003	0.0000	9.6311	9.6311	7.2000e-004	0.0000	9.6492

Total	**6.7000e-003**	**0.0562**	**0.0655**	**1.1000e-004**		**3.0300e-003**	**3.0300e-003**		**3.0100e-003**	**3.0100e-003**	**0.0000**	**9.6311**	**9.6311**	**7.2000e-004**	**0.0000**	**9.6492**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	3.0000e-005	2.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0551	0.0551	0.0000	0.0000	0.0551
Total	**3.0000e-005**	**3.0000e-005**	**2.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0551**	**0.0551**	**0.0000**	**0.0000**	**0.0551**

3.6 Access Stairs - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7000e-004	2.9500e-003	2.4700e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.3666	0.3666	4.0000e-005	0.0000	0.3676
Total	**4.7000e-004**	**2.9500e-003**	**2.4700e-003**	**1.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.3666**	**0.3666**	**4.0000e-005**	**0.0000**	**0.3676**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	5.4000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1529	0.1529	1.0000e-005	0.0000	0.1531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	3.4000e-004	2.9900e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7052	0.7052	3.0000e-005	0.0000	0.7058
Total	**3.8000e-004**	**8.8000e-004**	**3.0900e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.4000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.8581**	**0.8581**	**4.0000e-005**	**0.0000**	**0.8589**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7000e-004	2.9500e-003	2.4700e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	0.3666	0.3666	4.0000e-005	0.0000	0.3676
Total	**4.7000e-004**	**2.9500e-003**	**2.4700e-003**	**1.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.3666**	**0.3666**	**4.0000e-005**	**0.0000**	**0.3676**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	2.0000e-005	5.4000e-004	1.0000e-004	0.0000	3.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1529	0.1529	1.0000e-005	0.0000	0.1531
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.6000e-004	3.4000e-004	2.9900e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7052	0.7052	3.0000e-005	0.0000	0.7058
Total	**3.8000e-004**	**8.8000e-004**	**3.0900e-003**	**1.0000e-005**	**8.2000e-004**	**1.0000e-005**	**8.4000e-004**	**2.2000e-004**	**1.0000e-005**	**2.3000e-004**	**0.0000**	**0.8581**	**0.8581**	**4.0000e-005**	**0.0000**	**0.8589**

3.7 Vault Structures: Excvation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6700e-003	0.0162	0.0221	3.0000e-005		8.6000e-004	8.6000e-004		8.0000e-004	8.0000e-004	0.0000	2.9070	2.9070	9.4000e-004	0.0000	2.9305
Total	**1.6700e-003**	**0.0162**	**0.0221**	**3.0000e-005**		**8.6000e-004**	**8.6000e-004**		**8.0000e-004**	**8.0000e-004**	**0.0000**	**2.9070**	**2.9070**	**9.4000e-004**	**0.0000**	**2.9305**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0000e-005	1.0700e-003	2.0000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3059	0.3059	1.0000e-005	0.0000	0.3062
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**8.0000e-005**	**1.1100e-003**	**5.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.3940**	**0.3940**	**1.0000e-005**	**0.0000**	**0.3944**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6700e-003	0.0162	0.0221	3.0000e-005		8.6000e-004	8.6000e-004		8.0000e-004	8.0000e-004	0.0000	2.9070	2.9070	9.4000e-004	0.0000	2.9305
Total	**1.6700e-003**	**0.0162**	**0.0221**	**3.0000e-005**		**8.6000e-004**	**8.6000e-004**		**8.0000e-004**	**8.0000e-004**	**0.0000**	**2.9070**	**2.9070**	**9.4000e-004**	**0.0000**	**2.9305**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.0000e-005	1.0700e-003	2.0000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3059	0.3059	1.0000e-005	0.0000	0.3062
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**8.0000e-005**	**1.1100e-003**	**5.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.3940**	**0.3940**	**1.0000e-005**	**0.0000**	**0.3944**

3.8 Vault Structures: Doweling and Anchorage - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0300e-003	0.0121	8.3000e-003	4.0000e-005		3.7000e-004	3.7000e-004		3.4000e-004	3.4000e-004	0.0000	3.3096	3.3096	1.0700e-003	0.0000	3.3364
Total	**1.0300e-003**	**0.0121**	**8.3000e-003**	**4.0000e-005**		**3.7000e-004**	**3.7000e-004**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**3.3096**	**3.3096**	**1.0700e-003**	**0.0000**	**3.3364**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**5.0000e-005**	**4.0000e-005**	**3.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0300e-003	0.0121	8.3000e-003	4.0000e-005		3.7000e-004	3.7000e-004		3.4000e-004	3.4000e-004	0.0000	3.3096	3.3096	1.0700e-003	0.0000	3.3364

Total	**1.0300e-003**	**0.0121**	**8.3000e-003**	**4.0000e-005**		**3.7000e-004**	**3.7000e-004**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**3.3096**	**3.3096**	**1.0700e-003**	**0.0000**	**3.3364**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0882	0.0882	0.0000	0.0000	0.0882
Total	**5.0000e-005**	**4.0000e-005**	**3.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0882**	**0.0882**	**0.0000**	**0.0000**	**0.0882**

3.9 Vault Structures: Concrete Pour - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6700e-003	0.0229	0.0293	5.0000e-005		1.1900e-003	1.1900e-003		1.1500e-003	1.1500e-003	0.0000	4.2592	4.2592	7.3000e-004	0.0000	4.2775
Total	**2.6700e-003**	**0.0229**	**0.0293**	**5.0000e-005**		**1.1900e-003**	**1.1900e-003**		**1.1500e-003**	**1.1500e-003**	**0.0000**	**4.2592**	**4.2592**	**7.3000e-004**	**0.0000**	**4.2775**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	2.6900e-003	4.9000e-004	1.0000e-005	1.7000e-004	1.0000e-005	1.8000e-004	5.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7646	0.7646	3.0000e-005	0.0000	0.7654
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	2.1000e-004	1.8700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.4000e-004	0.0000	0.4407	0.4407	2.0000e-005	0.0000	0.4411
Total	**3.1000e-004**	**2.9000e-003**	**2.3600e-003**	**1.0000e-005**	**6.6000e-004**	**1.0000e-005**	**6.8000e-004**	**1.8000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**1.2054**	**1.2054**	**5.0000e-005**	**0.0000**	**1.2065**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.6700e-003	0.0229	0.0293	5.0000e-005		1.1900e-003	1.1900e-003		1.1500e-003	1.1500e-003	0.0000	4.2592	4.2592	7.3000e-004	0.0000	4.2774
Total	**2.6700e-003**	**0.0229**	**0.0293**	**5.0000e-005**		**1.1900e-003**	**1.1900e-003**		**1.1500e-003**	**1.1500e-003**	**0.0000**	**4.2592**	**4.2592**	**7.3000e-004**	**0.0000**	**4.2774**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	8.0000e-005	2.6900e-003	4.9000e-004	1.0000e-005	1.7000e-004	1.0000e-005	1.8000e-004	5.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7646	0.7646	3.0000e-005	0.0000	0.7654
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	2.1000e-004	1.8700e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.4000e-004	0.0000	0.4407	0.4407	2.0000e-005	0.0000	0.4411
Total	**3.1000e-004**	**2.9000e-003**	**2.3600e-003**	**1.0000e-005**	**6.6000e-004**	**1.0000e-005**	**6.8000e-004**	**1.8000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**1.2054**	**1.2054**	**5.0000e-005**	**0.0000**	**1.2065**

3.10 Electrical Installation: Electrical conduit - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.5200e-003	0.0746	0.0917	1.5000e-004		4.2300e-003	4.2300e-003		4.0700e-003	4.0700e-003	0.0000	12.7653	12.7653	2.2100e-003	0.0000	12.8207
Total	**8.5200e-003**	**0.0746**	**0.0917**	**1.5000e-004**		**4.2300e-003**	**4.2300e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**12.7653**	**12.7653**	**2.2100e-003**	**0.0000**	**12.8207**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	7.0000e-005	6.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1432	0.1432	1.0000e-005	0.0000	0.1434
Total	**7.0000e-005**	**7.0000e-005**	**6.1000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1432**	**0.1432**	**1.0000e-005**	**0.0000**	**0.1434**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.5200e-003	0.0746	0.0917	1.5000e-004		4.2300e-003	4.2300e-003		4.0700e-003	4.0700e-003	0.0000	12.7653	12.7653	2.2100e-003	0.0000	12.8206
Total	**8.5200e-003**	**0.0746**	**0.0917**	**1.5000e-004**		**4.2300e-003**	**4.2300e-003**		**4.0700e-003**	**4.0700e-003**	**0.0000**	**12.7653**	**12.7653**	**2.2100e-003**	**0.0000**	**12.8206**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	7.0000e-005	6.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1432	0.1432	1.0000e-005	0.0000	0.1434
Total	**7.0000e-005**	**7.0000e-005**	**6.1000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1432**	**0.1432**	**1.0000e-005**	**0.0000**	**0.1434**

3.11 Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7800e-003	0.0436	0.0556	9.0000e-005		2.3600e-003	2.3600e-003		2.2600e-003	2.2600e-003	0.0000	7.7517	7.7517	1.6000e-003	0.0000	7.7916
Total	**4.7800e-003**	**0.0436**	**0.0556**	**9.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.2600e-003**	**2.2600e-003**	**0.0000**	**7.7517**	**7.7517**	**1.6000e-003**	**0.0000**	**7.7916**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	3.1000e-004	2.8000e-003	1.0000e-005	7.4000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6611	0.6611	2.0000e-005	0.0000	0.6617
Total	**3.4000e-004**	**3.1000e-004**	**2.8000e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**2.0000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6611**	**0.6611**	**2.0000e-005**	**0.0000**	**0.6617**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7800e-003	0.0436	0.0556	9.0000e-005		2.3600e-003	2.3600e-003		2.2600e-003	2.2600e-003	0.0000	7.7517	7.7517	1.6000e-003	0.0000	7.7916

Total	**4.7800e-003**	**0.0436**	**0.0556**	**9.0000e-005**		**2.3600e-003**	**2.3600e-003**		**2.2600e-003**	**2.2600e-003**	**0.0000**	**7.7517**	**7.7517**	**1.6000e-003**	**0.0000**	**7.7916**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	3.1000e-004	2.8000e-003	1.0000e-005	7.4000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6611	0.6611	2.0000e-005	0.0000	0.6617
Total	**3.4000e-004**	**3.1000e-004**	**2.8000e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**2.0000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6611**	**0.6611**	**2.0000e-005**	**0.0000**	**0.6617**

3.12 Vault Structures: Coanda Screen - 2021

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.5000e-004	8.8300e-003	0.0117	2.0000e-005		4.6000e-004	4.6000e-004		4.3000e-004	4.3000e-004	0.0000	1.5451	1.5451	4.8000e-004	0.0000	1.5571
Total	**9.5000e-004**	**8.8300e-003**	**0.0117**	**2.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.5451**	**1.5451**	**4.8000e-004**	**0.0000**	**1.5571**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.7000e-004	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0765	0.0765	0.0000	0.0000	0.0765
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.9000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0441	0.0441	0.0000	0.0000	0.0441
Total	**3.0000e-005**	**2.9000e-004**	**2.4000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.1205**	**0.1205**	**0.0000**	**0.0000**	**0.1207**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.5000e-004	8.8300e-003	0.0117	2.0000e-005		4.6000e-004	4.6000e-004		4.3000e-004	4.3000e-004	0.0000	1.5451	1.5451	4.8000e-004	0.0000	1.5571
Total	**9.5000e-004**	**8.8300e-003**	**0.0117**	**2.0000e-005**		**4.6000e-004**	**4.6000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.5451**	**1.5451**	**4.8000e-004**	**0.0000**	**1.5571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	1.0000e-005	2.7000e-004	5.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0765	0.0765	0.0000	0.0000	0.0765
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	2.0000e-005	1.9000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0441	0.0441	0.0000	0.0000	0.0441
Total	**3.0000e-005**	**2.9000e-004**	**2.4000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**1.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.1205**	**0.1205**	**0.0000**	**0.0000**	**0.1207**

3.13 Vault Structures: Diversion Pipeline - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0138	0.1205	0.1482	2.4000e-004		6.8300e-003	6.8300e-003		6.5800e-003	6.5800e-003	0.0000	20.6209	20.6209	3.5800e-003	0.0000	20.7103
Total	**0.0138**	**0.1205**	**0.1482**	**2.4000e-004**		**6.8300e-003**	**6.8300e-003**		**6.5800e-003**	**6.5800e-003**	**0.0000**	**20.6209**	**20.6209**	**3.5800e-003**	**0.0000**	**20.7103**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	4.4000e-004	3.9300e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9255	0.9255	3.0000e-005	0.0000	0.9264
Total	**4.7000e-004**	**4.4000e-004**	**3.9300e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9255**	**0.9255**	**3.0000e-005**	**0.0000**	**0.9264**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0138	0.1205	0.1482	2.4000e-004		6.8300e-003	6.8300e-003		6.5800e-003	6.5800e-003	0.0000	20.6209	20.6209	3.5800e-003	0.0000	20.7103
Total	**0.0138**	**0.1205**	**0.1482**	**2.4000e-004**		**6.8300e-003**	**6.8300e-003**		**6.5800e-003**	**6.5800e-003**	**0.0000**	**20.6209**	**20.6209**	**3.5800e-003**	**0.0000**	**20.7103**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	4.4000e-004	3.9300e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0500e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9255	0.9255	3.0000e-005	0.0000	0.9264
Total	**4.7000e-004**	**4.4000e-004**	**3.9300e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0500e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9255**	**0.9255**	**3.0000e-005**	**0.0000**	**0.9264**

3.14 Sediment Control: Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0248	0.0322	5.0000e-005		1.3600e-003	1.3600e-003		1.3000e-003	1.3000e-003	0.0000	4.4254	4.4254	9.3000e-004	0.0000	4.4487
Total	**2.8000e-003**	**0.0248**	**0.0322**	**5.0000e-005**		**1.3600e-003**	**1.3600e-003**		**1.3000e-003**	**1.3000e-003**	**0.0000**	**4.4254**	**4.4254**	**9.3000e-004**	**0.0000**	**4.4487**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	7.0000e-005	6.5000e-004	0.0000	1.7000e-004	0.0000	1.7000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1543	0.1543	1.0000e-005	0.0000	0.1544
Total	**8.0000e-005**	**7.0000e-005**	**6.5000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1543**	**0.1543**	**1.0000e-005**	**0.0000**	**0.1544**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0248	0.0322	5.0000e-005		1.3600e-003	1.3600e-003		1.3000e-003	1.3000e-003	0.0000	4.4254	4.4254	9.3000e-004	0.0000	4.4487

Total	**2.8000e-003**	**0.0248**	**0.0322**	**5.0000e-005**		**1.3600e-003**	**1.3600e-003**		**1.3000e-003**	**1.3000e-003**	**0.0000**	**4.4254**	**4.4254**	**9.3000e-004**	**0.0000**	**4.4487**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.0000e-005	7.0000e-005	6.5000e-004	0.0000	1.7000e-004	0.0000	1.7000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1543	0.1543	1.0000e-005	0.0000	0.1544
Total	**8.0000e-005**	**7.0000e-005**	**6.5000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1543**	**0.1543**	**1.0000e-005**	**0.0000**	**0.1544**

3.15 Install Riprap - 2021

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.3100e-003	0.0133	0.0158	2.0000e-005		7.8000e-004	7.8000e-004		7.2000e-004	7.2000e-004	0.0000	1.9108	1.9108	6.2000e-004	0.0000	1.9263
Total	**1.3100e-003**	**0.0133**	**0.0158**	**2.0000e-005**		**7.8000e-004**	**7.8000e-004**		**7.2000e-004**	**7.2000e-004**	**0.0000**	**1.9108**	**1.9108**	**6.2000e-004**	**0.0000**	**1.9263**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.0000e-005	8.1000e-004	1.5000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	2.0000e-005	0.0000	0.2294	0.2294	1.0000e-005	0.0000	0.2296
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.9000e-004	2.6200e-003	1.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.8000e-004	1.0000e-005	1.9000e-004	0.0000	0.6170	0.6170	2.0000e-005	0.0000	0.6176
Total	**3.4000e-004**	**1.1000e-003**	**2.7700e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**1.9000e-004**	**1.0000e-005**	**2.1000e-004**	**0.0000**	**0.8464**	**0.8464**	**3.0000e-005**	**0.0000**	**0.8472**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.3100e-003	0.0133	0.0158	2.0000e-005		7.8000e-004	7.8000e-004		7.2000e-004	7.2000e-004	0.0000	1.9108	1.9108	6.2000e-004	0.0000	1.9263
Total	**1.3100e-003**	**0.0133**	**0.0158**	**2.0000e-005**		**7.8000e-004**	**7.8000e-004**		**7.2000e-004**	**7.2000e-004**	**0.0000**	**1.9108**	**1.9108**	**6.2000e-004**	**0.0000**	**1.9263**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	2.0000e-005	8.1000e-004	1.5000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	2.0000e-005	0.0000	0.2294	0.2294	1.0000e-005	0.0000	0.2296
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2000e-004	2.9000e-004	2.6200e-003	1.0000e-005	6.9000e-004	1.0000e-005	7.0000e-004	1.8000e-004	1.0000e-005	1.9000e-004	0.0000	0.6170	0.6170	2.0000e-005	0.0000	0.6176
Total	**3.4000e-004**	**1.1000e-003**	**2.7700e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**1.9000e-004**	**1.0000e-005**	**2.1000e-004**	**0.0000**	**0.8464**	**0.8464**	**3.0000e-005**	**0.0000**	**0.8472**

3.16 Sediment Control: Backfill Structure - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7700e-003	0.0136	0.0159	3.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004	0.0000	2.3339	2.3339	1.4000e-004	0.0000	2.3375
Total	**1.7700e-003**	**0.0136**	**0.0159**	**3.0000e-005**		**7.5000e-004**	**7.5000e-004**		**7.5000e-004**	**7.5000e-004**	**0.0000**	**2.3339**	**2.3339**	**1.4000e-004**	**0.0000**	**2.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-005	1.6100e-003	2.9000e-004	0.0000	1.0000e-004	1.0000e-005	1.1000e-004	3.0000e-005	1.0000e-005	3.0000e-005	0.0000	0.4588	0.4588	2.0000e-005	0.0000	0.4592
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.3000e-004	1.1200e-003	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2644	0.2644	1.0000e-005	0.0000	0.2647
Total	**1.9000e-004**	**1.7400e-003**	**1.4100e-003**	**0.0000**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**1.1000e-004**	**1.0000e-005**	**1.1000e-004**	**0.0000**	**0.7232**	**0.7232**	**3.0000e-005**	**0.0000**	**0.7239**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7700e-003	0.0136	0.0159	3.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004	0.0000	2.3339	2.3339	1.4000e-004	0.0000	2.3375
Total	**1.7700e-003**	**0.0136**	**0.0159**	**3.0000e-005**		**7.5000e-004**	**7.5000e-004**		**7.5000e-004**	**7.5000e-004**	**0.0000**	**2.3339**	**2.3339**	**1.4000e-004**	**0.0000**	**2.3375**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-005	1.6100e-003	2.9000e-004	0.0000	1.0000e-004	1.0000e-005	1.1000e-004	3.0000e-005	1.0000e-005	3.0000e-005	0.0000	0.4588	0.4588	2.0000e-005	0.0000	0.4592
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.3000e-004	1.1200e-003	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2644	0.2644	1.0000e-005	0.0000	0.2647
Total	**1.9000e-004**	**1.7400e-003**	**1.4100e-003**	**0.0000**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**1.1000e-004**	**1.0000e-005**	**1.1000e-004**	**0.0000**	**0.7232**	**0.7232**	**3.0000e-005**	**0.0000**	**0.7239**

3.17 Start up and Testing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.3900e-003	0.0418	0.0492	8.0000e-005		2.3500e-003	2.3500e-003		2.2400e-003	2.2400e-003	0.0000	6.6669	6.6669	1.2300e-003	0.0000	6.6977
Total	**4.3900e-003**	**0.0418**	**0.0492**	**8.0000e-005**		**2.3500e-003**	**2.3500e-003**		**2.2400e-003**	**2.2400e-003**	**0.0000**	**6.6669**	**6.6669**	**1.2300e-003**	**0.0000**	**6.6977**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.9000e-004	1.6800e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	1.0000e-005	0.0000	0.3970
Total	**2.0000e-004**	**1.9000e-004**	**1.6800e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3967**	**0.3967**	**1.0000e-005**	**0.0000**	**0.3970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.3900e-003	0.0418	0.0492	8.0000e-005		2.3500e-003	2.3500e-003		2.2400e-003	2.2400e-003	0.0000	6.6669	6.6669	1.2300e-003	0.0000	6.6977

Total	**4.3900e-003**	**0.0418**	**0.0492**	**8.0000e-005**		**2.3500e-003**	**2.3500e-003**		**2.2400e-003**	**2.2400e-003**	**0.0000**	**6.6669**	**6.6669**	**1.2300e-003**	**0.0000**	**6.6977**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.9000e-004	1.6800e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3967	0.3967	1.0000e-005	0.0000	0.3970
Total	**2.0000e-004**	**1.9000e-004**	**1.6800e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3967**	**0.3967**	**1.0000e-005**	**0.0000**	**0.3970**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.543525	0.028472	0.201539	0.126188	0.021864	0.005301	0.018669	0.039782	0.003072	0.002565	0.007028	0.001098	0.000897

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.9200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Unmitigated	5.9200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.9100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**5.9100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.9100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	5.0000e-005	5.0000e-005	0.0000	0.0000	6.0000e-005
Total	**5.9100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

LCDR

Monterey Bay Unified APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.10	Acre	2.10	91,476.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.8	**Precipitation Freq (Days)**	54
Climate Zone	5			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - Construction phasing information provided by the project applicant.

Land Use - Project land use information provided by the project applicant.

Construction Phase - Construction phasing information provided by the project applicant.

Off-road Equipment - Off-road equipment information provided by the project applicant.

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Off-road Equipment - Off-road equipment information provided by the project applicant.

Trips and VMT - Construction trip information provided by the project applicant

Fleet Mix - CalEEMod Defaults.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Parking	5489	0
tblConstructionPhase	NumDays	6.00	9.00
tblConstructionPhase	NumDays	3.00	6.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	PrecipitationFrequency	53	54
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	0.00	6.00
tblTripsAndVMT	HaulingTripNumber	0.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	14.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00

tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	20.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	2.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6659	57.3749	72.8524	0.1198	0.7360	2.7812	3.8177	0.1718	2.6714	3.2156	0.0000	11,491.9610	11,491.9610	2.0235	0.0000	11,542.5492
Maximum	**6.6659**	**57.3749**	**72.8524**	**0.1198**	**0.7360**	**2.7812**	**3.8177**	**0.1718**	**2.6714**	**3.2156**	**0.0000**	**11,491.9610**	**11,491.9610**	**2.0235**	**0.0000**	**11,542.5492**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6659	57.3749	72.8524	0.1198	0.7360	2.7812	3.8177	0.1718	2.6714	3.2156	0.0000	11,491.9610	11,491.9610	2.0235	0.0000	11,542.5492
Maximum	**6.6659**	**57.3749**	**72.8524**	**0.1198**	**0.7360**	**2.7812**	**3.8177**	**0.1718**	**2.6714**	**3.2156**	**0.0000**	**11,491.9610**	**11,491.9610**	**2.0235**	**0.0000**	**11,542.5492**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**0.0000**	**4.9000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**0.0000**	**4.9000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sit Preperation - Access Road	Site Preparation	8/3/2021	8/10/2021	5	6	
2	Grading - Access Road	Grading	8/3/2021	8/10/2021	5	6	
3	Cofferdams Installation	Grading	8/11/2021	8/23/2021	5	9	
4	Installation of Control Systems	Trenching	8/25/2021	8/31/2021	5	5	
5	Access Stairs	Trenching	8/31/2021	9/21/2021	5	16	
6	Vault Structures: Excvation	Trenching	9/7/2021	9/16/2021	5	8	
7	Vault Structures: Doweling and Anchorage	Trenching	9/7/2021	9/16/2021	5	8	
8	Vault Structures: Concrete Pour	Trenching	9/7/2021	9/16/2021	5	8	
9	Electrical Installation: Electrical conduit	Trenching	9/16/2021	10/4/2021	5	13	
10	Pipe Installation	Trenching	9/17/2021	10/4/2021	5	12	

11	Vault Structures: Coanda Screen	Trenching	9/17/2021	9/22/2021	5	4	
12	Vault Structures: Diversion Pipeline	Trenching	9/24/2021	10/22/2021	5	21	
13	Sediment Control: Pipe Installation	Trenching	9/24/2021	10/4/2021	5	7	
14	Install Riprap	Trenching	9/24/2021	10/13/2021	5	14	
15	Sediment Control: Backfill Structure	Trenching	10/4/2021	10/13/2021	5	8	
16	Start up and Testing	Trenching	10/4/2021	10/19/2021	5	12	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sit Preperation - Access Road	Excavators	1	8.00	158	0.38
Sit Preperation - Access Road	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading - Access Road	Graders	1	8.00	187	0.41
Cofferdams Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Generator Sets	4	8.00	84	0.74
Installation of Control Systems	Pumps	2	8.00	84	0.74
Installation of Control Systems	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Welders	1	8.00	46	0.45
Access Stairs	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Excvation	Excavators	1	8.00	158	0.38
Vault Structures: Excvation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Doweling and Anchorage	Bore/Drill Rigs	1	8.00	221	0.50
Vault Structures: Concrete Pour	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Concrete Pour	Excavators	1	8.00	158	0.38
Vault Structures: Concrete Pour	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Concrete/Industrial Saws	1	8.00	81	0.73

Electrical Installation: Electrical conduit	Excavators	1	8.00	158	0.38
Electrical Installation: Electrical conduit	Forklifts	1	8.00	89	0.20
Electrical Installation: Electrical conduit	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipe Installation	Excavators	1	8.00	158	0.38
Pipe Installation	Pumps	1	8.00	84	0.74
Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Coanda Screen	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Coanda Screen	Excavators	1	8.00	158	0.38
Vault Structures: Coanda Screen	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Diversion Pipeline	Concrete/Industrial Saws	1	8.00	81	0.73
Vault Structures: Diversion Pipeline	Excavators	1	8.00	158	0.38
Vault Structures: Diversion Pipeline	Forklifts	1	8.00	89	0.20
Vault Structures: Diversion Pipeline	Pumps	1	8.00	84	0.74
Vault Structures: Diversion Pipeline	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Pipe Installation	Concrete/Industrial Saws	1	8.00	81	0.73
Sediment Control: Pipe Installation	Excavators	1	8.00	158	0.38
Sediment Control: Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Install Riprap	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Backfill Structure	Cement and Mortar Mixers	1	8.00	9	0.56
Sediment Control: Backfill Structure	Concrete/Industrial Saws	1	8.00	81	0.73
Start up and Testing	Generator Sets	1	8.00	84	0.74
Start up and Testing	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sit Preperation - Access Road	2	10.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading - Access Road	1	2.00	0.00	14.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Cofferdams Installation	1	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

Installation of Control Systems	8	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Access Stairs	1	8.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Excvation	2	2.00	0.00	8.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Doweling and	1	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Concrete Pour	3	10.00	0.00	20.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Electrical Installation: Electrical conduit	5	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipe Installation	3	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Coanda Screen	3	2.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Diversion Pipeline	5	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Pipe Installation	3	4.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Install Riprap	1	8.00	0.00	6.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Backfill Structure	2	6.00	0.00	12.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Start up and Testing	3	6.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Sit Preperation - Access Road - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989		801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**	**0.0000**	**0.2162**	**0.2162**	**0.0000**	**0.1989**	**0.1989**		**801.0920**	**801.0920**	**0.2591**		**807.5693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.1100e-003	0.1761	0.0313	5.4000e-004	0.0117	6.6000e-004	0.0123	3.1900e-003	6.3000e-004	3.8200e-003		56.7088	56.7088	2.1800e-003		56.7632
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0607**	**0.2219**	**0.5313**	**1.8300e-003**	**0.1394**	**1.6500e-003**	**0.1410**	**0.0371**	**1.5500e-003**	**0.0386**		**185.3978**	**185.3978**	**6.9700e-003**		**185.5721**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989	0.0000	801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**	**0.0000**	**0.2162**	**0.2162**	**0.0000**	**0.1989**	**0.1989**	**0.0000**	**801.0920**	**801.0920**	**0.2591**		**807.5693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	5.1100e-003	0.1761	0.0313	5.4000e-004	0.0117	6.6000e-004	0.0123	3.1900e-003	6.3000e-004	3.8200e-003		56.7088	56.7088	2.1800e-003		56.7632
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0607**	**0.2219**	**0.5313**	**1.8300e-003**	**0.1394**	**1.6500e-003**	**0.1410**	**0.0371**	**1.5500e-003**	**0.0386**		**185.3978**	**185.3978**	**6.9700e-003**		**185.5721**

3.3 Grading - Access Road - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.4530	5.9246	1.7672	6.6200e-003		0.1877	0.1877		0.1727	0.1727		641.6841	641.6841	0.2075		646.8725
Total	**0.4530**	**5.9246**	**1.7672**	**6.6200e-003**	**0.5303**	**0.1877**	**0.7179**	**0.0573**	**0.1727**	**0.2299**		**641.6841**	**641.6841**	**0.2075**		**646.8725**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0179	0.6162	0.1096	1.8800e-003	0.0408	2.3100e-003	0.0431	0.0112	2.2100e-003	0.0134		198.4807	198.4807	7.6200e-003		198.6713
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0290**	**0.6254**	**0.2096**	**2.1400e-003**	**0.0663**	**2.5100e-003**	**0.0688**	**0.0180**	**2.3900e-003**	**0.0204**		**224.2185**	**224.2185**	**8.5800e-003**		**224.4330**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.4530	5.9246	1.7672	6.6200e-003		0.1877	0.1877		0.1727	0.1727	0.0000	641.6841	641.6841	0.2075		646.8725
Total	**0.4530**	**5.9246**	**1.7672**	**6.6200e-003**	**0.5303**	**0.1877**	**0.7179**	**0.0573**	**0.1727**	**0.2299**	**0.0000**	**641.6841**	**641.6841**	**0.2075**		**646.8725**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0179	0.6162	0.1096	1.8800e-003	0.0408	2.3100e-003	0.0431	0.0112	2.2100e-003	0.0134		198.4807	198.4807	7.6200e-003		198.6713
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0290**	**0.6254**	**0.2096**	**2.1400e-003**	**0.0663**	**2.5100e-003**	**0.0688**	**0.0180**	**2.3900e-003**	**0.0204**		**224.2185**	**224.2185**	**8.5800e-003**		**224.4330**

3.4 Cofferdams Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028		300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**	**0.0000**	**0.1118**	**0.1118**	**0.0000**	**0.1028**	**0.1028**		**300.9001**	**300.9001**	**0.0973**		**303.3330**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0556**	**0.0458**	**0.5000**	**1.2900e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**128.6890**	**128.6890**	**4.7900e-003**		**128.8089**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028	0.0000	300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**	**0.0000**	**0.1118**	**0.1118**	**0.0000**	**0.1028**	**0.1028**	**0.0000**	**300.9001**	**300.9001**	**0.0973**		**303.3330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0556**	**0.0458**	**0.5000**	**1.2900e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**128.6890**	**128.6890**	**4.7900e-003**		**128.8089**

3.5 Installation of Control Systems - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6804	22.4894	26.1992	0.0451		1.2120	1.2120		1.2031	1.2031		4,246.5874	4,246.5874	0.3195		4,254.5744
Total	**2.6804**	**22.4894**	**26.1992**	**0.0451**		**1.2120**	**1.2120**		**1.2031**	**1.2031**		**4,246.5874**	**4,246.5874**	**0.3195**		**4,254.5744**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6804	22.4894	26.1992	0.0451		1.2120	1.2120		1.2031	1.2031	0.0000	4,246.5874	4,246.5874	0.3195		4,254.5743
Total	**2.6804**	**22.4894**	**26.1992**	**0.0451**		**1.2120**	**1.2120**		**1.2031**	**1.2031**	**0.0000**	**4,246.5874**	**4,246.5874**	**0.3195**		**4,254.5743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

3.6 Access Stairs - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3084	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Total	**0.0588**	**0.3682**	**0.3084**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9100e-003	0.0660	0.0117	2.0000e-004	4.3700e-003	2.5000e-004	4.6200e-003	1.2000e-003	2.4000e-004	1.4300e-003		21.2658	21.2658	8.2000e-004		21.2862
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0464**	**0.1027**	**0.4117**	**1.2300e-003**	**0.1066**	**1.0500e-003**	**0.1076**	**0.0283**	**9.7000e-004**	**0.0293**		**124.2170**	**124.2170**	**4.6500e-003**		**124.3333**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3084	7.1000e-004		0.0143	0.0143		0.0143	0.0143	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Total	**0.0588**	**0.3682**	**0.3084**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9100e-003	0.0660	0.0117	2.0000e-004	4.3700e-003	2.5000e-004	4.6200e-003	1.2000e-003	2.4000e-004	1.4300e-003		21.2658	21.2658	8.2000e-004		21.2862
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0464**	**0.1027**	**0.4117**	**1.2300e-003**	**0.1066**	**1.0500e-003**	**0.1076**	**0.0283**	**9.7000e-004**	**0.0293**		**124.2170**	**124.2170**	**4.6500e-003**		**124.3333**

3.7 Vault Structures: Excvation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989		801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**		**0.2162**	**0.2162**		**0.1989**	**0.1989**		**801.0920**	**801.0920**	**0.2591**		**807.5693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.6600e-003	0.2641	0.0470	8.1000e-004	0.0175	9.9000e-004	0.0185	4.7900e-003	9.5000e-004	5.7400e-003		85.0632	85.0632	3.2700e-003		85.1448
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0188**	**0.2733**	**0.1470**	**1.0700e-003**	**0.0430**	**1.1900e-003**	**0.0442**	**0.0116**	**1.1300e-003**	**0.0127**		**110.8010**	**110.8010**	**4.2300e-003**		**110.9066**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989	0.0000	801.0920	801.0920	0.2591		807.5693

Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**		**0.2162**	**0.2162**		**0.1989**	**0.1989**	**0.0000**	**801.0920**	**801.0920**	**0.2591**		**807.5693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.6600e-003	0.2641	0.0470	8.1000e-004	0.0175	9.9000e-004	0.0185	4.7900e-003	9.5000e-004	5.7400e-003		85.0632	85.0632	3.2700e-003		85.1448
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0188**	**0.2733**	**0.1470**	**1.0700e-003**	**0.0430**	**1.1900e-003**	**0.0442**	**0.0116**	**1.1300e-003**	**0.0127**		**110.8010**	**110.8010**	**4.2300e-003**		**110.9066**

3.8 Vault Structures: Doweling and Anchorage - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2582	3.0228	2.0740	9.4300e-003		0.0916	0.0916		0.0843	0.0843		912.0624	912.0624	0.2950		919.4369
Total	**0.2582**	**3.0228**	**2.0740**	**9.4300e-003**		**0.0916**	**0.0916**		**0.0843**	**0.0843**		**912.0624**	**912.0624**	**0.2950**		**919.4369**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2582	3.0228	2.0740	9.4300e-003		0.0916	0.0916		0.0843	0.0843	0.0000	912.0624	912.0624	0.2950		919.4369
Total	**0.2582**	**3.0228**	**2.0740**	**9.4300e-003**		**0.0916**	**0.0916**		**0.0843**	**0.0843**	**0.0000**	**912.0624**	**912.0624**	**0.2950**		**919.4369**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

3.9 Vault Structures: Concrete Pour - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6684	5.7316	7.3208	0.0125		0.2964	0.2964		0.2880	0.2880		1,173.7440	1,173.7440	0.2010		1,178.7690
Total	**0.6684**	**5.7316**	**7.3208**	**0.0125**		**0.2964**	**0.2964**		**0.2880**	**0.2880**		**1,173.7440**	**1,173.7440**	**0.2010**		**1,178.7690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0192	0.6602	0.1175	2.0100e-003	0.0437	2.4700e-003	0.0462	0.0120	2.3700e-003	0.0143		212.6579	212.6579	8.1700e-003		212.8621
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0748**	**0.7061**	**0.6174**	**3.3000e-003**	**0.1714**	**3.4600e-003**	**0.1749**	**0.0459**	**3.2900e-003**	**0.0491**		**341.3469**	**341.3469**	**0.0130**		**341.6710**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6684	5.7316	7.3208	0.0125		0.2964	0.2964		0.2880	0.2880	0.0000	1,173.7440	1,173.7440	0.2010		1,178.7690
Total	**0.6684**	**5.7316**	**7.3208**	**0.0125**		**0.2964**	**0.2964**		**0.2880**	**0.2880**	**0.0000**	**1,173.7440**	**1,173.7440**	**0.2010**		**1,178.7690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0192	0.6602	0.1175	2.0100e-003	0.0437	2.4700e-003	0.0462	0.0120	2.3700e-003	0.0143		212.6579	212.6579	8.1700e-003		212.8621
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0748**	**0.7061**	**0.6174**	**3.3000e-003**	**0.1714**	**3.4600e-003**	**0.1749**	**0.0459**	**3.2900e-003**	**0.0491**		**341.3469**	**341.3469**	**0.0130**		**341.6710**

3.10 Electrical Installation: Electrical conduit - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266		2,164.8232	2,164.8232	0.3754		2,174.2073
Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**		**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266	0.0000	2,164.8232	2,164.8232	0.3754		2,174.2073

Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**	**0.0000**	**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0111**	**9.1700e-003**	**0.1000**	**2.6000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**25.7378**	**25.7378**	**9.6000e-004**		**25.7618**

3.11 Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7969	7.2592	9.2727	0.0149		0.3938	0.3938		0.3765	0.3765		1,424.1277	1,424.1277	0.2931		1,431.4546
Total	**0.7969**	**7.2592**	**9.2727**	**0.0149**		**0.3938**	**0.3938**		**0.3765**	**0.3765**		**1,424.1277**	**1,424.1277**	**0.2931**		**1,431.4546**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0556**	**0.0458**	**0.5000**	**1.2900e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**128.6890**	**128.6890**	**4.7900e-003**		**128.8089**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7969	7.2592	9.2727	0.0149		0.3938	0.3938		0.3765	0.3765	0.0000	1,424.1277	1,424.1277	0.2931		1,431.4546
Total	**0.7969**	**7.2592**	**9.2727**	**0.0149**		**0.3938**	**0.3938**		**0.3765**	**0.3765**	**0.0000**	**1,424.1277**	**1,424.1277**	**0.2931**		**1,431.4546**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0556	0.0458	0.5000	1.2900e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		128.6890	128.6890	4.7900e-003		128.8089
Total	**0.0556**	**0.0458**	**0.5000**	**1.2900e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**128.6890**	**128.6890**	**4.7900e-003**		**128.8089**

3.12 Vault Structures: Coanda Screen - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	4.4174	5.8404	8.9900e-003		0.2305	0.2305		0.2132	0.2132		851.6084	851.6084	0.2643		858.2167
Total	**0.4752**	**4.4174**	**5.8404**	**8.9900e-003**		**0.2305**	**0.2305**		**0.2132**	**0.2132**		**851.6084**	**851.6084**	**0.2643**		**858.2167**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.8300e-003	0.1320	0.0235	4.0000e-004	8.7400e-003	4.9000e-004	9.2300e-003	2.4000e-003	4.7000e-004	2.8700e-003		42.5316	42.5316	1.6300e-003		42.5724
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0150**	**0.1412**	**0.1235**	**6.6000e-004**	**0.0343**	**6.9000e-004**	**0.0350**	**9.1700e-003**	**6.5000e-004**	**9.8300e-003**		**68.2694**	**68.2694**	**2.5900e-003**		**68.3342**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	4.4174	5.8404	8.9900e-003		0.2305	0.2305		0.2132	0.2132	0.0000	851.6084	851.6084	0.2643		858.2167
Total	**0.4752**	**4.4174**	**5.8404**	**8.9900e-003**		**0.2305**	**0.2305**		**0.2132**	**0.2132**	**0.0000**	**851.6084**	**851.6084**	**0.2643**		**858.2167**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.8300e-003	0.1320	0.0235	4.0000e-004	8.7400e-003	4.9000e-004	9.2300e-003	2.4000e-003	4.7000e-004	2.8700e-003		42.5316	42.5316	1.6300e-003		42.5724
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0111	9.1700e-003	0.1000	2.6000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		25.7378	25.7378	9.6000e-004		25.7618
Total	**0.0150**	**0.1412**	**0.1235**	**6.6000e-004**	**0.0343**	**6.9000e-004**	**0.0350**	**9.1700e-003**	**6.5000e-004**	**9.8300e-003**		**68.2694**	**68.2694**	**2.5900e-003**		**68.3342**

3.13 Vault Structures: Diversion Pipeline - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266		2,164.8232	2,164.8232	0.3754		2,174.2073
Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**		**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0445**	**0.0367**	**0.4000**	**1.0300e-003**	**0.1022**	**8.0000e-004**	**0.1030**	**0.0271**	**7.3000e-004**	**0.0278**		**102.9512**	**102.9512**	**3.8300e-003**		**103.0471**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266	0.0000	2,164.8232	2,164.8232	0.3754		2,174.2073

Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**	**0.0000**	**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0445**	**0.0367**	**0.4000**	**1.0300e-003**	**0.1022**	**8.0000e-004**	**0.1030**	**0.0271**	**7.3000e-004**	**0.0278**		**102.9512**	**102.9512**	**3.8300e-003**		**103.0471**

3.14 Sediment Control: Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8013	7.0871	9.2061	0.0145		0.3893	0.3893		0.3720	0.3720		1,393.7567	1,393.7567	0.2935		1,401.0943
Total	**0.8013**	**7.0871**	**9.2061**	**0.0145**		**0.3893**	**0.3893**		**0.3720**	**0.3720**		**1,393.7567**	**1,393.7567**	**0.2935**		**1,401.0943**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0222	0.0183	0.2000	5.2000e-004	0.0511	4.0000e-004	0.0515	0.0136	3.7000e-004	0.0139		51.4756	51.4756	1.9200e-003		51.5236
Total	**0.0222**	**0.0183**	**0.2000**	**5.2000e-004**	**0.0511**	**4.0000e-004**	**0.0515**	**0.0136**	**3.7000e-004**	**0.0139**		**51.4756**	**51.4756**	**1.9200e-003**		**51.5236**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.8013	7.0871	9.2061	0.0145		0.3893	0.3893		0.3720	0.3720	0.0000	1,393.7567	1,393.7567	0.2935		1,401.0943
Total	**0.8013**	**7.0871**	**9.2061**	**0.0145**		**0.3893**	**0.3893**		**0.3720**	**0.3720**	**0.0000**	**1,393.7567**	**1,393.7567**	**0.2935**		**1,401.0943**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0222	0.0183	0.2000	5.2000e-004	0.0511	4.0000e-004	0.0515	0.0136	3.7000e-004	0.0139		51.4756	51.4756	1.9200e-003		51.5236
Total	**0.0222**	**0.0183**	**0.2000**	**5.2000e-004**	**0.0511**	**4.0000e-004**	**0.0515**	**0.0136**	**3.7000e-004**	**0.0139**		**51.4756**	**51.4756**	**1.9200e-003**		**51.5236**

3.15 Install Riprap - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028		300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**		**0.1118**	**0.1118**		**0.1028**	**0.1028**		**300.9001**	**300.9001**	**0.0973**		**303.3330**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.2800e-003	0.1132	0.0201	3.5000e-004	7.4900e-003	4.2000e-004	7.9100e-003	2.0500e-003	4.1000e-004	2.4600e-003		36.4556	36.4556	1.4000e-003		36.4906
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0478**	**0.1499**	**0.4201**	**1.3800e-003**	**0.1097**	**1.2200e-003**	**0.1109**	**0.0292**	**1.1400e-003**	**0.0303**		**139.4069**	**139.4069**	**5.2300e-003**		**139.5377**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028	0.0000	300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**		**0.1118**	**0.1118**		**0.1028**	**0.1028**	**0.0000**	**300.9001**	**300.9001**	**0.0973**		**303.3330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.2800e-003	0.1132	0.0201	3.5000e-004	7.4900e-003	4.2000e-004	7.9100e-003	2.0500e-003	4.1000e-004	2.4600e-003		36.4556	36.4556	1.4000e-003		36.4906
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0445	0.0367	0.4000	1.0300e-003	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		102.9512	102.9512	3.8300e-003		103.0471
Total	**0.0478**	**0.1499**	**0.4201**	**1.3800e-003**	**0.1097**	**1.2200e-003**	**0.1109**	**0.0292**	**1.1400e-003**	**0.0303**		**139.4069**	**139.4069**	**5.2300e-003**		**139.5377**

3.16 Sediment Control: Backfill Structure - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4436	3.4061	3.9824	6.9700e-003		0.1874	0.1874		0.1874	0.1874		643.1810	643.1810	0.0397		644.1724
Total	**0.4436**	**3.4061**	**3.9824**	**6.9700e-003**		**0.1874**	**0.1874**		**0.1874**	**0.1874**		**643.1810**	**643.1810**	**0.0397**		**644.1724**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0115	0.3961	0.0705	1.2100e-003	0.0262	1.4800e-003	0.0277	7.1900e-003	1.4200e-003	8.6100e-003		127.5947	127.5947	4.9000e-003		127.7172
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0334	0.0275	0.3000	7.8000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		77.2134	77.2134	2.8800e-003		77.2853
Total	**0.0449**	**0.4236**	**0.3705**	**1.9900e-003**	**0.1029**	**2.0800e-003**	**0.1049**	**0.0275**	**1.9700e-003**	**0.0295**		**204.8082**	**204.8082**	**7.7800e-003**		**205.0026**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4436	3.4061	3.9824	6.9700e-003		0.1874	0.1874		0.1874	0.1874	0.0000	643.1810	643.1810	0.0397		644.1724

Total	0.4436	3.4061	3.9824	6.9700e-003		0.1874	0.1874		0.1874	0.1874	0.0000	643.1810	643.1810	0.0397		644.1724

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0115	0.3961	0.0705	1.2100e-003	0.0262	1.4800e-003	0.0277	7.1900e-003	1.4200e-003	8.6100e-003		127.5947	127.5947	4.9000e-003		127.7172
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0334	0.0275	0.3000	7.8000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		77.2134	77.2134	2.8800e-003		77.2853
Total	**0.0449**	**0.4236**	**0.3705**	**1.9900e-003**	**0.1029**	**2.0800e-003**	**0.1049**	**0.0275**	**1.9700e-003**	**0.0295**		**204.8082**	**204.8082**	**7.7800e-003**		**205.0026**

3.17 Start up and Testing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7319	6.9578	8.2052	0.0128		0.3913	0.3913		0.3734	0.3734		1,224.8347	1,224.8347	0.2264		1,230.4954
Total	**0.7319**	**6.9578**	**8.2052**	**0.0128**		**0.3913**	**0.3913**		**0.3734**	**0.3734**		**1,224.8347**	**1,224.8347**	**0.2264**		**1,230.4954**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0334	0.0275	0.3000	7.8000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		77.2134	77.2134	2.8800e-003		77.2853
Total	**0.0334**	**0.0275**	**0.3000**	**7.8000e-004**	**0.0766**	**6.0000e-004**	**0.0772**	**0.0203**	**5.5000e-004**	**0.0209**		**77.2134**	**77.2134**	**2.8800e-003**		**77.2853**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7319	6.9578	8.2052	0.0128		0.3913	0.3913		0.3734	0.3734	0.0000	1,224.8347	1,224.8347	0.2264		1,230.4954
Total	**0.7319**	**6.9578**	**8.2052**	**0.0128**		**0.3913**	**0.3913**		**0.3734**	**0.3734**	**0.0000**	**1,224.8347**	**1,224.8347**	**0.2264**		**1,230.4954**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0334	0.0275	0.3000	7.8000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		77.2134	77.2134	2.8800e-003		77.2853
Total	**0.0334**	**0.0275**	**0.3000**	**7.8000e-004**	**0.0766**	**6.0000e-004**	**0.0772**	**0.0203**	**5.5000e-004**	**0.0209**		**77.2134**	**77.2134**	**2.8800e-003**		**77.2853**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.543525	0.028472	0.201539	0.126188	0.021864	0.005301	0.018669	0.039782	0.003072	0.002565	0.007028	0.001098	0.000897

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Total		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Unmitigated	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0324					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**		**4.9000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0324					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**		**4.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

LCDR

Monterey Bay Unified APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.10	Acre	2.10	91,476.00	0

1.2 Other Project Characteristics

Urbanization Rural **Wind Speed (m/s)** 2.8 **Precipitation Freq (Days)** 54

Climate Zone 5 **Operational Year** 2022

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Construction Phase - Construction phasing information provided by the project applicant.

Land Use - Project land use information provided by the project applicant.

Construction Phase - Construction phasing information provided by the project applicant.

Off-road Equipment - Off-road equipment information provided by the project applicant.

Off-road Equipment - Off-road equipment information provided by the project applicant.

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Off-road Equipment - Off-road equipment information provided by the project applicant.

Trips and VMT - Construction trip information provided by the project applicant

Fleet Mix - CalEEMod Defaults.

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblAreaCoating	Area_Parking	5489	0
tblConstructionPhase	NumDays	6.00	9.00
tblConstructionPhase	NumDays	3.00	6.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	PrecipitationFrequency	53	54
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	0.00	6.00
tblTripsAndVMT	HaulingTripNumber	0.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	14.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00

tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00
tblTripsAndVMT	WorkerTripNumber	8.00	4.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	10.00
tblTripsAndVMT	WorkerTripNumber	20.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	5.00	2.00
tblTripsAndVMT	WorkerTripNumber	3.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	2.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.7013	57.4402	72.7723	0.1194	0.7360	2.7812	3.8178	0.1718	2.6714	3.2156	0.0000	11,450.9247	11,450.9247	2.0228	0.0000	11,501.4956
Maximum	**6.7013**	**57.4402**	**72.7723**	**0.1194**	**0.7360**	**2.7812**	**3.8178**	**0.1718**	**2.6714**	**3.2156**	**0.0000**	**11,450.9247**	**11,450.9247**	**2.0228**	**0.0000**	**11,501.4956**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.7013	57.4402	72.7723	0.1194	0.7360	2.7812	3.8178	0.1718	2.6714	3.2156	0.0000	11,450.9246	11,450.9246	2.0228	0.0000	11,501.4956
Maximum	**6.7013**	**57.4402**	**72.7723**	**0.1194**	**0.7360**	**2.7812**	**3.8178**	**0.1718**	**2.6714**	**3.2156**	**0.0000**	**11,450.9246**	**11,450.9246**	**2.0228**	**0.0000**	**11,501.4956**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**0.0000**	**4.9000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**	**0.0000**	**4.9000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sit Preperation - Access Road	Site Preparation	8/3/2021	8/10/2021	5	6	
2	Grading - Access Road	Grading	8/3/2021	8/10/2021	5	6	
3	Cofferdams Installation	Grading	8/11/2021	8/23/2021	5	9	
4	Installation of Control Systems	Trenching	8/25/2021	8/31/2021	5	5	
5	Access Stairs	Trenching	8/31/2021	9/21/2021	5	16	
6	Vault Structures: Excvation	Trenching	9/7/2021	9/16/2021	5	8	
7	Vault Structures: Doweling and Anchorage	Trenching	9/7/2021	9/16/2021	5	8	
8	Vault Structures: Concrete Pour	Trenching	9/7/2021	9/16/2021	5	8	
9	Electrical Installation: Electrical conduit	Trenching	9/16/2021	10/4/2021	5	13	
10	Pipe Installation	Trenching	9/17/2021	10/4/2021	5	12	

11	Vault Structures: Coanda Screen	Trenching	9/17/2021	9/22/2021	5	4	
12	Vault Structures: Diversion Pipeline	Trenching	9/24/2021	10/22/2021	5	21	
13	Sediment Control: Pipe Installation	Trenching	9/24/2021	10/4/2021	5	7	
14	Install Riprap	Trenching	9/24/2021	10/13/2021	5	14	
15	Sediment Control: Backfill Structure	Trenching	10/4/2021	10/13/2021	5	8	
16	Start up and Testing	Trenching	10/4/2021	10/19/2021	5	12	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 2.1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sit Preperation - Access Road	Excavators	1	8.00	158	0.38
Sit Preperation - Access Road	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading - Access Road	Graders	1	8.00	187	0.41
Cofferdams Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Generator Sets	4	8.00	84	0.74
Installation of Control Systems	Pumps	2	8.00	84	0.74
Installation of Control Systems	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Installation of Control Systems	Welders	1	8.00	46	0.45
Access Stairs	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Excvation	Excavators	1	8.00	158	0.38
Vault Structures: Excvation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Doweling and Anchorage	Bore/Drill Rigs	1	8.00	221	0.50
Vault Structures: Concrete Pour	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Concrete Pour	Excavators	1	8.00	158	0.38
Vault Structures: Concrete Pour	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Concrete/Industrial Saws	1	8.00	81	0.73

Electrical Installation: Electrical conduit	Excavators	1	8.00	158	0.38
Electrical Installation: Electrical conduit	Forklifts	1	8.00	89	0.20
Electrical Installation: Electrical conduit	Pumps	1	8.00	84	0.74
Electrical Installation: Electrical conduit	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pipe Installation	Excavators	1	8.00	158	0.38
Pipe Installation	Pumps	1	8.00	84	0.74
Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Coanda Screen	Cement and Mortar Mixers	1	8.00	9	0.56
Vault Structures: Coanda Screen	Excavators	1	8.00	158	0.38
Vault Structures: Coanda Screen	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Structures: Diversion Pipeline	Concrete/Industrial Saws	1	8.00	81	0.73
Vault Structures: Diversion Pipeline	Excavators	1	8.00	158	0.38
Vault Structures: Diversion Pipeline	Forklifts	1	8.00	89	0.20
Vault Structures: Diversion Pipeline	Pumps	1	8.00	84	0.74
Vault Structures: Diversion Pipeline	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Pipe Installation	Concrete/Industrial Saws	1	8.00	81	0.73
Sediment Control: Pipe Installation	Excavators	1	8.00	158	0.38
Sediment Control: Pipe Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Install Riprap	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Sediment Control: Backfill Structure	Cement and Mortar Mixers	1	8.00	9	0.56
Sediment Control: Backfill Structure	Concrete/Industrial Saws	1	8.00	81	0.73
Start up and Testing	Generator Sets	1	8.00	84	0.74
Start up and Testing	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sit Preperation - Access Road	2	10.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading - Access Road	1	2.00	0.00	14.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Cofferdams Installation	1	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

Installation of Control Systems	8	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Access Stairs	1	8.00	0.00	4.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Excvation	2	2.00	0.00	8.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Doweling and	1	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Concrete Pour	3	10.00	0.00	20.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Electrical Installation: Electrical conduit	5	2.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Pipe Installation	3	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Coanda Screen	3	2.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Vault Structures: Diversion Pipeline	5	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Pipe Installation	3	4.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Install Riprap	1	8.00	0.00	6.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sediment Control: Backfill Structure	2	6.00	0.00	12.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Start up and Testing	3	6.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Sit Preperation - Access Road - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989		801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**	**0.0000**	**0.2162**	**0.2162**	**0.0000**	**0.1989**	**0.1989**		**801.0920**	**801.0920**	**0.2591**		**807.5693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.2900e-003	0.1792	0.0347	5.3000e-004	0.0117	6.8000e-004	0.0123	3.1900e-003	6.5000e-004	3.8400e-003		55.4753	55.4753	2.3900e-003		55.5350
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0682**	**0.2367**	**0.5159**	**1.7400e-003**	**0.1394**	**1.6700e-003**	**0.1411**	**0.0371**	**1.5700e-003**	**0.0386**		**176.3585**	**176.3585**	**6.9100e-003**		**176.5313**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989	0.0000	801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**	**0.0000**	**0.2162**	**0.2162**	**0.0000**	**0.1989**	**0.1989**	**0.0000**	**801.0920**	**801.0920**	**0.2591**		**807.5693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	5.2900e-003	0.1792	0.0347	5.3000e-004	0.0117	6.8000e-004	0.0123	3.1900e-003	6.5000e-004	3.8400e-003		55.4753	55.4753	2.3900e-003		55.5350
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0682**	**0.2367**	**0.5159**	**1.7400e-003**	**0.1394**	**1.6700e-003**	**0.1411**	**0.0371**	**1.5700e-003**	**0.0386**		**176.3585**	**176.3585**	**6.9100e-003**		**176.5313**

3.3 Grading - Access Road - 2021

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.4530	5.9246	1.7672	6.6200e-003		0.1877	0.1877		0.1727	0.1727		641.6841	641.6841	0.2075		646.8725
Total	**0.4530**	**5.9246**	**1.7672**	**6.6200e-003**	**0.5303**	**0.1877**	**0.7179**	**0.0573**	**0.1727**	**0.2299**		**641.6841**	**641.6841**	**0.2075**		**646.8725**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0185	0.6271	0.1213	1.8400e-003	0.0408	2.3800e-003	0.0432	0.0112	2.2700e-003	0.0135		194.1635	194.1635	8.3600e-003		194.3725
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0311**	**0.6386**	**0.2176**	**2.0800e-003**	**0.0663**	**2.5800e-003**	**0.0689**	**0.0180**	**2.4500e-003**	**0.0204**		**218.3402**	**218.3402**	**9.2600e-003**		**218.5717**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.4530	5.9246	1.7672	6.6200e-003		0.1877	0.1877		0.1727	0.1727	0.0000	641.6841	641.6841	0.2075		646.8725
Total	**0.4530**	**5.9246**	**1.7672**	**6.6200e-003**	**0.5303**	**0.1877**	**0.7179**	**0.0573**	**0.1727**	**0.2299**	**0.0000**	**641.6841**	**641.6841**	**0.2075**		**646.8725**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0185	0.6271	0.1213	1.8400e-003	0.0408	2.3800e-003	0.0432	0.0112	2.2700e-003	0.0135		194.1635	194.1635	8.3600e-003		194.3725
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0311**	**0.6386**	**0.2176**	**2.0800e-003**	**0.0663**	**2.5800e-003**	**0.0689**	**0.0180**	**2.4500e-003**	**0.0204**		**218.3402**	**218.3402**	**9.2600e-003**		**218.5717**

3.4 Cofferdams Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028		300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**	**0.0000**	**0.1118**	**0.1118**	**0.0000**	**0.1028**	**0.1028**		**300.9001**	**300.9001**	**0.0973**		**303.3330**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0629**	**0.0576**	**0.4813**	**1.2100e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**120.8832**	**120.8832**	**4.5200e-003**		**120.9963**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000

Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028	0.0000	300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**	**0.0000**	**0.1118**	**0.1118**	**0.0000**	**0.1028**	**0.1028**	**0.0000**	**300.9001**	**300.9001**	**0.0973**		**303.3330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0629**	**0.0576**	**0.4813**	**1.2100e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**120.8832**	**120.8832**	**4.5200e-003**		**120.9963**

3.5 Installation of Control Systems - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6804	22.4894	26.1992	0.0451		1.2120	1.2120		1.2031	1.2031		4,246.5874	4,246.5874	0.3195		4,254.5744
Total	**2.6804**	**22.4894**	**26.1992**	**0.0451**		**1.2120**	**1.2120**		**1.2031**	**1.2031**		**4,246.5874**	**4,246.5874**	**0.3195**		**4,254.5744**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6804	22.4894	26.1992	0.0451		1.2120	1.2120		1.2031	1.2031	0.0000	4,246.5874	4,246.5874	0.3195		4,254.5743
Total	**2.6804**	**22.4894**	**26.1992**	**0.0451**		**1.2120**	**1.2120**		**1.2031**	**1.2031**	**0.0000**	**4,246.5874**	**4,246.5874**	**0.3195**		**4,254.5743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

3.6 Access Stairs - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3084	7.1000e-004		0.0143	0.0143		0.0143	0.0143		50.5163	50.5163	5.2400e-003		50.6474
Total	**0.0588**	**0.3682**	**0.3084**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**		**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9800e-003	0.0672	0.0130	2.0000e-004	4.3700e-003	2.5000e-004	4.6200e-003	1.2000e-003	2.4000e-004	1.4400e-003		20.8032	20.8032	9.0000e-004		20.8256
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0523**	**0.1133**	**0.3980**	**1.1700e-003**	**0.1066**	**1.0500e-003**	**0.1076**	**0.0283**	**9.7000e-004**	**0.0293**		**117.5098**	**117.5098**	**4.5200e-003**		**117.6227**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.0588	0.3682	0.3084	7.1000e-004		0.0143	0.0143		0.0143	0.0143	0.0000	50.5163	50.5163	5.2400e-003		50.6474
Total	**0.0588**	**0.3682**	**0.3084**	**7.1000e-004**		**0.0143**	**0.0143**		**0.0143**	**0.0143**	**0.0000**	**50.5163**	**50.5163**	**5.2400e-003**		**50.6474**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	1.9800e-003	0.0672	0.0130	2.0000e-004	4.3700e-003	2.5000e-004	4.6200e-003	1.2000e-003	2.4000e-004	1.4400e-003		20.8032	20.8032	9.0000e-004		20.8256
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0523**	**0.1133**	**0.3980**	**1.1700e-003**	**0.1066**	**1.0500e-003**	**0.1076**	**0.0283**	**9.7000e-004**	**0.0293**		**117.5098**	**117.5098**	**4.5200e-003**		**117.6227**

3.7 Vault Structures: Excvation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989		801.0920	801.0920	0.2591		807.5693
Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**		**0.2162**	**0.2162**		**0.1989**	**0.1989**		**801.0920**	**801.0920**	**0.2591**		**807.5693**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9400e-003	0.2687	0.0520	7.9000e-004	0.0175	1.0200e-003	0.0185	4.7900e-003	9.7000e-004	5.7600e-003		83.2129	83.2129	3.5800e-003		83.3025
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0205**	**0.2803**	**0.1483**	**1.0300e-003**	**0.0430**	**1.2200e-003**	**0.0442**	**0.0116**	**1.1500e-003**	**0.0127**		**107.3896**	**107.3896**	**4.4800e-003**		**107.5017**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4165	4.0492	5.5321	8.2700e-003		0.2162	0.2162		0.1989	0.1989	0.0000	801.0920	801.0920	0.2591		807.5693

Total	**0.4165**	**4.0492**	**5.5321**	**8.2700e-003**		**0.2162**	**0.2162**		**0.1989**	**0.1989**	**0.0000**	**801.0920**	**801.0920**	**0.2591**		**807.5693**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.9400e-003	0.2687	0.0520	7.9000e-004	0.0175	1.0200e-003	0.0185	4.7900e-003	9.7000e-004	5.7600e-003		83.2129	83.2129	3.5800e-003		83.3025
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0205**	**0.2803**	**0.1483**	**1.0300e-003**	**0.0430**	**1.2200e-003**	**0.0442**	**0.0116**	**1.1500e-003**	**0.0127**		**107.3896**	**107.3896**	**4.4800e-003**		**107.5017**

3.8 Vault Structures: Doweling and Anchorage - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2582	3.0228	2.0740	9.4300e-003		0.0916	0.0916		0.0843	0.0843		912.0624	912.0624	0.2950		919.4369
Total	**0.2582**	**3.0228**	**2.0740**	**9.4300e-003**		**0.0916**	**0.0916**		**0.0843**	**0.0843**		**912.0624**	**912.0624**	**0.2950**		**919.4369**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.2582	3.0228	2.0740	9.4300e-003		0.0916	0.0916		0.0843	0.0843	0.0000	912.0624	912.0624	0.2950		919.4369
Total	**0.2582**	**3.0228**	**2.0740**	**9.4300e-003**		**0.0916**	**0.0916**		**0.0843**	**0.0843**	**0.0000**	**912.0624**	**912.0624**	**0.2950**		**919.4369**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

3.9 Vault Structures: Concrete Pour - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6684	5.7316	7.3208	0.0125		0.2964	0.2964		0.2880	0.2880		1,173.7440	1,173.7440	0.2010		1,178.7690
Total	**0.6684**	**5.7316**	**7.3208**	**0.0125**		**0.2964**	**0.2964**		**0.2880**	**0.2880**		**1,173.7440**	**1,173.7440**	**0.2010**		**1,178.7690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0198	0.6719	0.1300	1.9700e-003	0.0437	2.5400e-003	0.0462	0.0120	2.4300e-003	0.0144		208.0324	208.0324	8.9500e-003		208.2562
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0827**	**0.7294**	**0.6113**	**3.1800e-003**	**0.1714**	**3.5300e-003**	**0.1750**	**0.0459**	**3.3500e-003**	**0.0492**		**328.9156**	**328.9156**	**0.0135**		**329.2525**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6684	5.7316	7.3208	0.0125		0.2964	0.2964		0.2880	0.2880	0.0000	1,173.7440	1,173.7440	0.2010		1,178.7690
Total	**0.6684**	**5.7316**	**7.3208**	**0.0125**		**0.2964**	**0.2964**		**0.2880**	**0.2880**	**0.0000**	**1,173.7440**	**1,173.7440**	**0.2010**		**1,178.7690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0198	0.6719	0.1300	1.9700e-003	0.0437	2.5400e-003	0.0462	0.0120	2.4300e-003	0.0144		208.0324	208.0324	8.9500e-003		208.2562
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0827**	**0.7294**	**0.6113**	**3.1800e-003**	**0.1714**	**3.5300e-003**	**0.1750**	**0.0459**	**3.3500e-003**	**0.0492**		**328.9156**	**328.9156**	**0.0135**		**329.2525**

3.10 Electrical Installation: Electrical conduit - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266		2,164.8232	2,164.8232	0.3754		2,174.2073
Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**		**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266	0.0000	2,164.8232	2,164.8232	0.3754		2,174.2073

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**	**0.0000**	**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0126**	**0.0115**	**0.0963**	**2.4000e-004**	**0.0256**	**2.0000e-004**	**0.0257**	**6.7700e-003**	**1.8000e-004**	**6.9600e-003**		**24.1766**	**24.1766**	**9.0000e-004**		**24.1993**

3.11 Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7969	7.2592	9.2727	0.0149		0.3938	0.3938		0.3765	0.3765		1,424.1277	1,424.1277	0.2931		1,431.4546
Total	**0.7969**	**7.2592**	**9.2727**	**0.0149**		**0.3938**	**0.3938**		**0.3765**	**0.3765**		**1,424.1277**	**1,424.1277**	**0.2931**		**1,431.4546**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0629**	**0.0576**	**0.4813**	**1.2100e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**120.8832**	**120.8832**	**4.5200e-003**		**120.9963**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7969	7.2592	9.2727	0.0149		0.3938	0.3938		0.3765	0.3765	0.0000	1,424.1277	1,424.1277	0.2931		1,431.4546
Total	**0.7969**	**7.2592**	**9.2727**	**0.0149**		**0.3938**	**0.3938**		**0.3765**	**0.3765**	**0.0000**	**1,424.1277**	**1,424.1277**	**0.2931**		**1,431.4546**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0629	0.0576	0.4813	1.2100e-003	0.1277	9.9000e-004	0.1287	0.0339	9.2000e-004	0.0348		120.8832	120.8832	4.5200e-003		120.9963
Total	**0.0629**	**0.0576**	**0.4813**	**1.2100e-003**	**0.1277**	**9.9000e-004**	**0.1287**	**0.0339**	**9.2000e-004**	**0.0348**		**120.8832**	**120.8832**	**4.5200e-003**		**120.9963**

3.12 Vault Structures: Coanda Screen - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	4.4174	5.8404	8.9900e-003		0.2305	0.2305		0.2132	0.2132		851.6084	851.6084	0.2643		858.2167
Total	**0.4752**	**4.4174**	**5.8404**	**8.9900e-003**		**0.2305**	**0.2305**		**0.2132**	**0.2132**		**851.6084**	**851.6084**	**0.2643**		**858.2167**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9700e-003	0.1344	0.0260	3.9000e-004	8.7400e-003	5.1000e-004	9.2500e-003	2.4000e-003	4.9000e-004	2.8800e-003		41.6065	41.6065	1.7900e-003		41.6512
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0165**	**0.1459**	**0.1223**	**6.3000e-004**	**0.0343**	**7.1000e-004**	**0.0350**	**9.1700e-003**	**6.7000e-004**	**9.8400e-003**		**65.7831**	**65.7831**	**2.6900e-003**		**65.8505**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4752	4.4174	5.8404	8.9900e-003		0.2305	0.2305		0.2132	0.2132	0.0000	851.6084	851.6084	0.2643		858.2167
Total	**0.4752**	**4.4174**	**5.8404**	**8.9900e-003**		**0.2305**	**0.2305**		**0.2132**	**0.2132**	**0.0000**	**851.6084**	**851.6084**	**0.2643**		**858.2167**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9700e-003	0.1344	0.0260	3.9000e-004	8.7400e-003	5.1000e-004	9.2500e-003	2.4000e-003	4.9000e-004	2.8800e-003		41.6065	41.6065	1.7900e-003		41.6512
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0126	0.0115	0.0963	2.4000e-004	0.0256	2.0000e-004	0.0257	6.7700e-003	1.8000e-004	6.9600e-003		24.1766	24.1766	9.0000e-004		24.1993
Total	**0.0165**	**0.1459**	**0.1223**	**6.3000e-004**	**0.0343**	**7.1000e-004**	**0.0350**	**9.1700e-003**	**6.7000e-004**	**9.8400e-003**		**65.7831**	**65.7831**	**2.6900e-003**		**65.8505**

3.13 Vault Structures: Diversion Pipeline - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266		2,164.8232	2,164.8232	0.3754		2,174.2073
Total	**1.3110**	**11.4762**	**14.1146**	**0.0226**		**0.6506**	**0.6506**		**0.6266**	**0.6266**		**2,164.8232**	**2,164.8232**	**0.3754**		**2,174.2073**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0503**	**0.0461**	**0.3850**	**9.7000e-004**	**0.1022**	**8.0000e-004**	**0.1030**	**0.0271**	**7.3000e-004**	**0.0278**		**96.7066**	**96.7066**	**3.6200e-003**		**96.7970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266	0.0000	2,164.8232	2,164.8232	0.3754		2,174.2073

Total	1.3110	11.4762	14.1146	0.0226		0.6506	0.6506		0.6266	0.6266	0.0000	2,164.8232	2,164.8232	0.3754		2,174.2073

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0503**	**0.0461**	**0.3850**	**9.7000e-004**	**0.1022**	**8.0000e-004**	**0.1030**	**0.0271**	**7.3000e-004**	**0.0278**		**96.7066**	**96.7066**	**3.6200e-003**		**96.7970**

3.14 Sediment Control: Pipe Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8013	7.0871	9.2061	0.0145		0.3893	0.3893		0.3720	0.3720		1,393.7567	1,393.7567	0.2935		1,401.0943
Total	**0.8013**	**7.0871**	**9.2061**	**0.0145**		**0.3893**	**0.3893**		**0.3720**	**0.3720**		**1,393.7567**	**1,393.7567**	**0.2935**		**1,401.0943**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0251	0.0230	0.1925	4.9000e-004	0.0511	4.0000e-004	0.0515	0.0136	3.7000e-004	0.0139		48.3533	48.3533	1.8100e-003		48.3985
Total	**0.0251**	**0.0230**	**0.1925**	**4.9000e-004**	**0.0511**	**4.0000e-004**	**0.0515**	**0.0136**	**3.7000e-004**	**0.0139**		**48.3533**	**48.3533**	**1.8100e-003**		**48.3985**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8013	7.0871	9.2061	0.0145		0.3893	0.3893		0.3720	0.3720	0.0000	1,393.7567	1,393.7567	0.2935		1,401.0943
Total	**0.8013**	**7.0871**	**9.2061**	**0.0145**		**0.3893**	**0.3893**		**0.3720**	**0.3720**	**0.0000**	**1,393.7567**	**1,393.7567**	**0.2935**		**1,401.0943**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0251	0.0230	0.1925	4.9000e-004	0.0511	4.0000e-004	0.0515	0.0136	3.7000e-004	0.0139		48.3533	48.3533	1.8100e-003		48.3985
Total	**0.0251**	**0.0230**	**0.1925**	**4.9000e-004**	**0.0511**	**4.0000e-004**	**0.0515**	**0.0136**	**3.7000e-004**	**0.0139**		**48.3533**	**48.3533**	**1.8100e-003**		**48.3985**

3.15 Install Riprap - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028		300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**		**0.1118**	**0.1118**		**0.1028**	**0.1028**		**300.9001**	**300.9001**	**0.0973**		**303.3330**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4000e-003	0.1152	0.0223	3.4000e-004	7.4900e-003	4.4000e-004	7.9300e-003	2.0500e-003	4.2000e-004	2.4700e-003		35.6627	35.6627	1.5300e-003		35.7011
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0537**	**0.1612**	**0.4073**	**1.3100e-003**	**0.1097**	**1.2400e-003**	**0.1109**	**0.0292**	**1.1500e-003**	**0.0303**		**132.3693**	**132.3693**	**5.1500e-003**		**132.4981**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1873	1.8958	2.2602	3.1100e-003		0.1118	0.1118		0.1028	0.1028	0.0000	300.9001	300.9001	0.0973		303.3330
Total	**0.1873**	**1.8958**	**2.2602**	**3.1100e-003**		**0.1118**	**0.1118**		**0.1028**	**0.1028**	**0.0000**	**300.9001**	**300.9001**	**0.0973**		**303.3330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4000e-003	0.1152	0.0223	3.4000e-004	7.4900e-003	4.4000e-004	7.9300e-003	2.0500e-003	4.2000e-004	2.4700e-003		35.6627	35.6627	1.5300e-003		35.7011
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0503	0.0461	0.3850	9.7000e-004	0.1022	8.0000e-004	0.1030	0.0271	7.3000e-004	0.0278		96.7066	96.7066	3.6200e-003		96.7970
Total	**0.0537**	**0.1612**	**0.4073**	**1.3100e-003**	**0.1097**	**1.2400e-003**	**0.1109**	**0.0292**	**1.1500e-003**	**0.0303**		**132.3693**	**132.3693**	**5.1500e-003**		**132.4981**

3.16 Sediment Control: Backfill Structure - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4436	3.4061	3.9824	6.9700e-003		0.1874	0.1874		0.1874	0.1874		643.1810	643.1810	0.0397		644.1724
Total	**0.4436**	**3.4061**	**3.9824**	**6.9700e-003**		**0.1874**	**0.1874**		**0.1874**	**0.1874**		**643.1810**	**643.1810**	**0.0397**		**644.1724**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0119	0.4031	0.0780	1.1800e-003	0.0262	1.5300e-003	0.0277	7.1900e-003	1.4600e-003	8.6500e-003		124.8194	124.8194	5.3700e-003		124.9537
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0377	0.0346	0.2888	7.3000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		72.5299	72.5299	2.7100e-003		72.5978
Total	**0.0496**	**0.4377**	**0.3668**	**1.9100e-003**	**0.1029**	**2.1300e-003**	**0.1050**	**0.0275**	**2.0100e-003**	**0.0295**		**197.3493**	**197.3493**	**8.0800e-003**		**197.5515**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.4436	3.4061	3.9824	6.9700e-003		0.1874	0.1874		0.1874	0.1874	0.0000	643.1810	643.1810	0.0397		644.1724

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**0.4436**	**3.4061**	**3.9824**	**6.9700e-003**		**0.1874**	**0.1874**		**0.1874**	**0.1874**	**0.0000**	**643.1810**	**643.1810**	**0.0397**		**644.1724**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0119	0.4031	0.0780	1.1800e-003	0.0262	1.5300e-003	0.0277	7.1900e-003	1.4600e-003	8.6500e-003		124.8194	124.8194	5.3700e-003		124.9537
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0377	0.0346	0.2888	7.3000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		72.5299	72.5299	2.7100e-003		72.5978
Total	**0.0496**	**0.4377**	**0.3668**	**1.9100e-003**	**0.1029**	**2.1300e-003**	**0.1050**	**0.0275**	**2.0100e-003**	**0.0295**		**197.3493**	**197.3493**	**8.0800e-003**		**197.5515**

3.17 Start up and Testing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7319	6.9578	8.2052	0.0128		0.3913	0.3913		0.3734	0.3734		1,224.8347	1,224.8347	0.2264		1,230.4954
Total	**0.7319**	**6.9578**	**8.2052**	**0.0128**		**0.3913**	**0.3913**		**0.3734**	**0.3734**		**1,224.8347**	**1,224.8347**	**0.2264**		**1,230.4954**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0377	0.0346	0.2888	7.3000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		72.5299	72.5299	2.7100e-003		72.5978
Total	**0.0377**	**0.0346**	**0.2888**	**7.3000e-004**	**0.0766**	**6.0000e-004**	**0.0772**	**0.0203**	**5.5000e-004**	**0.0209**		**72.5299**	**72.5299**	**2.7100e-003**		**72.5978**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7319	6.9578	8.2052	0.0128		0.3913	0.3913		0.3734	0.3734	0.0000	1,224.8347	1,224.8347	0.2264		1,230.4954
Total	**0.7319**	**6.9578**	**8.2052**	**0.0128**		**0.3913**	**0.3913**		**0.3734**	**0.3734**	**0.0000**	**1,224.8347**	**1,224.8347**	**0.2264**		**1,230.4954**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0377	0.0346	0.2888	7.3000e-004	0.0766	6.0000e-004	0.0772	0.0203	5.5000e-004	0.0209		72.5299	72.5299	2.7100e-003		72.5978
Total	**0.0377**	**0.0346**	**0.2888**	**7.3000e-004**	**0.0766**	**6.0000e-004**	**0.0772**	**0.0203**	**5.5000e-004**	**0.0209**		**72.5299**	**72.5299**	**2.7100e-003**		**72.5978**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.543525	0.028472	0.201539	0.126188	0.021864	0.005301	0.018669	0.039782	0.003072	0.002565	0.007028	0.001098	0.000897

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Unmitigated	0.0324	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0324					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**		**4.9000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0324					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.6000e-004	4.6000e-004	0.0000		4.9000e-004
Total	**0.0324**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.6000e-004**	**4.6000e-004**	**0.0000**		**4.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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Appendix C

Biological Resources Assessment

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FINAL

BIOLOGICAL RESOURCES ASSESSMENT
for the
LAGUNA CREEK DIVERSION RETROFIT PROJECT

Prepared for:

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Table of Contents

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APPENDICES

FIGURES

TABLES

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1 Introduction

The City of Santa Cruz's (City) North Coast system comprises approximately 15% to 35% of the City's overall water production from rainfall runoff and groundwater infiltration. The Laguna Creek Diversion Facility (Facility) is one of four surface water collection/diversion sources supplying raw water to the North Coast System. The Facility directs water from Laguna Creek into the drinking water system and is located just north of the Smith Grade roadway approximately 12 miles northwest of downtown Santa Cruz. The Laguna Creek Diversion Retrofit Project (Proposed Project) proposes to improve the reliability of the water supply by addressing sediment transport issues, fisheries protection requirements, safe access, and changing environmental conditions (B&V 2020a). The purpose of this report is to (1) describe the conditions of biological resources within the project site in terms of vegetation communities, plants, wildlife, wildlife habitats, and wetlands; (2) quantify potential direct and indirect impacts to biological resources that will result from the Proposed Project; (3) discuss those impacts in terms of biological significance in view of federal, state, and local laws and policies; and (4) specify measures to mitigate any significant or potentially significant biological resource impacts.

1.1 Project Location

The project site is located near the community of Bonny Doon, in unincorporated Santa Cruz County, approximately 7 miles northwest of downtown Santa Cruz (straight-line distance) (Figure 1, Project Location). The Facility is positioned approximately 4 miles upstream of the Pacific Ocean and 0.1 miles upstream of the confluence with Reggiardo Creek. The Facility is which is operated by the SCWD and provides water from Laguna Creek to the SCWD's water supply system. It located on a portion of Assessor's Parcel Number 062-101-03, which is privately-owned land, surrounded predominantly by undeveloped open space, with scattered low-density residential development to the east, south, and west. Elevations within the project site range from 600 feet above mean sea level to 670 feet above mean sea level, and the project site is located within the U.S. Geological Survey 7.5-minute Davenport quadrangle (USGS 2020).

The 2.14-acre project site consists of the Facility (the existing dam, intake structure, diversion flume, control building, and downstream plunge pool); the surrounding area, including portions of Laguna Creek upstream and downstream of the dam; and the three unimproved access roadways from Smith Grade (Figure 2, Project Components). A 300-foot buffer added around the project site described above constitutes the 17.44-acre biological study area (BSA), which was used to describe biological resources within the immediate vicinity of the project site (Figure 3, Biological Resources).

1.2 Project Description

1.2.1 Project Background

The Facility was completed in 1890 as a stone masonry dam, and minor improvements have been installed subsequently, including the screened intake structure, diversion flume, and control building. The dam itself is approximately 60 feet long and 12 feet high, spans the entire width of the creek channel, and has been virtually unimproved since its original construction. It creates an impoundment upstream that passively directs water into a screened intake structure connected to a diversion flume (Figure 2, Project Components). The diversion flume is approximately 100 feet long and channels the diverted water into a transmission pipeline that conveys water via gravity to the City's Coast Pump Station on the San Lorenzo River, approximately 3.8 miles to the east. The water is ultimately delivered to the Graham Hill Water Treatment Plant.

The existing Facility includes two debris/sediment control bypasses with pneumatically operated gate valves to regulate sediment movement through the intake structure. Diversion of water from the creek to the City's water system is controlled by an electronic diversion control valve and propeller-type flowmeter. A control building houses operational equipment. Piping from the flume also allows for bypass flows to be returned to the stream. Approximately 400 feet downstream from the Facility, the creek passes under Smith Grade through a culvert under the roadway.

The City has historically diverted water from Laguna Creek as needed throughout the year based on established pre-1914 senior water rights. However, since 2007, the City has limited its diversions in order to maintain beneficial in-stream flows suitable for various salmonid life stages within the downstream anadromous reaches of Laguna Creek, based on ongoing agreements with the California Department of Fish and Wildlife (CDFW). Although the City is capable of diverting up to approximately 7 cubic feet per second based on current infrastructure, during the various salmonid life stages, water diversions are limited from Laguna Creek and often unavailable, as flows naturally recede below the agreed upon in-stream flows of 2 cubic feet per second. There is no typical diversion rate or diversion season, since the available flows are highly dependent on rainfall volume and timing.

While the Facility has several operational deficiencies related to management of sediment, fisheries protection, and maintenance challenges—issues that have been studied by the City—the overall condition of the Facility is satisfactory, with no signs of major deterioration, and it has adequate strength and stability for continued service. Even so, since the early 2000s, CDFW has corresponded with the City requesting improvements to sediment management and fisheries protection at the Facility. To that end, the City's draft Anadromous Salmonid Habitat Conservation Plan includes improvements at the Facility as a biological objective and as a covered activity, and improvements were analyzed at a programmatic level in the 2005 Program Environmental Impact Report for the North Coast System Repair and Replacement Project.

To address the aforementioned operational and maintenance issues, the City has developed the project-level definition of the Proposed Project, which is the subject of this project-level environmental impact report. A description of these operational and maintenance issues and how the Proposed Project would address them is outlined as follows:

- In-Stream Transport of Sediment. The dam impedes natural movement of sediment downstream. Although two sediment-control bypass valves can be operated during periods of sediment transport (e.g., during storms) to allow sediment to pass through the dam, they are intermittently clogged with large materials during high-flow storm events and have limited capacity, resulting in sediment buildup behind the dam, often during one large storm event. Periodic dredging and sediment removal are required to conduct maintenance activities and to clear the intake screen of sediment.
- Fish Protection Consistent with Regulatory Requirements. The existing intake screen is aged and buried in sediment. The screen was designed to prevent entrainment of debris within the diverted water and has a woven-wire opening of approximately 0.5 inches. Weekly maintenance and cleaning of the existing intake screen is required to clear sediment from the intake structure when the Facility is in service.

  The existing screen panels do not meet current regulatory requirements for screening of non-anadromous fish species; screen openings are too large to eliminate the potential for entrainment of juvenile fish and other aquatic organisms. Although federally or state-listed anadromous fish species are not present in the project area due to several downstream natural barriers, Laguna Creek does contain populations of rainbow trout (*Oncorhynchus mykiss*). Fish habitat downstream of the dam has also been degraded by sediment impoundment.

- Maintenance, Safety, and Access. The location of the existing control building impairs access to the diversion structures by mechanized maintenance equipment, the diamond-plate cover on the existing flume requires confined-space entry procedures when staff need to enter the structure, and the Facility does not have permanent fall-protection infrastructure in place for use during dam maintenance.

1.2.2 Proposed Project Description

The Proposed Project seeks to improve the existing Facility in order to allow for natural sediment transport past the diversion and to protect fish species and habitat. The Proposed Project would not increase the diversion rates at the Facility and would continue to allow the City to operate its diversion while enhancing its ability to meet its instream flow requirements. The Proposed Project would be comprised of the following primary components:

- **New Coanda Screen Intake Structure.** The Proposed Project would use Coanda screen technology. A Coanda screen consists of finely spaced, wedge-shaped wires that deflect a portion of the water to a collection chamber below the screen. Flows pass over the crest of the dam and across a solid steel plate, referred to as an accelerator plate because it creates an increase in the flow rate as water passes over the dam crest. A portion of the water then flows across and through the slotted Coanda screen panel. Flow that passes through the screen is collected in a collection chamber and by a diversion pipe to conveyed to the Laguna Pipeline. The Coanda screen would be embedded within a concrete support structure on the downstream side of the dam's left/east abutment, with the face of the screen sloped steeply downward such that water would pass over it at a high velocity, transporting sediment and debris downstream while skimming thin layers of water that would be directed into the collection chamber below. The Coanda screen technology would allow the intake screen to function regardless of sediment accumulation and buildup within the reservoir (i.e., upstream impoundment). The Coanda screen would divert some water that passes through the screen while the flow over it would transport the majority of entrained sediment downstream. Removal of smaller sediment that accumulates within the screen housing would be facilitated by a blowoff system incorporated into the design. Periodic manual brushing of the screen would occur to keep the intake operating as designed.
- **Valve Vault and Creek Bank Components.** The valve vault and other improvements along the downstream side of the dam's left/east abutment (eastern creek bank) are described below.
    - **Valve Vault.** A concrete vault would be cast-in-place and installed along the eastern creek bank to house the control-valve equipment. The approximately 9.5-foot-wide by 11.5-foot-long valve vault would be installed along the creek bank along the left/east abutment of the dam and adjacent to the existing intake structure, in a location that is accessible to City staff for maintenance and operation. The valve vault base would be constructed of structural concrete and anchored to bedrock with rebar. A cement curb up to 12 inches in height may be installed along the top of the valve vault to confine the 100-year storm event within Laguna Creek and to keep new infrastructure from flooding.
    - **Access Stairs and Safety Improvements.** The Proposed Project would include access and safety improvements including a cast-in-place concrete stairway (approximately 5 feet wide and 20 feet long) to provide access to the downstream plunge pool and guard rails at various locations

within the Facility, such as along the creek bank, at the new intake structure, across the dam, and at the valve vault.

- **Riprap Bank Stabilization.** Limited reinforcement of the creek bank may be necessary and may entail installation of streambank stabilization at the east side of the creek to protect the bank from erosion. Stabilization of an area approximately 20 feet long by 10 feet wide (approximately 25 cubic yards) may be required.

- **Other Components.** Other components of the Proposed Project including the diversion pipe, pre-cast drop inlet, and power and controls are described below.
  - **Diversion Pipe.** The new intake would be linked to a new diversion pipe that would extend approximately 100 feet downstream, which would be placed underground parallel to the existing diversion flume. Water from the collection chamber would be diverted into the new diversion pipe that would connect to the existing Laguna Pipeline downstream of the flume.
  - **Pre-Cast Drop Inlet.** A sediment trap structure would be installed at the interconnection of the new diversion pipe and the existing Laguna Pipeline within a pre-cast drop inlet feature that would allow for sediment removal using a hydro-vacuum truck or a hand-held shop vacuum, if needed.
  - **Power and Controls.** The Proposed Project would include additional electro-mechanical equipment for operations and remote-control capabilities. New monitoring and control equipment, including water quality sensors, water meters, valve actuators, and telecommunications, would be connected to the existing communications system and electrical distribution system on site to provide essential data for operations.

    An in-line control valve and electric actuator would be included to regulate flow into the City's diversion downstream of the flume. New electrical circuits would be installed for powering, monitoring, and remotely operating the new control valve actuators. The Facility's existing electrical distribution and SCADA equipment are deemed sufficient to accomplish automation and control functions at the Facility. The existing control building and SCADA equipment would accommodate new equipment required by the Proposed Project. The existing single-phase electrical service and data-grade telephone line would continue to provide power supply and communication capabilities for diversion control and automation.

- **Modified Existing Components.** The existing intake would be modified and decommissioned in place once the proposed improvements are implemented. A bypass pipe would be incorporated in the intake to allow for emergency diversion of water and the intake would be backfilled with concrete. This bypass pipe would extend from the intake to the existing diversion flume to allow water to be conveyed to the City's water treatment plant in the event that the new intake structure needs to be taken out of service for repair. A new cement curb up to 12 inches in height may be installed along the top of the existing intake to confine the 100-year storm event within Laguna Creek and to keep new infrastructure from flooding.

  In addition, the two existing sediment-control bypass valves on the downstream face of the dam would be removed and the bypass pipes abandoned in place and capped as follows:
  - At the dam's right/west sediment-control bypass valve (from the vantage point of looking downstream), the existing gate and actuator and its hood would be removed, and a blind flange would be installed on the end of the bypass pipe.
  - The conduits and electrical components would also be removed including the metal conduit/cable across the face of the dam.

- The dam's left/east sediment-control bypass valve is at the location where the new intake structure would be installed. Prior to installation of the intake structure, the piece of the bypass pipe that protrudes from the dam and the actuator would be removed and the pipe would be backfilled with concrete

1.2.3 Standard Construction Practices

Presented in this section are Standard Construction Practices that would be implemented by the City or its contractors during construction activities associated with the Proposed Project, where relevant.

Erosion Control and Air Quality Control

1. Implement erosion control best management practices for all construction activities occurring in or adjacent to jurisdictional aquatic resources (resources subject to permitting under Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code Section 1600). These measures may include, but are not limited to, (1) installation of silt fences, fiber or straw rolls, and/or bales along limits of work/construction areas and from the edge of the water course; (2) covering of stockpiled spoils; (3) revegetation and physical stabilization of disturbed graded and staging areas; and (4) sediment control including fencing, dams, barriers, berms, traps, and associated basins.
2. Provide stockpile containment and exposed soil stabilization structures (e.g., Visqueen plastic sheeting, fiber or straw rolls, gravel bags, and/or hydroseed).
3. Provide runoff control devices (e.g., fiber or straw rolls, gravel bag barriers/chevrons) used during construction phases conducted during the rainy season. Following all rain events, runoff control devices shall be inspected for their performance and repaired immediately if they are found to be deficient.
4. Implement wind erosion (dust) controls, including the following:
   - Use a water truck;
   - Water active construction areas as necessary to control fugitive dust;
   - Hydro seed and/or apply non-toxic soil binders to exposed areas after cut and fill operations;
   - Cover inactive storage piles;
   - Cover all trucks hauling dirt, sand, or loose materials off site; and
   - Install appropriately effective track-out capture methods at the construction site for all exiting trucks.

Water Quality Protection

5. Locate and stabilize spoil disposal sites and other debris areas such as concrete wash sites. Sediment control measures shall be implemented so that sediment is not conveyed to waterways or jurisdictional resources (resources subject to permitting under Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code Section 1600).
6. Minimize potential for hazardous spills from heavy equipment by not storing equipment or fueling within a minimum of 65 feet of any active stream channel or water body unless approved by permitting agencies along with implementation of additional spill prevention methods such as secondary containment and inspection.
7. Ensure that gas, oil, or any other substances that could be hazardous to aquatic life or pollute habitat are prevented from contaminating the soil or entering waters of the state or of the United States by storing these types of materials within an established containment area. Vehicles and equipment would have spill

kits available, be checked daily for leaks, and would be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Any gas, oil, or other substance that could be considered hazardous shall be stored in water-tight containers with secondary containment. Emergency spill kits shall be on site at all times.

8. Prevent equipment fluid leaks through regular equipment inspections.
9. Implement proper waste/trash management.

In-Channel Work and Fish Species Protection

10. Avoid activities in the active (i.e., flowing) channel whenever possible.
11. Isolate work areas as needed and bypass flowing water around work site (see dewatering measures below).
12. Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately tired vehicles, either tracked or wheeled, shall be used depending on the situation.

General Habitat Protection

13. Avoid disturbance of retained riparian vegetation to the maximum extent feasible when working in or adjacent to an active stream channel.
14. Restore all temporarily disturbed natural communities/areas by replanting native vegetation using a vegetation mix appropriate for the site.
15. Require decontamination of any used tools and equipment prior to entering water ways.
16. A qualified biologist shall conduct a training-educational session for project construction personnel prior to any mobilization-construction activities within the project sites to inform personnel about species that may be present on site. The training shall consist of basic identification of special-status species that may occur on or near the project site, their habitat, their basic habits, how they may be encountered in the work area, and procedures to follow when they are encountered. The training will include a description of the project boundaries; general provisions of the Migratory Bird Treaty Act, California Fish and Game Code, and federal and state Endangered Species Acts; the necessity for adhering to the provision of these regulations; and general measures for the protection of special-status species, including breeding birds and their nests. Any personnel joining the work crew later shall receive the same training before beginning work.

Dewatering

17. Prior to the start of work or during the installation of temporary water diversion structures, capture native aquatic vertebrates in the work area and transfer them to another reach as determined by a qualified biologist. Capture and relocation of aquatic native vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety of the biologist conducting the capture may be compromised.
18. When work in a flowing stream is unavoidable, isolate the work area from the stream. This may be achieved by diverting the entire streamflow around the work area by a pipe or open channel. Coffer dams shall be installed upstream and downstream, if needed, of the work areas at locations determined suitable based on site-specific conditions, including proximity to the construction zone and type of construction activities being conducted. Cofferdam construction shall be adequate to prevent seepage to the maximum extent feasible into or from the work area. Where feasible, water diversion techniques shall allow streamflows to flow by gravity around or through the work site. If gravity flow is not feasible, streamflows may be pumped

around the work site using pumps and screened intake hoses. Sumps or basins may also be used to collect water, where appropriate (e.g., in channels with low flows). The work area will remain isolated from flowing water until any necessary erosion protection is in place. All water shall be discharged in a non-erosive manner (e.g., gravel or vegetated bars, on hay bales, on plastic, on concrete, or in storm drains when equipped with filtering devices).

19. If a bypass will be of open channel design, the berm confining the channel may be constructed of material from the channel.
20. Diversions shall maintain ambient flows below the diversion, and waters discharged below the project site shall not be diminished or degraded by the diversion. All imported materials placed in the channel to dewater the channel shall be removed when the work is completed. Dirt, dust, or other potential discharge material in the work area will be contained and prevented from entering the flowing channel. Normal flows shall be restored to the affected stream as soon as is feasible and safe after completion of work at that location.
21. To the extent that streambed design changes are not part of the Proposed Project, return the streambed, including the low-flow channel, to as close to pre-project condition as possible unless the pre-existing condition was detrimental to channel condition as determined by a qualified biologist or hydrologist.
22. Remove all temporary diversion structures and the supportive material as soon as reasonably possible, but no more than 72 hours after work is completed.
23. Completely remove temporary fills, such as for access ramps, diversion structures, or coffer dams upon finishing the work.

Other Practices

24. 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.
25. 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.
26. Notify adjacent property owners of nighttime construction schedules. A Construction Noise Coordinator will be identified. The contact number for the Construction Noise Coordinator will be included on notices distributed to neighbors regarding planned nighttime construction activities. The Construction Noise

Coordinator will be responsible for responding to any local complaints about construction noise. When a complaint is received, the Construction Noise Coordinator shall notify the City within 48 hours of the complaint, determine the cause of the noise complaint, and implement as possible reasonable measures to resolve the complaint, as deemed acceptable by the City.

Project-Specific Practices for Biological Resources

27. To protect fish, the following shall be implemented:
    - Relocate fish to suitable habitat during dewatering activities.
    - Maintain adequate water depth within downstream plunge pool. A depth of 3 to 4 feet is preferred to conform to the existing pool depth and minimize potential for degrading the suitability of the pool for trout habitat. Greater depth also reduces the potential for harm to fish passing over the Coanda screen and entering the plunge pool below.
    - Maintain soft bank stabilization features identified during project design that provides potential habitat for trout.
    - Maintain native riparian shrubs and small trees in (as appropriate) and around riprap to provide overhead cover and shading when the plants have matured.
28. To protect trees that are retained on site, the following will be implemented:
    - Implement measures to minimize the potential for pathogen spread. Sanitize tools and equipment used in vegetation clearing including tree removal operations. If soil is collected on equipment, rinse equipment on site with a portable water tank or water truck, or at a designated rinsing station, to remove soil-borne pathogens and prevent transport to new sites. Alternatively, debris can be cleaned from tools/equipment via brushing, sweeping, or blowing with compressed air.
    - Implement additional prevention methods for sudden oak death and pitch canker. A qualified biologist, arborist, or forester should inspect loads of logs and equipment leaving the site to ensure that no host material is being transported without a permit if material is being transported to outside locations. If importing vegetative material for restoration purposes, ensure that material that has been produced in conformance with the latest horticultural standards in pest and disease avoidance and sanitation.
    - Implement recommendations from the Tree Inventory, Impact Assessment, and Protection Plan (Fouts 2020) prepared for the Proposed Project.
29. To prevent inadvertent entrapment of wildlife during construction activities, all excavated, steep-walled holes or trenches more than 2 feet deep and/or all open pipeline segments will be covered at the close of each working day with plywood or similar materials, to the extent feasible. These areas will be inspected for trapped wildlife before and after placement of exclusionary materials.

Project-Specific Practices for Cultural Resources

30. To protect the dam during construction, the following will be implemented:
    - Notching crest of dam. The notch in the crest of the dam shall be sawcut to score neat lines for stone masonry removal. The use of a wire saw would avoid excess material removal and would prevent unraveling of stone masonry beyond the limits of the new intake structure. Given the strength and hardness of the dam, the cuts may first be initiated using chisel hammers to remove materials as necessary.

- Water-pressure washing of dam to remove debris. To remove loose material and organics such as dirt and moss water-blasting of the downstream face of the dam may be required. Prior to completing any water-blasting work, and at the direction of the City and under supervision of the Project inspector, the contractor shall test washing methods and develop the least impactful method of dam cleaning. The pressure washing methods shall avoid eroding the mortar. The contractor shall start with a low-pressure water wash, and if unsuccessful, use water of slightly higher pressure. As feasible, the test shall be conducted in an inconspicuous location. Pressure washing shall be limited to the area where the new intake structure will be cast, with approximately 1-foot buffer. A bonding agent such as a high solids, water-based emulsion admixture suitable for modifying Portland cement compositions, shall be spray applied to the dam face within the limits of the new concrete formwork for the new intake structure.

31. Documentation of the historical resource. The City will work with a qualified architectural historian to develop interpretative text and content for a dedicated webpage on the City's public website that explains the history of the site and its importance within the water management system. This text and supporting content (historic era images) will be utilized to develop a brochure with a one-time limited pressing for distribution to local libraries and museums. In addition, the City will include a brief history of the project site as an entry in its Santa Cruz Municipal Utilities Review, a quarterly newsletter that is sent to all customers in the Water Service Area.

Project-Specific Practices for Wildfire Hazards

32. Internal combustion engine equipment shall include spark arrestors, fire suppression equipment (e.g. fire extinguishers and shovels) must be stored onsite during use of such mechanical equipment, and construction activities may not be conducted during red flag warnings issued by the California Department of Forestry and Fire Protection (CAL FIRE). Red flag warnings and fire weather watches are issued by CAL FIRE based on weather patterns (low humidity, strong winds, dry fuels, etc.) and listed on their website (https://www.fire.ca.gov/programs/communications/red-flag-warnings-fire-weather-watches/).

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2 Regulatory Setting

2.1 Federal

2.1.1 Clean Water Act

The Federal Water Pollution Control Act of 1972 (Clean Water Act) (33 USC 1251 et seq.), as amended by the Water Quality Act of 1987 (PL 100-4), is the major federal legislation governing water quality. The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Discharges into waters of the United States are regulated under Section 404. Waters of the United States include (1) all navigable waters (including all waters subject to the ebb and flow of tides); (2) all interstate waters and wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, and natural ponds; (4) all impoundments of waters mentioned above; (5) all tributaries to waters mentioned above; (6) the territorial seas; and (7) all wetlands adjacent to waters mentioned above. In California, the State Water Resources Control Board and the RWQCBs are responsible for implementing the Clean Water Act. Important applicable sections of the Clean Water Act are as follows:

- Section 401 requires an applicant for any federal permit for an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Clean Water Act. Certification is provided by the respective RWQCB.
- Section 402 establishes the National Pollutant Discharge Elimination System, a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. The National Pollutant Discharge Elimination System program is administered by the RWQCB. Conformance with Section 402 is typically addressed in conjunction with water quality certification under Section 401.
- Section 404 provides for issuance of dredge/fill permits by USACE. Permits typically include conditions to minimize impacts on water quality. Common conditions include (1) USACE review and approval of sediment quality analysis before dredging, (2) a detailed pre- and post-construction monitoring plan that includes disposal site monitoring, and (3) required compensation for loss of waters of the United States.

2.1.2 Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by USFWS for most plant and animal species and by the National Oceanic and Atmospheric Administration National Marine Fisheries Service for certain marine species. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and to provide programs for the conservation of those species, thus preventing the extinction of plants and wildlife. FESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under FESA, it is unlawful to take any listed species; "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." As part of this regulatory act, FESA provides for designation of critical habitat, defined in FESA Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and that "may require special management considerations or protection." Critical habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species." Critical habitat designations identify with the best available knowledge, those biological and physical features (primary constituent elements) which provide for the life history processes essential to the conservation of the species.

FESA allows for the issuance of incidental take permits for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans on public or private property without any other federal agency involvement.

The BSA occurs within USFWS-designated California red-legged frog critical habitat Unit SCZ-1 for Santa Cruz County (75 FR 12815-12959; USFWS 2020). According to USFWS, the following items are the primary constituent elements (PCE) identified for California red-legged frog (75 FR 12815-12959):

1. **Aquatic Breeding Habitat.** Standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
2. **Aquatic Non-Breeding Habitat.** Freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to: plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
3. **Upland Habitat.** Upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile (1.6 kilometers) in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. These upland features contribute to: (1) filling of aquatic, wetland, or riparian habitats; (2) maintaining suitable periods of pool inundation for larval frogs and their food sources; and (3) providing non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.
4. **Dispersal Habitat.** Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile (1.6 kilometers) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres (20 hectares) in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the species.

2.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) was originally passed in 1918 as four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The primary motivation for the international negotiations was to stop the "indiscriminate slaughter" of migratory birds by market hunters and others. The MBTA protects over 800 species of birds (including their parts, eggs, and nests) from killing, hunting, pursuing, capturing, selling, and shipping unless expressly authorized or permitted.

2.2 State

2.2.1 California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources and ways that such impacts can be avoided, minimized, or mitigated. The act also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

CEQA Guidelines Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors" (14 CCR 15380(b)(1). A rare animal or plant is defined in Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c).

CDFW has developed a list of "Special Species" as "a general term that refers to all of the taxa the California Natural Diversity Database (CNDDB) is interested in tracking, regardless of their legal or protection status." This is a broader list than those species that are protected under FESA, the California Endangered Species Act (CESA), and other CFGC provisions, and includes lists developed by other organizations, such as the Audubon Watch List Species. Guidance documents prepared by other agencies, including the Bureau of Land Management Sensitive Species and USFWS Birds of Special Concern, are also included on this CDFW Special Species list. Additionally, CDFW has concluded that plant species included on the California Native Plant Society's (CNPS's) California Rare Plant Rank (CRPR) List 1 and 2 are covered by CEQA Guidelines Section 15380.

CEQA Guidelines Section IV, Appendix G (Environmental Checklist Form), requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service" (14 CCR 15000 et seq.).

2.2.2 California Endangered Species Act

CESA (CFCG Section 2050 et seq.) provides protection and prohibits the take of plant, fish, and wildlife species listed by the State of California. Unlike FESA, state-listed plants have the same degree of protection as wildlife, but insects and other invertebrates may not be listed. Take is defined similarly to FESA and is prohibited for both listed and candidate species. Take authorization may be obtained by the project applicant from the CDFW under CESA

Section 2081, which allows take of a listed species for educational, scientific, or management purposes. In this case, project applicants consult with CDFW to develop a set of measures and standards for managing the listed species, including full mitigation for impacts, funding of implementation, and monitoring of mitigation measures.

2.2.3 California Fish and Game Code

Fully Protected Species

The classification of "fully protected" was the state's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, mammals, amphibians and reptiles, birds, and mammals. Fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. "Take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

Lake or Streambed Alteration

Under the CFCG Section 1602, CDFW has authority to regulate work that will substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake. CDFW also has authority to regulate work that will deposit or dispose of debris, water, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement for a Lake or Streambed Alteration Agreement and is applicable to any person, state, or local governmental agency or public utility (CFCG Section 1601). CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of (1) definable bed and banks and (2) existing fish or wildlife resources. In practice, CDFW marks its jurisdictional limit at the top of the stream or lake bank or the outer edge of the riparian vegetation, where present, and sometimes extends its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries, as defined by Clean Water Act Section 404, sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1602 may encompass a greater area than those regulated under Clean Water Act Section 404; CDFW does not have jurisdiction over ocean or shoreline resources.

Fish and Game Code Sections 3503, 3511, 3513, 4150

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Fish and Game Code Section 3503.5 protects all birds-of-prey (raptors) and their eggs and nests. Section 3511 states fully protected birds or parts thereof may not be taken or possessed at any time. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA. All nongame mammals, including bats, are protected by CFCG Section 4150.

2.2.4 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the State Water Resources Control Board and RWQCB as the principal state agencies responsible for the protection of water quality in California. The Central Coast Regional Water Quality Control Board (CCRWQCB) has regulatory authority over the project site. The Porter-Cologne Water

Quality Control Act provides that "All discharges of waste into the waters of the state are privileges, not rights." Waters of the State are defined in Section 13050(e) of the Porter-Cologne Water Quality Control Act as "…any surface water or groundwater, including saline waters, within the boundaries of the state." All dischargers are subject to regulation under the Porter-Cologne Water Quality Control Act, including both point and nonpoint source dischargers. The CCRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within its jurisdiction. As noted above, the CCRWQCB is the appointed authority for Section 401 compliance in the project site.

2.2.5 California Native Plant Protection Act

The California Native Plant Protection Act of 1977 directed CDFW to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take. CESA expanded on the original Native Plant Protection Act and enhanced legal protection for plants, but the Native Plant Protection Act remains part of the CFCG. To align with federal regulations, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals into the act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Because rare plants are not included in CESA, appropriate compensatory mitigation measures for significant impacts to rare plants are typically negotiated with the CDFW.

2.2.6 California Coastal Act

In 1976, the State Legislature enacted the California Coastal Act (Public Resources Code Section 30000 et seq.) to provide long-term protection of the state's 1,100-mile coastline for the benefit of current and future generations. The Coastal Act provides for the management of lands within California's coastal zone boundary, as established by the Legislature and defined in Coastal Act (Section 30103). The boundary of the coastal zones varies across the state and each location varies from anywhere of couple hundred feet to 5 miles. The coastal boundary extends approximately three miles offshore. The goals of the Coastal Act, per Public Resources Code Section 30001.5 are:

- Protect, maintain, and, where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.
- Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.
- Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sounds resources conservation principles and constitutionally protected rights of private property owners.
- Assure priority for coastal-dependent and coastal-related development over other development on the coast.
- Encourage state and local initiative and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in the coastal zone.

Furthermore, the Coastal Act includes specific policies to achieve these goals within the coastal zone (see Division 20 of the Public Resources Code). These policies include the legal standards applied to coastal planning and regulatory decisions made by the CCC in pursuant to the Coastal Act. The Coastal Act requires that individual jurisdictions adopt a Local Coastal Program (LCP) to implement the Coastal Act at the local level. After the CCC certifies the LCP, and the local government becomes the coastal development permit (CDP) permitting authority. See Section 2.3.1, for information about the County's LCP.

2.2.7 California Government Code – Local Exemptions

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, and transmissions of water supplies are exempt from local (i.e., county and city) building and zoning ordinances. The Proposed Project evaluated in this report relate to operation, utilization, and storage of water resources, therefore, the Proposed Project is legally exempt from Santa Cruz County building and zoning ordinances.

2.2.8 California Public Resources Code - Timberland and Forest Land

California Public Resources Code 4526 defines "Timberland" to mean "land, other than land owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees." While the project site is not used for growing timber for commercial purposes, the definition of timber under PRC 4526 is broad enough to include areas where commercial species of trees such as coast redwoods grow. Furthermore, the project site is zoned Timber Production by Santa Cruz County. Public Resources Code 12220(g) defines forest land as "land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." The redwood forest at the project would be considered forestland.

2.2.9 California Department of Food and Agriculture Sudden Oak Death Zone of Infestation

The project site is located within the Sudden Oak Death Zone of Infestation and the "Regulated Area" for Sudden Oak Death, as designated by the California Department of Food and Agriculture (California Code of Regulations 3700). This designation requires a permit from the County Agricultural Commissioner prior to the removal of regulated plant material. The project site is also located within the Pitch Canker Zone of Infestation. California Public Resources Code (Article 5, Sections 4712-4718) outlines the authority of the California Board of Forestry to designate a Zone of Infestation associated with forest pests. The Code requires timberland owners to eradicate such pests and outlines the authority of the Board to take such actions within a designated Zone of Infestation. Since the City is not the landowner, they would not be responsible for pest eradication. Sudden Oak Death is a tree disease caused by the fungus-like plant pathogen *Phytophthora ramorum* affecting oak species (primarily coast live oak (*Quercus agrifolia*)), tanoak (*Notholithocarpus densiflorus*), and California bay (*Umbellularia californica*) trees. Host species include many found within the project site, including, but not limited to, redwood (*Sequoia sempervirens*), bigleaf maple (*Acer macrophyllum*), madrone (*Arbutus menziesii*), and Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*). Pitch canker is a disease of pine trees that is caused by the fungus *Fusarium circinatum*. Douglas-fir can also be infected, but this disease primarily affects Monterey pine (*Pinus radiata*) trees.

2.3 Local

2.3.1 County of Santa Cruz General Plan and Local Coastal Program

The Santa Cruz County General Plan and Local Coastal Program (LCP) is a comprehensive, long-term planning document for the unincorporated areas of the County and includes the County's LCP, which was certified by the California Coastal Commission in 1994 (County of Santa Cruz, 1994). The County General Plan and LCP provides policies and programs to establish guidelines for future growth and all types of physical developments.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.2 (Riparian Corridors and Wetlands), establishes definitions for riparian corridors and wetlands to ensure their protection. Policies 5.2.1 through 5.2.5 identify and define riparian corridors and wetlands, determine the uses which are allowed in and adjacent to these habitats, and specify required buffer setbacks and performance standards for land in and adjacent to these areas. Riparian corridors are defined as (a) 50 feet from the top of a distinct channel or physical evidence of high water mark of perennial stream; (b) 30 feet from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated on the General Plan maps and through field inspection of undesignated intermittent and ephemeral streams; (c) 100 feet of the high water mark of a lake, wetland, estuary, lagoon, or natural body of standing water; (d) the landward limit of a riparian woodland plant community; and (e) wooded arroyos within urban areas. The County definitions are consistent with those used for CEQA purposes.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.1 (Biological Diversity), establishes definitions for sensitive habitats to ensure their protection. Policies 5.1.1 through 5.1.11 identify and define sensitive habitats, determine the uses which are allowed in and adjacent to these habitats, and specify performance standards for land in and adjacent to these areas.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.12 (Timber Resources), describes lands to be designated for timber production to encourage economic production of forest products on a sustained yield basis under high environmental standards. Policies 5.12.1 through 5.12.14 identify and define permitted and conditional uses in timber production zones and specify performance standards for land in and adjacent to these areas.

The County's certified LCP is administered by the County Planning Department, pursuant to the California Coastal Act, and includes specific plans and ordinances for activities within the Coastal Zone. The LCP implementing ordinances in the County Code that are particularly relevant in the evaluation of biological resources of the Proposed Project include the following:

- County Grading Ordinance (Chapter 16.20)
- Erosion Control Ordinance (Chapter 16.22)
- Riparian Corridor and Wetlands Protection (Chapter 16.30)
- Sensitive Habitat Protection (Chapter 16.32)
- Significant Trees Protection (Chapter 16.34)
- Timber Harvesting Regulations (Chapter 16.52)

As the Proposed Project occurs within the Coastal Zone and is not exempt from the LCP, it would require compliance with the LCP and the standards contained in the above LCP implementing ordinances. While some of these ordinances require separate approvals or permits (e.g., Riparian Exception), such approvals are not required for the Proposed Project, as it falls under California Government Code Section 53091 (d) and (e) and is legally exempt from Santa Cruz County building and zoning ordinances (See Section 2.2.7 above). The relevant LCP implementing ordinances that are addressed through the CDP process, are described below.

2.3.1.1 Grading and Erosion Control Ordinances

Chapter 16.20, Grading Regulations, sets forth rules and regulations to control all grading, including excavations, earthwork, road construction, dredging, diking, fills and embankments. Chapter 16.22 requires control of all existing and potential conditions of accelerated (human-induced) erosion; sets forth required provisions for project planning, preparation of erosion control plans, runoff control, land clearing, and winter operations.

2.3.1.2 Riparian Corridor Protection Ordinance

Chapter 16.30, Riparian Corridor and Wetlands Protection, includes regulations to limit development activities in riparian corridors. The regulations provide that "no project shall undergo developmental activities in riparian corridors or areas with urban or rural service lines which are within a buffer zone as measured from the top of the arroyo." Buffer areas are specified in the regulations and shall be determined from characteristics found in the riparian area, including average slope within 30 feet of water's edge, vegetation, and stream characteristics. The buffer shall always extend 50 feet from the edge of riparian woodland and 20 feet beyond the edge of other woody vegetation as determined by the dripline. After the buffer is determined, a 10-foot setback from the edge of the buffer is required for all structures, which allows construction equipment and use of yard area. Exceptions and conditioned exceptions to the provisions of the chapter may be authorized. Findings meeting the following criteria define the circumstances necessary in granting an exception to the above requirements:

1. That there are special circumstances or condition affecting the property.
2. That the exception is necessary for the proper design and function of some permitted or existing activity on the property.
3. That the granting of the exception will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located.
4. That the granting of the exception, in the Coastal Zone, will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative.
5. That the granting of the exception is in accordance with the purpose of this chapter, and with the objectives of the General Plan and elements thereof, and the Local Coastal Program Land Use Plan.

2.3.1.3 Sensitive Habitats Protection Ordinance

Santa Cruz County Code Chapter 16.32 regulates development in or adjacent to specified environmentally sensitive habitat areas. An area is defined as "sensitive habitat" under this ordinance includes various criteria, and includes all lakes, wetlands, estuaries, lagoons, streams, rivers, and riparian corridors. No development activity may occur within an area of biotic concern unless approval is issued or unless the activity is reviewed concurrently with the review of an associated development of land-division application. All development within environmentally sensitive habitat must be mitigated or restored. The following findings are necessary in granting an exception to the provisions and requirements of this ordinance:

1. That adequate measures will be taken to ensure consistency with the purpose of this chapter to minimize the disturbance of sensitive habitats; and
2. One of the following situations exists:
   a. The exception is necessary for restoration of a sensitive habitat; or
   b. It can be demonstrated by biotic assessment, biotic report, or other technical information that the exception is necessary to protect public health, safety, or welfare.

Any development activity that has received a riparian exception according to the provisions of Chapter 16.30 would not likely be subject to this chapter according Chapter 16.32.105, if the Planning Director determines that the Proposed Project received an equivalent review in granting a riparian exception.

2.3.1.4 Significant Trees Protection Ordinance

Chapter 16.34 regulates the removal of trees in the Coastal Zone, which could reduce scenic beauty and the attractiveness of the area to residents and visitors. The ordinance establishes the type of trees to be protected, the circumstances under which they may be removed, and the procedures for obtaining a permit for their removal. This chapter defines Significant Trees (Section 16.34.030) as

> "any tree, sprout clump, or group of trees, as follows:
>
> (A) Within the urban services line or rural services line, any tree which is equal to or greater than 20 inches d.b.h. (approximately five feet in circumference); any sprout clump of five or more stems each of which is greater than 12 inches d.b.h. (approximately three feet in circumference); or any group consisting of five or more trees on one parcel, each of which is greater than 12 inches d.b.h. (approximately three feet in circumference).
>
> (B) Outside the urban services line or rural services line, where visible from a scenic road, any beach, or within a designated scenic resource area, any tree which is equal to or greater than 40 inches d.b.h. (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches d.b.h. (approximately five feet in circumference); or, any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference).
>
> (C) Any tree located in a sensitive habitat as defined in Chapter 16.32 SCCC. Also see SCCC 16.34.090(C), exemption of projects with other permits."

A tree removal permit will not be required for the Proposed Project, as tree removal will be authorized under the County's Coastal Zone Regulations. Specifically, the Coastal Development Permit application shall address removal of any significant tree located within the Coastal Zone. The site plan submitted with the application shall include the Tree Inventory, Impact Assessment & Protection Plan (Fouts, K. 2020), which identifies the trees to be removed, a description of the species, size, and condition of the tree(s) to be removed, a description of the method to be used in removing the tree(s), the reason(s) for removal of the tree(s), and proposed visual impact mitigation measures, including identification of the size, location, and species of replacement trees on a site plan (if necessary). Compliance with these requirements is further discussed in Section 4.11, Land Use and Planning and is not further addressed in this section.

2.3.1.5 Timber Harvesting Regulations

The project site is zoned Timber Production by Santa Cruz County. Chapter 16.34 establishes the definitions and procedures to protect and maintain the timberlands through regulation of timber harvesting. The regulations encourage the continued production of forest products in compliance with performance standards, which emphasize protection of environmental and open space values while fostering increased productivity of forest land. This regulation also serves to protect, maintain and improve the forest land of Santa Cruz County. The ordinance restricts timber harvesting to specified zone districts within the County and requires development of a timber harvest plan, timberland conversion permit, or conversion exemption prior to the cutting of any commercial tree species.

3 Methods

Data regarding biological resources present within the 17.44-acre BSA were obtained through a review of pertinent literature, field reconnaissance, an aquatic resources jurisdictional delineation, and habitat assessments, which are described in detail below. For purposes of this report, special-status resources are defined as follows:

- Special-status plant species include (1) species designated as either rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (CFCG 2050 et seq.) or FESA (16 USC 1531 et seq.); (2) species that are candidate species being considered or proposed for listing under CESA or FESA; (3) species that are included on the CDFW Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2020a) or species with a CRPR of 1 or 2 in the CNPS Inventory of Rare and Endangered Plants of California (CNPS Inventory; CNPS 2020); or (4) species given protection under the County's General Plan/Local Coastal Program and applicable ordinances.
- Special-status wildlife species include (1) species designated as either rare, threatened, or endangered by the CDFW or USFWS and are protected under either CESA (CFCG, Section 2050 et seq.) or FESA (16 USC 1531 et seq.); (2) species that are candidate species being considered or proposed for listing under CESA or FESA; or (3) species that are included on the CDFW Special Animals List (CDFW 2016b).
- Special-status vegetation communities include (1) those designated as sensitive by CDFW and assigned state ranks of S1-S3 based on their rarity and threats, (2) those that provide habitat for special-status species, or (3) those designated as sensitive by the County of Santa Cruz within Chapter 5 of the General Plan and County Code Title 16.

3.1 Literature Review

Prior to field surveys, special-status biological resources present or potentially present within the BSA were identified through queries of the County of Santa Cruz Online GIS database (County of Santa Cruz 2020), CNDDB (CDFW 2020b), USFWS Inventory for Planning and Conservation (IPaC) database (USFWS 2020), CNPS Inventory of Rare and Endangered Plants data (CNPS Inventory) (CNPS 2020), and U.S. Department of Agriculture Web Soil Survey (USDA 2020a). The CNPS Inventory and CNDDB were queried based on the U.S. Geological Survey 7.5-minute quadrangle in which the BSA is located (Davenport) and the six surrounding quadrangles (Santa Cruz, Felton, Año Nuevo, Castle Rock Ridge, Big Basin, and Franklin Point). The IPaC databases was queried using GIS software based on a 1-mile buffer around the BSA.

General information regarding wildlife species distribution in the region and potential presence within the BSA was primarily obtained from Cornell Lab of Ornithology (2016) for birds, Hall (1981) for mammals, and Stebbins (2003) for reptiles and amphibians.

3.2 Field Surveys

Dudek biologist Emily Scricca conducted a biological resources reconnaissance survey, vegetation mapping, and a formal California red-legged frog (*Rana draytonii;* CRLF) habitat assessment within the BSA on January 14, 2020. During this site visit, Dudek evaluated the site's potential to support sensitive natural communities and special-status plant and wildlife species. Also on January 14, 2020, Dudek environmental scientists Sheldon Leiker and Elizabeth Geisler conducted the aquatic resources jurisdictional delineation within the project site to investigate and delineate potential waters of the United States, including wetlands, under USACE jurisdiction, pursuant to Section 404 of the federal Clean Water Act; and waters of the state under RWQCB jurisdiction, pursuant to the Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act (Porter-Cologne Act) and CDFW jurisdiction, pursuant to Section 1602 of the CFCG (Dudek 2020). Table 1 lists the dates, focus, scope, conditions, and personnel for each survey, and Appendix A, Site Photographs, documents photos taken during the survey efforts.

Table 1. Summary of Surveys

Date	Time	Type of Survey	Scope of Survey	Survey Conditions	Biologists
01/14/2020	1000-1400	Biological reconnaissance survey, vegetation mapping, CRLF habitat assessment	BSA	48°F –54°F, 0%-15% CC, 0-5 mph wind	ES
01/14/2020	1000-1400	CRLF habitat assessment	Project Site, plus 1-mile buffer	48°F –54°F, 0%-15% CC, 0-5 mph wind	ES
01/14/2020	1000-1700	Aquatic resources jurisdictional delineation	Project Site	48°F –54°F, 0%-15% CC, 0-5 mph wind	SL, EG

Biologists: ES = Emily Scricca; SL = Sheldon Leiker; EG = Elizabeth Geisler.
Notes: BSA = biological study area; CRLF = California red-legged frog; °F = degrees Fahrenheit; mph = miles per hour; CC = cloud cover.

3.2.1 Vegetation Communities and Land Covers

Dudek used the CDFW's Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities (CDFW 2018) and the California Natural Communities List (CDFW 2019a) to map the entire BSA. Vegetation communities and land covers were delineated to the vegetation alliance level and, where appropriate, to the association level.

Vegetation communities and land uses within the BSA were mapped in the field directly onto a 1:2,400-scale (1 inch = 200 feet), aerial-photograph-based field map of the entire BSA. A minimum mapping unit of 2.2 acres (1 hectare) was established to standardize the mapping protocol among biologists. A Dudek GIS analyst processed the vegetation boundaries as delineated by the field biologists and created a GIS coverage for vegetation communities using ArcGIS software. Once major linework and community designations were completed, a geodatabase was created to help ensure the data was topologically correct and met final quality assurance/quality control procedures.

3.2.2 Plants

All plant species encountered during the field surveys were identified and recorded. Species that could not be identified immediately were collected brought into the laboratory for further investigation. Latin and common names for plant species with a CRPR (formerly "CNPS List") follow the CNPS Inventory (CNPS 2020). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2020), and common names follow the California Natural Community List (CDFW 2019a) or the USDA Natural Resources Conservation Service PLANTS Database (USDA 2020b).

3.2.3 Wildlife

Wildlife species detected during field surveys by sight, calls, tracks, scat, or other signs were recorded. Binoculars (10 × 42 power) were used to aid in the identification of observed wildlife throughout the BSA. In addition to species actually detected, expected wildlife use of the BSA was determined by known habitat preferences of local species and knowledge of their relative distributions in the area.

Sources for common and scientific names used for wildlife include Crother (2012) for reptiles and amphibians, American Ornithologists' Union (AOU 2012) for birds, Wilson and Reeder (2005) for mammals, North American Butterfly Association (NABA 2001) for butterflies, and Moyle (2002) for fish.

3.2.3.1 California Red-Legged Frog Habitat Assessment

The CRLF habitat assessment was conducted following the USFWS' Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005). The assessment included an evaluation of general upland and aquatic resources within and adjacent to the BSA, as well as a review of species occurrence records in the CNDDB for localities of CRLF within an approximate 1-mile radius of the project site. Other information sources on local occurrences included results of biological investigations conducted as part of the North Coast System Repair and Replacement Project (Entrix 2005, 2004, 2002, and 1997; LSA 2014), Dudek's in-house GIS database records on species occurrences, and information obtained from the City. A review of Google Earth imagery was also conducted during the desktop exercise to identify potential habitat types within the 1-mile radius.

A pedestrian survey within the BSA was conducted simultaneously with the general biological reconnaissance site visit by Emily Scricca on January 14, 2020, and the overall assessment was expanded to include the 1-mile buffer in order to evaluate the surrounding landscape and document relevant species observations. Aquatic habitats were mapped and characterized, which included collecting data on vegetation, water depth, bank full depth, stream gradient, substrate, and bank features. Other information collected included presence of aquatic predators, adjacent land uses, and barriers to CRLF movement.

3.2.4 Aquatic Resources Jurisdictional Delineation

Prior to visiting the project site, potential and/or historic drainages and aquatic features were investigated based on a review of the following: USGS topographic maps (1:24,000 scale), aerial photographs, the National Wetlands Inventory database (USFWS 2019), and the Natural Resources Conservation Service Web Soil Survey (USDA 2020a). In addition, hydrologic information from gauge stations within the vicinity of the project site was obtained.

The January 14, 2020, aquatic resources jurisdictional delineation served to investigate and identify potential jurisdictional aquatic resources within the project site including wetlands, streams, and creeks, among other aquatic features. All areas that were identified as being potentially subject to the jurisdiction of the USACE, RWQCB, and CDFW were field verified and mapped.

The USACE wetlands delineation was performed in accordance with the Corps Wetlands Delineation Manual (USACE 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010); A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States (Mersel and Lichvar 2014); and recent changes to 33 CFR, Part 328 provided by the USACE and EPA on the geographic extent of waters protected under the Clean Water Act (USACE & EPA 2007). The new rule, referred to as the “Navigable Waters Protection Rule,” issued new regulations to redefine the types of waterbodies covered by the federal Clean Water Act, which dramatically narrowed the scope of the federal administration’s regulatory authority compared to previous Clean Water Act regulations. As a result of the final rule, EPA and USACE define “waters of the United States” to include the following four categories: (1) the territorial seas and traditional navigable waters; (2) tributaries of such waters; (3) certain lakes, ponds, and impoundments of jurisdictional waters; and (4) wetlands adjacent to other jurisdictional waters (other than waters that are themselves wetlands). Non-wetland waters of the United States were delineated based on the limits of an OHWM. During the delineation, drainage features were examined for evidence of an OHWM, indicators for top-of-bank (TOB), saturation, permanence of surface water, wetland vegetation, and nexus to a traditional navigable water of the United States. If any of these criteria were met, transects were run to determine the extent of each regulatory agency’s jurisdiction.

Transects were taken approximately every 100 feet or greater if streambed conditions were unchanged. In dynamic reaches, transects were taken more frequently to capture channel morphology. Data on transect widths, dominant vegetation present within the drainage and in the adjacent uplands, and channel morphology were recorded on field forms. In areas where USACE jurisdictional wetlands were suspected, data on vegetation, hydrology, and soils were collected along transects to determine if any resources met the USACE jurisdictional three-parameter wetland test.

Areas regulated by the RWQCB are generally coincident with USACE, but include features isolated from navigable waters of the United States that have evidence of surface water inundation. The CDFW jurisdiction was defined to the bank of the stream/channels or to the limit of the adjacent riparian vegetation.

Drainage features were mapped during the field observation to obtain characteristic parameters and detailed descriptions using standard measurement tools. The location of transects, upstream and downstream extents of each feature, and sample points were collected in the field using a 1:2,400 scale (1 inch = 200 feet) aerial photograph and topographic map. GPS equipment could not be used due to the project location in a deep, narrow canyon with dense canopy cover. Dudek geographic information system (GIS) technician Tyler Friesen digitized the jurisdictional extents based on the transect measurements into a project-specific GIS using ArcGIS software.

Vegetation

Seasonal changes in species composition, human land-use practices, wildfires, and other natural disturbances can adversely affect the wetlands vegetation determination. During the delineation, a data station point was considered positive for hydrophytic vegetation if it passed the basic dominance test (Indicator 1), meaning that more than 50% of the dominant species sampled were characterized as either obligate, facultative wetland, and/or facultative per the North American Digital Flora: National Wetland Plant List (Lichvar et al. 2016), or if it passed the prevalence index (Indicator 2), which takes into account all plant species in the community, not just dominants. The standard plot sampling technique was used to sample vegetation within a 10-foot radius for herbaceous vegetation and a 30-foot radius for trees, shrubs, and woody vines (USACE 1987).

Hydric Soils

According to the National Technical Committee for Hydric Soils, hydric soils are “soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (USDA 1994). Soil pits were prepared using a “sharp shooter” shovel to determine if hydric soils were present. The presence of hydric soils was analyzed in accordance with Field Indicators of Hydric Soils in the United States (USDA and NRCS 2018). Munsell Soil Color Charts were used to determine soil chroma and value. Where feasible, soil pits were prepared to depths ranging from 16 to 18 inches. Dry soils were moistened to obtain the most accurate color. In general, soils from test pits were determined to be hydric if found to be of a chroma one or chroma two with mottles. Excavated soils were examined for evidence of hydric conditions, including low chroma values and mottling, vertical streaking, sulfidic odor, and high organic matter content in the upper horizon. Evidence of previous ponding or flooding was assessed, along with the slope, slope shape, existing landform characteristics, soil material/composition, and hydrophytic vegetation to determine if hydric soils were present.

Hydrology

Per the guidelines prescribed in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010), wetland hydrology indicators are separated into four major groups: Groups A, B, C, and D. Group A indicators are based on direct observations of surface flow, ponding, and soil saturation/groundwater. Group B indicators consist of evidence that the site has been or is currently subjected to ponding, including, but not limited to, water marks, drift deposits, and sediment deposits. Group C indicators include signs of previous and/or current saturation, including oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur, both of which are indicative of extended periods of soil saturation. Group D indicators consist of “consists of landscape characteristics and vegetation and soil features that indicate contemporary rather than historical wet conditions.” Each group is subdivided into primary and secondary categories based on its frequency and reliability of occurrence in the Western Mountains, Valleys, and Coast Region.

3.2.5 Survey Limitations

The surveys were conducted during the winter season, which resulted in detection and identification of most perennial plant species that may occur in the BSA. Due to the timing of the surveys, annual species that bloom in spring, summer, and early fall, as well as cryptic perennials, may not have been detectable. Limitations of the surveys also included a diurnal bias and the absence of trapping for small mammals, reptiles, and amphibians. The surveys were conducted during the daytime to maximize the detection of most wildlife. Most birds are active in the daytime; therefore, diurnal surveys maximize the number of bird observations. Conversely, diurnal surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe using standard meandering transects.

The biological reconnaissance survey, vegetation mapping, CRLF habitat assessment, and the aquatic resources jurisdictional delineation were conducted within the entire BSA from the existing easements and publicly accessible roads and rights-of-way. However, access was not available for all parcels within a 1-mile buffer of the project site for the CRLF habitat assessment due to private residential properties that surround the BSA. Therefore, use of aerial imagery signatures for vegetation communities and habitat suitability adjacent to the project site within the BSA were conducted for those areas that could not be accessed on foot.

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4 Results

4.1 Vegetation Communities and Land Covers

The BSA supports the following vegetation communities and land covers: redwood forest alliance, and urban/developed. Figure 3 illustrates the distribution, and Table 2 summarizes the extent of vegetation communities and land covers within the BSA. Descriptions of these vegetation communities and land covers are summarized below.

Table 2. Vegetation Communities and Land Covers within the Biological Study Area

Vegetation Community or Land Cover	Area (acres)
Forest and Woodland Alliances and Stands	
Redwood forest alliance*	16.65
Subtotal Forest and Woodland Alliances and Stands	*16.65*
Non-natural Land Covers/Unvegetated Communities	
Urban/Developed mapping unit	0.79
Subtotal Non-Natural Land Covers/Unvegetated Communities	*0.79*
Total	**17.44**

Note:
* CDFW sensitive vegetation community.

4.1.1 Forest and Woodlands Alliances

4.1.1.1 Redwood Forest Alliance

The redwood forest alliance includes redwood (*Sequoia sempervirens*) as the dominant or co-dominant tree in the canopy. The alliance has a continuous to intermittent canopy less than 400 feet in height with an infrequent to common shrub canopy and a variable herbaceous layer (Sawyer et al. 2009). Species associated with the alliance include bigleaf maple (*Acer macrophyllum*), California bay (*Umbellularia californica*), red alder (*Alnus rubra*), giant chinquapin (*Chrysolepis chrysophylla*), tanoak (*Notholithocarpus densiflorus*), Douglas fir (*Pseudotsuga menziesii*), and Pacific madrone (*Arbutus menziesii*) among others (Sawyer et al. 2009).

Redwood forest alliance makes up the entirety of the BSA aside from developed structures and roads encompassing 16.65 acres, and supports an overstory of redwood and tanoak with scattered bigleaf maple in the tree layer. The shrub layer is dominated by California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), and Himalayan blackberry (*Rubus armeniacus*); and the herbaceous layer included redwood sorrel (Oxalis oregana), western sword fern (*Polystichum munitum*), sugar scoop (*Tiarella trifoliata*), stinging nettle (*Urtica dioica*), American speedwell (*Veronica americana*), western rush (*Juncus patens*), and horsetail (*Equisetum* sp.). The redwood forest alliance is listed as a sensitive vegetation community (Global and State rarity rank of 3) under the California Natural Community List (CDFW 2019a).

4.1.2 Non-Natural Land Covers

4.1.2.1 Urban/Developed Mapping Unit

This mapping unit refers to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Urban or developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation. This mapping unit also includes areas that lack vegetation such as paved roads or unimproved areas that still retain a pervious surface.

Within the BSA, the urban/developed land cover includes 0.79 acres associated with Smith Grade, the main access road, the eastern and western access roads, and the existing Facility including the diversion flume, control building, and the dam.

4.2 Plants and Wildlife Observed

4.2.1 Plants

A total of 32 vascular and one nonvascular plant species, consisting of 26 native species (79%) and seven non-native species (21%), were recorded within the BSA during surveys. A full list of plant species observed is provided in Appendix B, Plant Compendium.

4.2.2 Wildlife

A total of four wildlife species, consisting of four native species (100%) and no non-native species (0%), were recorded within the BSA during the survey. A full list of wildlife species by taxonomic group observed is provided in Appendix C, Wildlife Compendium. Several other common wildlife species are expected to occur within the BSA and are noted below for each group of species.

4.2.2.1 Birds

One common avian species observed within the BSA during the survey was Steller's jay (*Cyanocitta stelleri*). Other common birds that are likely to inhabit the BSA include dark-eyed junco (*Junco hyemalis*), California quail (*Callipepla californica*), band-tailed pigeon (*Patagioenas fasciata*), acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), California scrub jay (*Aphelocoma californica*), bushtit (*Psaltriparus minimus*), wrentit (*Chamaea fasciata*), California towhee (*Melozone crissalis*), and spotted towhee (*Pipilo maculatus*) among many others.

4.2.2.2 Reptiles and Amphibians

Two amphibians were observed during surveys, and included California newt (*Taricha torosa*) and California giant salamander (*Dicamptodon ensatus*). Based on previous snorkel survey efforts at the project site from 2006 through 2019, the City has consistently observed California newts and California giant salamanders, and crayfish (*Pacifastacus* sp.) to a lesser extent, at the project site (City of Santa Cruz 2020). Other common reptiles that are likely to inhabit the BSA include Santa Cruz gartersnake (*Thamnophis atratus atratus*), California alligator lizard

(*Elgaria multicarinata multicarinata*), and California kingsnake (*Lampropeltis californiae*); however, no reptiles were observed during surveys.

4.2.2.3 Mammals

No mammals were detected during field surveys. Common mammals that are likely to inhabit the BSA include western gray squirrel (*Sciurus griseus*), fox squirrel (*Sciurus niger*), striped skunk (*Mephitis mephitis*), brush rabbit (*Sylvilagus bachmani*), Botta's pocket gopher (*Thomomys bottae*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), and mule deer (*Odocoileus hemionus*).

4.2.2.4 Fish

Laguna Creek is a State Water Resources Control Board Class 1 cold-water stream. In a Class 1 stream, fish are always or seasonally present, either currently or historically; and habitat to sustain fish exists (SWRCB 2010). Rainbow trout (*Oncorhynchus mykiss*) are the primary fish species present within the BSA. Based on previous snorkel survey efforts at the project site from 2006 through 2019, the City has consistently observed rainbow trout, but no other fish species (City of Santa Cruz 2020). Other fish species detected outside the BSA during these annual surveys included prickly sculpin (*Cottus asper*) and coastrange sculpin (*Cottus aleuticus*), which are found lower in the watershed. These species may also be present at the project site, but were not observed during 2020 surveys conducted by Dudek (Berry et al 2019; City of Santa Cruz 2020). There is a barrier to anadromy within Laguna Creek that occurs approximately 1.43 miles upstream of the Pacific Ocean near the confluence with Y Creek. The barrier consists of a large bedrock waterfall which precludes anadromous fish from traveling further upstream (Hagar et al. 2017). This limit of anadromy is located approximately 2.66 miles downstream of the project site.

The reach of Laguna Creek from the barrier of anadromy upstream to the Facility has a relatively steep gradient (averaging 2.8%); however, there are short sections with cascades, falls, and logjams that have higher gradient and present obstacles or barriers to fish migration (Hagar 2014). Reggiardo Creek is the only major tributary in this reach and it enters Laguna Creek approximately 0.09 miles downstream of the diversion. Habitat for resident trout is good with cold, high quality water and frequent but small pools having adequate depth and generally good cover characteristics (Hagar 2014). There is a good mix of flatwater (run, step run, pocket water, and glide) and riffle habitat providing suitable conditions for spawning, early rearing for juvenile trout, and production of aquatic invertebrate forage organisms. Abundance of all life stages of trout is good both upstream and downstream of the dam and equals or exceeds abundance in the anadromous reach of Laguna Creek, and the other streams surveyed by the City (Liddell and Majors Creeks) (City of Santa Cruz 2020).

4.3 Special-Status Biological Resources

Appendix D, Special-Status Plant Potentially Occurring within the Biological Study Area, and Appendix E, Special-Status Wildlife Potentially Occurring within the Biological Study Area, provide tables of all special-status species whose geographic ranges fall within the general BSA vicinity. Special-status species potential to occur within the BSA were evaluated based on known species distribution, species-specific habitat preferences, and Dudek's knowledge of regional biological resources. Species potentially occurring within the BSA are identified as having moderate or high potential to occur based on habitat conditions on site, and species for which there is little or no suitable habitat are identified as not expected to occur or having low potential to occur.

4.3.1 Special-Status Plants

Special-status plants include those listed, or candidates for listing, as threatened or endangered by the USFWS and CDFW, and species identified as rare by the CNPS (particularly CRPR 1A – presumed extinct in California; CRPR 1B – rare, threatened, or endangered throughout its range; and CRPR 2 – rare or endangered in California, more common elsewhere).

No special-status plant species were observed within the BSA during surveys conducted in January 2020.

Dudek performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status plant species to occur within the BSA. Each special-status plant species was assigned a rating of “not expected,” “low,” “moderate,” or “high” potential to occur based on relative location to known occurrences, vegetation community, soil, and elevation. Based on the results of the literature review and database searches, 57 special-status plant species were identified as potentially occurring within the region of the BSA. Of these, three were determined to have a moderate potential to occur within the BSA based on the soils, vegetation communities (habitat) present, elevation range, and previous known locations based on the CNDDB, IPaC, and CNPS Inventory. The remaining special-status species were evaluated and determined to have little to no potential to occur within the BSA. Table 3 includes the special-status plant species with a moderate to high potential to occur rating. Appendix D lists the 57 special-status plant species identified as occurring within the BSA and their potential to occur rating and reasoning.

Additionally, there is no USFWS-designated critical habitat for listed plant species within the BSA (USFWS 2020) or within 10 miles of the BSA.

Table 3. Special-Status Plant Species with a Moderate to High Potential to Occur within the Biological Study Area

Scientific Name	Common Name	Federal/State/CRPR	Status within Biological Study Area*
Dacryophyllum falcifolium	tear drop moss	None/None/1B.3	Moderate
Fissidens pauperculus	minute pocket moss	None/None/1B.2	Moderate
Piperia candida	white-flowered rein orchid	None/None/1B.2	Moderate

Source: CDFW 2020a; CNPS 2020.
Status Legend
* Although the BSA provides potential habitat, the proposed work areas do not support suitable habitat for the tear drop moss, minute pocket moss, and white-flowered rein orchid.
Federal
Species listed do not have federal status.
State
Species listed do not have state status.
CRPR (California Rare Plant Rank)
CRPR List 1B: Plants rare, threatened, or endangered in California and elsewhere
Threat Rank:
.2 Fairly endangered in California (20% to 80% of occurrences threatened)
.3 Not very endangered in California (less than 20% of occurrences threatened or no current threats known)

4.3.1.1 Tear Drop Moss

Tear drop moss (*Dacryophyllum falcifolium*) is a moss with a CRPR of 1B.3 that occurs on limestone substrates, damp coastal soil, and rock outcrops within north coast coniferous forest (CNPS 2020; CDFW 2020b). This species is known to occur on limestone rock above mixed coniferous forest in Henry Cowell Redwoods State Park (CDFW

2020b). However, this species was not observed within the BSA, but would have been detected if present during the project surveys.

4.3.1.2 Minute Pocket Moss

Minute pocket moss (*Fissidens pauperculus*) is a moss with a CRPR of 1B.2 that occurs on damp soil along the coast, in dry streambeds, and on stream banks within north coast coniferous forest (CNPS 2020; CDFW 2020b). This species is known to occur along a trail edge on bare soil between mixed evergreen forest and grassland in upper University of California, Santa Cruz campus at four corners (CDFW 2020b). However, this species was not observed within the BSA, but would have been detected if present during the project surveys.

4.3.1.3 White-Flowered Rein Orchid

White-flowered rein orchid (*Piperia candida*) is a perennial herb with a CRPR of 1B.2 that blooms from May to September (CNPS 2020). This species occurs within broadleafed upland forest, lower montane coniferous forest, and north coast coniferous forest habitats occasionally on serpentine soils, and prefers forest duff, mossy streambanks, rock outcrops, and dry streambed microhabitats. This species is known to occur along the streambank of Boulder Creek near Hesse Brook (CDFW 2020b). However, this species was not observed within the BSA, but would have been detected if present during the project surveys.

4.3.2 Special-Status Wildlife

Special-status wildlife include those listed, or candidates for listing, as threatened or endangered by the USFWS and CDFW, and designated as species of special concern (SSC) by CDFW and sensitive by the USFWS.

One special-status wildlife species incidentally observed within the BSA during surveys conducted in January 2020 was the California giant salamander (*Dicamptodon ensatus*).

Similar to special-status plants, Dudek performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status wildlife species to occur within the BSA. Each special-status wildlife species was assigned a rating of “not expected,” “low,” “moderate,” or “high” potential to occur based on relative location to known occurrences and vegetation community/habitat association. Based on the results of the literature review and database searches, 30 special-status wildlife species were reported in the CNDDB and USFWS databases as occurring in the vicinity of the BSA. Of these, two wildlife species were determined to have a moderate potential to occur within the BSA, and one was determined to have a high potential to occur within the BSA based on vegetation communities (habitat) present and previous known locations based on the CNDDB and IPaC records (Table 4). Two other special-status wildlife species were initially investigated due to historic records and/or mapped habitat within the vicinity of the BSA: CRLF and anadromous fishes including steelhead (*Oncorhynchus mykiss irideus*) and coho salmon (*Oncorhynchus kisutch*). These species are discussed further below. The remaining special-status species were evaluated and determined to have little to no potential to occur within the BSA. Table 4 includes the special-status wildlife species with a moderate to high potential to occur rating. Appendix E lists the 30 special-status wildlife species identified as occurring within the vicinity of the BSA and their potential to occur rating and reasoning.

Additionally, the BSA is within USFWS-designated critical habitat for the CRLF, Unit SCZ-1 for Santa Cruz County (75 FR 12815-12959; USFWS 2020).

Table 4. Special-Status Wildlife Species Detected or with a Moderate to High Potential to Occur within the Biological Study Area

Scientific Name	Common Name	Federal/State	Status within Biological Study Area
Amphibians			
Aneides flavipunctatus niger	Santa Cruz black salamander	None/SSC	Moderate
Dicamptodon ensatus	California giant salamander	None/SSC	High
Mammals			
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	None/SSC	Moderate

Source: CDFW 2019b.
Status Legend
Federal
Species listed do not have a federal status.
State
SSC: California species of special concern

4.3.2.1 California Red-Legged Frog

The CLRF is a federally threatened species and a state SSC (CDFW 2019b). It generally inhabits lowland streams, wetlands, riparian woodland, and livestock ponds. CRLFs require dense, shrubby, or emergent vegetation associated with deep, still or slow-moving water (CDFW 2020b).

Based on a review of the CNDDB and other sources, no CRLF occurrences are known within the BSA. The nearest CNDDB records are located approximately 1.2 to 1.6 miles southwest of the Facility. All of these records are from the Liddell Creek and East Branch of Liddell Creek (CDFW 2020b). The BSA is within USFWS-designated California red-legged frog critical habitat Unit SCZ-1 for Santa Cruz County (USFWS 2020).

The entire reach of Laguna Creek within the BSA is characterized as a uniform, perennial drainage with an approximate 10-foot grade change at the dam (from 619 feet to 609 feet above mean sea level). Due to the geomorphological differences within Laguna Creek around the diversion dam, the evaluation of aquatic habitats for CRLF breeding and foraging suitability is presented in two segments: upstream of the dam and downstream of the dam.

In general, the upstream reach of Laguna Creek within the BSA is characterized by an earthen, trapezoidal-shaped channel that ranged in width from 8 to 20 feet. A few large logs were observed in the creek; however, no instream, emergent vegetation was observed. The adjacent banks were steep with an 80% slope on the western side and 20% slope on the eastern side. The vegetation was dense with an average 70% canopy cover and little sunlight exposure. This reach of Laguna Creek supports low suitable foraging opportunities for CRLF on the eastern side of the channel due to accessible slope and presence of woody debris and downed logs, which could be used as refugia. However, the western bank is unlikely to support potential foraging habitat due to its steepness. No breeding habitat occurs within or near the creek due to the lack of in-channel or adjacent pools/ponds and the associated high surface water velocities during the breeding season. A small, in-channel pool occurs immediately northwest of the dam. Some large woody debris was present; however, no emergent vegetation occurred within the pool. No additional pools or depressions were observed within or adjacent to Laguna Creek above the dam. The pool may support some marginal, low-flow foraging habitat along the edges, but poor breeding habitat due to the associated high water velocities during the breeding season and lack of backwater habitats.

Immediately below the dam, the downstream reach of Laguna Creek within the BSA is characterized by a large, in-channel pool that measures approximately 40 feet by 20 feet wide. The area is heavily shaded with a covered canopy, and little to no sunlight available. The banks are steep, approximately 80% to 90% grade on either side of the pool, and vegetation is sparse. Although the pool may offer some low-velocity edge water habitat for CRLF, there was no emergent or overhanging vegetation around the pool. The pool may support some low-flow foraging habitat along the edges, but offers poor breeding habitat because of the associated high water velocities during the breeding season and lack of backwater habitats. No emergent/aquatic vegetation was observed within the downstream section of the creek, and woody debris buildup was minimal. The banks were steep and rocky in this section, with a 60% to 80% grade throughout the downstream section of the creek within the BSA. Given the lack of pools or depressions in this downstream section of Laguna Creek, and the expected high water velocities, CRLF breeding is not expected. CRLF foraging is unlikely given the steep, rocky gradients on both sides of the creek.

In addition to Laguna Creek, a small tributary that feeds into Laguna Creek further downstream of the Facility within the BSA (Reggiardo Creek) was assessed for potential CRLF habitat components. Reggiardo Creek is a steep (30% grade), narrow, perennial creek (approximately 3 feet wide), that contains large rocks, boulders, and significant woody debris buildup. The banks of this creek are narrow and steep, and no pools, depressions, or aquatic and emergent vegetation was observed within this creek. The steep, confined channel of Reggiardo Creek likely creates high velocity conditions during the winter and spring, and likely does not provide appropriate CRLF breeding or foraging habitat.

The potential for upland refugia immediately surrounding the project site is considered low due to the presence of downed redwood logs and debris, redwood duff and vegetation. However, no mammal burrows (which can serve as habitat for CRLF) were observed anywhere within the BSA.

4.3.2.2 Steelhead and Coho Salmon

The federally and state endangered Central California Coast Evolutionarily Significant Unit of coho salmon (*Oncorhynchus kisutch* pop. 4) occurs in streams of the north coast. The federally threatened Central California Coast Distinct Population Segment of steelhead (*Oncorhynchus mykiss irideus* pop. 8) also occurs in streams along the coast of Santa Cruz County. Laguna Creek lagoon, which is located approximately 4 miles downstream of the Facility, supports both of these species, with coho salmon observed in the lower Laguna Creek lagoon in 2015 and steelhead observed in the lower Laguna Creek lagoon as recently as 2018 (Berry et. al 2019). The BSA, however, is not expected to support either of these species due to a large bedrock waterfall which serves as a natural barrier to anadromy approximately 1.4 miles upstream of the ocean, which precludes anadromous fish from traveling further upstream (Hagar et al. 2017). Resident rainbow trout are known to occur both upstream and downstream of the Facility within Laguna Creek, and the Santa Cruz Water Department has conducted annual abundance surveys in the stream reaches downstream and upstream of the dam since 2006, measuring the fluctuations of the separated populations of rainbow trout (City of Santa Cruz 2020).

4.3.2.3 Santa Cruz Black Salamander

The Santa Cruz black salamander (*Aneides niger*) is a state SSC that is restricted to mesic deciduous or coniferous forests in the fog belt of outer Coast Range of San Mateo, Santa Cruz, and Santa Clara counties (CDFW 2020b). This species occurs in moist streamside microhabitats and is typically found under rocks near streams, in talus, and under damp woody debris. This species is known to occur in the upper reaches of Laguna Creek, having been collected in 1979 in the vicinity of the Ice Cream Grade and Laguna Creek intersection (CDFW 2020b). No salamanders were observed within the BSA during January 2020 surveys.

4.3.2.4 California Giant Salamander

The California giant salamander is a state SSC that occurs in wet coastal forests near streams and seeps. This species' range is limited to Mendocino County, south to Monterey County and east to Napa County. Aquatic larvae are found in cold, clear streams and occasionally occur in lakes and ponds. Adults occur in wet forests under rocks and woody debris in the vicinity of streams or lakes (CDFW 2020b). This species was observed within the BSA during January 2020 surveys, located within the creek bed of Reggiardo Creek adjacent to the Laguna Creek confluence (Figure 3, Biological Resources).

4.3.2.5 San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat is a state SSC that occurs in forest habitats with moderate canopy and dense to moderate understories, particularly on the upper banks of riparian forests or within poison oak-dominated shrublands (CDFW 2020b). The San Francisco dusky-footed woodrat is a small-sized rodent that builds middens made of sticks, typically at the base of trees and shrubs, but sometimes in the low to mid-level canopy of a tree. The dusky-footed woodrat feeds on a variety of woody plants, fungi, flowers and seeds. This species requires ample midden building materials to construct middens of shredded grass, leaves, or other materials. This species in known to occur along Smith Grade and was observed in 2006 near the intersection with Bonny Doon Road where multiple middens were observed primarily located in redwood forest and coyote brush scrub habitat (CDFW 2020b). No woodrat middens were observed within the BSA during January 2020 surveys.

4.3.3 Jurisdictional Wetlands and Waters

Jurisdictional aquatic resources mapped within the project site included one perennial drainage, Laguna Creek. Laguna Creek is a natural drainage that originates in the Santa Cruz Mountains near Pine Flat Road in Bonny Doon and drains to the Pacific Ocean. The mainstem and active channel of the drainage (including the OHWM) runs through the center of the project site. This natural perennial drainage is characterized by a redwood forest alliance vegetation community and supports a clearly defined bed and bank, as well as has connectivity to downstream receiving waters (Pacific Ocean). The BSA is within the coastal zone as defined by the CCA. Figure 3 illustrates the location and extent of jurisdiction within the project site, and Table 5 summarizes the specific acreages of jurisdictional aquatic resources.

Table 5. Jurisdictional Aquatic Resources within the Project Site

Jurisdictional Aquatic Resource	Acreage
Non-wetland Waters of the United States	
Developed	<0.01
Redwood forest alliance	0.28
Non-wetland Waters of the United States Subtotal	***0.29***
Non-Wetland Waters of the State	
Developed	0.02
Redwood forest alliance	0.63
Non-wetland Waters of the State Subtotal	***0.65***

Non-wetland Waters of the United States/State

The OHWM and TOB were recorded within the project site. OHWM indicators included break in slope, change in vegetation, change in duff and debris presence on the bank, and exposed roots and alluvial deposits in the bank. The TOB was indicated by a distinct natural break in slope, except in the downstream end of the project site where the access road served as TOB.

Near the Facility, Laguna Creek has filled with sediment and gravel behind the existing dam resulting in an island that has split the creek into two distinct channels for approximately 90 linear feet. The creek reconnects downstream of the island, approximately 25 linear feet upstream of the dam. An in-channel gravel bar has developed within the OHWM between the island and the dam, with some hydrophytic plants present. A data station was established on the island to determine if federal jurisdictional wetlands adjacent to the OHWM are present. Soils at the data station consisted of loamy sand interspersed with cobble and gravel from 1 to 14 inches below ground surface (refusal at cobble layer), and did not meet the definition of hydric soils. Vegetation at the date station was dominated by upland species such as redwood sorrel (*Oxalis oregana*) in the herbaceous layer, Pacific blackberry (*Rubus ursinus*) in the shrub layer, and coast redwoods (*Sequoia sempervirens)* in the tree layer. Although some hydrophytic plant species occurred in the herbaceous layer, the data station did not pass the dominance test or meet the prevalence index for hydrophytic vegetation. One secondary hydrology indicator was present on the island (water-stained leaves). In the absence of hydrophytic vegetation, hydric soils, and sufficient hydrology indicators, the island does not meet the USACE definition of a jurisdictional wetland.

The USACE/RWQCB/CDFW jurisdictional width encompassed the lateral extent of Laguna Creek's OHWM within the survey area and ranged in width from 17 to 60 feet. The CDFW and RWQCB-only jurisdictional width also encompasses the lateral extent of the Laguna Creek's TOB within the survey area and ranged from 40 to 110 feet. A total of 0.29 acres of USACE jurisdictional non-wetland waters of the United States occur within the project site, and a total of 0.65 acres of RWQCB and CDFW jurisdictional non-wetland waters of the state occur within the project site. No state or federally-defined wetlands occur within the project site.

4.3.4 Wildlife Corridors/Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by assuring continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires).

Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation. Habitat linkages provide a potential route for gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as steppingstones for dispersal.

Laguna Creek, between its headwaters and coastal terminus, may serve as a local movement corridor that connects habitat for certain amphibians, reptiles, and localized fish species. However, the BSA is not recognized as an important regional wildlife corridor by any state agency or jurisdiction, and is not considered critical to the ecological functioning of adjoining watersheds and open space areas. The most obstructive aspect of the Facility for aquatic-dependent species is the dam across Laguna Creek that has been present since 1890, which effectively separates the upstream and downstream portions of the creek for strictly aquatic organisms. This barrier to aquatic-dependent species is one of several natural and artificial barriers within Laguna Creek. There is a bedrock waterfall barrier to anadromy approximately 1.4 miles upstream of the ocean within Laguna Cr eek that prevents anadromous steelhead and coho salmon from traveling further upstream to the BSA (Hagar et al. 2017), so the existing Facility does not pose a barrier to movement to anadromous fishes. However, the rest of the Facility is non-intrusive and does not pose an obstruction to habitat connectivity or wildlife movement.

5 Project Impacts

This section addresses direct, indirect, and cumulative impacts to biological resources that would result from implementation of the Proposed Project. The significance determinations for potential impacts are described in Section 6.

- **Direct impacts** refer to complete loss of a biological resource. For purposes of this report, it refers to the area where vegetation clearing, grubbing, or grading replaces biological resources. Direct impacts were quantified by overlaying the proposed impact limits on the biological resources within the BSA.
- **Indirect impacts** are reasonably foreseeable effects caused by Proposed Project implementation on remaining or adjacent biological resources outside the direct disturbance zone. Indirect impacts may affect areas outside the disturbance zone, including open space and areas within the BSA. Indirect impacts may be short-term and construction-related, or long-term in nature and associated with development in proximity to biological resources.
- **Cumulative impacts** refer to the combined environmental effects of the Proposed Project and other relevant projects.

The evaluation of Proposed Project's impacts is organized by the resource potentially affected and follows Appendix G of the CEQA Guidelines for biological resources (described further in Section 6 of this report): special-status species, sensitive vegetation communities, jurisdictional wetlands, wildlife corridors and habitat linkages, local policies or ordinances, and habitat conservation plans.

Analysis of the Proposed Project presented below focuses on temporary construction-related impacts and permanent impacts due to the placement of a Coanda screen and new intake structure, a new concrete control vault to house new control values and additional diversion piping, a downstream streambank stabilization, new access and safety provisions including stairways, and a drop inlet at the interconnection of the new diversion pipe and the existing Laguna Pipeline (Figure 4, Project Impacts). The new concrete control vault, access stairways, and streambank stabilization would be located within a small segment of the wetted and TOB portions of Laguna Creek, just downstream of the existing intake screen. The bulk of temporary impacts during construction are limited to the use of the existing unimproved access routes; however, additional grading beyond the limits of both western and eastern access routes is necessary to adequately access the upstream and downstream dam areas. Installation of a new diversion pipeline adjacent to the existing diversion flume, temporary dewatering of the work area with downstream and upstream cofferdam installation, diversion of Laguna Creek flows past the active work area, minor channel grading, and sediment removal upstream and downstream of the dam will also contribute to construction-related temporary impacts within the project site (Figure 4, Project Impacts). Access road improvements are also proposed as a part of Project implementation.

The operations and maintenance activities would generally remain similar to existing operations and maintenance activities, which are conducted weekly, monthly, and annually. However, unlike existing conditions, the Proposed Project would not require periodic sediment removal from behind the dam. Additionally, it is anticipated that the operations and maintenance activities would also occur with a similar frequency and intensity of activities under existing conditions. Routine maintenance of the Facility would consist of a weekly visit to inspect the Facility operations. Basic clearing of fallen leaves, needles, and branches from the intake screen and on access roads would continue as is done under existing conditions. Plant restoration is anticipated to occur over approximately 2 to 5 years; landscape restoration activities would include weeding, monitoring, and installation of irrigation or monthly/biweekly watering, which could require water to be trucked periodically to the site. If nighttime emergency work is required, task lighting that would be installed as part of the Proposed Project as described above would be used. Emergency work could include use of a Vactor truck with vacuum and high-pressure water jetting capabilities for cleaning out sediment from the intake.

Because the majority of sediment in the creek would flow over the screen and not fall through the screen, only a minor amount of sediment is anticipated to fall into the collection chamber within the intake structure (i.e. approximately 97% of entrained sediment would pass over the screen). An adaptive management plan would be developed for the flushing out of the minor amount of sediments that could collect within the intake structure. This plan would be developed in collaboration with applicable resource agencies.

The City would continue to maintain in-stream flow levels established with CDFW pursuant to ongoing agreements and ultimately would maintain the in-stream flow levels established by the Anadromous Salmonid Habitat Conservation Plan that is currently under preparation. As described above, these in-stream flows are intended to protect anadromous salmonids and other species.

Future operations and maintenance activities will result in reduced impacts to long-term to biological resources as compared to current conditions due to better management of diversions and required downstream flows. Specifically, reduced impacts to long-term biological resources would include improved in-stream transport of sediment by changing the format and orientation of water intake so sediment would not obstruct water intake and be able to pass downstream unimpeded, particularly during high stream flows similar to how sediment transport would occur in a more natural system. While federally or state-listed anadromous fish species are not expected to occur in the Proposed Project area due to several downstream natural barriers (Hagar el al 2017), Laguna Creek does contain resident rainbow trout populations, and therefore appropriate fish screening will be implemented by the Proposed Project. Finally, the Proposed Project would provide better remote controls of diversions to improve the regulation of downstream water levels so that fish and other aquatic organisms are not stranded by rapid changes in water levels when the City diverts Laguna Creek and maintains the water intake, and would allow for a flexible approach to manage the quantity and quality of water that can be diverted, minimize the use of power, and provide for economical and operational feasibility.

From this point forward, impacts will be analyzed for the construction phase of the Proposed Project (and not operations and maintenance) in relation to the project site, given that operations and maintenance activities are expected to have beneficial impacts on biological resources, as indicated above. This report assumes that direct impacts will generally occur within the temporary and permanent impact footprints within the project site, and indirect, temporary impacts will generally occur within the surrounding 300-foot buffer BSA. Figure 4, Project Impacts, shows the general location of direct biological resources impact areas that will occur within the project site.

5.1 Impacts to Special-Status Species

5.1.1 Special-Status Plants

The BSA provides moderate potential to support three special-status plant species: tear drop moss, minute pocket moss, and white-flowered rein orchid. These species have potential to occur in the redwood forest alliance community adjacent to the proposed work areas. However, these species were not observed within the BSA, but would have been detected if present during the project surveys.

5.1.1.1 Direct Impacts

Direct, temporary impacts resulting from construction activities would primarily be located within existing unimproved access roads in areas mapped as develop totaling 0.30 acres (see Figures 3 and 4). Additional construction-related temporary impacts would occur to 0.14 acres of the redwood forest understory immediately adjacent and within the streambed and banks of Laguna Creek during dewatering and diversion activities. Heavy construction equipment would access the existing dam and intake screen to implement Proposed Project improvements. The three special-status plant species are unlikely to occur within or along the existing developed access roads, especially since none are disturbance followers or have other characteristics that might suggest they would prefer disturbed areas.

Direct, permanent impacts to 0.01 acres of the redwood forest understory between Laguna Creek and the existing diversion flume would occur from the placement of a new concrete control vault, stairways, and streambank stabilization (see Figure 4). This specific area does not support suitable habitat for the tear drop moss, minute pocket moss, or white-flowered rein orchid.

The Proposed Project would not occur within federally designated critical habitat for special-status plant species, and there would be no direct impacts to critical habitat.

5.1.1.2 Indirect Impacts

Construction-related dust, soil erosion, and water runoff could indirectly impact any potentially occurring special-status plant species outside the immediate work areas, but within the BSA. Special-status plant species are unlikely to occur within existing access routes or the wetted portion of Laguna Creek where the temporary and permanent impacts would occur.

5.1.2 Special-Status Wildlife

The BSA provides moderate to high potential to support three special-status wildlife species: Santa Cruz black salamander, California giant salamander, and San Francisco dusky-footed woodrat. The California giant salamander was incidentally observed south of the project site during the January 2020 surveys. However, neither of the other species (nor any woodrat middens) were detected. Three federally-listed species evaluated, but not expected to occur within the BSA, include the California red-legged frog, steelhead trout, and coho salmon. Although not considered a special-status species, resident trout are present within the project site and their protection has been addressed below. Additionally, the native trees and shrubs within the BSA provide suitable nesting habitat for bird species protected under the MBTA and CFGC Section 3500 and roosting bats protected under CFGC Section 4150.

Additionally, the BSA occurs within USFWS-designated California red-legged frog critical habitat Unit SCZ-1 for Santa Cruz County (75 FR 12815-12959; USFWS 2020). However, this species has a low potential to occur within the BSA.

5.1.2.1 Direct Impacts

As discussed above for special-status plants, direct temporary impacts resulting from construction activities would primarily be located within existing unimproved access roads in areas mapped as developed. Additional construction-related temporary impacts would occur immediately adjacent and within the streambed and banks of Laguna Creek during dewatering and diversion activities. Heavy construction equipment would access the existing dam and intake screen to implement Proposed Project improvements. Construction-related ground disturbance beyond the limits of the developed access routes to enter the dam area would result in temporary impacts to each of the three special-status wildlife species, if they are present during construction. Temporary impacts to these species could also occur within Laguna Creek during diversion, dewatering, and minor channel grading activities. A total of 0.14 acres of temporary impacts could occur to potential habitat for the Santa Cruz black salamander, California giant salamander, and San Francisco dusky-footed woodrat. Direct, permanent impacts to 0.01 acres of redwood forest understory between Laguna Creek and the existing diversion flume would permanently impact potential habitat of these species from the placement of a new concrete control vault, stairways, and a streambank stabilization for bank protection.

Direct impacts to federally designated critical habitat for CRLF could occur as a result of implementing the Proposed Project. However, the primary constituent elements for this species as described in Section 2.1.2 are not supported within the BSA (75 FR 12815-12959). Aquatic breeding habitat, aquatic non-breeding habitat, upland habitat, and dispersal habitat were each assessed during the habitat assessment conducted for this species and were considered either unsuitable or marginally suitable. As a result, no adverse modification to CRLF-designated critical habitat would occur with the Proposed Project's implementation.

Trimming, pruning, and/or removal of trees and native shrubs may occur as a result of construction of the Proposed Project. Therefore, there may be a potential for direct or indirect impacts to nesting birds and bats, particularly during the general nesting season of February 1 through August 31 or near a bat maternity roost.

5.1.2.2 Indirect Impacts

Short-term indirect impacts to special-status wildlife species that could occur during construction include an increase in human activity and construction noise in the immediate vicinity of potentially occupied areas. Operation of construction equipment during vegetation removal, grading, dewatering, and dam improvements could temporarily interrupt the feeding and breeding cycles of Santa Cruz black salamander, California giant salamander, and San Francisco dusky-footed woodrat, if present. Additionally, noise generated by construction activities, including vegetation removal and grading, that are conducted during the avian breeding season (February 1 through August 31), could result in indirect impacts to nesting birds and roosting bats, if present. Specifically, indirect impacts to nesting birds and roosting bats from short-term construction-related noise could result in decreased reproductive success, disrupted feeding, or abandonment of an area as nesting or roosting habitat if conducted during the nesting season (i.e., February through August) or near a bat maternity roost.

Indirect impacts associated with decreased water quality during construction downstream of the work areas are not expected with implementation of the Standard Construction Practices.

5.2 Impacts to Sensitive Vegetation Communities

The BSA is characterized as a redwood forest with a portion of the understory that has been developed within roadways or existing structures associated with the Facility. The redwood forest alliance vegetation community is considered a sensitive natural community on the California Natural Community List (CDFW 2019a).

5.2.1 Direct Impacts

The Proposed Project would result in the temporary removal of vegetation and ground disturbance as necessary to access the existing dam and intake screen areas with heavy equipment beyond the limits of the existing access roads. Portions of Laguna Creek will be temporarily impacted through diversion and dewatering, minor grading and sediment removal within the channel, and possible trimming during equipment ingress/egress of the work area directly adjacent to the creek. A very small portion of redwood forest habitat between Laguna Creek and the existing diversion flume would be permanently impacted from the placement of a new concrete control vault, stairways, and streambank stabilization for bank protection. However, the vast majority of the redwood forest habitat over Laguna Creek and within the project site is proposed to remain intact.

Table 6 summarizes the direct impacts to sensitive vegetation communities and land covers anticipated as a result of project implementation.

Table 6. Impacts to Sensitive Vegetation Communities and Land Covers within the Project Site

Vegetation Community or Land Cover	Permanent Impacts (acres)	Temporary Impacts (acres)
Forest and Woodland Alliances and Stands		
Redwood forest alliance[1]	0.01	0.14
Subtotal Forest and Woodland Alliances and Stands	*0.01*	*0.14*
Total[2]	**0.01**	**0.14**

Notes:
1 CDFW sensitive vegetation community (CDFW 2019a).
2 Totals may not sum due to rounding.

Up to 12 coast redwood trees situated along the banks of Laguna Creek just downstream of the dam between the creek and the existing diversion flume would be removed due to the placement of the new concrete control vault, stairways, streambank stabilization, and improvements to the main access road.

5.2.2 Indirect Impacts

During construction activities, indirect impacts to sensitive vegetation communities (redwood forest alliance) resulting from edge effects may include dust, which could disrupt plant vitality in the short term, or construction-related soil erosion and water runoff.

5.3 Impacts to Jurisdictional Wetlands and Waters

Laguna Creek, which runs through the middle of the project site and is the surface water source for the Facility, supports jurisdictional non-wetland waters of the United States/state. No state or federally-defined wetlands occur within the project site.

5.3.1 Direct Impacts

Direct temporary impacts to portions of Laguna Creek would result from surface water diversion and dewatering activities upstream and downstream of the dam. These temporary impacts include installation of cofferdams and a diversion pipe to isolate and divert flows past the active work area, as well as minor grading and sediment removal within the channel. Possible vegetation trimming during equipment ingress/egress along the banks of Laguna Creek is also a potential temporary impact. Temporary impacts would also occur within the existing structures that are located within the jurisdictional boundaries of Laguna Creek, and would be largely confined to work along the dam and existing intake screen. A very small portion of the streambed and banks of Laguna Creek just below the existing intake screen would be permanently impacted from the placement of a new concrete control vault, stairways, and streambank stabilization.

A total of 0.11 acres of temporary impacts and less than 0.01 acres of permanent impacts would occur to USACE non-wetland waters of the United States. A total of 0.13 acres of temporary impacts and 0.01 acres of permanent impacts would occur to RWQCB and CDFW non-wetland waters of the state. Table 7 summarizes the direct impacts to jurisdictional aquatic resources anticipated as a result of the Proposed Project's implementation.

Table 7. Impacts to Jurisdictional Aquatic Resources within the Project Site

Jurisdiction	Permanent Impacts (acres)	Temporary Impacts (acres)
Non-Wetland Waters of the United States (OHWM)	<0.01	0.11
Non-Wetland Waters of the State (Streambed/TOB)	0.01	0.13

5.3.2 Indirect Impacts

Indirect impacts to jurisdictional aquatic resources could result primarily from adverse indirect edge effects. During construction activities, edge effects may include construction-related soil erosion and water runoff.

5.4 Impacts to Wildlife Corridors and Migratory Routes

5.4.1 Direct Impacts

The Proposed Project would not substantially alter the vegetation communities or physical setting of Laguna Creek. During construction, activities could block or otherwise hinder wildlife movement along Laguna Creek or temporarily affect the ability of wildlife to access other habitat areas upstream or downstream of the BSA. However, this impact would be temporary and would not substantially degrade the quality or use of a wildlife corridor or migratory route. Existing habitat linkages and wildlife corridor functions would remain intact while construction activities are conducted and following completion. Construction activities would not likely result in impacts to wildlife movement because no new structures that would impede wildlife movement are proposed.

Following temporary construction disturbances, the function and values of Laguna Creek would remain the same as existing conditions, and would improve downstream of the dam due to sediment management at the Facility and maintenance of in-stream flows facilitated by the Proposed Project. While a small area within the banks of Laguna

Creek would be permanently impacted due to the placement of diversion improvement structures, this small displacement of habitat would not impact wildlife movement or use of native wildlife nursery sites within the project site and surrounding areas. Since the existing dam structure already functions as a barrier to the movement of aquatic species, it is assumed that the existing wildlife corridor functions within Laguna Creek would remain intact during and post construction. Project-related construction activities would not likely result in direct impacts to wildlife movement because the Proposed Project improvements would not exacerbate the impediment to wildlife movement that is already present in the form of the dam. Although the dam would still serve as a barrier to movement past the Facility, wildlife movement is anticipated to improve downstream due to better controls of flows so that fish are not stranded by rapid changes in water levels during diversions.

5.4.2 Indirect Impacts

There would be no long-term indirect impacts to wildlife movement as a result of the Proposed Project. Some short-term, indirect impacts to localized wildlife movement could occur due to construction-related noise and in-water work. However, these impacts would be temporary and would not be expected to disrupt wildlife movement due to the assumed limited construction activities within the creek, ambient noise conditions, and the ability for wildlife to continue to move through the creek and upland portions of the BSA during and following construction activities. Work activities are not currently proposed during the nighttime, requiring lighting that would need to be positioned away from the creek. However, future maintenance activities may occur during the nighttime in response to emergency situations. Limited lighting sources that are on timers and switches could be used during these situations to provide safe access. Additionally, due to the current existing uses on the site and amount of human presence, the conditions and uses surrounding Laguna Creek post-construction would either be consistent with or improved from existing uses, particularly by providing better flow to downstream fish habitat during diversions, decreasing the potential for any minimal long-term indirect impacts.

5.5 Impacts to Local Policies and Ordinances

Potential impacts resulting from implementation of the Proposed Project were analyzed for compliance with the Santa Cruz County LCP and LCP implementing ordinances. Based on the discussion presented in Section 2.3, the impact analysis below focuses on the Riparian Corridor Protection Ordinance.

The County's Riparian Corridor Protection Ordinance prohibits development within riparian corridors or areas within a buffer zone as measured from the top of bank. The portion of Laguna Creek within the BSA meets the definition of an arroyo that includes discernible banks with a minimum slope of 20% and adjacent area characterized by a "live oak or other woodland" (i.e. redwood forest that lacks a separate, distinct riparian vegetation community). The buffer zone for an arroyo associated with a perennial stream meeting these parameters extend 50 feet from the edge of the arroyo (i.e., top of bank). In addition, a 10-foot setback from the edge of the buffer is required for all structures to allow for construction equipment and use of yard area. The Proposed Project occurs within the protected buffer zone of Laguna Creek. However, the Proposed Project qualifies as a riparian exception considering the unique circumstances of its design, function, and net benefit to natural resources. Specifically, the Proposed Project:

- is necessary for the proper design and function of an existing facility;
- will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located;

- will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative (see Section 6, Alternatives for additional information); and
- is in accordance with the purpose of the County's ordinance, the objectives of the General Plan, and the Local Coastal Program Land Use Plan (see Section 4.11, Land Use and Planning for additional information).

Since the Proposed Project is considered a riparian exception according to the provisions of Chapter 16.30, it would not be subject to the provisions from Chapter 16.32 (Sensitive Habitats Protection Ordinance).

Additionally, the Proposed Project would require the removal of up to 14 trees (approximately 12 coast redwoods and 2 tan oaks) that may meet the County's definition of a significant tree. These trees are situated along the banks of Laguna Creek just downstream of the dam between the creek and the existing diversion flume are proposed to be removed due to the construction of the new concrete control vault, stairways, and streambank stabilization, as well as due to main access road improvements. Adjacent redwood trees that would not be removed by the Proposed Project may be subject to injury or damage with construction equipment and materials. Removal of significant trees and protection of avoided trees within the coastal zone would be addressed through the coastal development permit process.

These trees represent about 0.01 acres of redwood forest and this area is within land zoned Timber Production by the County. The removal of these trees would constitute a Minor Conversion as defined in Chapter 16.52.195 of the Santa Cruz County Code. Minor Conversions permits are administered by CAL FIRE (14 CCR Section 1104(a)(4)). As such, a tree inventory and protection plan has been developed for the project (Fouts, K. 2020) and would require a minor conversion permit exemption prior to tree removal.

It is anticipated that a less than 3-acre conversion exemption (14 CCR Section 1104.1(a)) approved by CAL FIRE would be required to remove these redwood trees. Timber operations conducted under an exemption are exempt from conversion permit and timber harvesting plan requirements of the California Forest Practice Rules, although they are still required to comply with all other applicable provisions of the Z'berg-Nejedly Forest Practice Act, regulations of the Board of Forestry, and currently effective provisions of county general plans, zoning ordinances and any implementing ordinances.

Impacts related to Sudden Oak Death and Pine Pitch Canker are associated with the spread of these pathogens to uninfected trees within the project area and the spread of pathogens outside of the project area. Pathogens can be spread via tools and equipment used in tree removal operations and by the movement of infested soil and plant materials.

5.6 Impacts to Habitat Conservation Plans

The Proposed Project does not occur within any approved Habitat Conservation Plans (HCPs) or other approved local, regional or state habitat conservation plans. Therefore, no impacts to any conservation planning efforts would occur with implementation of the Proposed Project.

5.7 Cumulative Impacts

This section provides an evaluation of cumulative impacts to biological resources associated with the Proposed Project and other reasonably foreseeable future projects. The cumulative projects considered include other City

Water Department planned capital improvement projects, construction/development projects proposed within the County, or improvement projects on nearby state facilities.

The geographic scope of cumulative impacts to biological resources is limited to the Laguna Creek watershed and the immediate surroundings of the project site that support a similar undeveloped setting. The surrounding vegetation community is an extension of the redwood forest alliance found on the project site. Surrounding land uses include open space and rural residential.

Cumulative projects in the project vicinity would be those that would contribute to construction- or operations-related impacts to biological resources impacted by the Proposed Project. Cumulative projects that could potentially overlap with the operation of the Proposed Project include the Santa Cruz Water Rights Project (SCWRP) and the North Coast System Repair and Replacement Project. No cumulative projects within the study area are anticipated to have overlapping construction-periods with the Proposed Project.

The SCWRP proposes to implement changes to the City's existing water rights in order to improve the City's water system flexibility, while enhancing stream flows for local anadromous fisheries. The SCWRP would commit the City to ensuring minimum bypass flows, including at the Facility. No construction or development within the Laguna Creek watershed is proposed as part of the SCWRP. No change is proposed to the authorized volume of water under the City's existing water rights; however, changes in stream flows would result in impacts (likely beneficial) on aquatic special-status species.

The North Coast System Repair and Replacement Project proposes to rehabilitate several existing stream diversion facilities to ensure continued operation and reliability. Diversions along the Liddell, Majors, and Reggiardo creeks would be rehabilitated as part of a phased approach and occur over a 15- to 20-year timeframe. No additional construction activities are anticipated at the Facility and the anticipated effect of the rehabilitation project is a net benefit to biological resources within the immediate vicinity of each project site.

Other future projects within the County could result in impacts to biological resources. However, these projects would be subject to review and approval by the County on a case-by-case basis. Thus, it can be reasonably assumed that these projects would be designed or otherwise conditioned to avoid and minimize impacts to biological resources and would be required to comply with federal, state, and local regulations, policies and ordinances.

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6 Findings of Significance and Mitigation

6.1 Explanation of Findings of Significance

Impacts to special-status vegetation communities, plant and wildlife species, and jurisdictional waters, including wetlands, must be quantified and analyzed to determine whether such impacts are significant under CEQA. CEQA Guidelines Section 15064(b) states that an ironclad definition of "significant" effect is not possible, because the significance of an activity may vary with the setting. Appendix G of the CEQA Guidelines, however, does provide "examples of consequences which may be deemed to be a significant effect on the environment" (14 CCR 15064(e)). These effects include substantial effects on rare or endangered species of animal or plant or the habitat of the species. CEQA Guidelines Section 15065(a)(1) is also helpful in defining whether a project may have a significant effect on the environment. Under that section, a proposed project may have a significant effect on the environment if the project has the potential to (1) substantially degrade the quality of the environment, (2) substantially reduce the habitat of a fish or wildlife species, (3) cause a fish or wildlife population to drop below self-sustaining levels, (4) threaten to eliminate a plant or animal community, (5) reduce the number or restrict the range of a rare or endangered plant or animal, or (6) eliminate important examples of a major period of California history or prehistory.

The following are the significance thresholds for biological resources provided in the CEQA Guidelines Appendix G Environmental Checklist, which states that a project would potentially have a significant effect if it:

- Impact BIO-1. Has a substantial adverse effect, either directly or through habitat modifications, on any species identified as being a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Impact BIO-2. Has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- Impact BIO-3. Has a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Impact BIO-4. Interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites.
- Impact BIO-5. Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Impact BIO-6. Conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.
- Impact BIO-7. Has impacts that are individually limited, but cumulatively considerable.

The evaluation of whether or not an impact to a particular biological resource is significant must consider both the resource itself and the role of that resource in a regional context. Substantial impacts are those that contribute to, or result in, permanent loss of an important resource, such as a population of a rare plant or wildlife species. Impacts may be important locally, because they result in an adverse alteration of existing site conditions, but considered not significant because they do not contribute substantially to the permanent loss of that resource regionally. The severity of an impact is the primary determinant of whether or not that impact can be mitigated to a level below significance.

The following significance determinations were made based on the impacts of the Proposed Project presented in Section 5.

6.2 Impact BIO-1: Special-Status Species

6.2.1 Special-Status Plants

Potential direct temporary and permanent impacts could occur to three special-status plant species that have moderate potential to occur within the BSA: tear drop moss, minute pocket moss, and white-flowered rein orchid. These impacts could result from grading activities to establish temporary access and construction work areas, as well as installation of a new concrete control vault/stairway and bank protection. However, these special-status plant species were not detected during project surveys and are unlikely to occur within the Proposed Project footprint (along the existing unimproved roadways or within the streambed of Laguna Creek. Additionally, even if present, loss of individuals or the habitat of these species would not threaten their regional populations as a result of the Proposed Project, the temporary and permanent direct impacts to special-status plant species would be less than significant.

Indirect impacts to special-status plants that could occur during construction include a limited amount of dust in the immediate vicinity of areas potentially occupied by special-status plants. These impacts are anticipated to be less than significant.

These potential direct and indirect impacts to special-status plants would be less than significant. Potential impacts would be further reduced with the implementation of the Standard Construction Practices listed in Section 1.2.3.

6.2.2 Special-Status Wildlife

Potential direct temporary and permanent impacts resulting from grading activities to establish temporary access and construction work areas, as well as installation of a new concrete control vault/stairway and bank protection, could result in significant impacts to special-status wildlife species. Short-term, indirect impacts to special-status wildlife resulting from increased human presence and noise generated during construction activities could also result in significant impacts to special-status wildlife species.

Santa Cruz black salamander, California giant salamander, and San Francisco dusky-footed woodrat. These three special-status wildlife species would have a moderate to high potential to occur within the project site. Construction-related activities could have a substantial adverse effect on these species, if present. Additionally, a total of 0.14 acres of temporary impacts and 0.01 acres of permanent impacts to potential habitat for these species would be impacted during construction-related ground disturbance. The impact of the Proposed Project on these species would be potentially significant.

Nesting Birds and Roosting Bats. Potential direct temporary and permanent impacts resulting from grading activities could occur to nesting birds and roosting bats. The BSA contains suitable nesting habitat for ground and tree-nesting bird species and roosting bats, particularly within the riparian areas associated with Laguna Creek and the undeveloped lands surrounding the project site. Construction-related activities that occur within the general nesting season (February through August) could result in a substantial adverse effect to nesting birds. Construction activities that could result in direct impacts to nesting birds and roosting bats include vegetation and tree removal during grading activities. Indirect impacts to nesting birds and roosting bats that could occur during construction include an increase in human activity, construction noise and dust in the immediate vicinity of an active nest that could result in significant harassment and nest abandonment, causing loss of the nest. Therefore, the impact of the Proposed Project on nesting birds and roosting bats would be potentially significant.

California Red-legged Frog. The CRLF was determined to have low potential to occur within the BSA, and focused, protocol-level surveys within the BSA were not warranted for this species. The project site occurs within federally designated critical habitat for the CRLF. Based on the habitat assessment conducted for the species, the BSA does not support the primary constituent elements established for this species. Aquatic breeding habitat, aquatic non-breeding habitat, upland habitat, and dispersal habitat were each assessed during the habitat assessment conducted for this species and were considered either unsuitable or marginally suitable. Implementation of the Proposed Project would have long-term beneficial effects to CRLF by reducing the need for future emergency repairs and for sediment removal at the Facility. Therefore, the Proposed Project's impacts on CRLF or its potential habitat would be less than significant.

Steelhead and Coho Salmon. These special-status fish species are not expected to occur within the BSA due to several barriers to anadromy downstream of the Facility. As a result, the Proposed Project would not be expected to have any direct impact on these species. Indirect impacts associated with decreased water quality during construction downstream of the work areas are not expected with implementation of the Standard Construction Practices. Downstream reaches of Laguna Creek would continue to receive base flows during construction to support these species as required. The Proposed Project would not adversely affect suitable spawning and rearing habitat for steelhead or coho salmon located approximately 2 miles downstream of the Proposed Project. Additionally, implementation of the Proposed Project would have long-term beneficial effects to steelhead and coho salmon by improving sediment management at the Facility and maintaining in-stream flows suitable for various salmonid life stages within the downstream anadromous reaches of Laguna Creek. As a result, the Proposed Project would not be expected to have an impact on these species.

Implementation of **MM BIO-1**, **MM BIO-2**, **MM BIO-3**, and **MM BIO-4,** as well as Standard Construction Practices listed in Section 1.2.3 above, would reduce potentially significant direct and indirect impacts to special-status wildlife species, if identified, to a less-than-significant level.

MM BIO-1 **Conduct Worker Environmental Awareness Training.** A qualified biologist shall conduct an education program for all persons employed on the Proposed Project prior to performing work activities. The presentation given by the qualified biologist will include a discussion of the biology and general behavior of any special-status species that may be in the area, how they may be encountered within the work area, and procedures to follow when they are encountered. The qualified biologist shall prepare and distribute handouts containing all of this information for workers to carry on site. Interpretation shall be provided for non-English speaking workers. All personnel working on the site will receive this training, and will sign a sign-in sheet showing they received the training. Any personnel joining the work crew after the training has been administered shall receive the same training before beginning work.

MM BIO-2 **Conduct Special-Status Amphibian Species Survey and Monitoring.** A pre-construction survey for Santa Cruz black salamander, California giant salamander, and California red-legged frog shall be conducted within 48 hours prior to the onset of construction activities. The survey area shall include all suitable habitat within the project site, plus a 50-foot buffer. Suitable habitat for these species in the project site consists of damp upland areas near/adjacent to existing aquatic features associated with Laguna Creek, and the wetted portion of Laguna Creek. Additionally, a qualified biologist shall be onsite daily during construction activities to ensure impacts to special-status wildlife are avoided and minimized. A daily pre-construction sweep for wildlife within all staging and work areas shall be conducted followed by construction monitoring when work is conducted within suitable habitat.

Salamanders. If any individuals of Santa Cruz black salamander or California giant salamander are observed during the pre-construction survey or subsequent monitoring, their location(s) shall be recorded and identified for avoidance. Individuals found should be allowed to move out of the area on their own. If avoidance is not feasible, they shall be moved to the nearest appropriate habitat outside of the construction footprint by a qualified biologist. Qualified biologists shall be approved by the California Department of Fish and Wildlife prior to handling/translocating individuals of these species.

California red-legged frogs. Although determined to have a low potential to occur within the project site, initial ground-disturbing activities shall avoid the period when California red-legged frogs are most likely to be moving through upland areas (November 1 through March 31). When ground-disturbing activities must take place between November 1 and March 31, a qualified biologist shall monitor construction activity daily for the species to ensure avoidance. If any California red-legged frogs are observed and take authorization has been provided for the Proposed Project, relevant conservation measures from the applicable take authorization shall be implemented. If any California red-legged frogs are observed and take authorization has not been provided for the Proposed Project, the monitoring biologist shall have the authority to temporarily stop work to allow the species to move out of the work area on its own volition. The U.S. Fish and Wildlife Service shall be contacted if frogs remain in work areas and appropriate avoidance and minimization measures shall be implemented, as determined by the qualified biologist and approved by the City, to ensure protection of the frogs.

MM BIO-3 **Conduct San Francisco Dusky-Footed Woodrat Survey and Relocation.** A pre-construction survey to locate woodrat middens shall be conducted by a qualified biologists within 48 hours prior to the onset of construction activities. The survey area shall include all suitable habitat within the project site, plus a 50-foot buffer. Woodrat middens found shall be mapped and flagged with high visibility flagging tape for avoidance. If middens are found and complete avoidance is not feasible, the following measures shall be implemented:

- If construction is to occur during the breeding season (generally between January 1 and September 31), and young are suspected to be present, the existing midden shall be left undisturbed until such a time as the qualified biologist determines the young are capable of independent survival.
- A qualified biologist shall construct replacement woodrat middens for each midden that would be removed. The replacement middens shall be located in similar habitat outside the area of disturbance.
- A qualified biologist shall trap woodrats and relocate them to the constructed middens outside the area of disturbance. After trapping is complete, the biologist will disassemble the existing woodrat middens by hand to allow any remaining woodrats inside to escape unharmed.
- Prior to implementation of any disturbance of the existing woodrat middens and/or trapping/relocation, approval from the California Department of Fish and Wildlife will be obtained.

MM BIO-4 **Conduct Preconstruction Nesting Bird and Roosting Bat Survey.** Construction and tree removal activities should avoid the migratory bird nesting season (typically February 1 through August 31), to reduce any potentially significant impact to birds that may be nesting on the study area. If construction and tree removal activities must occur during the migratory bird nesting season, an avian nesting survey of the project site and contiguous habitat within 300 feet of all impact areas must be conducted for protected migratory birds and active nests. The avian nesting survey shall be performed by a qualified wildlife biologist within 7 days prior to the start of ground or vegetation disturbance. Once construction has started, if there are breaks in ground or vegetation disturbance that exceed 14 days, then another avian nesting survey shall be conducted. If an active bird nest is found, the nest shall be flagged and mapped on the construction plans along with an appropriate no disturbance buffer, which will be determined by the biologist based on the species' sensitivity to disturbance (typically 250 feet for passerines and 500 feet for raptors and special-status species). The nest area shall be avoided until the nest is vacated and the juveniles have fledged. The nest area shall be demarcated in the field with flagging and stakes or construction fencing.

To the extent practicable, tree removal should occur outside peak bat activity timeframes when young or overwintering bats may be present, which generally occurs from March through April and August through October, to ensure protection of potentially occurring bats and their roosts on the project site. Additionally, daily restrictions on the timing of any construction activities should be limited to daylight hours to reduce disturbance to roosting (and foraging) bat species. Additionally, a visual bat survey should be conducted within 30 days of the removal of any trees. The survey should include a determination on whether active bat roosts are present on or within 50 feet of the project site. If a non-breeding and non-wintering bat colony is found, the individuals shall be evicted under the direction of a qualified biologist to ensure their protection and avoid unnecessary harm. If a maternity colony or overwintering colony is found in the control building or trees on the project site, then the qualified biologist shall establish a suitable construction-free buffer around the location. The construction-free buffer shall remain in place until the qualified biologist determines that the nursery is no longer active.

6.3 Impact BIO-2: Sensitive Vegetation Communities

The only natural vegetation community within the project site is the redwood forest alliance. This vegetation community is considered a sensitive vegetation community, and the Proposed Project would have a substantial adverse effect on this community and therefore project-related impacts would be considered potentially significant. Direct temporary and permanent impacts to the redwood forest alliance would result from grading activities to establish temporary access and construction work areas, as well as installation of a new concrete control vault/stairway and bank protection. A total of 0.01 acres of permanent impacts and 0.14 acres of temporary impacts to this natural vegetation community could result from Proposed Project implementation. Up to 12 redwood trees would be removed with Proposed Project implementation. While the vast majority of the redwood forest habitat over Laguna Creek and within the project site is proposed to remain intact, the Proposed Project could result in a substantial adverse effect on redwood forest alliance. Therefore, the direct impact of the Proposed Project on sensitive natural communities would be potentially significant.

Potential indirect impacts to the redwood forest alliance would be limited to short-term construction-related impacts due to erosion, runoff, and dust. The Standard Construction Practices listed in Section 1.2.3 would be implemented during construction to address these potential indirect impacts. With these Standard Construction Practices, the indirect impact of the Proposed Project on sensitive natural communities would be less than significant.

Potentially significant direct impacts to sensitive vegetation communities would be mitigated to less than significant through implementation of MM BIO-5.

MM BIO-5 **Compensate for Impacts to Sensitive Vegetation Communities.** Direct temporary impacts to 0.14 acres of redwood forest alliance would be mitigated through on-site rehabilitation to conditions similar to those that existed prior to grading and/or ground-disturbing activities. This would consist of re-contouring temporarily impacted areas to match pre-project grade and non-native species removal and monitoring over a 3-year period to inhibit non-native species encroachment. A one-time rehabilitation effort followed by monitoring and non-native weed removal for a minimum of 3 years shall compensate for temporary direct impacts to the redwood forest alliance vegetation community.

Direct permanent impacts to 0.01 acres of redwood forest alliance vegetation community shall be mitigated through on-site enhancement activities at a 2:1 mitigation ratio.

A conceptual Habitat Mitigation and Monitoring Plan shall be prepared and implemented that includes the enhancement activities, which may include non-native species removal and revegetation followed by monitoring, for all disturbed areas. The plan shall specify the criteria and standards by which the enhancement actions will compensate for impacts of the Proposed Project on the redwood forest vegetation community and shall at a minimum include discussion of the following:

- The enhancement objectives including the type and amount of revegetation to be implemented taking into account enhanced areas where non-native invasive vegetation is removed and replanting specifications that take into account natural regeneration of species.
- The specific methods to be employed for revegetation.
- Success criteria and monitoring requirements to ensure vegetation community restoration success.
- Remedial measures to be implemented in the event that performance standards are not achieved.

6.4 Impact BIO-3: Jurisdictional Wetlands

No state or federally protected wetlands occur within the BSA. However, implementation of the Proposed Project could have direct, temporary and permanent effects to non-wetland waters of the United States/state under the jurisdiction of USACE, RWQCB, and CDFW. A total of 0.13 acres of temporary impacts to jurisdictional waters would result from diversion, dewatering, minor channel grading, and sediment removal upstream and downstream of the dam. A total of 0.01 acres of permanent impacts to jurisdictional waters would result from the construction and placement of a new concrete control vault, access stairways, and streambank stabilization within a very small portion of Laguna Creek streambed, but primarily along the upper banks of Laguna Creek. The direct impact of the Proposed Project on jurisdictional non-wetland waters would be potentially significant.

Short-term and long-term indirect impacts to jurisdictional non-wetland waters relating to construction activities (edge effects) and trash/pollution would not likely result in significant impacts, with implementation of the Standard Construction Practices that would be implemented during Proposed Project construction (Section 1.2.3). Therefore, the indirect impact of the Proposed Project on jurisdictional non-wetland waters would be less than significant.

Potentially significant impacts to jurisdictional non-wetland waters of the United States/state would be mitigated to less than significant through implementation of MM-BIO-6. This mitigation shall overlap with measures taken to address impacts to sensitive vegetation communities (as identified above in MM-BIO-5).

MM-BIO-6 **Compensate for Impacts to Jurisdictional Non-Wetland Waters.** Direct temporary and permanent impacts to jurisdictional non-wetland waters shall be mitigated on site. On-site measures shall include rehabilitation of areas temporarily impacted (approximately 0.13 acres) and permanently impacted (approximately 0.01 acres) within jurisdictional limits at a 1:1 mitigation ratio. Areas impacted shall be returned to conditions similar to those that existed prior to grading and/or ground-disturbing activities. The conceptual Habitat Mitigation and Monitoring Plan implemented as part of MM-BIO-6 shall include enhancement activities to address impacts to jurisdictional non-wetland waters, which may include non-native species removal and revegetation followed by monitoring, for all disturbed areas. The plan shall specify the criteria and standards by which the enhancement actions will compensate for impacts of the Proposed Project on jurisdictional non-wetland waters. Direct temporary and permanent impacts to jurisdictional non-wetlands waters shall be addressed through Section 401 and Section 404 of the Clean Water Act, the Porter-Cologne Water Quality Act, and Section 1602 of the California Fish and Game Code.

6.5 Impact BIO-4: Wildlife Corridors and Migratory Routes

The BSA is not recognized as an important regional wildlife corridor by any state agency or jurisdiction and is not considered critical to the ecological functioning of adjoining watersheds and open space areas. However, Laguna Creek may serve as a local movement corridor that marginally connects habitat for certain amphibians, reptiles, and localized fish species. Overall, the Proposed Project would not substantially alter the vegetation communities or physical setting of Laguna Creek.

During construction, activities could block or otherwise hinder wildlife movement along Laguna Creek or temporarily affect the ability of wildlife to access other habitat areas upstream or downstream of the BSA. However, this impact would be temporary and would not substantially degrade the quality or use of a wildlife corridor or migratory route. Existing habitat linkages and wildlife corridor functions would remain intact while construction activities are conducted and following completion. Construction activities would not likely result in impacts to wildlife movement because no new structures that would impede wildlife movement would be installed.

Following temporary construction disturbances, the function and values of Laguna Creek would remain the same as existing conditions, and would improve downstream of the dam due to sediment management at the Facility and maintenance of in-stream flows facilitated by the Proposed Project. While a small area within the banks of Laguna Creek would be permanently impacted due to the placement of diversion improvement structures, this small displacement of habitat would not impact wildlife movement or use of native wildlife nursery sites within the project site and surrounding areas. Since the existing dam structure already functions as a barrier to the movement of aquatic species, it is assumed that the existing wildlife corridor functions within Laguna Creek would remain intact during and post construction.

Some indirect impacts to localized wildlife movement could occur during construction due to construction-related noise and in-water work. However, these impacts would be temporary and would not be expected to significantly disrupt wildlife movement during and following construction activities. The environmental conditions and uses surrounding Laguna Creek post-construction would remain and actually improve for riparian-dependent species as a result of the project's design and operation to provide better flow to downstream fish habitat during diversions. These factors would also reduce the potential for any long-term indirect impacts to wildlife movement as a result of the Proposed Project.

Therefore, direct and indirect impacts on wildlife corridors and migratory routes resulting from the Proposed Project would be less than significant.

6.6 Impact BIO-5: Local Policies or Ordinances

Potentially significant impacts resulting from implementation of the Proposed Project were analyzed for compliance with the Santa Cruz County LCP and LCP implementing ordinances. The Proposed Project occurs within the protected buffer zone of Laguna Creek. However, the Proposed Project qualifies as a riparian exception considering the unique circumstances of its design, function, and net benefit to natural resources. Since the Proposed Project is considered a riparian exception according to the provisions of Chapter 16.30, the Proposed Project would not conflict with the County's Riparian Corridor Protection Ordinance or Sensitive Habitats Protection Ordinance and the impact would be less than significant.

Removal of significant trees and protection of avoided trees within the Coastal Zone will be addressed through the Coastal Development Permit process. Tree removal associated with the Proposed Project would also be required to obtain a minor conversion permit exemption from Cal FIRE. Furthermore, Standard Construction Practices described above in Section 1.2.3, would protect trees from construction damage and reduce impacts related to the Sudden Oak Death Zone of Infestation (and the "Regulated Area") and the Pitch Canker Zone of Infestation.

The Proposed Project would not be in conflict with any local policies or ordinances protecting biological resources. Therefore, the impact of the Proposed Project related local policies would be less than significant.

6.7 Impact BIO-6: Habitat Conservation Plans

The Proposed Project is not located within any adopted habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plan. Therefore, the Proposed Project would not be in conflict with any such plans, and there would be no impacts as a result of the Proposed Project.

6.8 Impact BIO-7: Cumulative Impacts

As described above, the known cumulative projects planned within the Laguna Creek watershed include the Santa Cruz Water Rights Project and the North Coast System Repair and Replacement Project. These two SCWD projects are anticipated to result in construction impacts that can be reduced to a less-than-significant level with standard mitigation measures and would have long-term benefits to biological resources. Other cumulative projects may include those subject to County approval; such projects that require discretionary approval are assumed to be designed or otherwise conditioned to avoid and minimize impacts to biological resources. As described above, implementation of the Proposed Project would result in minor impacts to areas immediately surrounding the Facility. Post-construction, the project site would be operated and maintained similar to existing conditions. Mitigation measures have been identified to reduce potential impacts to special-status wildlife species, sensitive vegetation communities, and jurisdictional wetlands resulting from project implementation to less-than-significant levels. Therefore, the Proposed Project, in combination with the reasonably foreseeable future projects in the Laguna Creek watershed would result in less-than-significant impacts to biological resources and no further mitigation measures are required.

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16 USC 1531–1544. Endangered Species Act of 1973, as amended.

33 USC 1251–1387. Water Pollution Control Act Amendments of 1972 (Clean Water Act).

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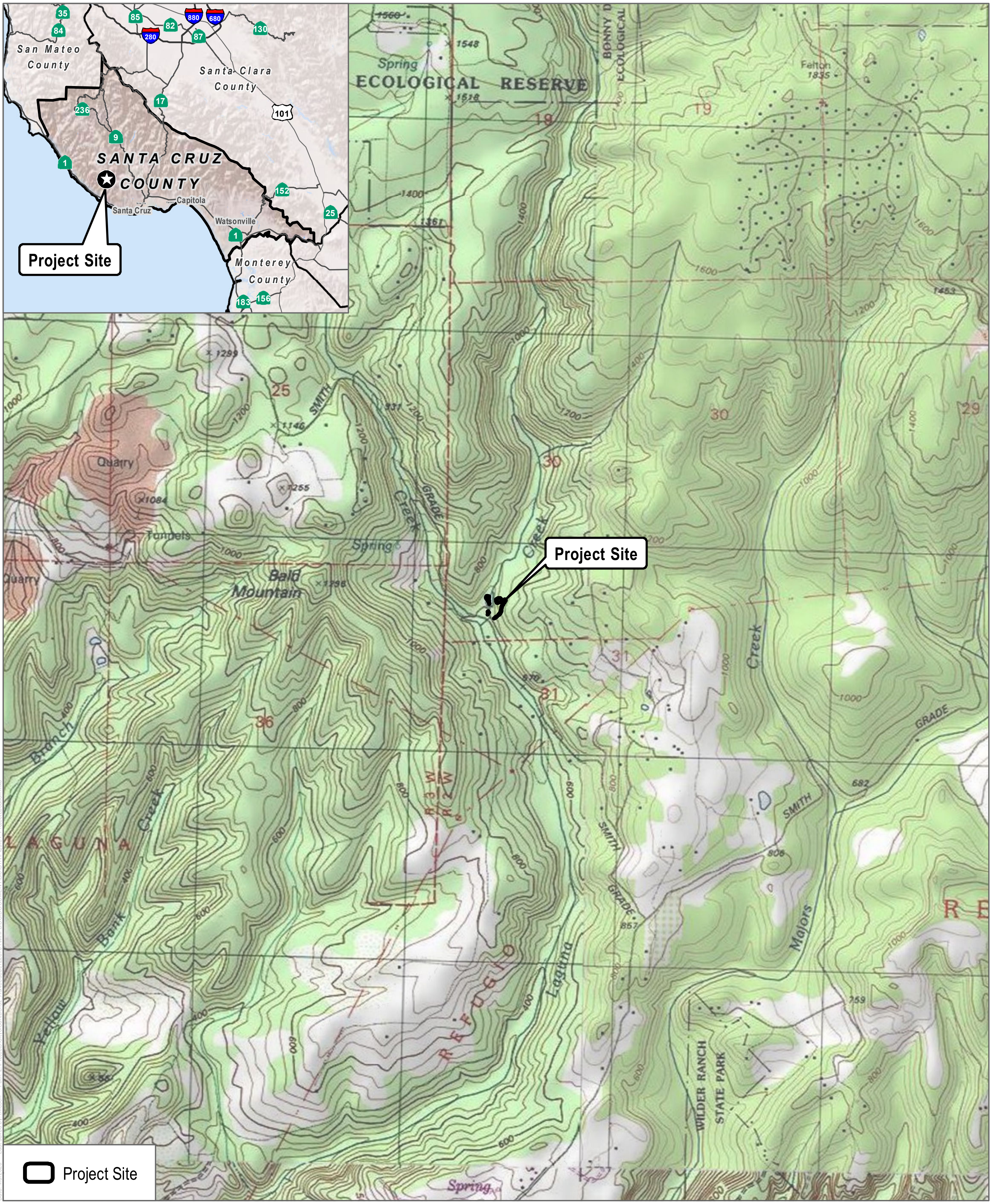

SOURCE: USGS 7.5-Minute Series Davenport Quadrangle

FIGURE 1

Project Location

Laguna Creek Diversion Retrofit Project

0 1,000 2,000 Feet

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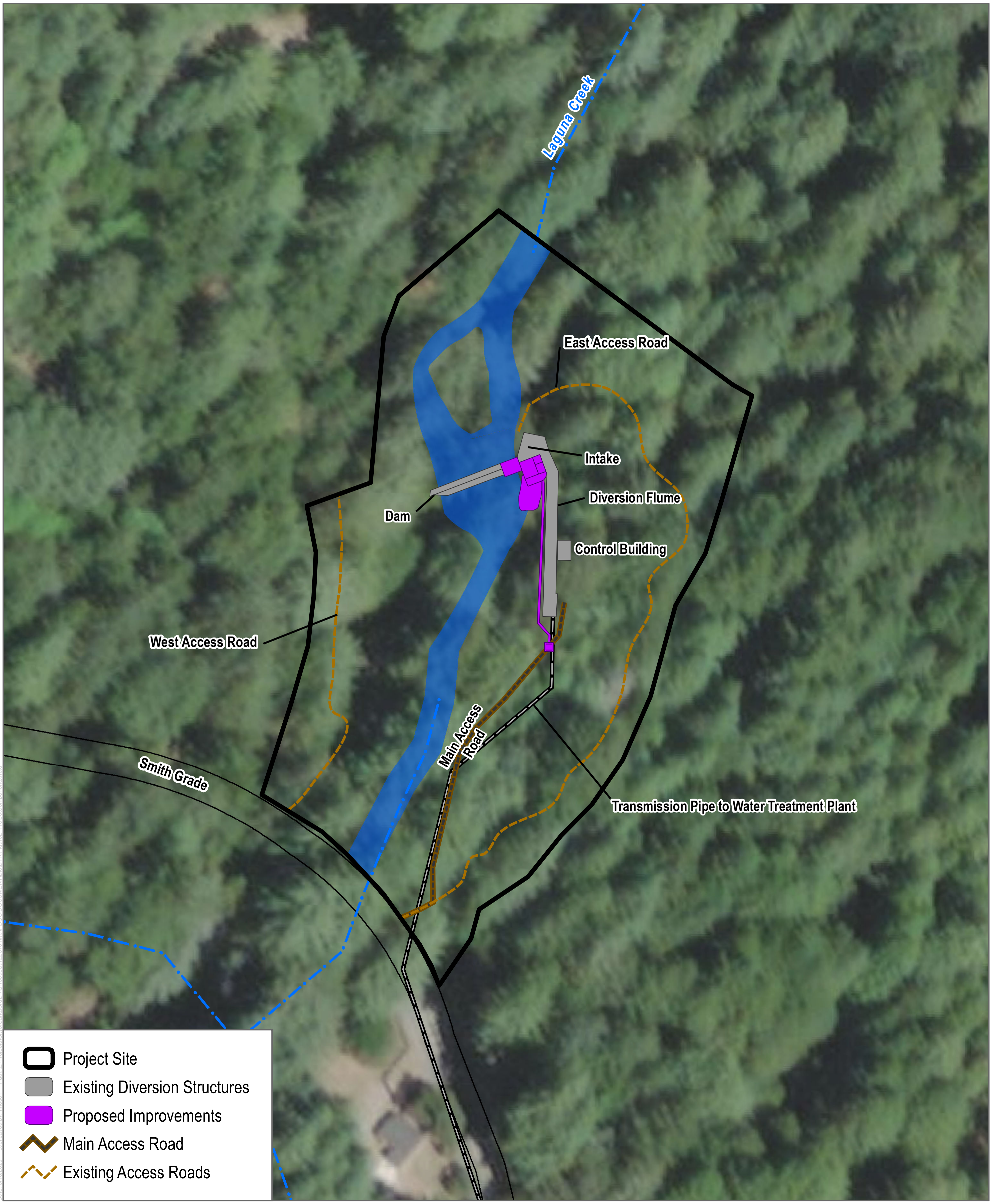

SOURCE: ESRI 2020, City of Santa Cruz 2019, USGS 2019

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FIGURE 2

Project Components

Laguna Creek Diversion Retrofit Project

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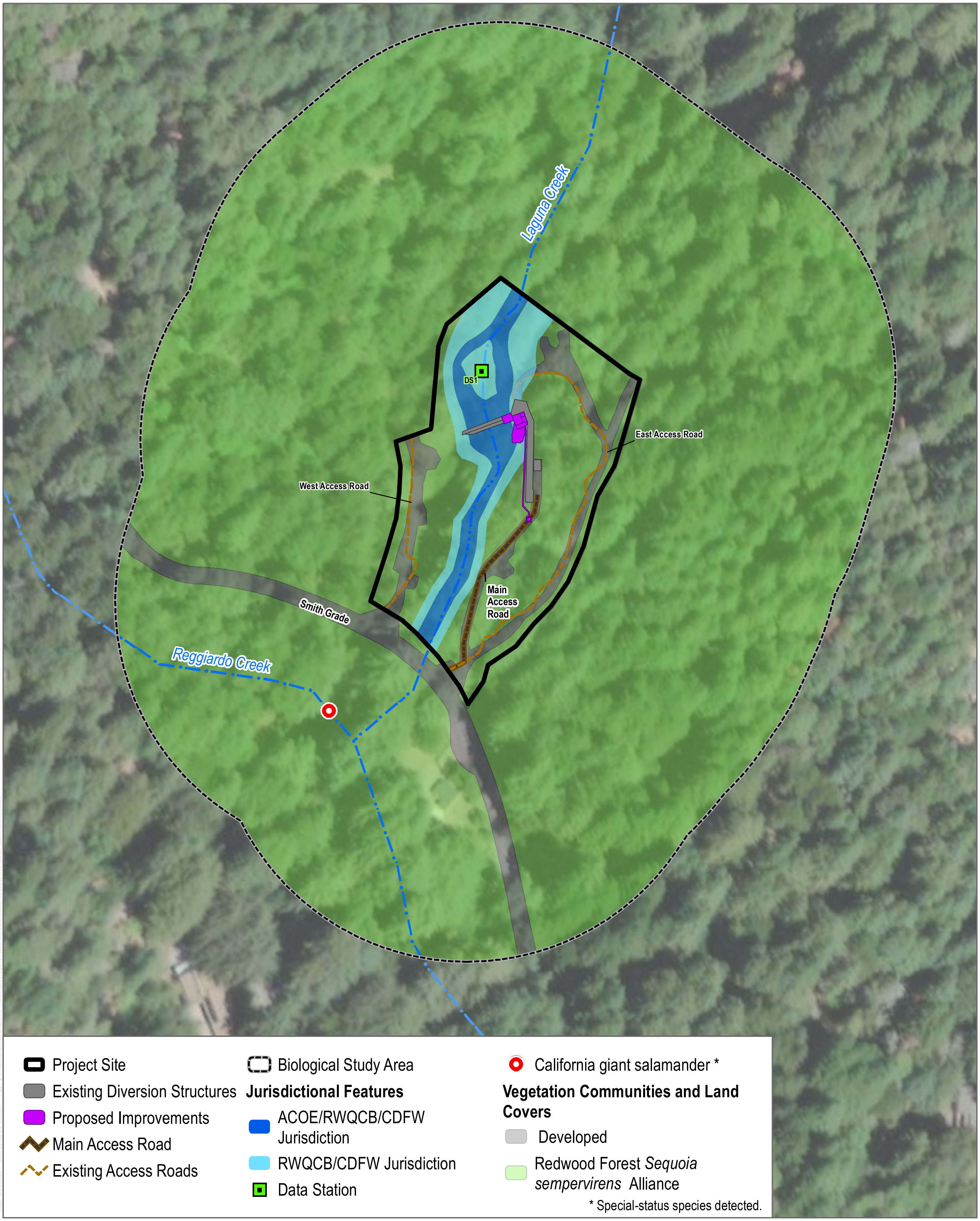

SOURCE: Santa Cruz County 2016, ESRI 2020

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0 75 150 Feet

FIGURE 3

Biological Resources

Laguna Creek Diversion Retrofit Project

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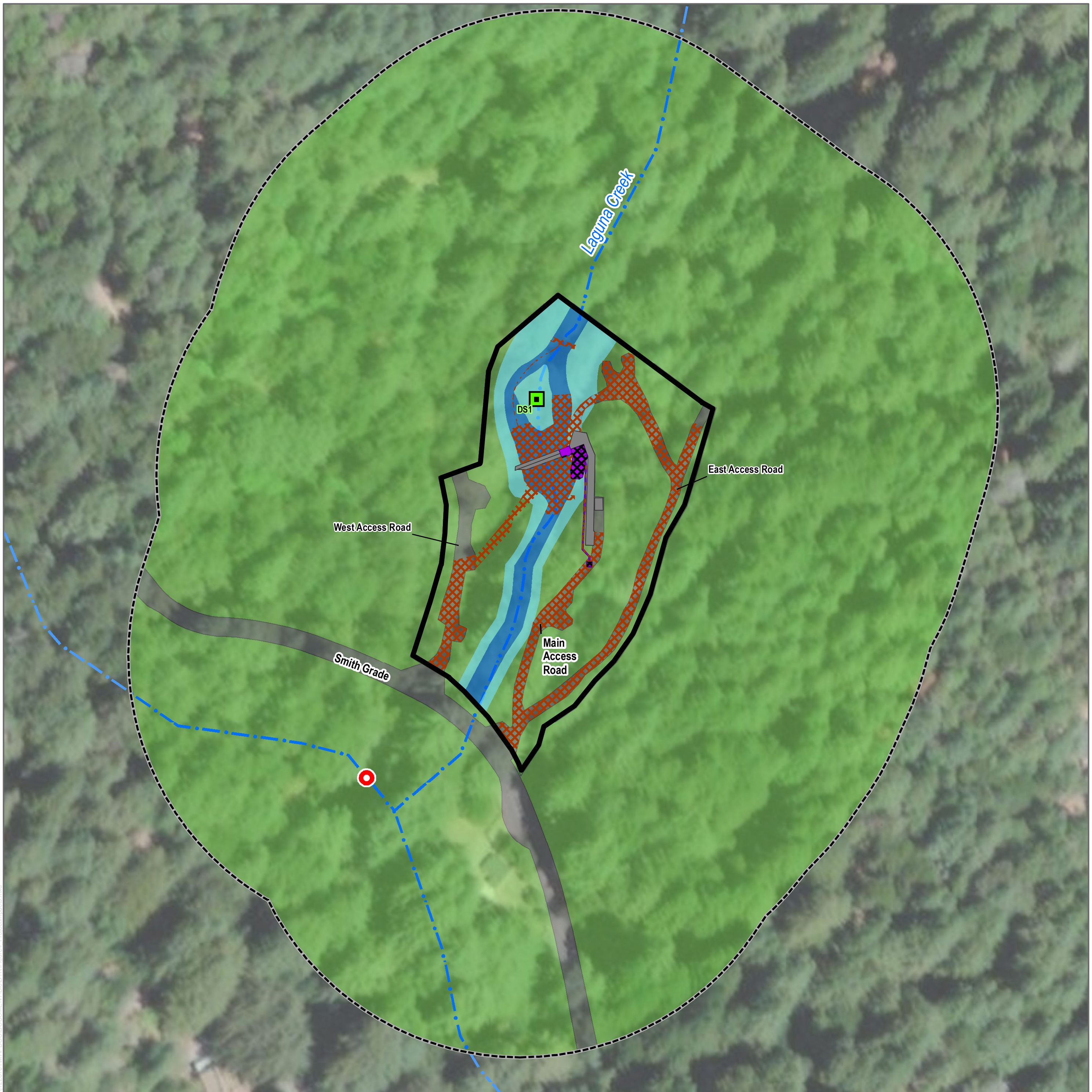

Project Site
Biological Study Area
Existing Diversion Structures
Proposed Improvements
California giant salamander *

Proposed Project Impacts
Permanent Impact Area
Temporary Impact Area

Jurisdictional Features
ACOE/RWQCB/CDFW Jurisdiction
RWQCB/CDFW Jurisdiction
Data Station

Vegetation Communities and Land Covers
Developed
Redwood Forest *Sequoia sempervirens* Alliance

* Special-status species detected.

SOURCE: Santa Cruz County 2016, ESRI 2020

DUDEK

0 75 150 Feet

FIGURE 4
Project Impacts
Laguna Creek Diversion Retrofit Project

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Appendix A

Site Photographs

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Photo 1: Laguna Creek upstream of the dam. View looking south (downstream).

Photo 2: Sediment buildup in Laguna Creek immediately upstream of the dam. View looking south (downstream).

Photo 3: Small, in-channel pool upstream of the dam (northwest). View looking southwest (downstream).

Photo 4: In-channel pool below the dam. View looking southwest.

Photo 5: Laguna Creek downstream of the dam. View looking south (downstream).

Photo 6: Existing control building and diversion flume. Foreground would be the approximate location of the riprap apron and shows the few redwood trees to be removed. View looking southeast.

Photo 7: Characteristic upland habitat within project site taken from the eastern access road. Note the existing control building in the background. View looking southwest.

Photo 8: East access road within project site. View looking north.

Photo 9: Main access road turnoff from Smith Grade Road. View facing southwest.

Photo 10: Main access road leading to the existing facility. View facing northeast.

Photo 11: West access road within the project site. View facing north.

Photo 12: Area where Laguna Creek passes under Smith Grade Road (upstream). Facing northeast.

Photo 13: Reggiardo Creek. View looking northwest (upstream).

Photo 14: Reggiardo Creek. View looking southeast (downstream).

Photo 15: Deceased California giant salamander discovered in Reggiardo Creek.

Appendix B

Plant Compendium

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Vascular Species

Eudicots

ANACARDIACEAE—SUMAC OR CASHEW FAMILY

Toxicodendron diversilobum—poison oak

ARALIACEAE—GINSENG FAMILY

* *Hedera helix*—English ivy

BORAGINACEAE—BORAGE FAMILY

* *Myosotis latifolia*—broadleaf forget-me-not

BRASSICACEAE—MUSTARD FAMILY

Cardamine oligosperma—little western bittercress

CAPRIFOLIACEAE—HONEYSUCKLE FAMILY

Lonicera hispidula—pink honeysuckle

ERICACEAE—HEATH FAMILY

Vaccinium ovatum—California huckleberry

FABACEAE—LEGUME FAMILY

Lathyrus vestitus—Pacific pea

* *Vicia benghalensis*—purple vetch

FAGACEAE—OAK FAMILY

Notholithocarpus densiflorus—tanoak

Quercus agrifolia—coast live oak

LAMIACEAE—MINT FAMILY

* *Mentha spicata*—spearmint

Stachys bullata—California hedgenettle

MORACEAE—MULBERRY FAMILY

* *Ficus carica*—edible fig

OXALIDACEAE—OXALIS FAMILY

Oxalis oregana—redwood-sorrel

PLANTAGINACEAE—PLANTAIN FAMILY

Veronica americana—American speedwell

POLYGONACEAE—BUCKWHEAT FAMILY

* *Rumex crispus*—curly dock

ROSACEAE—ROSE FAMILY

Prunus ilicifolia—holly leaf cherry

* *Rubus armeniacus*—Himalayan blackberry

Rubus ursinus—California blackberry

SAPINDACEAE—SOAPBERRY FAMILY

Acer macrophyllum—bigleaf maple

SAXIFRAGACEAE—SAXIFRAGE FAMILY

Tiarella trifoliata—threeleaf foamflower

URTICACEAE—NETTLE FAMILY

Urtica dioica—stinging nettle

VIOLACEAE—VIOLET FAMILY

Viola sempervirens—evergreen violet

Ferns and Fern Allies

DRYOPTERIDACEAE—WOOD FERN FAMILY

Polystichum munitum—western swordfern

EQUISETACEAE—HORSETAIL FAMILY

Equisetum sp.—horsetail

POLYPODIACEAE—POLYPODY FAMILY

Polypodium californicum—California polypody

PTERIDACEAE—BRAKE FAMILY

Adiantum sp.—maidenhair

Gymnosperms and Gnetophytes

CUPRESSACEAE—CYPRESS FAMILY

Sequoia sempervirens—redwood

Monocots

CYPERACEAE—SEDGE FAMILY

Carex obnupta—slough sedge

Cyperus eragrostis—tall flatsedge

JUNCACEAE—RUSH FAMILY

Juncus mexicanus—Mexican rush

Juncus patens—western rush

Non-Vascular Species

Complex-Thallus Liverworts

AYTONIACEAE — NO FAMILY NAME

Asterella californica —no common name

* signifies introduced (non-native) species

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Appendix C

Wildlife Compendium

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Vertebrates

Amphibians

DICAMPTODONTIDAE— GIANT SALAMANDERS

Dicamptodon ensatus —California giant salamander

SALAMANDRIDAE—NEWTS

Taricha torosa—California newt

Birds

CORVIDAE—CROWS & JAYS

Cyanocitta stelleri—Steller's jay

Fish

SALMONIDAE—SALMON & TROUTS

Oncorhynchus mykiss—rainbow trout[1]

1 City of Santa Cruz, 2020. Unpublished data: results of 2006-2019 annual snorkel surveys. City of Santa Cruz Water Department, Watershed Section.

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Appendix D

Special-Status Plant Species Potentially Occurring within the Biological Study Area

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Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Agrostis blasdalei	Blasdale's bent grass	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal prairie/perennial rhizomatous herb/May–July/0–490	Not expected to occur. Suitable coastal bluff, dune, or prairie habitat is not present within the BSA.
Amsinckia lunaris	bent-flowered fiddleneck	None/None/1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland/annual herb/Mar–June/5–1,640	Low potential to occur. Although suitable woodland habitat is present, the closest CNDDB occurrence is located 6.3 miles northwest of the BSA (CDFW 2020).
Arctostaphylos andersonii	Anderson's manzanita	None/None/1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest; openings, edges/perennial evergreen shrub/Nov–May/195–2,495	Not expected to occur. No suitable redwood forest habitat with openings or edges is present. This perennial species would have been detected if present during surveys. The closest CNDDB occurrence is located in the Bonny Doon Ecological Reserve 1.2 miles north of the BSA (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Arctostaphylos glutinosa	Schreiber's manzanita	None/None/1B.2	Closed-cone coniferous forest, Chaparral; diatomaceous shale/perennial evergreen shrub/(Nov)Mar–Apr/555–2,245	Low potential to occur. Suitable coniferous forest habitat is present, and the closest CNDDB occurrence is located 1.6 miles north of the BSA; however, diatomaceous shale soils are not present (CDFW 2020; USDA 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Arctostaphylos ohloneana	Ohlone manzanita	None/None/1B.1	Closed-cone coniferous forest, Coastal scrub; siliceous shale/evergreen shrub/Feb–Mar/1,475–1,740	Not expected to occur. The site is outside of the species' known elevation range.
Arctostaphylos pajaroensis	Pajaro manzanita	None/None/1B.1	Chaparral (sandy)/perennial evergreen shrub/Dec–Mar/95–2,495	Not expected to occur. Suitable chaparral habitat is not present in the BSA, and this species is not known to occur within the region* (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Arctostaphylos regismontana	Kings Mountain manzanita	None/None/1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest; granitic or sandstone/perennial evergreen shrub/Dec–Apr/1,000–2,395	Not expected to occur. The site is outside of the species' known elevation range.
Arctostaphylos silvicola	Bonny Doon manzanita	None/None/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; inland marine sands/perennial evergreen shrub/Jan–Mar/390–1,970	Not expected to occur. No suitable forest habitat with inland marine sandy soils is present. This perennial species would have been detected if present during surveys. The closest CNDDB occurrence recorded in 1989 is located 0.5 miles northeast of the BSA (CDFW 2020).
Arenaria paludicola	marsh sandwort	FE/SE/1B.1	Marshes and swamps (freshwateror brackish); sandy, openings/perennial stoloniferous herb/May–Aug/5–560	Not expected to occur. Suitable marsh and swamp habitat is not present.
Astragalus pycnostachyus var. *pycnostachyus*	coastal marsh milk-vetch	None/None/1B.2	Coastal dunes (mesic), Coastal scrub, Marshes and swamps (coastal salt, streamsides)/perennial herb/(Apr)June–Oct/0–100	Not expected to occur. The site is outside of the species' known elevation range.
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	None/None/1B.1	Chaparral, Cismontane woodland; sandy or gravelly, openings/annual herb/May–Aug/1,000–5,020	Not expected to occur. The site is outside of the species' known elevation range.
Campanula californica	swamp harebell	None/None/1B.2	Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (freshwater), North Coast coniferous forest; mesic/perennial rhizomatous herb/June–Oct/0–1,330	Low potential to occur. Although suitable forest habitat is present, bog or marsh vegetation is absent within the BSA. The only CNDDB occurrence within the region* is located 6 miles north of the BSA near Camp Evers (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Carex comosa	bristly sedge	None/None/2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland/perennial rhizomatous herb/May–Sep/0–2,050	Not expected to occur. Suitable marsh, swamp, or grassland habitat is not present.
Carex saliniformis	deceiving sedge	None/None/1B.2	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt); mesic/perennial rhizomatous herb/June(July)/5–755	Not expected to occur. Suitable prairie, meadow, scrub, or marsh habitat is not present.
Chorizanthe pungens var. *hartwegiana*	Ben Lomond spineflower	FE/None/1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills)/annual herb/Apr–July/295–2,000	Not expected to occur. Suitable maritime ponderosa pine sandhills habitat not present. Closest CNDDB occurrence is located 1.7 miles north of the BSA within Bonny Doon Ecological Reserve (CDFW 2020).
Chorizanthe robusta var. *hartwegii*	Scotts Valley spineflower	FE/None/1B.1	Meadows and seeps (sandy), Valley and foothill grassland (mudstone and Purisima outcrops)/annual herb/Apr–July/750–805	Not expected to occur. Suitable grassland or meadow habitat is not present.
Chorizanthe robusta var. *robusta*	robust spineflower	FE/None/1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub; sandy or gravelly/annual herb/Apr–Sep/5–985	Not expected to occur. Suitable woodland habitat or sandy terraces/bluffs in sandy soils are not present within the BSA. The closest CNDDB occurrence is located 1.8 miles southeast of the BSA (CDFW 2020).
Cirsium andrewsii	Franciscan thistle	None/None/1B.2	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub; mesic, sometimes serpentinite/perennial herb/Mar–July/0–490	Not expected to occur. The site is outside of the species' known elevation range.
Collinsia multicolor	San Francisco collinsia	None/None/1B.2	Closed-cone coniferous forest, Coastal scrub; sometimes serpentinite/annual herb/(Feb) Mar–May/95–820	Low potential to occur. Although suitable forest habitat is present, the closest CNDDB occurrence recorded in 1936 is 3.6 miles southwest of the BSA (CDFW 2020).
Dacryophyllum falcifolium	tear drop moss	None/None/1B.3	North Coast coniferous forest; carbonate/moss/N.A./160–900	Moderate potential to occur. Suitable coniferous forest is present, however rocky outcrops area limited within the BSA. The closest CNDDB occurrence is located 3 miles northeast of the BSA (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Eriogonum nudum var. *decurrens*	Ben Lomond buckwheat	None/None/1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills); sandy/perennial herb/June–Oct/160–2,625	Not expected to occur. Suitable maritime ponderosa pine sandhills habitat not present. The closest CNDDB occurrence is located 1.5 miles north of the BSA at the south end of Bonny Doon Ecological Reserve (CDFW 2020).
Erysimum ammophilum	sand-loving wallflower	None/None/1B.2	Chaparral (maritime), Coastal dunes, Coastal scrub; sandy, openings/perennial herb/Feb–June/0–195	Not expected to occur. The site is outside of the species' known elevation range.
Erysimum teretifolium	Santa Cruz wallflower	FE/SE/1B.1	Chaparral, Lower montane coniferous forest; inland marine sands/perennial herb/Mar–July/390–2,000	Not expected to occur. No suitable chaparral or yellow pine forest habitat is present, and inland marine sandy upland deposits were not explicitly detected on site. The closest CNDDB occurrence is located 1.5 miles north of the BSA in Bonny Doon Ecological Reserve (CDFW 2020).
Fissidens pauperculus	minute pocket moss	None/None/1B.2	North Coast coniferous forest (damp coastal soil)/moss/N.A./30–3,360	Moderate potential to occur. Suitable coniferous forest and streambank habitat is present. The closest CNDDB occurrence is located 3.1 miles east of the BSA (CDFW 2020).
Fritillaria liliacea	fragrant fritillary	None/None/1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland; Often serpentinite/perennial bulbiferous herb/Feb–Apr/5–1,345	Low potential to occur. Although woodland habitat is present, the only CNDDB occurrence in the region* is located 14 miles northeast of the BSA (CDFW 2020).
Grimmia torenii	Toren's grimmia	None/None/1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Openings, rocky, boulder and rock walls, carbonate, volcanic/moss/N.A./1,065–3,805	Not expected to occur. The site is outside of the species' known elevation range.
Grimmia vaginulata	vaginulate grimmia	None/None/1B.1	Chaparral (openings); Rocky, boulder and rock walls, carbonate/moss/N.A./2,245–2,245	Not expected to occur. The site is outside of the species' known elevation range.
Hesperevax sparsiflora var. *brevifolia*	short-leaved evax	None/None/1B.2	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie/annual herb/Mar–June/0–705	Not expected to occur. Suitable dune, scrub, or prairie habitat is not present.

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Hesperocyparis abramsiana var. *abramsiana*	Santa Cruz cypress	FT/SE/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; sandstone or granitic/perennial evergreen tree/N.A./915–2,625	Not expected to occur. The site is outside of the species' known elevation range.
Hesperocyparis abramsiana var. *butanoensis*	Butano Ridge cypress	FT/SE/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; Sandstone/perennial evergreen tree/Oct/1,310–1,610	Not expected to occur. The site is outside of the species' known elevation range.
Hoita strobilina	Loma Prieta hoita	None/None/1B.1	Chaparral, Cismontane woodland, Riparian woodland; usually serpentinite, mesic/perennial herb/May–July (Aug–Oct)/95–2,820	Low potential to occur. Although woodland habitat is present, the only CNDDB occurrence in the region* recorded in 1913 is located 17 miles northeast of the BSA (CDFW 2020).
Holocarpha macradenia	Santa Cruz tarplant	FT/SE/1B.1	Coastal prairie, Coastal scrub, Valley and foothill grassland; often clay, sandy/annual herb/June–Oct/30–720	Not expected to occur. Suitable grassland, scrub, or prairie habitat is not present.
Horkelia cuneata var. *sericea*	Kellogg's horkelia	None/None/1B.1	Closed-cone coniferous forest, Chaparral (maritime), Coastal dunes, Coastal scrub; sandy or gravelly, openings/perennial herb/Apr–Sep/30–655	Low potential to occur. Suitable forest habitat is present; however, sandy or gravelly soils were not explicitly detected on site. The closest CNDDB occurrence is 1.6 miles north of the BSA in Bonny Doon Ecological Reserve (CDFW 2020).
Horkelia marinensis	Point Reyes horkelia	None/None/1B.2	Coastal dunes, Coastal prairie, Coastal scrub; sandy/perennial herb/May–Sep/15–2,475	Not expected to occur. Suitable dune, scrub, or prairie habitat is not present, although the closest CNDDB occurrence is only 1.6 miles north of the BSA in Bonny Doon Ecological Reserve (CDFW 2020).
Lessingia micradenia var. *glabrata*	smooth lessingia	None/None/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; serpentinite, often roadsides/annual herb/(Apr–June) July–Nov/390–1,380	Low potential to occur. Although woodland habitat is present, this species is not known to occur in the region* (CDFW 2020).
Limnanthes douglasii ssp. *sulphurea*	Point Reyes meadowfoam	None/SE/1B.2	Coastal prairie, Meadows and seeps (mesic), Marshes and swamps (freshwater), Vernal pools/annual herb/Mar–May/0–460	Not expected to occur. The site is outside of the species' known elevation range.

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Malacothamnus arcuatus	arcuate bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland/perennial evergreen shrub/Apr–Sep/45–1,165	Low potential to occur. Although woodland habitat is present, the only CNDDB occurrence in the region* is located 12 miles northwest of the BSA (CDFW 2020).
Microseris paludosa	marsh microseris	None/None/1B.2	Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland/perennial herb/Apr–June (July)/15–1,165	Not expected to occur. Suitable coastal scrub or closed-cone pine forest habitat is not present, and the closest CNDDB occurrence is located 2.9 miles east of the BSA (CDFW 2020). Within the region* this species seems to occur along grassland margins which are not present in the BSA.
Monardella sinuata ssp. *nigrescens*	northern curly-leaved monardella	None/None/1B.2	Chaparral (SCR Co.), Coastal dunes, Coastal scrub, Lower montane coniferous forest (SCR Co., ponderosa pine sandhills); Sandy/annual herb/(Apr) May–July (Aug–Sep)/0–985	Not expected to occur. Suitable chaparral, coastal dune, coast scrub, or coniferous forest habitat is not present. Additionally, sandy upland soils were not explicitly detected on site. The closest CNDDB occurrence is located 4.8 miles northwest of the BSA (CDFW 2020).
Monolopia gracilens	woodland woolythreads	None/None/1B.2	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland; Serpentine/annual herb/(Feb) Mar–July/325–3,935	Not expected to occur. Suitable woodland habitat is present, however grassy openings and serpentine soils which this species prefers are not present within the BSA. The closest CNDDB occurrence is located 4.5 miles northeast of the site; however, it was recorded in 1930 (CDFW 2020).
Orthotrichum kellmanii	Kellman's bristle moss	None/None/1B.2	Chaparral, Cismontane woodland; sandstone, carbonate/moss/Jan–Feb/1,125–2,245	Not expected to occur. The site is outside of the species' known elevation range.
Pedicularis dudleyi	Dudley's lousewort	None/SR/1B.2	Chaparral (maritime), Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland/perennial herb/Apr–June/195–2,955	Low potential to occur. Suitable shaded coniferous forest habitat is present; however, the closest CNDDB recorded after 1900 is located 16.5 miles northwest of the BSA (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Penstemon rattanii var. *kleei*	Santa Cruz Mountains beardtongue	None/None/1B.2	Chaparral, Lower montane coniferous forest, North Coast coniferous forest/perennial herb/May–June/1,310–3,610	Not expected to occur. The site is outside of the species' known elevation range.
Pentachaeta bellidiflora	white-rayed pentachaeta	FE/SE/1B.1	Cismontane woodland, Valley and foothill grassland (often serpentinite)/annual herb/Mar–May/110–2,035	Low potential to occur. Suitable woodland habitat is present, although the only CNDDB occurrence in the region* that isn't considered possibly extirpated is 8.6 miles northwest of the BSA (CDFW 2020).
Pinus radiata	Monterey pine	None/None/1B.1	Closed-cone coniferous forest, Cismontane woodland/perennial evergreen tree/N.A./80–605	Not expected to occur. This species is known to occur on coastal bluffs in the region* and would have been detected during the site assessment. However, coastal bluffs are not present on site. The only CNDDB occurrence in the region* is located along the coast 7.2 miles northwest of the BSA (CDFW 2020).
Piperia candida	white-flowered rein orchid	None/None/1B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest; sometimes serpentinite/perennial herb/(Mar)May–Sep/95–4,300	Moderate potential to occur. Suitable coniferous forest habitat including forest duff and mossy banks of which this species prefers is present on site, and the closest CNDDB occurrence is located 6.6 miles north of the BSA (CDFW 2020).
Plagiobothrys chorisianus var. *chorisianus*	Choris' popcornflower	None/None/1B.2	Chaparral, Coastal prairie, Coastal scrub; mesic/annual herb/Mar–June/5–525	Not expected to occur. Suitable chaparral, scrub, or prairie habitat is not present.
Plagiobothrys diffusus	San Francisco popcornflower	None/SE/1B.1	Coastal prairie, Valley and foothill grassland/annual herb/Mar–June/195–1,180	Not expected to occur. Suitable grassland or prairie habitat is not present.
Polygonum hickmanii	Scotts Valley polygonum	FE/SE/1B.1	Valley and foothill grassland (mudstone and sandstone)/annual herb/May–Aug/685–820	Not expected to occur. Suitable grassland habitat is not present.
Rosa pinetorum	pine rose	None/None/1B.2	Closed-cone coniferous forest, Cismontane woodland/perennial shrub/May, July/5–,3100	Low potential to occur. Although coniferous forest habitat is present, the only CNDDB occurrence in the region* is located 9.5 miles northwest of the BSA (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Senecio aphanactis	chaparral ragwort	None/None/2B.2	Chaparral, Cismontane woodland, Coastal scrub; sometimes alkaline/annual herb/Jan–Apr (May)/45–2,625	Not expected to occur. Suitable foothill woodland and coastal scrub habitat is not present on site. The closest CNDDB occurrence, which is the only recorded in the region*, is located 1.6 miles north of the BSA (CDFW 2020).
Silene scouleri ssp. *scouleri*	Scouler's catchfly	None/None/2B.2	Coastal bluff scrub, Coastal prairie, Valley and foothill grassland/perennial herb/(Mar–May) June–Aug (Sep)/0–1,970	Not expected to occur. Suitable grassland, scrub, or prairie habitat is not present.
Silene verecunda ssp. *verecunda*	San Francisco campion	None/None/1B.2	Coastal bluff scrub, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; sandy/perennial herb/(Feb) Mar–June (Aug)/95–2,115	Not expected to occur. Suitable chaparral, scrub, prairie, or grassland habitat is not present.
Stebbinsoseris decipiens	Santa Cruz microseris	None/None/1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; open areas, sometimes serpentinite/annual herb/Apr–May/30–1,640	Low potential to occur. Suitable forest habitat is present; however, open areas with loose soils were not explicitly detected on site. The closest CNDDB occurrence is 1.4 miles southeast of the BSA (CDFW 2020).
Stuckenia filiformis ssp. *alpina*	slender-leaved pondweed	None/None/2B.2	Marshes and swamps (assorted shallow freshwater)/perennial rhizomatous herb (aquatic)/May–July/980–7,055	Not expected to occur. The site is outside of the species' known elevation range.
Trifolium buckwestiorum	Santa Cruz clover	None/None/1B.1	Broadleafed upland forest, Cismontane woodland, Coastal prairie; gravelly, margins/annual herb/Apr–Oct/340–2,000	Low potential to occur. Suitable woodland habitat is present; however, mesic grasslands or gravelly margins which this species prefers are not present within the BSA. The closest CNDDB occurrence is 2.9 miles east of the BSA (CDFW 2020).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Trifolium polyodon	Pacific Grove clover	None/SR/1B.1	Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Valley and foothill grassland; mesic, sometimes granitic/annual herb/Apr–June (July)/15–1,395	Not expected to occur. Suitable coastal prairie, closed-cone pine forest, and meadow habitat is not present. Additionally, grassy openings or seeps which this species prefers are not present within the BSA. The closest CNDDB occurrence is 2.9 miles east of the BSA in Marshall Field (CDFW 2020).

Notes: BSA = Biological Study Area; CNDDB = California Natural Diversity Database.

* Region refers to the USGS 7.5-minute quadrangle in which the BSA is located (Davenport) and the six surrounding quadrangles (Santa Cruz, Felton, Año Nuevo, Castle Rock Ridge, Big Basin, and Franklin Point).

Status Legend

Federal

FE: Federally listed as endangered
FT: Federally listed as threatened
FC: Federal candidate for listing as threatened or endangered

State

SE: State listed as endangered
ST: State listed as threatened
SR: State listed as rare

CRPR (California Rare Plant Rank)

CRPR 1A: Plants presumed extinct in California and either rare or extinct elsewhere
CRPR List 1B: Plants rare, threatened, or endangered in California and elsewhere
CRPR List 2A: Plants rare, threatened, or endangered in California but common elsewhere
CRPR List 2B: Plants rare, threatened, or endangered in California but more common elsewhere

Threat Rank

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

References

CDFW (California Department of Fish and Wildlife). 2020. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento, California: CDFW, Biogeographic Data Branch. Accessed February 2020. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

USDA (U.S. Department of Agriculture). 2020. Web Soil Survey: Santa Cruz County Area. USDA, Natural Resources Conservation Service, Web Soil Survey Staff. Accessed February 2020. http://websoilsurvey.nrcs.usda.gov/.

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Appendix E

Special-Status Wildlife Species Potentially Occurring within the Biological Study Area

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Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Amphibians				
Aneides niger	Santa Cruz black salamander	None/SSC	Restricted to mesic forests in the fog belt of the outer Coast Range of San Mateo, Santa Cruz, and Santa Clara Counties. Mixed deciduous and coniferous woodlands and coastal grasslands. Occurs in moist streamside microhabitats and is found under rocks, talus, and damp woody debris.	Moderate potential to occur. Suitable moist streamside habitat is present and the closest CNDDB occurrence is located 1.4 miles east of the BSA (CDFW 2020).
Dicamptodon ensatus	California giant salamander	None/SSC	Known from wet coastal forests and chaparral near streams and seeps from Mendocino County south to Monterey County and east to Napa County. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	High potential to occur. Suitable habitat is present within the project site. A dead California giant salamander was observed within Reggiardo Creek west of the project site and the confluence with Laguna Creek.

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Rana boylii	foothill yellow-legged frog	None/SSC, PST	Rocky streams and rivers with open banks in forest, chaparral, and woodland.	Low potential to occur. Although suitable rocky stream habitat within forest is present, no occurrences post 1960 have been recorded within a 5-mile radius of the BSA (CDFW 2020). The closest CNDDB occurrence post 1960 is located 6 miles northeast of the BSA recorded in 2018 at the base of Loch Lomond Dam (CDFW 2020).
Rana draytonii	California red-legged frog	FT/SSC	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands.	Low potential to occur. In-stream pools occur within Laguna Creek above and below the dam; however, these pools lack emergent vegetation and have steep banks, and would likely only be used for low-flow foraging habitat by this species. The surrounding forest habitat lacks small mammal burrows and provides little upland refugia. The closest CNDDB occurrence is located 1.2 miles west of the BSA, within settlement ponds in the then active quarry property (CDFW 2020).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Reptiles				
Actinemys marmorata	northwestern pond turtle	None/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter.	Low potential to occur. Although suitable perennial stream habitat is present within the BSA, drainages are fairly incised with steep banks that limit accessibility to adjacent uplands and accelerate heavy flows. The BSA is also heavily shaded limiting basking habitat. The closest CNDDB occurrence is located 4.3 miles northeast of the BSA near a long pool in Felton (CDFW 2020).
Thamnophis sirtalis tetrataenia	San Francisco garter snake	FE/FP, SE	Wide range of habitats including grasslands or wetlands adjacent to ponds, marshes, and sloughs	Low potential to occur. Marginal slow-moving aquatic habitat is present within the BSA. However, the project site lacks emergent vegetation for cover and likely supports unsuitable velocities during high flows due to steep surrounding banks. The closest CNDDB occurrences are located within the Ano Nuevo or Franklin Point USGS quadrangles approximately 10.5 miles northwest of the BSA (CDFW 2020).
Birds				
Brachyramphus marmoratus (nesting)	marbled murrelet	FT/SE	Nests in old-growth coastal forests, forages in subtidal and pelagic habitats.	Low potential to occur (nest). Suitable coastal redwood forest habitat is present in the BSA and is located within 6 miles inland. However, small, isolated populations in the Santa Cruz Mountains are limited to the Pescadero Creek, Butano Creek, Little Butano Creek, Gazos Creek, Cascade Creek, Waddell Creek, and Scott Creek watersheds north of the BSA. The closest CNDDB occurrence is located 3.7 miles north of the BSA in Henry Cowell Redwoods State Park (CDFW 2020).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Charadrius alexandrinus nivosus (nesting)	western snowy plover	FT, BCC/SSC	On coasts, nests on sandy marine and estuarine shores; in the interior, nests on sandy, barren or sparsely vegetated flats near saline or alkaline lakes, reservoirs, and ponds.	Not expected to occur. Suitable nesting habitat is not present within the BSA, and this species is only known to nest along the coast within the region* (CDFW 2020).
Coturnicops noveboracensis	yellow rail	BCC/SSC	Nesting requires wet marsh/sedge meadows or coastal marshes with wet soil and shallow, standing water.	Not expected to occur. Suitable marshland habitat is not present within the BSA, and the only CNDDB occurrence within the region* dates back to 1905 (CDFW 2020).
Cypseloides niger (nesting)	black swift	BCC/SSC	Nests in moist crevices, caves, and cliffs behind or adjacent to waterfalls in deep canyons; forages over a wide range of habitats.	Not expected to occur. Suitable cliff or deep canyon nesting habitat is not present within the BSA, although this species may forage on site. This species is known to nest along the coastal cliffs and caves in the region* approximately 3.4 miles south of the BSA (CDFW 2020).
Elanus leucurus (nesting)	white-tailed kite	None/FP	Nests in woodland, riparian, and individual trees near open lands; forages opportunistically in grassland, meadows, scrubs, agriculture, emergent wetland, savanna, and disturbed lands.	Low potential to occur (nest). Suitable dense woodland for nesting is present within the BSA; however, nearby open habitat for foraging is not present. The closest CNDDB occurrence is 4.1 miles southeast of the BSA (CDFW 2020).
Falco peregrinus anatum (nesting)	American peregrine falcon	FDL, BCC/FP, SDL	Nests on cliffs, buildings, and bridges; forages in wetlands, riparian, meadows, croplands, especially where waterfowl are present.	Not expected to occur. Suitable nesting habitat is not present within the BSA, and this species is only known to nest along the coast within the region* (CDFW 2020).
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	BCC/SSC	Nests and forages in emergent wetlands including woody swamp, brackish marsh, and freshwater marsh.	Not expected to occur. Suitable emergent wetland or marsh habitat is not present within the BSA, and the only CNDDB occurrence in the region* is 5.5 miles west of the BSA within brackish marsh habitat (CDFW 2020).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Laterallus jamaicensis coturniculus	California black rail	BCC/FP, ST	Tidal marshes, shallow freshwater margins, wet meadows, and flooded grassy vegetation; suitable habitats are often supplied by canal leakage in Sierra Nevada foothill populations.	Not expected to occur. Suitable marsh or meadow habitat is not present within the BSA, and the closest CNDDB occurrence dates back to 1941, approximately 6.6 miles southeast of the site (CDFW 2020).
Riparia riparia (nesting)	bank swallow	None/ST	Nests in riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with sandy soils; open country and water during migration.	Not expected to occur. Suitable riparian, coastal, or lacustrine nesting habitat with bluffs or cliffs is not present within the BSA.
Fishes				
Eucyclogobius newberryi	tidewater goby	FE/SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County, to the mouth of the Smith River.	Not expected to occur. No suitable brackish habitat present.
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU	FE/SE	Streams and small freshwater tributaries during first half of life cycle and estuarine and marine waters of the Pacific Ocean during the second half of life cycle. Spawns in small streams with stable gravel substrates.	Not expected to occur. There is a barrier to anadromy about 1.4 miles upstream of the Ocean in Laguna Creek in the form of a large bedrock waterfall which precludes anadromous fishes from traveling further upstream (Hagar et al. 2017). However, coho salmon were observed in the lower Laguna Creek lagoon in 2015 (Berry et al. 2019; CDFW 2020).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	FT/None	Coastal basins from Redwood Creek south to the Gualala River, inclusive; does not include summer-run steelhead.	Not expected to occur. There is a barrier to anadromy about 1.4 miles upstream of the Ocean in Laguna Creek in the form of a large bedrock waterfall which precludes anadromous fishes from traveling further upstream (Hagar et al. 2017). Steelhead are known to occur in the lower creek reaches and lagoon (Berry et al. 2019; CDFW 2020). Resident populations of rainbow trout are known to occur in the upper reaches of Laguna Creek where the BSA is located (Hagar et al. 2017).
Spirinchus thaleichthys	longfin smelt	FC/ST	Aquatic, estuary.	Not expected to occur. No suitable estuarine habitat present.
Mammals				
Antrozous pallidus	pallid bat	None/SSC	Grasslands, shrublands, woodlands, forests; most common in open, dry habitats with rocky outcrops for roosting, but also roosts in man-made structures and trees.	Low potential to occur. Suitable forest habitat is present, although roosting potential is largely absent on site with the exception of the diversion facility control building present within the BSA. The only CNDDB occurrence within the region* is 7.9 miles north of the BSA (CDFW 2020).
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, man-made structures, and tunnels.	Low potential to occur. Suitable mesic forest habitat is present, and although roosting potential is largely absent on site with the exception of the diversion facility control building present within the BSA. The closest CNDDB occurrence is 1.9 miles west of the BSA, while the closest maternity roost CNDDB occurrence is located 5.2 miles west of the BSA.

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	None/SSC	Forest habitats with a moderate canopy and moderate to dense understory.	Moderate potential to occur. Suitable redwood forest habitat is present within the BSA. The closest CNDDB occurrence is located 1.5 miles west of the BSA in redwood forest/grassland margins along the then active quarry (CDFW 2020).
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils.	Not expected to occur. Suitable dry, open habitats are not present within the heavily forested BSA, and the closest CNDDB occurrence, which was recorded in 1983, is 2.8 miles southeast of the BSA (CDFW 2020).
Invertebrates				
Bombus occidentalis	western bumble bee	None/PSE	Once common and widespread, species has declined precipitously from central California to southern British Columbia, perhaps from disease.	Low potential to occur. Suitable habitat dependent on abundant flowering plants is limited within the BSA; however the most recent CNDDB occurrence in the region* dates back to 1983. This 1983 occurrence is also the closest, located 4.9 miles southeast of the BSA (CDFW 2020).
Cicindela ohlone	Ohlone tiger beetle	FE/None	Remnant native grasslands with California oatgrass (*Danthonia californica*) and purple needlegrass (*Stipa pulchra*) in Santa Cruz County	Not expected to occur. No suitable grassland vegetation present.
Euphilotes enoptes smithi	Smith's blue butterfly	FE/None	Sand dunes, scrub, chaparral, grassland, and their ecotones.	Not expected to occur. No suitable dune, scrub, chaparral, or grassland vegetation present.
Polyphylla barbata	Mount Hermon (=barbate) June beetle	FE/None	Known only from sand hills in vicinity of Mount Hermon, Santa Cruz County	Not expected to occur. Suitable sand hill habitat is not present within the BSA, and the nearest CNDDB occurrence is located 4 miles east of the site (CDFW 2020).
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	FE/None	Coastal dunes, coastal scrub, and coastal prairie	Not expected to occur. No suitable dune, scrub, or prairie vegetation present.

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Trimerotropis infantilis	Zayante band-winged grasshopper	FE/None	Isolated sandstone deposits in the Santa Cruz Mountains (the Zayante Sand Hills ecosystem)	Not expected to occur. Suitable sandstone deposit habitat is not present within the BSA, and the nearest CNDDB occurrence is located 4.3 miles east of the site (CDFW 2020).

Notes: BSA = Biological Study Area; CNDDB = California Natural Diversity Database; USGS = U.S. Geological Survey; ESU = Evolutionarily Significant Unit, DPS = Distinct Population Segment.

* Region refers to the USGS 7.5-minute quadrangle in which the BSA is located (Davenport) and the six surrounding quadrangles (Santa Cruz, Felton, Ano Nuevo, Castle Rock Ridge, Big Basin, and Franklin Point).

Status Legend

Federal

BCC: Bird of Conservation Concern
FC: Candidate for federal listing as threatened or endangered
FDL: Federally delisted; monitored for 5 years
FE: Federally listed endangered
FT: Federally listed as threatened

State

PSE: Proposed state listing as endangered
SDL: State delisted
SSC: Species of Special Concern
FP: California Department of Fish and Wildlife Protected and Fully Protected Species
SE: State listed as endangered
ST: State listed as threatened

References

Berry, C., Bean, E., Bassett, R., Martinez-McKinney, J., Retford, N., Chirco-MacDonald, D., and Hagar, J. 2019. North Coast Anadromous Creeks Snorkel Fish Counts and Habitat Survey Data Summary 2018. Prepared for the City of Santa Cruz Water Department. Santa Cruz, CA.

Hagar, J., E. Bean, and C. Berry. 2017. North Coast Streams Limit of Anadromy. Prepared for the City of Santa Cruz. August 23, 2017.

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Appendix D

Cultural Resources Inventory, Evaluation, and Finding of Effect Report

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CULTURAL RESOURCES INVENTORY, EVALUATION, AND FINDING OF EFFECT REPORT FOR THE LAGUNA CREEK DIVERSION RETROFIT PROJECT

Prepared for:

City of Santa Cruz Water Department
212 Locust Street, Suite C
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Contact: Jessica Martinez-McKinney

and

U.S. ARMY CORPS OF ENGINEERS
San Francisco District, Regulatory Department
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Prepared by:

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JULY 2020

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APPENDICES

FIGURES

EXHIBITS

TABLES

Executive Summary

The City of Santa Cruz retained Dudek to complete a cultural resources inventory, evaluation and finding of effect report for Laguna Creek Diversion Retrofit Project (Proposed Project). The purpose of the project is to retrofit the existing Laguna Creek Diversion Facility (hereafter referred to as the Facility). To implement the proposed actions, permitting through the U.S. Army Corps of Engineers (USACE) is necessary. The USACE is 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 Corps requires an inventory of cultural resources within the project's area of potential effects (APE) in order to determine the presence or absence of historic properties and potential effects upon those properties.

This report included the following components: (1) a California Historical Resources Information System (CHRIS) records search conducted at the Northwest Information Center (NWIC) addressing the proposed APE plus a 0.25-mile radius; (2) a Sacred Lands File (SLF) search through the Native American Heritage Commission (NAHC) and outreach to Native American contacts with local information about cultural and tribal cultural resources in the vicinity of the APE; (3) a pedestrian survey of the project site for archaeological and built environment resources; (4) a historical significance evaluation of four historic era structures within the APE; and (5) an assessment of project-related impacts to historical resources in conformance with the California Environmental Quality Act (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.

The records search results indicated that there are no recorded archaeological resources within the APE and there are two previously conducted cultural resources technical investigations with some coverage reported within the APE.

Dudek completed an archaeological assessment for the Proposed Project consistent with Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800), CEQA Section 15064.5, PRC 5024, and applicable local regulations. The assessment included a records search for known archaeological resources and reports within 0.25 miles of the APE and a pedestrian reconnaissance of the land portion of the APE. The records search indicated that no archaeological resources are present in the APE. The SLF search was also negative. No new information regarding cultural and tribal cultural resources was obtained through the Native American outreach. In addition, the surface reconnaissance conducted within the APE on January 14, 2020 was uniformly negative. The results of the assessment show there are no historic properties of an archaeological nature in the APE and low potential for encountering unknown archaeological resources during the planned project construction. Dudek has no further recommendations regarding the discovery of archaeological resources within the APE.

Dudek also conducted an intensive-level pedestrian survey for built environment resources within the APE on January 14, 2020. Dudek recorded and evaluated all four historic era components of the Laguna Creek Diversion Facility located within the APE. None of the historic era structures that are part of the Facility are known to have been previously evaluated for the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), or the Santa Cruz County Historic Resources Inventory (SCCHRI). As part of this study, Dudek recorded and evaluated these water management structures that comprise the Facility under all NRHP, CRHR and SCCHRI criteria. The evaluation finds that the Laguna Creek Dam, is a well-preserved masonry water management structure dating to 1890. It is a physical example of early water management infrastructure in California. As such the dam appears individually eligible for listing in the NRHP Criterion A, CRHR 1, and Santa Cruz County Criterion 2 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 that supplied the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The other three components of the Laguna Creek Diversion Facility, the Diversion Flume/Intake Structure, the Transmission Pipeline, and the Chlorination Station building are not considered contributing elements of the Laguna Creek Dam. Additionally, these three structures do not rise to a level of significance where they could be found eligible under any of the NRHP or CRHR Criteria individually or as part of a district.

Therefore, the Laguna Creek Dam is considered a historic property under Section 106 of the NHPA and a historical resource under CEQA. Preparation of a detailed effects assessment recommends that the Proposed Project would have a less-than-significant impact on historical resources/no adverse effect on historic properties in the APE.

1 Introduction

This chapter provides a detailed description of the proposed Laguna Creek Diversion Retrofit Project (Proposed Project), and includes information about the location and setting; existing facilities and operations; background; project purpose and objectives; project design and components; construction schedule and activities; operations and maintenance; approvals and permits; and the Santa Cruz Water Department's (SCWD) Standard Construction Practices (see Figures 1 through 3: project location and project components). The chapter is based on the 30% design drawings and Basis of Design Report prepared by the City's design engineer, as well as other background studies prepared for the Proposed Project (B&V 2020a, 2020b; Wood Rodgers 2002). This chapter also presents the regulatory setting, description of the area of potential effect (APE) and presents project personnel.

1.1 Project Description

1.1.1 Project Location and Setting

The Proposed Project would be located in the community of Bonny Doon, California, in unincorporated Santa Cruz County, approximately 7 miles northwest of downtown Santa Cruz (straight-line distance) at an elevation of approximately 620 feet. The project site is located within the U.S. Geological Survey's Davenport Quadrangle. Figure 1 shows the project location and vicinity.

As shown in Figure 2, the approximately 2.1-acre project site contains the Laguna Creek Diversion Facility (Facility), which is operated by the SCWD and provides water from Laguna Creek to the SCWD's water supply system. The project site consists of the existing dam, intake structure, diversion flume, transmission pipeline, control building, access roads, and downstream plunge pool, as well as the surrounding area. The project site is approximately 0.1 miles upstream of the confluence with Reggiardo Creek and approximately 4 miles upstream of the Pacific Ocean.

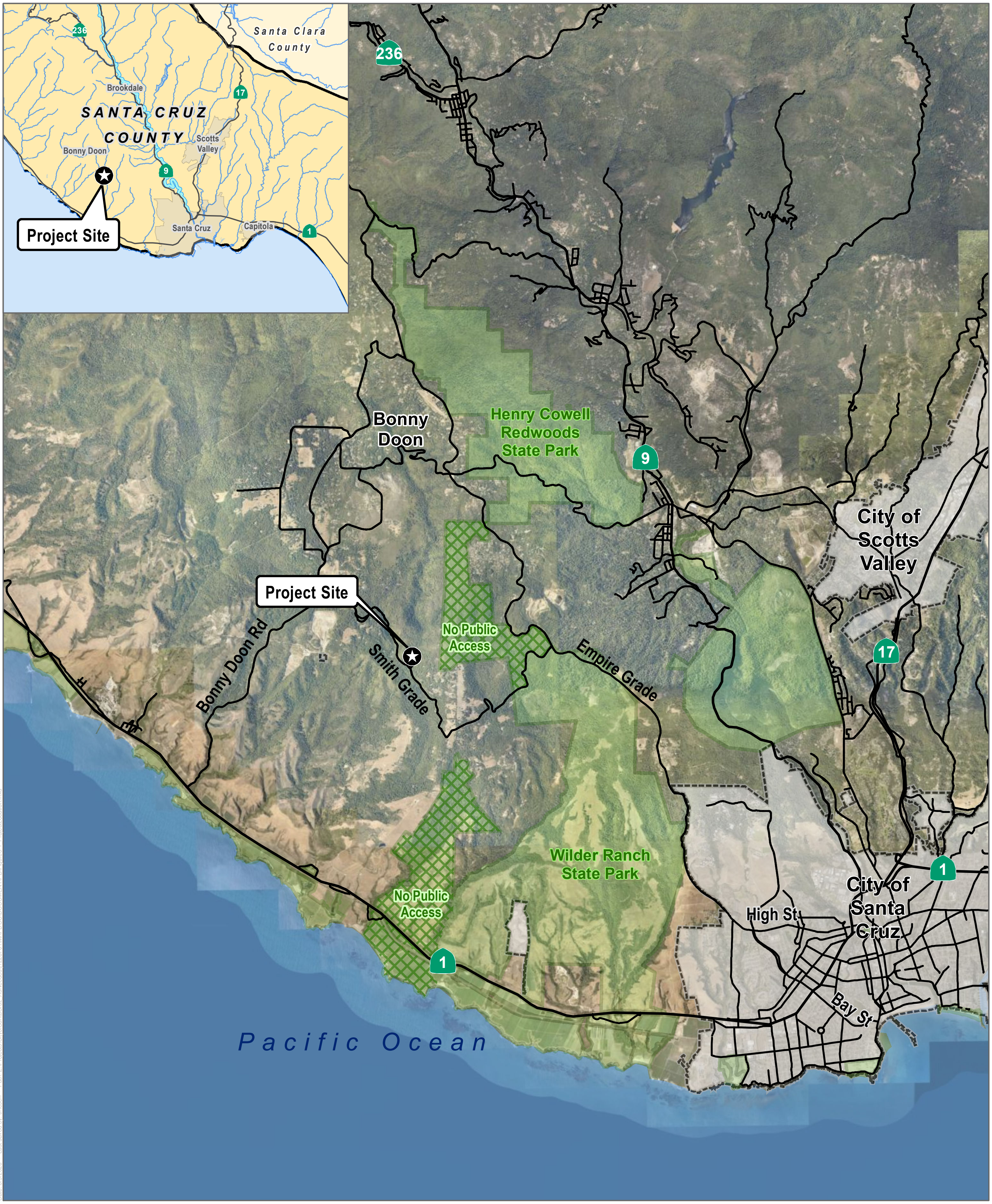
The project site is located on a portion of Assessor's Parcel Number 062-101-03, which is privately owned land. The City was deeded access and rights for operation of the Facility per an agreement from January 1889 (Henneuse 1889). Access to the project site is provided by three unimproved access roads off Smith Grade. The project site is approximately 5 miles from State Route 1 via Bonny Doon Road to Smith Grade, and approximately 12 miles from State Route 17 via State Route 1, Bay Street, and High Street/Empire Grade to Smith Grade.

The project site is surrounded predominantly by undeveloped, heavily forested land, with scattered, low-density residential development to the east, south, and west. The nearest residence to the project site is located along the southern edge of the project site, approximately 100 feet to the south across Smith Grade.

1.1.2 Existing Facilities

The Facility is one of four surface water collection/diversion sources supplying raw water to the City's North Coast System. The North Coast System provides approximately 15% to 35% of the City's overall water supply and contributes to systemwide operational flexibility due to its favorable water quality and year-round reliability. The

Facility consists of a concrete and limestone dam and diversion flume, a reinforced concrete intake structure and debris screen, two debris/sediment-control bypasses with pneumatically operated gate valves, an electronic diversion control valve, and a control building. The Facility directs water from Laguna Creek into the North Coast System through the Laguna Pipeline.



SOURCE: ESRI 2020, City of Santa Cruz 2020

FIGURE 1
Project Location and Vicinity
Laguna Creek Diversion Retrofit Project

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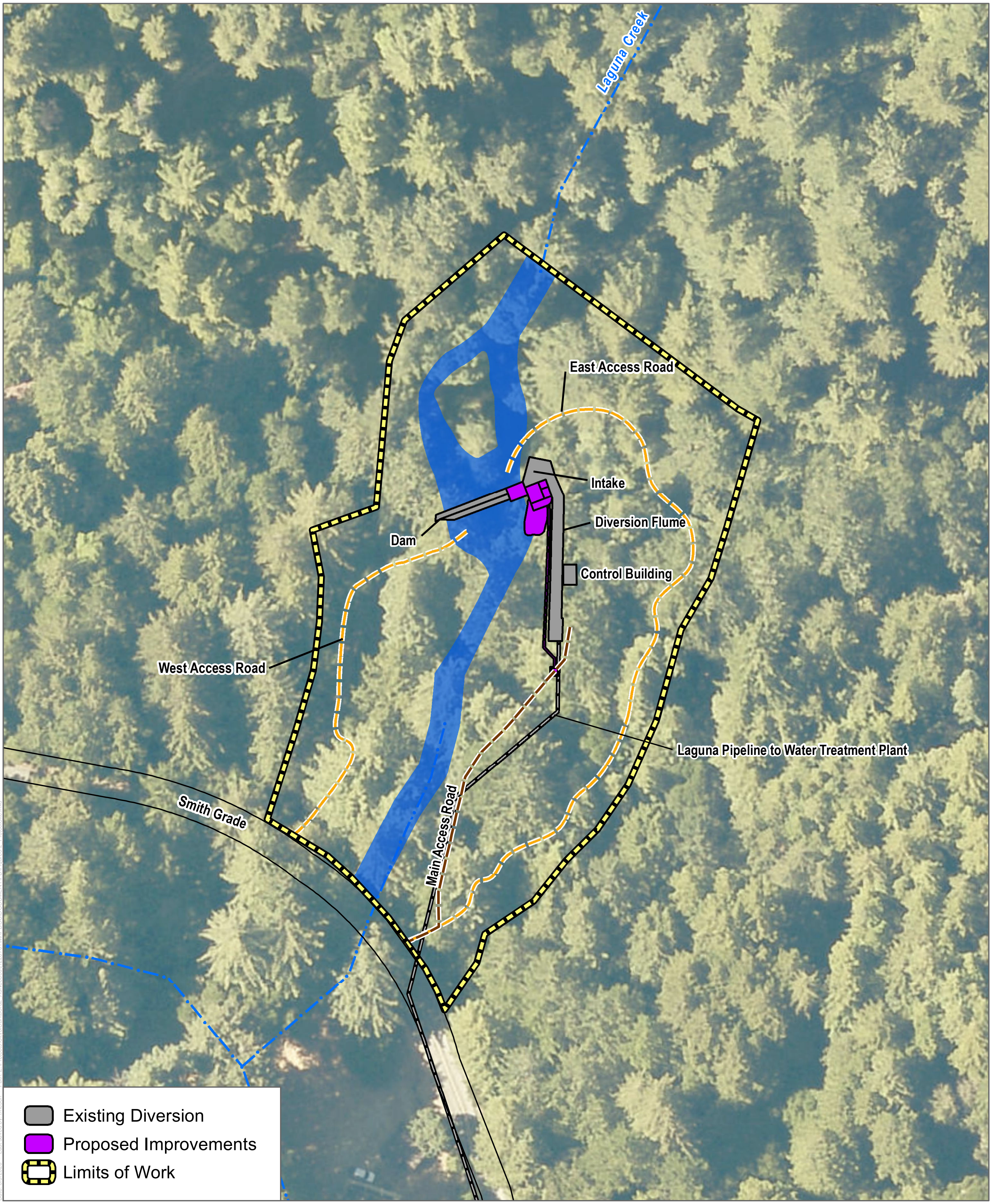
0 4,200 8,400 Feet



SOURCE: ESRI 2020, City of Santa Cruz 2020, Black & Veatch 2020

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0 40 80 Feet

FIGURE 2

Project Site

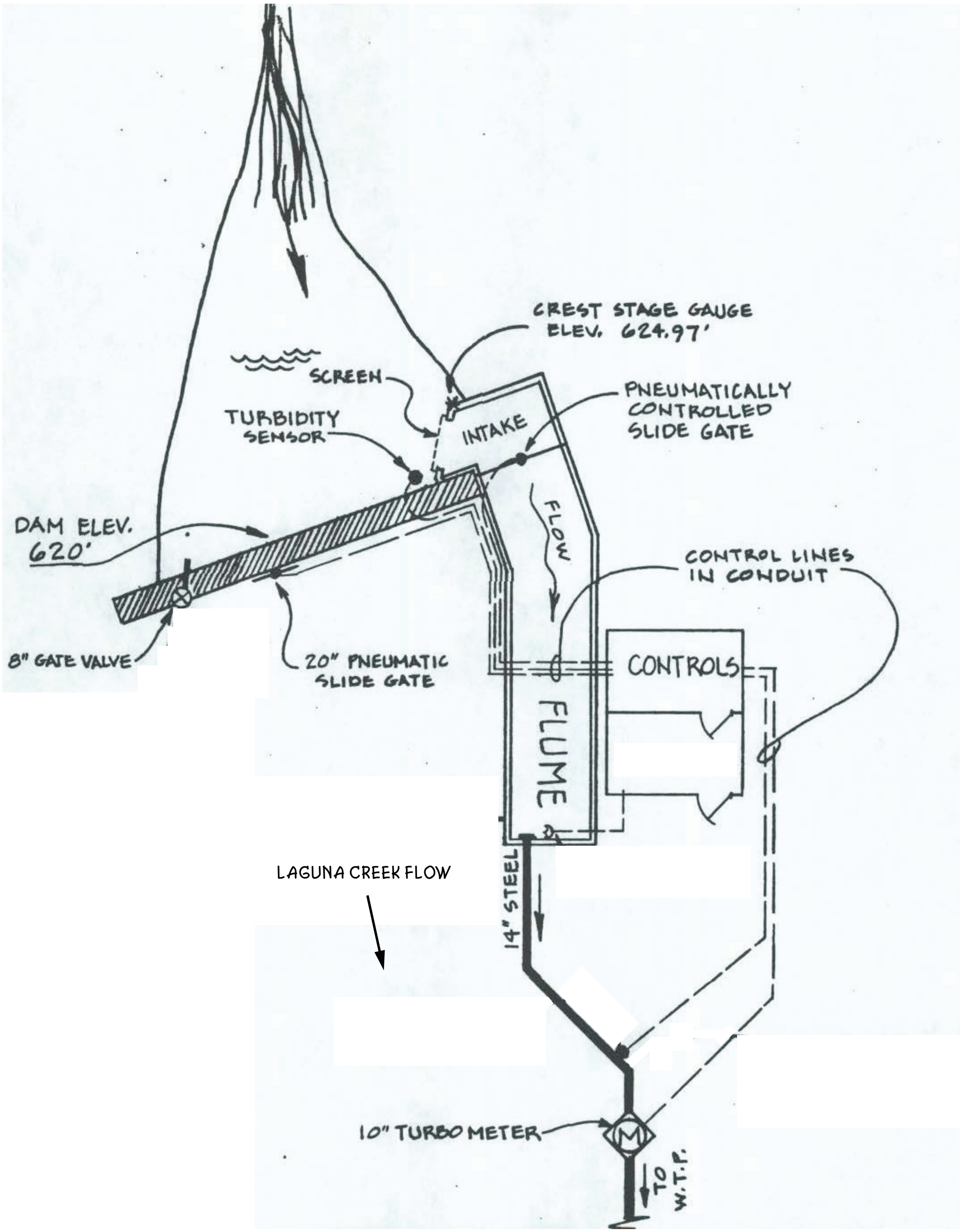
Laguna Creek Diversion Retrofit Project

The Facility was completed in 1890 and originally included the dam and diversion flume constructed from native stone and the cast iron Laguna Pipeline. Improvements have been installed subsequently to aid in the continued functionality of the Facility, including the installation of an iron sluice gate in 1897, replacement of the original Laguna Pipeline and construction of a chlorination station (now the control building) in 1965, modification of the intake structure and access platform built at the dam's left/east abutment in 1980, installation of sediment-control bypass valves in the dam in 1983, installation of a cribwall upstream of the intake in 1986, and fiberglass decking and handrails on the diversion flume in 2002. As described in this report, the dam is a physical example of pioneering water management infrastructure in California and appears individually eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, and the Santa Cruz County Historic Resources Inventory, and therefore, is considered a historic resource for the purposes of CEQA. Figure 3 shows the Facility layout and flows through the Facility. The dam is approximately 60 feet long and 12 feet high and spans the entire width of the Laguna Creek channel. The dam creates an impoundment upstream that passively directs water into a screened intake structure on the upstream side of the dam's left/east abutment (from the vantage point of looking downstream). The intake structures is connected to a concrete diversion flume that is approximately 100 feet long by 4 feet wide and channels the diverted water into the Laguna Pipeline, a transmission pipeline that conveys water approximately 13 miles via gravity to the City's Coast Pump Station, from which it is pumped for treatment at the City's Graham Hill Water Treatment Plant. The Laguna Pipeline consists of approximately 20,000 feet of 14-inch-diameter steel piping.

The Facility includes two sediment-control bypass valves in the dam that are operated pneumatically to move sediment past the dam. The rate at which water is diverted from Laguna Creek to the Laguna Pipeline is controlled either manually or via the City's supervisory control and data acquisition (SCADA) system by an electronic diversion control valve and measured by a propeller-type flowmeter. This system allows adjustments to the diversion rate to ensure that adequate in-stream flow levels are maintained downstream of the Facility, as further described below. A control building houses operational equipment. Piping from the flume also allows for flow to be returned to Laguna Creek to meet in-stream flow requirements, as needed. Laguna Creek passes under Smith Grade approximately 400 feet downstream from the Facility through a box culvert maintained by the County of Santa Cruz (County). The City has historically diverted water from Laguna Creek as needed throughout the year based on established pre-1914 senior water rights. However, since 2007, the City has limited its diversions to maintain beneficial in-stream flows suitable for various salmonid life stages within the downstream anadromous reaches of Laguna Creek, based on ongoing agreements with the California Department of Fish and Wildlife (CDFW). Although the City is capable of diverting up to approximately 7 cubic feet per second based on current infrastructure, during the various salmonid life stages, water diversions are limited from Laguna Creek and often unavailable, as flows naturally recede below the agreed upon in-stream flows of 2 cubic feet per second. There is no typical diversion rate or diversion season, since the available flows are highly dependent on rainfall volume and timing.

The existing operation and maintenance of the Facility includes:

- Weekly station checks. When the City is diverting water from Laguna Creek, the weekly site visit also includes cleaning the intake screens.
- Monthly visits to clean and calibrate turbidimeters, read the flow meters, test the generator, and conduct general landscape maintenance.
- Annual visits to calibrate flow meters, maintain valves and actuators, and service the generator.
- Road maintenance every 5 years.



SOURCE: City of Santa Cruz 2020, Black & Veatch 2020

FIGURE 3

Existing Schematic for the Facility

Laguna Creek Diversion Retrofit Project

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Since 2007, the City has conducted periodic sediment removal from behind the dam, consistent with the Streambed Alteration Agreement issued by CDFW for the purposes of sediment management at the site (Notification Number 1600-2013-0291-R3).

1.1.3 Project Background

SCWD serves approximately 24,535 connections in the approximately 20-square-mile service area, which includes the City of Santa Cruz, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, and coastal agricultural lands north of the City of Santa Cruz. The population within this service area is approximately 98,000 persons. The City's average water production is approximately 5 to 7 million gallons per day during the winter and approximately 7 to 10 million gallons per day during the summer. The Facility is a critical component of the City's water supply and operational and maintenance issues present challenges to its continued use, as described below.

The dam has impounded sediment and debris in the upstream reservoir, causing the streambed to fill in to the crest of the dam. Nevertheless, the overall condition of the Facility is satisfactory, with no signs of major deterioration or structural defects, and it has adequate strength and stability for continued service (B&V 2018). The following operational constraints related to management of sediment, fisheries protection, and maintenance challenges have been identified:

- In-Stream Transport of Sediment. The dam impedes natural movement of sediment downstream. Although two sediment-control bypass valves can be operated during periods of sediment transport (e.g., during storms) to allow sediment to pass through the dam, they are intermittently clogged with large materials during high-flow storm events and have limited capacity, resulting in sediment buildup behind the dam, often during one large storm event. Periodic dredging and sediment removal are required to conduct maintenance activities and to clear the intake screen of sediment.
- Fish Protection Consistent with Regulatory Requirements. The existing intake screen is aged and buried in sediment. The screen was designed to prevent entrainment of debris within the diverted water and has a woven-wire opening of approximately 0.5 inches. Weekly maintenance and cleaning of the existing intake screen is required to clear sediment from the intake structure when the Facility is in service.

  The existing screen panels do not meet current regulatory requirements for screening of non-anadromous fish species; screen openings are too large to eliminate the potential for entrainment of juvenile fish and other aquatic organisms. Although federally or state-listed anadromous fish species are not present in the project area due to several downstream natural barriers, Laguna Creek does contain populations of rainbow trout (*Oncorhynchus mykiss*). Fish habitat downstream of the dam has also been degraded by sediment impoundment.
- Maintenance, Safety, and Access. The location of the existing control building impairs access to the diversion structures by mechanized maintenance equipment, the diamond-plate cover on the existing flume requires confined-space entry procedures when staff need to enter the structure, and the Facility does not have permanent fall-protection infrastructure in place for use during dam maintenance.

Since the early 2000s, CDFW has corresponded with the City requesting improvements to sediment management and fisheries protection at the Facility. Potential improvements were analyzed at a programmatic level in the 2005 Program Environmental Impact Report (EIR) for the North Coast System Repair and Replacement Project (SCWD 2005). The 2005 Program EIR considered improvements to be implemented over a period of 15 to 20 years, including replacement of the existing intake screen with a self-cleaning screen system that meets CDFW specifications for protection of fish and other aquatic organisms, an automatically operated spillway gate based on changes in flow and turbidity to help flush sediment downstream, and pipeline rehabilitation or replacement. As analyzed in the 2005 Program EIR, construction activities involved a cofferdam and a temporary creek bypass system, dewatering, earthwork, reinforced concrete demolition and construction, metal work fabrication and installation, stone protection, and miscellaneous electrical and mechanical services. To address the aforementioned operational and maintenance constraints, the City is now pursuing the implementation of the Proposed Project and has developed project-level definition of the Proposed Project, which is the subject of this project-level EIR.

Furthermore, the City's Anadromous Salmonid Habitat Conservation Plan, which is under preparation, includes improvements at the Facility as a biological objective associated with operating facilities to enable unimpaired sediment transport dynamics. Specifically, the draft plan calls for modifying the Facility at Laguna within 10 years of the signed Incidental Take Permit to provide sediment transport during high flows. The Proposed Project is intended to meet this biological objective.

1.1.4 Project Purpose and Objectives

The project purpose and need and project objectives are described below.

1.1.4.1 Purpose and Need

The Proposed Project is necessary to allow the City's continued ability to utilize the Facility for delivery of high-quality water to the City's water treatment plant. The purpose of the Proposed Project is to improve the reliability of the City's water supply by addressing sediment transport issues, fisheries protection requirements, safe access, and changing environmental conditions (B&V 2020a). Specifically, the Proposed Project would prevent impounded sediment from clogging the intake and temporarily disrupting the function of the Facility. To address the operational and maintenance constraints described in Chapter 1.1.3, Project Background, the City has developed the Proposed Project, which is the subject of this project-level EIR. The Proposed Project would address these issues as follows:

- Instream Transport of Sediment. The Proposed Project would change the type and orientation of the water intake so that sediment would not obstruct water intake through the screen. Although the dam would remain in place and existing sediment would remain impounded behind the dam, the new system would be designed to allow for the movement of sediment past the dam in sync with the transport capacity of the creek, restoring natural fluvial functions of sediment transport and deposition that benefit downstream fisheries and aquatic habitats.
- Fish Protection Consistent with Regulatory Requirements. The Proposed Project would provide appropriate fish screening and improved ability to regulate the rate of change in water diversions so that fish do not become stranded by rapidly changing water levels in downstream stream reaches.
- Maintenance, Safety, and Access. The Proposed Project would provide a flexible approach to manage the quantity and quality of water that can be diverted, minimize the use of power, and provide for economical and operational feasibility. The Proposed Project would also allow for fine-tuned control of diversion rates and would include improvements for safe access to the Facility.

1.1.4.2 Project Objectives

Section 15124 of the California Environmental Quality Act (CEQA) Guidelines indicates that EIR project descriptions must include a statement of the objectives sought by the lead agency for that project. A clearly written statement of objectives helps the lead agency develop a reasonable range of alternatives to evaluate in the EIR and aids the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of that project. The objectives for the Proposed Project are as follows:

- Protect an important water supply for the City by addressing constraints at the Facility to maintain uninterrupted service and full system functionality.
- Improve environmental conditions at the intake with upgraded screen technology for fish protection and in downstream reaches by facilitating sediment movement to support aquatic species habitat.
- Improve overall operational efficiency to maximize surface water diversions by use of technology that allows for fine-tuned control of diversion rates to enhance the SCWD's ability to meet instream flow requirements and regulation of water levels downstream of the Facility.
- Improve safety and access at the Facility to facilitate the City's ability to maintain the Facility.
- Implement a project that is relatively cost-effective in terms of both capital and operation/maintenance costs and provides a good cost-benefit ratio.

1.1.5 Project Design and Components

The project design and key elements of the Proposed Project are described below.

1.1.5.1 Project Overview

As described above, the Proposed Project would improve the reliability of the City's diversion by allowing natural sediment transport past the dam and protecting fish species and habitat. The Proposed Project would maintain the maximum diversion rate at the Facility as described above (see Chapter 1.1.2, Existing Facilities) while enhancing the ability to fine-tune diversion rates in order to maintain sustained diversions while continuing to meet in-stream flow requirements.

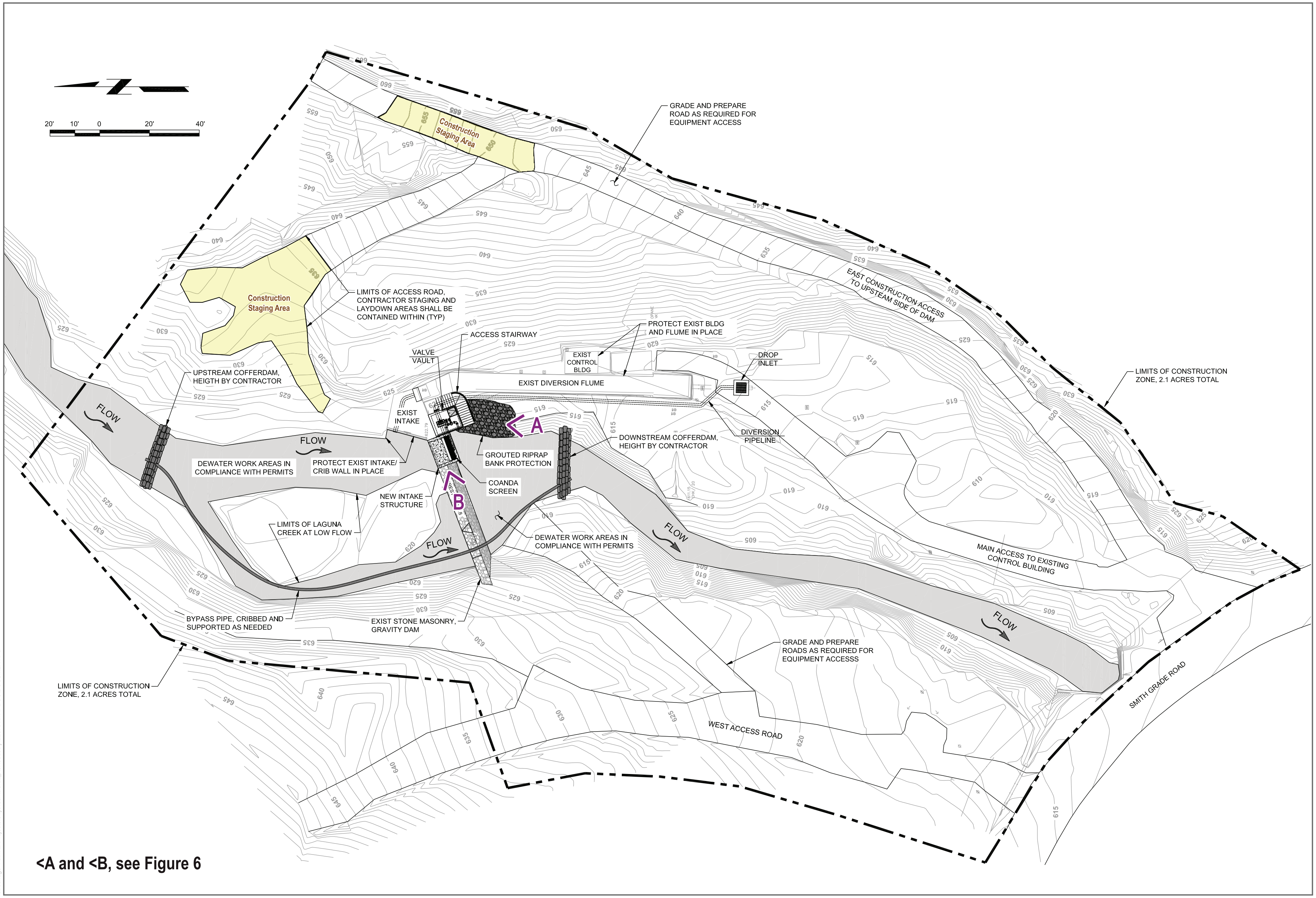
Once operable, the Proposed Project would concentrate the Laguna Creek flows over a newly created notch in the dam where the new Coanda screen intake structure would be installed on the downstream side of the dam's left/east abutment (from the vantage point of looking downstream). The Coanda screen would allow a controlled portion of the streamflow to fall through the screen while excluding a majority of sediments. The flow would collect in a chamber connected to a diversion pipeline that would extend approximately 100 feet downstream, alongside the existing diversion flume, and connect with the City's existing transmission pipeline. The rate of diversion would be regulated by a new diversion control valve. A separate blowoff piping system with valve and actuator would be installed to allow for the clearing of fine sediment that falls through the Coanda screen and into the chamber so that the sediment does not enter the intake pipeline. The control valve equipment would be installed within a concrete valve control vault along the creek bank.

As shown in Figure 4, Figure 5, and Figure 6, the Proposed Project would involve construction of a new intake structure with an embedded Coanda screen at the downstream face of the dam's left/east abutment. Other components of the Proposed Project would include installation of intake structure appurtenances, a new valve control vault and diversion pipeline, new monitoring and control equipment, riprap bank stabilization along the creek bank, and site access and safety improvements. Table 3-1 lists the key Proposed Project components that are described further below.

Table 1. Key Proposed Project Components

Component	Description	Approximate Dimensions (if applicable)
New Coanda Screen Intake Structure		
Support Structure	Reinforced concrete structure tied (or doweled) into existing dam	12 feet wide × 10 feet long × 12 feet tall
Coanda Screen	Stainless steel wedge wire plate screen (0.5-millimeter openings), accelerator plate, pre-manufactured housing	10 feet wide × 2.5 feet long
Other Features	Collection chamber, portion of diversion pipe (described below), sediment blowoff system	—
Valve Vault and Creek Bank Components		
Valve Vault and Control Valves	Cast-in-place concrete, reinforced; access hatches/actuator pedestals; butterfly valve and electric actuator on the diversion pipe	9.5 feet wide × 11.5 feet long x 10 feet tall
Vault Base	Structural concrete	Approximately 10 cubic yards (matching footprint of valve vault)
Access Stairs and Safety Improvements	Cast-in-place concrete, reinforced; removable handrails to provide access to downstream plunge pool; task lighting	Approximately 5 cubic yards (5 feet wide x 20 feet long)
Riprap Bank Stabilization	Grouted facing class riprap, 12-ounce non-woven geotextile fabric	Approximately 25 cubic yards (20 feet long x 10 feet wide)
Other Components		
Diversion Pipe	Welded steel pipe and polyvinyl chloride pipe	100 feet long, 18-inch-diameter pipe
Pre-Cast Drop Inlet	Pre-cast concrete inlet with 2-foot sump and cast-iron cover connecting new diversion pipe to existing Laguna Pipeline	4 feet × 4 feet × 8 feet deep
Power and Controls	Conduits, conductors, devices	—
Modified Existing Components		
Existing Intake	Install pipe for emergency diversion and backfill with concrete	—
Existing Sediment-Control Bypass Valves	Abandoned in place and capped	—

Source: B&V 2020a.



SOURCE: City of Santa Cruz 2020, Black & Veatch 2020

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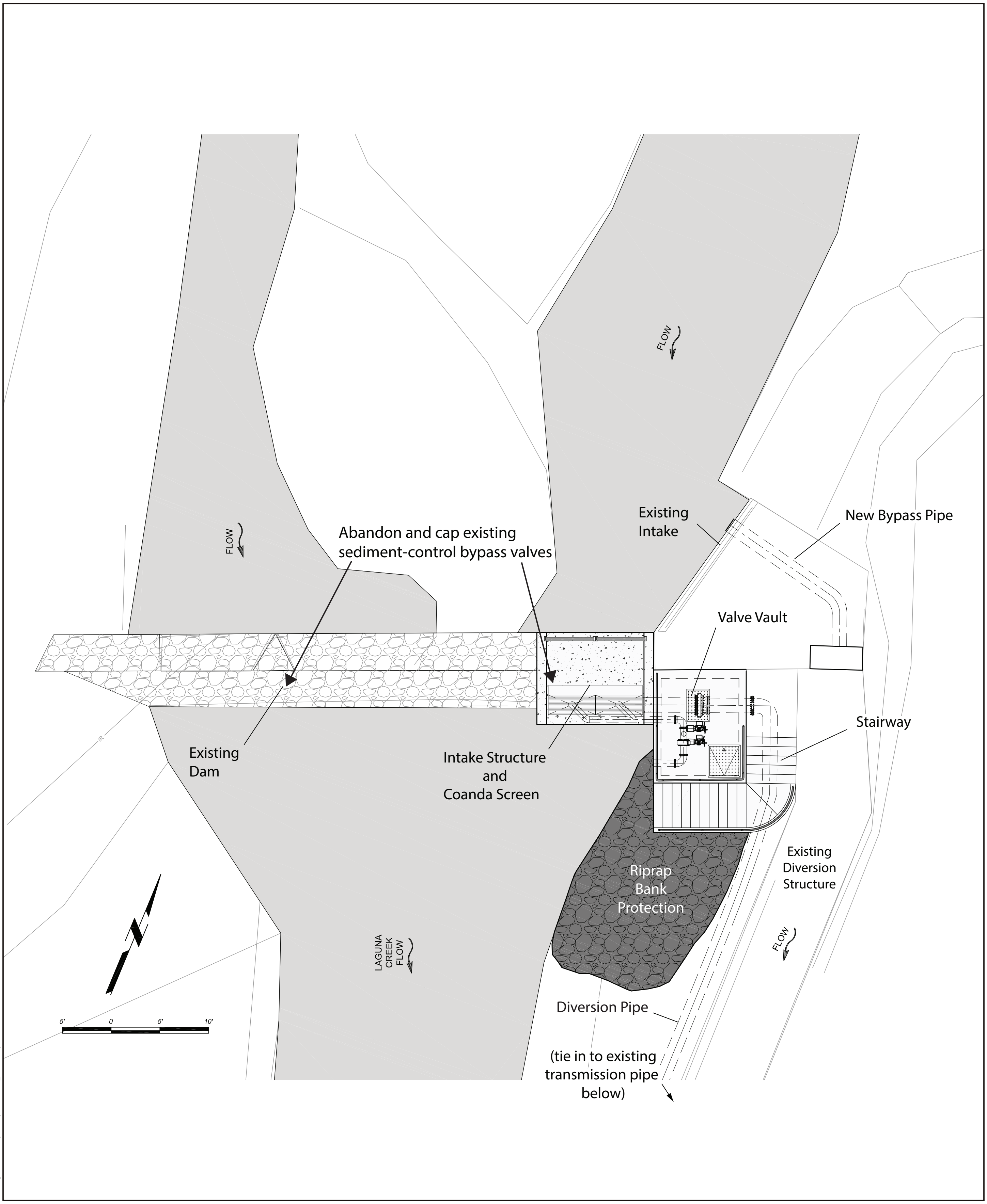
FIGURE 4

Proposed Site Plan and Construction Access/Staging

Laguna Creek Diversion Retrofit Project



SOURCE: City of Santa Cruz 2020, Black & Veatch 2020

FIGURE 5

Proposed Project (Plan View)

Laguna Creek Diversion Retrofit Project

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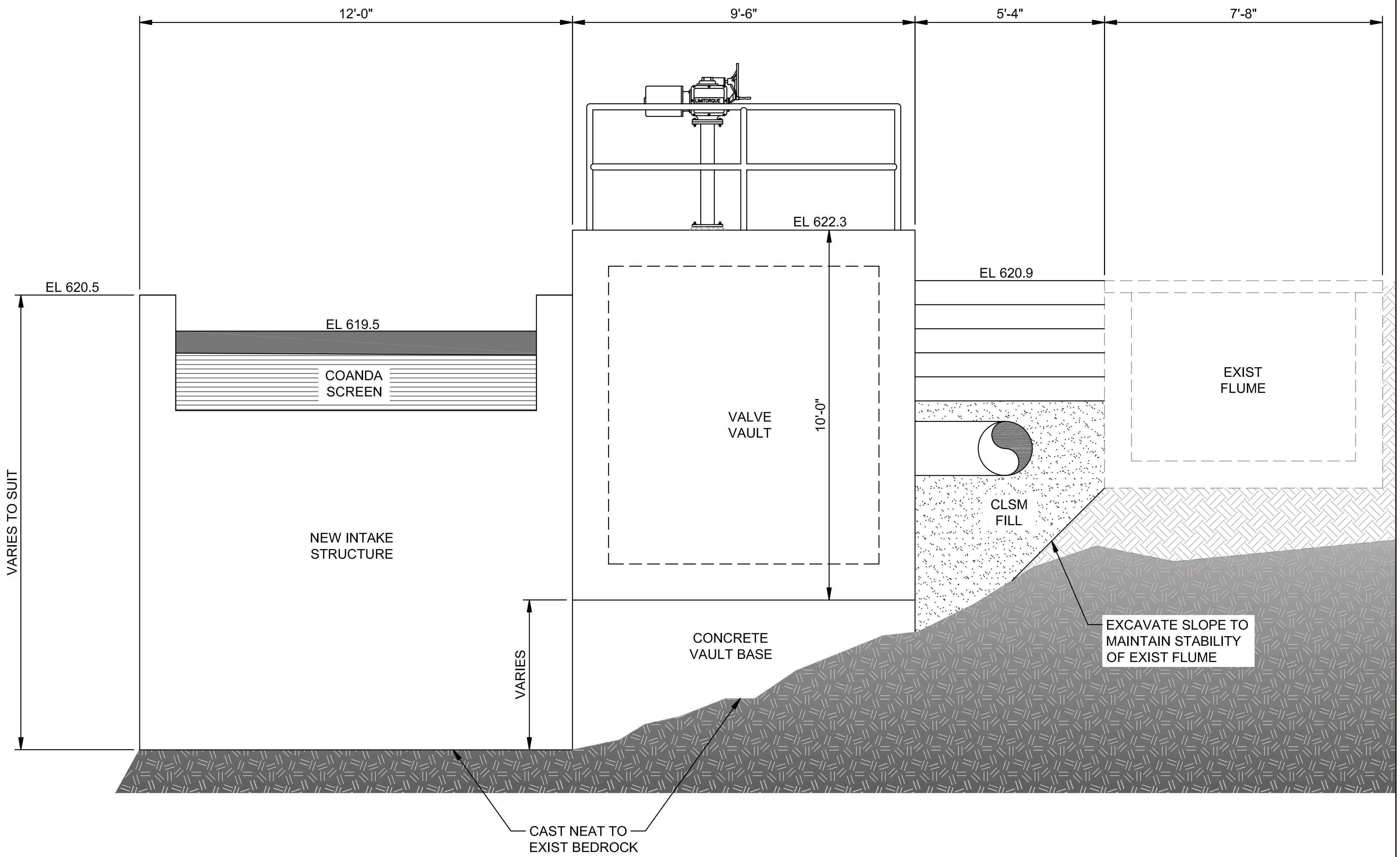
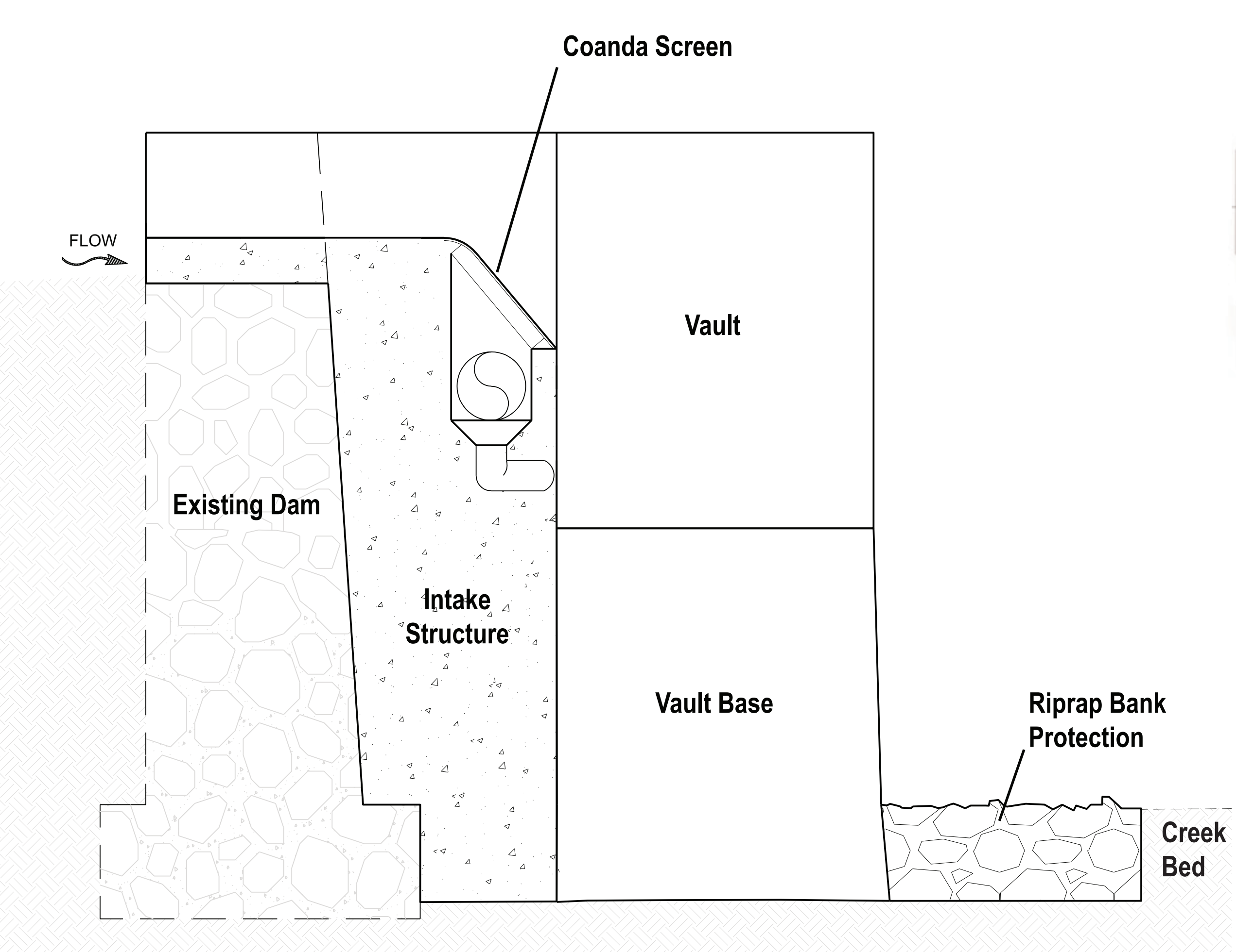
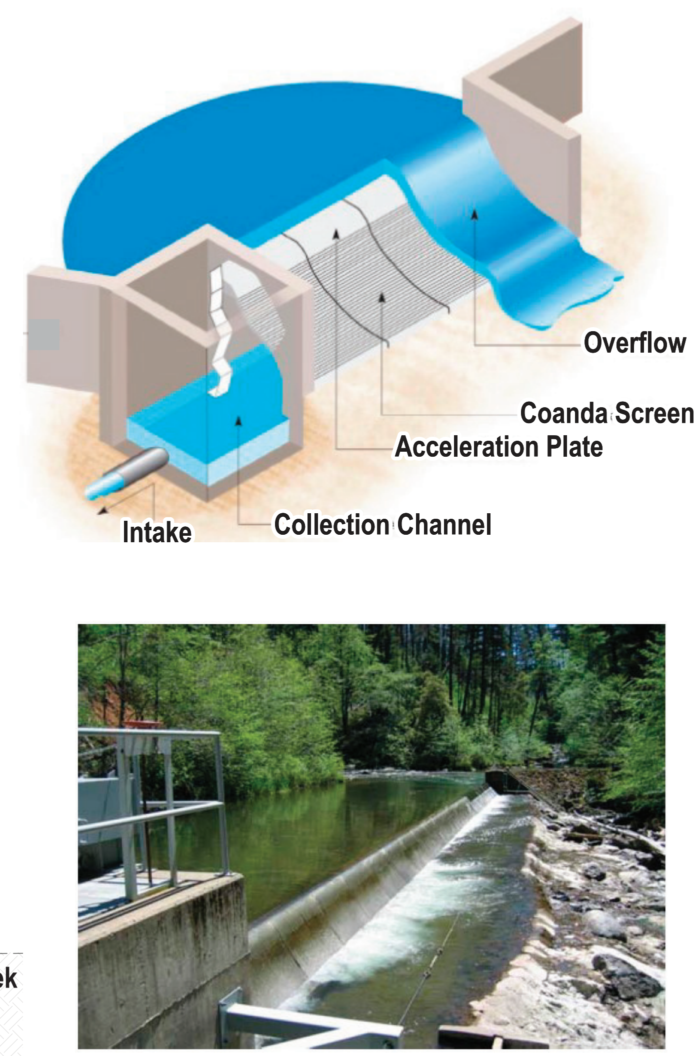


Intake Plan and Elevations
<A from Figure 4

(Dimensions are approximate.)



Proposed Facility Improvements (Cross-section)
<B from Figure 4



Coanda Screen Schematic Diagram and Example Photo

SOURCE: City of Santa Cruz 2020, Black & Veatch 2020

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FIGURE 6
Proposed Project (Section Views)

1.1.5.2 New Coanda Screen Intake Structure

The Coanda screen technology offers an efficient way of screening fine materials from diverted water with minimal clogging and maintenance and it is self-cleaning. The design and orientation of the screen allows the natural flow of the creek (hydraulic action) to keep material moving over it, and requires no moving parts. The design criteria for the Coanda screen are based on CDFW's fish screen criteria, which include considerations for structure placement, approach velocity, sweeping velocity, screen openings and porosity, and screen construction (CDFW 2002). See Figure 6 for images of the Coanda screen technology.

The Coanda screen technology features a screen that is steeply inclined at the downstream face of a dam. A Coanda screen consists of finely spaced, wedge-shaped wires that deflect a portion of the water to a collection chamber below the screen. Flows pass over the crest of the dam and across a solid steel plate, referred to as an accelerator plate because it creates an increase in the flow rate as water passes over the dam crest. A portion of the water then flows across and through the slotted Coanda screen panel. Flow that passes through the screen is collected in a collection chamber and by a diversion pipe to conveyed to the Laguna Pipeline. See Chapter 1.1.5.4, Other Components, for additional description of the diversion pipe.

The Coanda screen would be embedded within a concrete support structure on the downstream side of the dam's left/east abutment, with the face of the screen sloped steeply downward such that water would pass over it at a high velocity, transporting sediment and debris downstream while skimming thin layers of water that would be directed into the collection chamber below.

Installation of the Coanda screen would require a portion of the dam crest to be notched to channel the creek flow over the screen. When the creek flow is relatively low, approximately 7 cubic feet per second or less, water would flow entirely through the notch and over the screen. At higher creek flows, water would cascade over the dam crest as well as through the notch and over the screen.

A notch approximately 16 inches below the top of the dam and 12 feet wide would be cut in the dam. The new concrete intake support structure would be installed along the length of the notch at the downstream face of the dam. It would be approximately 12 feet wide (along the face of the dam), 12 feet tall, and 10 feet long (as it projects downstream from the dam). It would be tied to the bedrock and the face of the dam with rebar anchors that would be doweled into the dam. See Chapter 1.1.6, Project Construction, for additional details.

The Coanda screen technology would allow the intake screen to function regardless of sediment accumulation and buildup within the reservoir (i.e., upstream impoundment). The Coanda screen would divert some water that passes through the screen while the flow over it would transport the majority of entrained sediment downstream. Specifically, sediment greater than 0.25-millimeter grain size (50% of the screen opening size), which (based on previous sediment studies) characterizes the vast majority of the sediments found in Laguna Creek upstream of the Facility, would flow over the screen. Removal of smaller sediment that accumulates within the screen housing would be facilitated by a blowoff system incorporated into the design. Periodic manual brushing of the screen would occur to keep the intake operating as designed.

1.1.5.3 Valve Vault and Creek Bank Components

The valve vault and other improvements along the downstream side of the dam's left/east abutment (eastern creek bank) are described below.

1.1.5.3.1 Valve Vault

A concrete vault would be cast-in-place and installed along the eastern creek bank to house the control-valve equipment. The approximately 9.5-foot-wide by 11.5-foot-long valve vault would be installed along the creek bank along the left/east abutment of the dam and adjacent to the existing intake structure, in a location that is accessible to City staff for maintenance and operation. The valve vault base would be constructed of structural concrete and anchored to bedrock with rebar. A cement curb up to 12 inches in height may be installed along the top of the valve vault to confine the 100-year storm event within Laguna Creek and to keep new infrastructure from flooding.

As described above, water from the collection chamber below the Coanda screen would enter the diversion piping and then pass through the valve vault. Then the water would flow through the diversion pipe to the existing transmission pipeline as described further below. A new control valve would be installed to allow diversion rates to be regulated at fine intervals. The sediment blowoff piping would also be housed in the valve vault.

1.1.5.3.2 Access Stairs and Safety Improvements

The Proposed Project would include access and safety improvements including a cast-in-place concrete stairway (approximately 5 feet wide and 20 feet long) to provide access to the downstream plunge pool and guard rails at various locations within the Facility, such as along the creek bank, at the new intake structure, across the dam, and at the valve vault.

These improvements would allow City staff and contractors to safely conduct the City's streamflow monitoring program and regular biotic surveys, as well as to access the Coanda structure and dam for maintenance purposes (such as Coanda screen removal and/or cleaning of the chamber). Other safety features would include anchorage points for fall safety and task lighting along the valve vault and stairs. The lighting would be on timers and switches to provide lighting during emergency work.

1.1.5.3.3 Riprap Bank Stabilization

Limited reinforcement of the creek bank may be necessary and may entail installation of riprap bank stabilization at the east side of the creek to protect the bank from erosion. Stabilization of an area approximately 20 feet long by 10 feet wide (approximately 25 cubic yards) may be required.

1.1.5.4 Other Components

Other components of the Proposed Project including the diversion pipe, pre-cast drop inlet, and power and controls are described below.

1.1.5.4.1 Diversion Pipe

The new intake would be linked to a new diversion pipe that would extend approximately 100 feet downstream, which would be placed underground parallel to the existing diversion flume. Water from the collection chamber would be diverted into the new diversion pipe that would connect to the existing Laguna Pipeline downstream of the flume.

1.1.5.4.2 Pre-Cast Drop Inlet

A sediment trap structure would be installed at the interconnection of the new diversion pipe and the existing Laguna Pipeline within a pre-cast drop inlet feature that would allow for sediment removal using a hydro-vacuum truck or a hand-held shop vacuum, if needed.

1.1.5.4.3 Power and Controls

The Proposed Project would include additional electro-mechanical equipment for operations and remote-control capabilities. New monitoring and control equipment, including water quality sensors, water meters, valve actuators, and telecommunications, would be connected to the existing communications system and electrical distribution system on site to provide essential data for operations.

An in-line control valve and electric actuator would be included to regulate flow into the City's diversion downstream of the flume. New electrical circuits would be installed for powering, monitoring, and remotely operating the new control valve actuators. The Facility's existing electrical distribution and SCADA equipment are deemed sufficient to accomplish automation and control functions at the Facility. The existing control building and SCADA equipment would accommodate new equipment required by the Proposed Project. The existing single-phase electrical service and data-grade telephone line would continue to provide power supply and communication capabilities for diversion control and automation.

1.1.5.5 Modified Existing Components

The existing intake would be modified and decommissioned in place once the proposed improvements are implemented. A bypass pipe would be incorporated in the intake to allow for emergency diversion of water and the intake would be backfilled with concrete. This bypass pipe would extend from the intake to the existing diversion flume to allow water to be conveyed to the City's water treatment plant in the event that the new intake structure needs to be taken out of service for repair. A new cement curb up to 12 inches in height may be installed along the top of the existing intake to confine the 100-year storm event within Laguna Creek and to keep new infrastructure from flooding.

In addition, the two existing sediment-control bypass valves on the downstream face of the dam would be removed and the bypass pipes abandoned in place and capped as follows:

- At the dam's right/west sediment-control bypass valve (from the vantage point of looking downstream), the existing gate and actuator and its hood would be removed, and a blind flange—a circular steel plate covering the exposed end of the valve—would be installed on the end of the bypass pipe. The conduits and electrical components would also be removed including the metal conduit/cable across the face of the dam.
- The dam's left/east sediment-control bypass valve is at the location where the new intake structure would be installed. Prior to installation of the intake structure, the piece of the bypass pipe that protrudes from the dam and the actuator would be removed and the pipe would be backfilled with concrete.

1.1.6 Project Construction

This section describes the anticipated Proposed Project construction schedule, construction activities and methods, construction routes, spoils, equipment, and Standard Construction Practices.

1.1.6.1 Construction Schedule

Construction is projected to occur in 2021 upon completion of the environmental review process, approval of the Proposed Project by the City Council, and acquisition of the necessary permits. Construction would take place over approximately 3 months, planned to occur during the low-flow period (June to October). Construction work would be performed from 7 a.m. to 5 p.m. on weekdays. Work outside of these hours, including weekend work is not anticipated. However, if it is required, work outside of these hours would require approval from the SCWD Director.

It is expected work crews would generally consist of a staff of 5 workers during normal construction activities, possibly increasing to approximately 10 workers during concrete placements.

1.1.6.2 Construction Activities

Construction activities would generally include the following phases, which are described further in the section below: (1) improvement of access roads, site preparation, and mobilization; (2) installation of the cofferdam and temporary creek bypass system; (3) construction of the Coanda screen intake structure, including dam preparation, foundation work, and concrete formwork, and installation of the intake screen, piping, and valves; (4) modification of the existing intake and sediment-control valves; (5) installation of the valve vault; (6) installation of electrical; (7) installation of the access stairs and riprap bank stabilization; and (8) startup and testing, site restoration, and construction closeout. No blasting or pile-driving is required for construction.

The anticipated sequencing of construction activities for the purpose of the analyses in this EIR is listed below:

- Equipment mobilization to the site using ground transportation and development of access roads and staging areas.
- Installation of the temporary streamflow bypass system.
- Excavation on the upstream and downstream sides of the dam and notching the top of the dam to accommodate the Coanda screen, anchoring to the bedrock, formation of the new intake structure form with cement, and installation of the Coanda screen.
- Modification of the existing intake structure and sediment-control valves.
- Installation of the new valve vault and new sediment blowoff and diversion piping.
- Installation of electrical components.
- Testing of the new system.
- Backfilling of void space between the new valve vault and existing covered diversion flume, installation of stairs, and placement of riprap in areas where creek bank protection is required.
- Removal of temporary facilities, demobilization, site restoration, and revegetation of disturbed areas.

1.1.6.2.1 Access Road Improvements, Site Preparation, and Mobilization

Three private, unpaved roads on the site provide existing access from Smith Grade, as shown in Figure 4. These roads may be improved to allow access of equipment to the site, which may entail limited tree removal to accommodate road widening, grading, compaction, and placement of aggregate.

The east access road would provide construction access to the upstream side of the dam. The main gate and access road are well graded and would provide access to the existing control building. The west access road would be extended by approximately 100 feet to provide construction access to the downstream plunge pool from the west side.

In addition, construction staging/laydown areas would be established in areas that are already fairly level along the access roads, as shown in Figure 4. Staging areas would be used for storage of materials and products, treatment and storage of spoils, and equipment laydown. Clearing and grubbing would be completed for these areas and for the work area on the east side of the dam to allow for installation of the valve vault and riprap bank stabilization. Up to 20 trees including redwoods may need to be removed. During construction startup, equipment and supplies would be mobilized to the site on trucks, including a mobile office and porta-potties.

Based on the City's Standard Construction Practices, described further below in Chapter 1.1.6.3, Standard Construction Practices, best management practices would be installed where necessary to prevent soil migration into the creek channel; these best management practices would most likely include silt fence or straw wattles. Vegetation that is removed may be left on site at construction completion or hauled off site.

1.1.6.2.2 Cofferdam and Temporary Creek Bypass System

Construction would be performed in the summer and early fall when creek flows are typically at their lowest, and natural creek flows would be maintained at all times during construction by a temporary creek bypass system.

As shown in Figure 4, this system would consist of two cofferdams—one installed upstream and one downstream of the dam—and a 12-inch-diameter, approximately 240-foot-long high-density polyethylene bypass pipe. The cofferdam would be expected to consist of gravel-filled sacks and sandbags or an alternative technology such as an inflatable dam. Water would be impounded behind the upstream cofferdam and flow by gravity through the bypass pipe around the dam to a location below the construction area to the lower cofferdam, where it would rejoin the creek. To accommodate equipment access to the downstream face of the dam, the bypass pipe would be anchored using sandbags and buried near the west access route for vehicles.

Once the creek bypass system is functional, dewatering and leakage control pump systems would be installed in the construction work areas. Between the upstream cofferdam and the dam, a sump pit would be excavated to at least 1 foot below the lowest excavation point, which would be in front of the existing intake structure so that the construction area could be isolated from seepage. Additional spot pumping would also occur at the downstream side of the diversion dam. Dewatering and leakage control pumps would be electric submersible and be powered with electricity from the control building. To manage water quality from dewatering efforts during excavation activities, discharge piping from dewatering pumps would be treated appropriately prior to discharge back into the creek channel.

1.1.6.2.3 New Coanda Screen Intake Structure

The new Coanda screen intake structure would require excavation of creek materials upstream and downstream of the dam to allow the dam to be notched and the bedrock to be exposed, anchoring of the structure's foundation to the bedrock and dam, installation of rebar and pouring concrete for the structure, and placement of the Coanda screen and other intake components.

Excavation at the upstream side of the dam would be required to expose the base of the existing intake structure and the area along the dam where it would be notched for the new Coanda screen. Impounded materials upstream of the dam would be temporarily excavated approximately 3 feet at its deepest point and along the portion of the dam and existing intake. A mini-excavator is expected to be used to move the material away from the structures at safe temporary cut slopes. The downstream side of the dam would also be excavated to the bedrock for the Coanda screen concrete structure and foundation for the new valve fault.

As shown in Figure 5 and Figure 6, a notch would be incised into the crest of the dam adjacent to the existing intake on the left/east side of the dam facing downstream; the dam would be notched approximately 16 inches below the top of the dam for an approximately 12-foot width. The dam crest would be sawcut to score neat lines for stone masonry removal. The use of a wire saw would avoid excess material removal and would prevent unraveling of stone masonry beyond the limits of the new intake structure and the slurry would be captured using a shop vacuum system and off-hauled from the site. Scaffolding would be installed on the downstream side of the dam to support construction workers. After wire saw cutting is complete, the section of the dam to be removed would be demolished by hand with pneumatic hand tools. The remaining rubble from the notch of the dam would either be off-hauled or cleaned and used as riprap for bank stabilization, described below.

After removal of the notch is complete, the downstream face of the dam where the new intake structure would be installed would be water-blasted to remove debris. Surface cleaning of the dam would be performed to achieve the best bonding possible between the new concrete structure and the dam but would not be critical as the new intake structure is self-supporting. The pressure washing methods would avoid eroding the mortar; the contractor would be required to test washing methods prior to the work and develop the least impactful method of dam cleaning.

Rebar anchors would be secured with epoxy to the dam, on the exposed surfaces, and on bedrock for the Coanda structure foundation; these anchors would be covered by the new intake structure. Temporary timber formwork with would be used for forming the new concrete surfaces. Forms and rebar would be installed, the intake collection chamber and components would be embedded, and concrete would be placed using a line concrete pump. Once the intake structure is set, the Coanda screen would be installed.

1.1.6.2.4 Modifications to Existing Intake and Sediment-Control Values

The existing intake structure would be closed and abandoned in place, and a bypass pipe for emergency diversion would be installed before the structure is backfilled with concrete to provide connectivity between the creek and the existing diversion flume in case the City needs to bypass the new intake during repairs or an emergency. Holes would be drilled in the top of the existing intake structure to fill the void space with concrete around the new pipe. A blind flange would be installed at the upstream end of the proposed 18-inch-diameter pipe to allow emergency bypass flows, if needed, through the emergency diversion pipe to the existing diversion flume. A piece of the existing transmission pipeline that connects to the flume would be removed and capped for the new diversion pipe connection. In the event of an emergency, the cap would be removed and a spool piece of the pipe would be placed into the gap to allow water to flow from the flume into the transmission pipe and into the City's water system.

The existing sediment-control valve on the left/east side of the dam would be removed and the new pipe penetration would be integrated within the new intake structure. The existing sediment-control valve and pipe at the right/west side of the dam would be abandoned in place and blind flanged.

1.1.6.2.5 Valve Vault Installation

The valve vault would be embedded into the creek bank near the new intake but would be exposed or visible on the creek channel side. The foundation would have a stem wall configuration, and the vault and its foundation would be cast in place. The foundation would be anchored to bedrock with rebar.

Once the foundation for the new valve vault has been installed, mechanical installation would begin. The blowoff drain that would connect to the bottom of the Coanda collection chamber and piping and valves would be installed. The new diversion piping with diversion butterfly valve would be connected to the Coanda collection chamber and would extend parallel past the existing diversion flume to the existing Laguna Pipeline where it would connect via the pre-cast drop inlet. After vault construction is complete, valve stems, pedestals, and electric actuators would be installed. Hatches for the vault and handrails would be installed. The space between the new valve vault and the existing covered diversion flume would be backfilled with structural concrete.

1.1.6.2.6 Electrical Installations

Electrical work would begin with running conduits from the existing control building to the valve vault, followed by installation of the required electrical and communication panels. Power for the electrical equipment would come from the existing electrical drop and metered for 208 volts/Single Phase/100 ampere service. The electrical work would include wire pulling, terminations, and remote terminal unit/SCADA control panel upgrades. New lighting and grounding would also be installed to provide for nighttime safety if sight access is required during an emergency or other activity.

1.1.6.2.7 Access Stairs and Riprap Bank Stabilization

At the downstream end of the new valve vault, a stairway would be installed from the downstream pool up to the top of the valve vault. Once the stairs are cast, grouted riprap bank stabilization would be constructed along the creek bank where slope protection is required. The bank armoring would serve as a transition from the sloped profile of the stairway to the near vertical slope of the existing creek bank downstream.

1.1.6.2.8 Startup and Testing, Site Restoration, and Construction Closeout

After construction is complete, startup and testing would commence. Typical startup and testing activities include: circuit merger and continuity testing, local-manual equipment checks, loop testing (i.e., manually simulate an input at the control panel and verify appropriate output occurs). Demonstration testing (e.g., of the diversion and sediment bypass valves) may occur during winter/spring months under more representative streamflow conditions.

Final erosion control best management practices described in Chapter 1.1.6.3 would be installed in areas of disturbed soils. Disturbed soils would be stabilized with erosion control materials, and hydroseeded, hand-seeded, or replanted with some combination thereof. The cofferdam and bypass system would be removed, and creek flows would flow over the new Coanda screen. The mobile office and any other temporary facilities would be removed, and workers and equipment would be demobilized. The site would be restored to as near pre-project conditions as is practical. Restoration planting and tree planting would occur as required.

1.1.6.2.9 Construction Routes

Access for vehicles carrying materials, equipment, and personnel to and from the project site would be provided via existing roadways in the vicinity. The primary routes for construction traffic would likely be from State Route 1 via Bonny Doon Road to Smith Grade, or from State Route 17 to State Route 1, Bay Street, then High Street/Empire Grade to Smith Grade. Roadways in the immediate vicinity of the site, including Bonny Doon Road, Empire Grade, and Smith Grade, are winding, two-lane roads that traverse densely forested land. To facilitate transport of construction equipment, public roads could be closed temporarily, but would not be closed for extended durations during construction.

1.1.6.2.10 Spoils Disposal

Temporary excavation of material (approximately 10 cubic yards) upstream of the dam would be stockpiled on site and the material would be returned to its original location after construction completion. Spoils would be generated during excavation of material on the downstream side of the dam. Approximately 40 cubic yards of material would be excavated downstream of the dam; 10 cubic yards would be reused as engineered fill and 30 net cubic yards of excavated sediments would be hauled off site to the City's Resource Recovery Facility (landfill), approximately 10 miles away. Spoils generated from pipeline trenching and other project excavations would be hauled off site to a disposal location in accordance with state and federal regulations.

1.1.6.2.11 Construction Equipment

The Proposed Project would require use of heavy equipment such as excavators, drill rigs, forklifts, graders, tractors, loaders, backhoes, dumpers, and generators. Haul trucks would be used to transport materials to the site and to transport spoils off site to a permanent disposal location. Water trucks would also be used at the site. Appendix B summarizes equipment and assumptions used for each construction phase.

Construction worker vehicle trips would be approximately 5 one-way trips per day, with up to 18 one-way trips per day if multiple construction phases overlap (during less than a month period). Approximately 35 one-way haul truck trips would be required during the 3-month construction period, with two to three trips per week.

1.1.6.3 Standard Construction Practices

The City has identified standard construction practices, presented in this section that would be implemented by the City and its contractors during construction activities associated with the Proposed Project.

Erosion Control and Air Quality Control

1. Implement erosion control best management practices for all construction activities occurring in or adjacent to jurisdictional aquatic resources (resources subject to permitting under Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code Section 1600). These measures may include, but are not limited to, (1) installation of silt fences, fiber or straw rolls, and/or bales along limits of work/construction areas and from the edge of the water course; (2) covering of stockpiled spoils; (3) revegetation and physical stabilization of disturbed graded and staging areas; and (4) sediment control including fencing, dams, barriers, berms, traps, and associated basins.
2. Provide stockpile containment and exposed soil stabilization structures (e.g., Visqueen plastic sheeting, fiber or straw rolls, gravel bags, and/or hydroseed).

3. Provide runoff control devices (e.g., fiber or straw rolls, gravel bag barriers/chevrons) used during construction phases conducted during the rainy season. Following all rain events, runoff control devices shall be inspected for their performance and repaired immediately if they are found to be deficient.
4. Implement wind erosion (dust) controls, including the following:
   - Use a water truck;
   - Water active construction areas as necessary to control fugitive dust;
   - Hydro seed and/or apply non-toxic soil binders to exposed areas after cut and fill operations;
   - Cover inactive storage piles;
   - Cover all trucks hauling dirt, sand, or loose materials off site; and
   - Install appropriately effective track-out capture methods at the construction site for all exiting trucks.

Water Quality Protection

5. Locate and stabilize spoil disposal sites and other debris areas such as concrete wash sites. Sediment control measures shall be implemented so that sediment is not conveyed to waterways or jurisdictional resources (resources subject to permitting under Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code Section 1600).
6. Minimize potential for hazardous spills from heavy equipment by not storing equipment or fueling within a minimum of 65 feet of any active stream channel or water body unless approved by permitting agencies along with implementation of additional spill prevention methods such as secondary containment and inspection.
7. Ensure that gas, oil, or any other substances that could be hazardous to aquatic life or pollute habitat are prevented from contaminating the soil or entering waters of the state or of the United States by storing these types of materials within an established containment area. Vehicles and equipment would have spill kits available, be checked daily for leaks, and would be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Any gas, oil, or other substance that could be considered hazardous shall be stored in water-tight containers with secondary containment. Emergency spill kits shall be on site at all times.
8. Prevent equipment fluid leaks through regular equipment inspections.
9. Implement proper waste/trash management.

In-Channel Work and Fish Species Protection

10. Avoid activities in the active (i.e., flowing) channel whenever possible.
11. Isolate work areas as needed and bypass flowing water around work site (see dewatering measures below).
12. Personnel shall use the appropriate equipment for the job that minimizes disturbance to the channel bed and banks. Appropriately tired vehicles, either tracked or wheeled, shall be used depending on the situation.

General Habitat Protection

13. Avoid disturbance of retained riparian vegetation to the maximum extent feasible when working in or adjacent to an active stream channel.

14. Restore all temporarily disturbed natural communities/areas by replanting native vegetation using a vegetation mix appropriate for the site.
15. Require decontamination of any used tools and equipment prior to entering water ways.
16. A qualified biologist shall conduct a training-educational session for project construction personnel prior to any mobilization-construction activities within the project sites to inform personnel about species that may be present on site. The training shall consist of basic identification of special-status species that may occur on or near the project site, their habitat, their basic habits, how they may be encountered in the work area, and procedures to follow when they are encountered. The training will include a description of the project boundaries; general provisions of the Migratory Bird Treaty Act, California Fish and Game Code, and federal and state Endangered Species Acts; the necessity for adhering to the provision of these regulations; and general measures for the protection of special-status species, including breeding birds and their nests. Any personnel joining the work crew later shall receive the same training before beginning work.

Dewatering

17. Prior to the start of work or during the installation of temporary water diversion structures, capture native aquatic vertebrates in the work area and transfer them to another reach as determined by a qualified biologist. Capture and relocation of aquatic native vertebrates is not required at individual project sites when site conditions preclude reasonably effective operation of capture gear and equipment, or when the safety of the biologist conducting the capture may be compromised.
18. When work in a flowing stream is unavoidable, isolate the work area from the stream. This may be achieved by diverting the entire streamflow around the work area by a pipe or open channel. Coffer dams shall be installed upstream and downstream, if needed, of the work areas at locations determined suitable based on site-specific conditions, including proximity to the construction zone and type of construction activities being conducted. Cofferdam construction shall be adequate to prevent seepage to the maximum extent feasible into or from the work area. Where feasible, water diversion techniques shall allow streamflows to flow by gravity around or through the work site. If gravity flow is not feasible, streamflows may be pumped around the work site using pumps and screened intake hoses. Sumps or basins may also be used to collect water, where appropriate (e.g., in channels with low flows). The work area will remain isolated from flowing water until any necessary erosion protection is in place. All water shall be discharged in a non-erosive manner (e.g., gravel or vegetated bars, on hay bales, on plastic, on concrete, or in storm drains when equipped with filtering devices).
19. If a bypass will be of open channel design, the berm confining the channel may be constructed of material from the channel.
20. Diversions shall maintain ambient flows below the diversion, and waters discharged below the project site shall not be diminished or degraded by the diversion. All imported materials placed in the channel to dewater the channel shall be removed when the work is completed. Dirt, dust, or other potential discharge material in the work area will be contained and prevented from entering the flowing channel. Normal flows shall be restored to the affected stream as soon as is feasible and safe after completion of work at that location.
21. To the extent that streambed design changes are not part of the Proposed Project, return the streambed, including the low-flow channel, to as close to pre-project condition as possible unless the pre-existing condition was detrimental to channel condition as determined by a qualified biologist or hydrologist.

22. Remove all temporary diversion structures and the supportive material as soon as reasonably possible, but no more than 72 hours after work is completed.
23. Completely remove temporary fills, such as for access ramps, diversion structures, or coffer dams upon finishing the work.

Other Practices

24. 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.
25. 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.
26. Notify adjacent property owners of nighttime construction schedules. A Construction Noise Coordinator will be identified. The contact number for the Construction Noise Coordinator will be included on notices distributed to neighbors regarding planned nighttime construction activities. The Construction Noise Coordinator will be responsible for responding to any local complaints about construction noise. When a complaint is received, the Construction Noise Coordinator shall notify the City within 48 hours of the complaint, determine the cause of the noise complaint, and implement as possible reasonable measures to resolve the complaint, as deemed acceptable by the City.

Project-Specific Practices for Biological Resources

27. To protect fish, the following shall be implemented:
    - Relocate fish to suitable habitat during dewatering activities.
    - Maintain adequate water depth within downstream plunge pool. A depth of 3 to 4 feet is preferred to conform to the existing pool depth and minimize potential for degrading the suitability of the pool for trout habitat. Greater depth also reduces the potential for harm to fish passing over the Coanda screen and entering the plunge pool below.
    - Maintain soft bank stabilization features identified during project design that provides potential habitat for trout.

- Maintain native riparian shrubs and small trees in (as appropriate) and around riprap to provide overhead cover and shading when the plants have matured.

28. To protect trees that are retained on site, the following will be implemented:
    - Implement measures to minimize the potential for pathogen spread. Sanitize tools and equipment used in vegetation clearing including tree removal operations. If soil is collected on equipment, rinse equipment on site with a portable water tank or water truck, or at a designated rinsing station, to remove soil-borne pathogens and prevent transport to new sites. Alternatively, debris can be cleaned from tools/equipment via brushing, sweeping, or blowing with compressed air.
    - Implement additional prevention methods for sudden oak death and pitch canker. A qualified biologist, arborist, or forester should inspect loads of logs and equipment leaving the site to ensure that no host material is being transported without a permit if material is being transported to outside locations. If importing vegetative material for restoration purposes, ensure that material that has been produced in conformance with the latest horticultural standards in pest and disease avoidance and sanitation.
    - Implement recommendations from the Tree Inventory, Impact Assessment, and Protection Plan prepared for the Proposed Project.

Project-Specific Practices for Cultural Resources

29. To protect the dam during construction, the following will be implemented:
    - Impounded materials upstream of the dam would be temporarily excavated approximately 3 feet at the deepest point along the dam and the existing intake as needed to enable construction of the Coanda Screen intake and to abandon the existing intake in place. A mini-excavator is expected to be used to pull material away from the structures at safe temporary cut slopes.
    - Notching crest of dam. The notch in the crest of the dam shall be sawcut to score neat lines for stone masonry removal. The use of a wire saw would avoid excess material removal and would prevent unraveling of stone masonry beyond the limits of the new intake structure. Given the strength and hardness of the dam, the cuts may first be initiated using chisel hammers to remove materials as necessary.
    - Water-pressure washing of dam to remove debris. To remove loose material and organics such as dirt and moss water-blasting of the downstream face of the dam may be required. Prior to completing any water-blasting work, and at the direction of the City and under supervision of the Project inspector, the contractor shall test washing methods and develop the least impactful method of dam cleaning. The pressure washing methods shall avoid eroding the mortar. The contractor shall start with a low-pressure water wash, and if unsuccessful, use water of slightly higher pressure. As feasible, the test shall be conducted in an inconspicuous location. Pressure washing shall be limited to the area where the new intake structure will be cast, with approximately 1-foot buffer. A bonding agent such as a high solids, water-based emulsion admixture suitable for modifying Portland cement compositions, shall be spray applied to the dam face within the limits of the new concrete formwork for the new intake structure.
30. Documentation of the historical resource. The City will work with a qualified architectural historian to develop interpretative text and content for a dedicated webpage on the City's public website that explains the history of the site and its importance within the water management system. This text and supporting content (historic era images) will be utilized to develop a brochure with a one-time limited pressing for

distribution to local libraries and museums. In addition, the City will include a brief history of the project site as an entry in its Santa Cruz Municipal Utilities Review, a quarterly newsletter that is sent to all customers in the Water Service Area.

1.1.7 Operations and Maintenance

After construction and commissioning of the Proposed Project, the operations and maintenance activities would generally remain similar to existing operations, as described in Section 1.1.2, Existing Facilities, above. Operations and maintenance activities would entail 1) weekly station checks; 2) monthly cleaning, inspections of equipment, testing of the generator, and landscape maintenance; 3) annual inspections of equipment and service of the generator; and 4) road maintenance every 5 years. However, unlike existing conditions, the Proposed Project would not require periodic sediment removal from behind the dam.

It is anticipated that the operations and maintenance activities would also occur with a similar frequency and intensity of activities under existing conditions. Routine maintenance of the Facility would consist of a weekly visit to inspect the Facility operations. Basic clearing of fallen leaves, needles, and branches from the intake screen and on access roads would continue as is done under existing conditions. Plant restoration is anticipated to occur over approximately 2 to 5 years; landscape restoration activities would include weeding, monitoring, and installation of irrigation or monthly/biweekly watering, which could require water to be trucked periodically to the site. If nighttime emergency work is required, task lighting that would be installed as part of the Proposed Project as described above would be used. Emergency work could include use of a Vactor truck with vacuum and high-pressure water jetting capabilities for cleaning out sediment from the intake.

Propane for the emergency backup generator would continue to be stored on the site (250-gallon aboveground tank). No other fuels, gas, oil, solvents, petroleum products, etc. would be stored on site. Overall, during operation of the Proposed Project, demand for electricity and water, generation of solid waste and wastewater, and vehicle trips to the site for maintenance would not substantially increase over existing conditions.

Because the majority of sediment in the creek would flow over the screen and not fall through the screen, only a minor amount of sediment is anticipated to fall into the collection chamber within the intake structure (i.e. approximately 97% of entrained sediment would pass over the screen). An adaptive management plan would be developed for the flushing out of the minor amount of sediments that could collect within the intake structure. This plan would be developed in collaboration with applicable resource agencies.

The City would continue to maintain in-stream flow levels established with CDFW pursuant to ongoing agreements and ultimately would maintain the in-stream flow levels established by the Anadromous Salmonid Habitat Conservation Plan that is currently under preparation. As described above, these in-stream flows are intended to protect anadromous salmonids and other species.

1.1.8 Project Permits and Approvals

In addition to CEQA, the Proposed Project would be subject to compliance and permitting requirements under federal, state, and local regulations. The anticipated agency permits/approvals necessary for the implementation of the Proposed Project are described below.

The City of Santa Cruz is the lead agency and is responsible for approving and implementing the Proposed Project. The Santa Cruz City Council is the decision-making body tasked with certification of the Final EIR, approval of the Proposed Project, and adoption of CEQA findings and the mitigation monitoring and reporting program.

In addition to the City, other public agencies that have review or approval authority of the Proposed Project are outlined below. This Draft EIR is intended to provide the information and environmental analysis necessary to assist state permitting agencies (also known under CEQA as "responsible agencies") in considering the approvals required for the Proposed Project.

U.S. Army Corps of Engineers. Approval of a Clean Water Act Section 404 permit.

U.S. Fish and Wildlife Service. Endangered Species Act Section 7 consultation.

State Historic Preservation Office. National Historic Preservation Act Section 106 consultation.

California Central Coast Regional Water Quality Control Board. Approval of a Clean Water Act Section 401 Water Quality Certification Permit.

California Department of Fish and Wildlife. Approval of a California Fish and Game Code Section 1602 Lake or Streambed Alteration Agreement.

CAL FIRE. Minor conversion permit exemption per (14 CCR Section 1104.1[a]) for removal of trees and replacement with developed uses.

County of Santa Cruz. Approval of a Coastal Development Permit and an encroachment permit and County-approved Traffic Control Plan for ingress to/egress from the site.

Although the project site is located within the unincorporated area of Santa Cruz County, the City is not required to obtain building or grading permits from the County, pursuant to state law. California Government Code Sections 53091(d) and (e) provide that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local zoning and building ordinances.

1.2 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.

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.

State

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.

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.

4. 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.

Local

Santa Cruz County Municipal Code

Santa Cruz County Native American Cultural Sites and Paleontological Resource Protection

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

Santa Cruz County Historic Resources Inventory

Historic Resources in the County of Santa Cruz are termed and are under the aegis of the Planning Department, County of Santa Cruz. 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]).

- A 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
2. Represent one or more periods or styles of architecture typical of one or more eras in the history of the County; and
3. 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 is 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.

(D) Inventory Amendment. Amendment to the Santa Cruz County inventory of historic resources shall be by certified resolution of the Board of Supervisors following the review and recommendation of the Historic Resources Commission. Actions of both bodies shall be taken following public hearing with public notice provided pursuant to SCCC 18.10.223. Any action to amend the inventory of historic resources to add or remove a structure, site, object or district shall be based on the criteria provided in subsections (B) and (C) of this section, and may be initiated by a property owner or their representative, the Board of Supervisors, the Historic Resources Commission, County staff or any member of the general public. Inclusions of new historic resources in the inventory shall be accompanied by a completed historic documentation report which includes a California Department of Parks and Recreation Historic Inventory Form to document the historic and architectural values of the designated resource.

(E) Findings Required. The following findings must be made for inclusion or deletion of properties from the Historic Inventory:

(1) For Inclusion in the Historic Inventory.

(a) That the proposed historic resource, or group of structures, or features thereof have significant cultural, architectural, or engineering interest or value of an historical nature, as defined in subsection (C) of this section.

(b) That approval or modified approval of the application to designate a historic resource is consistent with the purposes and criteria of the County's historic preservation policies set forth in this chapter, and the Historic Resources Policies of the General Plan.

(2) For Deletion from the Historic Inventory.

(a) That the proposed historic resource, or group of structures, or features thereof no longer have significant cultural, architectural, or engineering interest or value of an historical nature, as defined in subsection (C) of this section.

(b) That approval or modified approval of the application to delete a historic resource is consistent with the purposes and criteria of the County's historic preservation policies set forth in this chapter, and the historic resources policies of the General Plan.

(F) Recording of Certified Resolution Establishing the Historic Resource Designation. Within 90 days after an historic resource has been included in the Santa Cruz County historic resources inventory by the Board of Supervisors, the Planning Director shall cause to be filed for record with the County Recorder a certified resolution establishing the historic resource designation specifying the names of the owners of record, a legal description of the property, a description of the historic resource and its historic and/or architectural value, and a statement that the historic resource so described is subject to the provisions of this chapter. A copy of the recorded certified resolution shall be sent to the property owner.

(G) Documents. Following the Historic Resources Commission's and Board of Supervisor's acceptance of an historical documentation report, three archival copies with original black and white photographs shall be submitted by the applicant and shall be placed on permanent file by staff with the Santa Cruz County Planning Department, the County Historic Museum and the UCSC McHenry Library, Special Collections.

(H) Pending Designations. Once an amendment to the Inventory of Historic Resources has been initiated to designate a property as an historic resource, no permit may be approved for any project affecting the historic resource on property until either:

(1) Final action has been taken to reject the amendment; or

(2) Approval of a historic resource preservation plan by the Historic Resources Commission has been obtained. [Ord. 4922 § 1, 2008].

- Chapter 16.42.060 discusses the development procedures for designated historic resources as follows:

(A) Applications for Historic Review. Applications for historic resource preservation plan approval or sign review shall be filed with the Planning Department in accordance with the procedures of SCCC 18.10.223, and the administrative application requirements as established by the Historic Resources Commission.

(B) Demolition and Relocation.

(1) Application Requirements. For projects involving demolition of the historic structure, or involving relocation of an historical structure, the application submittal shall also include:

(a) A special inspections report from the County Planning Department on the condition of the structure; and

(b) An historical documentation report prepared according to guidelines established by the Historic Resources Commission. The report shall contain the following:

(i) Information which supports the claim that preservation is not feasible due to the deteriorated condition of the structure or object, or would create exceptional hardship, or is necessary to alleviate a dangerous condition.

(ii) Provisions to preserve the historic values of the structure or object by documentation and/or preservation of artifacts and building materials.

(c) Provisions to offer the structure to the general public for removal or dismantling for salvage at no cost or remuneration to the applicant. The availability of the structure shall be advertised by means of an one-eighth-page display ad in a paper of general circulation in the County of Santa Cruz, at least twice during a 30-day period. The advertisement shall include the address at which the structure proposed for demolition is located, information as to how arrangements can be made for relocation (through moving or dismantling) of the structure proposed for demolition, and the date after which a demolition permit may be issued. Evidence of this publication must be submitted prior to issuance of a demolition permit. This is not applicable to projects involving the relocation of the historic resource on the same site.

(2) Processing. Demolition applications shall be processed as follows:

(a) The complete demolition of the entirety of a landmark or contributing resource shall require a public hearing and recommendation by the Historic Resources Commission and a public hearing and final action by the Board of Supervisors.

(b) The partial demolition, as defined in SCCC 16.42.030(C), of a landmark or contributing resource shall require a public hearing and final action by the Historic Resources Commission. The Historic Resources Commission may, at their discretion, refer the final action to the Board of Supervisors.

(c) Lesser demolition, not meeting the definition of “demolition” in SCCC 16.42.030(C), of a landmark or contributing resource may be approved or denied without public hearing by the Planning Director. The Planning Director, at his or her discretion, may refer the final action to the Historic Resources Commission.

(C) Alteration.

(1) Criteria for Projects Involving the Exterior Alteration of a Historic Resource. A historic resource preservation plan for alterations and changes to the exterior of an historical structure or object shall conform to the following criteria:

(a) Every reasonable effort shall be made to provide a compatible use for a property that requires minimal alteration of the building, structure, or site and its environment, or to use a property for its originally intended purpose.

(b) The distinguishing original qualities or character of a building, structure, or site and its environment shall not be destroyed. The removal or alteration of any historic material or distinctive architectural features should be avoided when possible.

(c) All buildings, structures, and sites shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create an earlier or later appearance shall be discouraged.

(d) Changes which may have take place in the course of time are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected.

(e) Distinctive stylistic features or examples of skilled craftsmanship which characterize a building, structure, or site shall be treated with sensitivity.

(f) Deteriorated architectural features shall be repaired rather than replaced, wherever possible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features substantiated by historic, physical or pictorial evidence, rather than on conjectural design or the availability of different architectural elements from other buildings or structures.

(g) The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials should not be utilized.

(h) Every reasonable effort shall be made to protect and preserve archaeological resources affected by, or adjacent to, any project.

(i) Alterations and additions to existing properties shall not destroy significant historical, architectural or cultural elements or materials, and shall be compatible with the size, scale, color, materials, and character of the property, neighborhood or environment.

(j) Whenever possible, new additions or alterations to structures shall be done in a manner so that the essential form and integrity of the structure would be unimpaired.

(2) Processing. Alteration applications shall be processed as follows:

(a) Alteration applications shall require a public hearing before the Historic Resources Commission.

(b) Minor historic alteration project applications may be approved or denied without public hearing by the Planning Director. The Planning Director, at his or her discretion, may refer the final action to the Historic Resources Commission.

(D) New Construction. Historic resource preservation plans for construction of new structures on historic properties or in historic districts shall conform to the following criteria:

(1) The location, siting and size of new construction on an historical property shall not detract from the historic character of the property, and between existing buildings, landscape features and open space.

(2) All structures shall be designed in proportion and integrated into the historic character of the property or district by the use of compatible building materials and textures, construction methods, design, and color.

(3) The size, location and arrangement of new on-site parking or loading ramps shall be designed so that they are as unobtrusive as possible and preserve the features of the property or district.

(4) Ingress and egress, and internal traffic circulation shall preserve the historic features of the property.

(5) Landscaping should be provided in keeping with the character and design of the historic site, property or district.

(6) Disturbance of terrain around existing buildings or elsewhere on the property should be minimized to reduce the possibility of destroying unknown archaeological materials. Where any proposed land alterations may impact important archaeological resources, a professional archaeological survey shall be provided and its recommendations implemented to mitigate potential impacts as provided for in Chapter 16.40 SCCC.

(E) Sign Approvals. Plans for all new signs and alterations to existing signs located on an historical structure, or located on an historical property, or located in an historical district, except for historic landmark plaques as approved by the Historic Resources Commission or changes in sign copy, shall be submitted to the Planning Director. No historic resource preservation plan is required for this review. Signs shall conform to all other County Code requirements and adopted sign design guidelines.

(F) Development Applications Involving Historic Resources. When plans for a project affecting an historic resource are required by this section to obtain an approval or a recommendation by the Historic Resources Commission, all applications for permits authorizing development of the project shall be deemed incomplete until the Historic Resources Commission approval or recommendation has been granted and documentation of such action is submitted with the permit applications, except as provided in subsection (G) of this section.

(G) Concurrent Processing. Where the Planning Director determines that processing time for a permit will not be adversely affected, the Director may authorize the acceptance of a permit application as complete for processing concurrently with the Historic Resources Commission review and action required by this chapter.

(H) Historic Resources Commission Hearing Procedure. When an application for historic review is determined by Planning Department staff to be complete it shall be forwarded with any other information of record to the Historic Resources Commission for their review and subsequent action. Except for minor historic alteration projects, minor demolition as described in subsection (B)(2)(c) of this section, and sign review, each completed application for a historic resource preservation plan approval and associated recommendation shall be considered for review and action by the Historic Resources Commission at a public hearing. Notice of all hearings shall be given pursuant to SCCC 18.10.223. The Commission may continue a hearing from the original hearing date in order to request additional information, conduct a site inspection, require that a professional historian and/or archaeologist prepare the historical documentation report, or for any other reason determined to be necessary by the Historic Resources Commission.

(I) Historic Resources Commission Action. Following the public hearing on an application, the Historic Resources Commission may approve a historic resource preservation plan, or historic documentation report, by an affirmative vote of three or more of the Commission members. In order for the Commission to approve or conditionally approve the historic resource preservation plan, all the following findings must be made:

(1) That the historic resource preservation plan is consistent with the purposes and goals of this chapter and the County General Plan;

(2) That the historic resource preservation plan is in conformance with the requirements of this chapter; and

(3) That the historic resource preservation plan, if implemented, will preserve and maintain the cultural and historical heritage of the County and/or further cultivate the knowledge of the past.

The Historic Resources Commission shall deny the historic resource preservation plan if one or more of these findings cannot be made.

(J) Final Project Approval. When an historic resource preservation plan is required by this section, no final County approval shall be given to a land division, development permit, building permit, demolition permit, land clearing permit or grading permit for a project affecting an historical structure, object, property, site or district, unless an historic resource preservation plan for the protection of the historic resource has been approved by the Historic Resources Commission, the project is in conformance with the approved plan, and development will commence prior to the expiration of the Historic Resources Commission approval. Final inspection clearance on project permits or improvement plans shall not be granted unless the completed project complies with all provisions of the historic resource preservation plan.

(K) No Project Authorization Granted. The Historic Resources Commission's approval of a historic resource preservation plan, historic documentation report or sign recommendation does not authorize any development rights or grant permission to proceed with project development; such actions can only be authorized through the approval and issuance of project permits pursuant to other provisions of the County Code.

(L) Expiration. An approved historic resource preservation plan shall remain valid for a period of two years from the date of approval by the Historic Resources Commission unless the Commission specifies a longer period of time. Time extensions as provided for in SCCC 18.10.133(A) may be subsequently granted by the Historic Resources Commission upon application prior to expiration of the plan approval.

(M) Environmental Review. When an environmental impact report (EIR) is required for a development project affecting a designated historic resource, the Historic Resources Commission shall be consulted in establishing the scope of the EIR and for comments on the draft EIR and historic resource mitigation measures. [Ord. 4922 § 1, 2008].

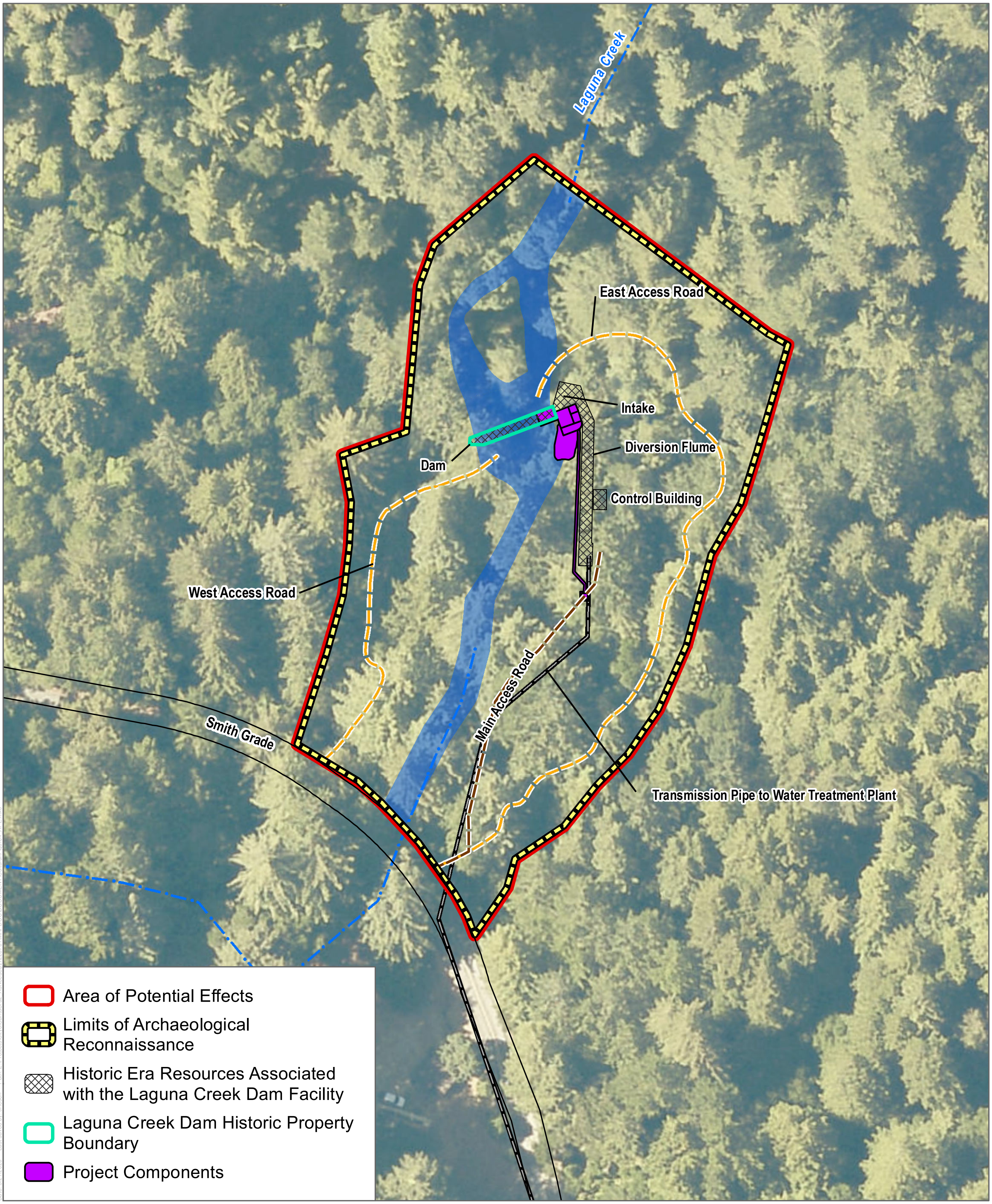
1.3 Area of Potential Effect

The 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 Cultural Resource APE, presented in Figure 7, Cultural Resources 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 Facility boundary within the limits of work for the project illustrated on Figure 1. Any new disturbances of the area surrounding the APE will require further study to determine potential adverse effects.

The only built environment resources located in the APE that have a potential to be impacted by the project are those related to the Facility, including the Laguna Creek Dam, the Diversion Flume/Intake Structure, the Transmission Pipeline, and the Chlorination Station building. A section of the Reggiardo Creek Pipeline, a 10-inch iron blow off pipe (Exhibit 1) (see Chapter 5.1.2 for a description) is also present within the APE where it briefly transects the dam. The Reggiardo Creek Pipeline is not considered a component of the Facility because it maintains a distinct development history. Most importantly, the Proposed Project does not include any actions related to the pipeline, 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 pipeline to be effected by the Proposed Project. Additionally, proposed alterations to the dam will not directly or indirectly result in any adverse effects to the pipeline. As there is no possibility that the Reggiardo Creek Pipeline will be effected by the proposed undertaking it is not included in the APE. The Reggiardo Creek Pipeline was therefore not evaluated for historic significance under NRHP, CRHR or SCCHRI criteria as a part of this report.

Exhibit 1. West end of the Laguna Creek Dam showing where the segment of the Reggiardo Creek Pipeline (white arrow) crosses over the dam, view looking northwest (DSCN4837).



SOURCE: ESRI 2020, City of Santa Cruz 2019, USGS 2019

DUDEK

0 40 80 Feet

FIGURE 7

Cultural Resources Area of Potential Effects

Laguna Creek Diversion Retrofit Project

1.4 Project Personnel

Archaeological Resources: John Schlagheck is an archaeologist with 9 years cultural resources management experience along California's Central Coast with a focus on the greater Monterey Bay and San Francisco Bay areas. Mr. Schlagheck acts as principal investigator, field director, and project manager for projects under local, state (CEQA), or federal (Section 106) regulations. He meets the Secretary of the Interior's Standards for prehistoric and historical period archaeology and his extensive work experience includes Phase I survey, Phase II evaluation, and Phase III data recovery projects.

Built Environment Resources: Fallin Steffen is an Architectural Historian with 4 years of professional 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 resource-appropriate and city-wide historic contexts, and historical significance evaluations in consideration of the NRHP, CRHR, and local designation criteria. 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.

Kathryn Haley is a senior architectural historian with over 15 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 has prepared numerous Historic Resources Evaluation Reports (HRERs) and Historic Property Survey Reports (HPSRs) for the California Department of Transportation (Caltrans). Ms. Haley also worked on the California High-Speed Rail, San Jose to Merced, and Central Valley Wye Project Sections; leading the built environment survey, conducting property specific research, preparing the Draft Historic Architectural Survey Report (HASR) as well as co-authoring the environmental section for Cultural Resources. She meets the Secretary of the Interior's Professional Qualification Standards for historian and architectural historian. Ms. Haley has also assisted in preparation of Historic Properties Inspection Reports (condition assessments) under the direction of the Naval Facilities Engineering Command (NAVFAC) in accordance with Section 106 and Section 110 of the National Historic Preservation Act. Moreover, Ms. Haley has served as project manager, coordinator, historian, and researcher for a wide variety of project. She is also experienced in the preparation for National Register nominations, as well as, Historic American Building Survey (HABS), Historic American Engineering Record (HAER), and Historic American Landscape Survey (HALS) documents

2 Background Research

2.1 CHRIS Records Search

In order to identify historic properties located within the APE that might be affected by the proposed undertaking, Dudek defined a study area that includes the APE and a 0.25-mile buffer to identify previously recorded resources and cultural reports near the APE. On December 2, 2019, Dudek archaeologist, Sarah Brewer, B.A., conducted the records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University (NWIC File No. 19-0932). The CHRIS search also included a review of the NRHP, CRHR, California Inventory of Historic Resources, historical maps, and local inventories. The results of the **Confidential** Record Search are summarized below and included in **Appendix A** and available upon request.

Previous Technical Studies

The records search results indicated two previously conducted studies with some coverage reported within the APE and one previously conducted studies within a 0.25-mile radius of the APE (Table 2).

Table 2. Previously Conducted Cultural Resources Technical Studies within the Area of Potential Effect and 0.25-mile Radius

Report No.	Authors	Year	Title	Publisher
Within APE				
S-3888	Jean Stafford	1977	Preliminary Archaeological Reconnaissance of the Coast Transmission Mains Expansion Project, Santa Cruz County	Jean Stafford
S-4006	Jean Stafford	1979	Preliminary Archaeological Reconnaissance of Mary C. Booker Timber Harvest Plan, Santa Cruz County	Jean Stafford
Within 0.25-mile Radius of APE				
S-10393	Mark Hylkema	1988	Archaeological Survey Report, Lands of Williams, Santa Cruz County, California Forest Improvement Program, 88/89-1-SCR 650 (California Department of Forestry)	San Jose State University

Previously Conducted Cultural Resources Technical Studies within the APE

S-3888

In 1977, Jean Stafford reported results from a preliminary archaeological reconnaissance for a water main expansion project by the City of Santa Cruz Water Department. As the water main project included new facilities at the Facility, the reconnaissance included a substantial portion of the current APE. Regarding archaeological resources near the dam Stafford wrote, “The reconnaissance failed to reveal any archeological resources around the dam area or on adjacent roads” (Stafford 1977:4). Regarding the Laguna Creek Dam she wrote, “The dam is considered by the City of Santa Cruz Water Department to be of historical value and it has already been photographed and submitted for acceptance and registration as a historical water works site…" (Stafford 1977:4). It is important to note that it appears that no formal recordation or designation regarding the dam as a historical resource was filed. As of the date of this report, no prior recordation or evaluation was located. The Laguna Creek Dam Facility is formally evaluated in Chapter 5 of this report.

S-4006

Jean Stafford (1979) completed a general archaeological reconnaissance for a timber harvest plan that included property immediately adjacent to the Facility to the east, west and north. Stafford did not report any new archaeological resources in the vicinity of the dam. In recognition of the dam's historical value, Stafford recommended a 50-foot exclusion zone around the dam to prevent inadvertent adverse impacts.

Previously Recorded Cultural Resources

There are no previously recorded resources within the APE or within the 0.25-mile buffer.

2.2 Native American Coordination

Native American Information Outreach

On February 3, 2020, Dudek sent a request to NAHC for a search of their Sacred Lands File (SLF) for the vicinity of the APE. The SLF is a list of properties important to Native American tribes. On February 4, 2020, 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 cultural and tribal cultural resources near the APE.

In order to obtain any relevant information from local tribes, Jessica Martinez-McKinney, City of Santa Cruz, sent letters via mail and email to all five of the Native American contacts provided by the NAHC on March 16, 2020. The email sent to the Chairperson of the Indian Canyon Mutsun Band of Costanoan, Ann Marie Sayers, was returned due to an invalid email address.

On March 18, 2020, Patrick Orozco, Chairman of the Costanoan Ohlone Rumsen-Mutsen Tribe contacted Jessica Martinez-McKinney by email. Mr. Orozco indicated he is aware of five Native American sites in the area (CA-SCR-13, -14, -15, -16, and -58). Mr. Orozco asked that these sites not be disturbed. No additional Native American contacts have responded to the outreach letters as of June 26, 2020. A complete record of the Native American outreach effort is included in **Appendix B.**

NHPA Section 106 Consultation

U.S. Army Corps of Engineers is the federal lead agency for compliance with NHPA Section 106 regulations. As part of the Regional General Permit application review, USACE conducted a Sacred Lands File search and the required Section 106 Native American consultation through the Native American Heritage Commission directly from the USACE District office in San Francisco. The regulatory contact for the Native American consultation is Frances Malamud-Roam, USACE Regulatory Department, San Francisco, CA, (Phone: 415-503-6792).

2.3 Other Interested Party Correspondence

On April 9, 2020 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, and the San Lorenzo Valley Museum. The letters briefly described the Proposed Project and requested information about cultural resources near the project area. One response from the Santa Cruz Museum of Natural History was received on May 5, 2020. No other responses have been received to date. Copies of all correspondence to and from interested parties are located in **Appendix C.**

2.4 Building Development and Archival Research

Santa Cruz Museum of Art and History

Dudek staff visited the Santa Cruz Museum of Art and History (MAH) on January 15, 2020 and viewed documents and photographs related to the Facility and the development of water infrastructure in Santa Cruz housed in their archives. The materials reviewed during this visit were used in the preparation of Chapter 3, Historic Context, of this report.

Santa Cruz Public Library

Dudek staff visited the Main Branch of the Santa Cruz Public Library on January 14, 2020 and viewed both physical and digital source material related to the Facility and the development of water infrastructure in Santa Cruz. The materials reviewed during this visit were used in the preparation of Chapter 3, Historic Context, and Chapter 5, Significance Evaluation of this report.

Santa Cruz Water Department Archives

Santa Cruz Water Department staff provided Dudek with a selection of materials related to City ownership of the Laguna Creek water rights, the development of the Laguna Creek Dam, and modifications to the dam and appurtenances overtime. These materials were incorporated throughout this report and used in the preparation of Chapter 3, Historic Context, and Chapter 5, Significance Evaluation of this report.

California State Library, California History Room

Dudek staff visited the California History Room at the California State Library on February 26, 2020 and reviewed materials related to the general development water infrastructure in California, the City of Santa Cruz, and the Facility site. The materials reviewed during this visit were used in the preparation of Chapter 3, Historic Context, of this report.

University of California, Santa Cruz – Map Library Collections

Dudek staff reviewed the digital University of California, Santa Cruz Map Library Collection for information related to the ownership of property surrounding the Facility and the pipeline. The reviewed materials were used in the preparation of Chapter 3, Historic Context, of this report.

Historical Newspaper Review

Dudek reviewed historical newspapers from Santa Cruz covering the development of water infrastructure in Santa Cruz, the development of the Facility and pipeline in an effort to understand the development of the historic property and the biography of the contractors involved in the construction of the built features. These documents were used in the preparation of Chapter 3, Historic Context, 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. Unfortunately, while the water facilities are described in detail on the title page of each edition, the subject property does not fall within the mapped area of the City.

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: 1940, 1948, 1953, 1964, 1968, 1982, 1991, 2005, 2009, 2010, 2012, 2014, and 2016. Due to the remote setting and dense forest surrounding the site, the Facility was not visible in any of the reviewed aerial photographs. Therefore, the following table discusses the development of the areas surrounding the site (NETR 2020; UCSB 2020).

Table 3. Historical Aerial Photograph Review of the Laguna Creek Diversion Facility and the Surrounding Area

Photograph Year	Observations and Findings
1940	Smith Grade and the Facility access road to the east of Laguna creek are both established and visible by the time of this photograph. Smith Grade appears to be paved and includes wide shoulders on either side of the road. To the northwest of the dam site is a clearing containing two groupings of small agricultural buildings and a sizable orchard. To the southeast of the dam site is a very large clearing featuring a range of orchards and fields between separate groups of residential and farm buildings.
1948	The heavily forested appearance of the site remains consistent with the 1940 photograph. The vegetation along Smith Grade has filled in and the wide shoulders are no longer visible.
1953	Appearance of the site is consistent with the previous photograph.
1968	Appearance of the site is consistent with the previous photograph. A complex of new dirt roads are now present to the east of the creek.
1982	The large clearing to the southeast has been significantly infilled with vegetation and it does not appear to maintain and agricultural use any longer. A quarry is now present to the west of the dam site.
1991	Smith Grade and the Facility access road are no longer visible and the clearing to the northwest is now significantly infilled also. The quarry has grown significantly in size.
2005	The image quality is poor, so many details are obscured. Overall, the appearance of the site appears to be consistent with the previous photograph.
2009–2016	No discernable changes.

3 Historic Context

The following historic context addresses relevant themes concerning the history of the subject property. It begins with an overview of the prehistoric and ethnographic history of the area, followed by an overview of the development of Santa Cruz County and the City of Santa Cruz, and concludes with a discussion of the historical development of the Facility.

3.1 Environmental Context

The project site lies approximately 600 feet above mean sea level on upper Laguna Creek in the south central portion of the Santa Cruz Mountains. The project site is approximately 0.1 miles upstream of the confluence with Reggiardo Creek and approximately 4 miles upstream of the Pacific Ocean. Upstream of Reggiardo Creek, Laguna Creek flows south through several relatively steep canyons with ridgelines between 700 to 800 feet above the creek channel. Adjacent land uses are primarily low density residential with an ecological reserve and some recreation areas in the general vicinity.

Vegetation includes the redwood forest regime dominated by redwood (*Sequoia sempervirens*) but with close proximity to the mixed hardwood forest regime (Küchler 1977). The Natural Resources Conservation Service (NRCS) maps show Lompico-Felton complex, 50-75% slopes soil type, within the project area (USDA 2019). Geology of the area is described as Miocene (Oligocene to Miocene) marine rocks containing sandstone, shale, siltstone and conglomerate (USGS 2019). The region has a Mediterranean climate, with warm dry summers and cool wet winters.

3.2 Prehistory

The APE lies within the territory that was occupied by the Costanoan or Ohlone people prior to European contact. The term Costanoan refers to people who spoke eight separate Penutian-stock language groups and lived in autonomous tribelet communities between the vicinities of the city of Richmond in the north to Big Sur in the south. The Awaswas tribelet occupied the Santa Cruz area at the time of European contact (Levy 1978).

New information into the lifeways of pre-contact Californians are elucidated through continued ethnographic and archaeological studies. Early European explorers between 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. Many of the studies, such as those conducted by John P. Harrington (1942) and C. Hart Merriam (1967), 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 of archaeological sites. Costanoan/Ohlone descendants are often invited to participate in decisions about treatment of their ancestral sites as well as to 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) presents 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 the last 10,000–12,000 years, aka, the Holocene, and divides that span into six different periods. Researchers distinguish these periods by perceived changes in prehistoric settlement patterns, subsistence practices, and technological advances. These adaptive shifts are recognized by differences in temporally discrete artifact assemblages, site locations, and site types. Table 4 summarizes the cultural chronology presented by Jones et al. (2007).

Table 4. 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

* Following Jones et al. 2007.

Paleo-Indian

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 found 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 fluted points have been found in the northern Central Coast—Monterey, Santa Cruz, and San Mateo counties. Possible evidence for Paleo-Indian occupation is reported at CA-SCR-38/123, at Wilder Ranch (Bryne 2002), and CA-SCR-177 in Scotts Valley (Cartier 1993). The traditional interpretation of Paleo-Indian lifeways is that people were highly mobile hunters who focused subsistence efforts on large mammals. In contrast, Erlandson et al. (2007) proposes a "kelp highway" hypothesis for the peopling of the Americas. Proponents of this model argue that the earliest inhabitants of the region focused their economic pursuits on coastal resources. Archaeological sites that support this hypothesis are mainly from the Santa Barbara Channel Islands. Some scholars hypothesize that Paleo-Indian sites in the Bay Area/ northern Central Coast region may exist, but have been inundated as a result of rising ocean levels throughout the Holocene (Jones and Jones 1992).

Millingstone

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, cores and core-cobble tools, thick rectangular (L-series) Olivella beads, and a low incidence of projectile points, which are 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 at CA-SCR-60/130, 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. Similar to the Paleo-Indian era, archaeologists generally view people living during the Millingstone era as highly mobile.

Early

The Early Period corresponds with the earliest era of what Rogers (1929) called the “Hunting Culture.” According to Rogers, the “Hunting Culture” continues through to what is termed the Middle-Late Transition in the present framework. The Early 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 practiced previously (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 include less temporally diagnostic Contracting-stemmed and Año Nuevo long-stemmed points, and bone gorges. Ground stone artifacts are less common relative to flaked stone tools when compared with Millingstone-era sites.

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 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)

Middle

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), and CA-MNT-229 at Elkhorn Slough (Dietz et al. 1988), CA-SCR-9 and CA-SMA 218 at Año Nuevo (Hylkema 1991).

Jones et al. (2007) discuss the Middle Period in the context of Rogers’ “Hunting Culture” because it is seen as a continuation of the pattern that begins in the Early Period. The pattern reflects a greater emphasis on labor-intensive technologies that include projectile and plant processing. Additionally, faunal evidence highlight a shift toward prey species that are more labor intensive to capture, either by search and processing time or technological needs. These labor-intensive species include small schooling fishes, sea otters, rabbits, and plants such as acorn. Jones and Haney (2005) offer that Early and Middle Period sites are difficult to distinguish without shell beads due to the similarity of artifact assemblages.

Middle-Late Transition

The Middle-Late Transition corresponds with the end of Rogers' "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, notched line sinkers, hopper mortars, and circular shell fishhooks (Jones 1995; Jones et al. 2007). Sites that correspond with this time are CA-MNT-1233 and -281 at Willow Creek (Pohorecky 1976), CA-MNT-1754, and CA-MNT-745 in Priest Valley (Hildebrandt 2006). A greater number of Middle-Late Transition sites are found in San Luis Obispo County to the south.

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).

Late

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 (or Canaliño) 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 -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 resource acquisition or processing sites, while evidence for residential occupation is more common inland (Jones et al. 2007).

3.3 Historical Overview of Santa Cruz County

3.3.1 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 (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. 2005: 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. Converted Native Americans known as 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 the mission Padres and soldiers. 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 ND: 1)..

From the start, Mission Santa Cruz was plagued by substantial issues. The forced conversion of the local native population resulted in repeated rebellions, violence, desertion, and pestilence at Mission Santa Cruz. In 1793, the Native 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 due with crude dwellings of their own design. In 1803, there were 107 inhabitants, however, 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 Native Americans living at the Mission fled from the complex during the looting chaos and never returned (Lehmann 2000: 4-5).

3.3.2 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 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 purloined by the Spanish was returned to Native Americans between 1834 and 1839, but a small pox epidemic in 1838 and reoccurring bouts of syphilis caused a massive decline in the Native population from 284 in 1837 to 71 in 1839. This meant that very few eligible recipients remained to receive it, and records indicate that only 25 Native Americans held property in the Santa Cruz area between 1834 and 1849 (Lehman 2000: 4-5).

Extensive land grants were established in the interior during this period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated colonization efforts. Land grants to citizens covered over 150,000 acres of present-day Santa Cruz County. Several land grants covered the lower regions of the densely forested Santa Cruz Mountains, including, *Rancho Carbonera* (1838), *Rancho Arroya De La Laguna* (1840), *Rancho Refugio* (1841), *Rancho Zayante* (1841), and *Rancho Cañada del Rincon en el Rio de San Lorenzo* (1843). Not all regions of the Santa Cruz Mountains, however, became part of a Mexican Land grant during this vast undertaking. The Santa Cruz Mountain region encompassing the present-day communities of Bonny Doon, Ben Lomond, and Boulder Creek, was never formally granted to a recipient during this period (Hoover et al. 2005: 456-8; Koch 1973: 11).

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 Mission aqueduct to the limited control of the secularized 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 (SCWD ND: 1).

3.3.3 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 (Lehman 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. The lumber, mining, tanning, fishing, and leisure industries formed the economic foundation of the County of Santa Cruz. 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).

Interest in the beauty of the Monterey Bay drew visitors to the County as early as the 1860s, causing beach tourism to emerge 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. A rail line running from Gilroy to Santa Cruz by way of Watsonville was completed by 1876, followed shortly thereafter by a narrow gauge line from Santa Cruz to Felton. The completion of the Santa Cruz–Watsonville Railroad allowed for greater mobility to the area from the inland counties of California, by both residents and tourists alike. As the port altogether declined due to lack of use and the ease of transport by train, the beachfront areas of the city presented savvy entrepreneurs with emerging opportunities (Lehmann 2000: 14, 25-6).

3.3.3.1 The Role of Water in the Early Development of Santa Cruz County

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 Santa Cruz County (Pisani 1984: 246-7).

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; 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 (Clark 2008: 130–131; Hoover et al. 2005: 456; Koch 1973: 36–37; Brown 2011: 4).

3.4 Development of Water Infrastructure in Santa Cruz

The San Lorenzo River, and the many creeks that wind through the greater Santa Cruz County area have historically been subject to seasonal droughts and floods. Coupled with the many upstream diversions and industrial uses of these waterways by settlers and purveyors in the Santa Cruz Mountains, water shortages are present in the earliest records of the County. By the 1860s, acute cyclical shortages and pollution prompted the development of private for-profit water systems by entrepreneurs.

3.4.1 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 1864a: 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 1864b: 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 Carbonero 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 2020b).

3.4.2 The Santa Cruz Water Company (1866)

Competition for Hihn soon followed. 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. H. K. Moore, company President, and E. R. Morgan, the resident engineer and superintendent, operated the Santa Cruz Water Company. By the end of 1876, the Company had also installed a diversion off Branciforte Creek to deliver water 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 San Lorenzo pumping plant for a meager $800 (Santa Cruz Weekly Sentinel 1877a: 1; 1877b: 2; SCWD ND: 1).

For the next several years, the Santa Cruz Water Company focused its attention on the construction of a pipeline to divert water from the newly acquired Majors Creek appropriations. This effort was very costly and the company the slipped into dire financial standing, eventually prompting the sale of the company in 1886.

3.4.3 City of Santa Cruz Water Department

During the 1880s, the rising price of the private, fee-based water systems prompted the City of Santa Cruz to explore their own, City-owned public option that would grant the citizens of Santa Cruz unlimited free water. In August of 1886, the Santa Cruz Water Company along with all of its appurtenances was purchased by the City of Santa Cruz 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 system for over a year when it was re-conveyed to private owners in 1887 (Santa Cruz Weekly Sentinel 1882: 3; SCWD ND: 1; Santa Cruz Surf 1890a: 1).

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

The City revised its approach and by July 1888, the Common Council had secured nearly all of 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 creek was capable of supplying 1.4 million gallons towards a City-owned Water Works, and in August, it was reported that open negotiations with the sole opposing claimant, a land owner concerned with loss of access to water for his own land as a result of the pipeline, were underway and was resolved amicably. Plans 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 were finally in motion. 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)" (Santa Cruz Sentinel 1888: 2; The Santa Cruz Daily Surf 1888b: 2).

3.5 Development of the Laguna Creek Diversion Facility

With the rights to the water of Laguna Creek secured, the City of Santa Cruz set in motion plans to construct the first municipal water distribution system, known then as the City Water Works, and later as the Laguna Creek Diversion Facility.

After some difficulty, 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 conducted a survey and inspection of the proposed dam, reservoir and pipeline site. He produced a report in favor of the project that valued the proposed undertaking at $260,000 (Santa Cruz Surf 1889a: 3; 1889b: 3; Santa Cruz Sentinel 1889: 3).

The City of Santa Cruz made an arrangement with the New York banking group, Coffin and Stanton, who agreed to accept the money and construct the City Water Works on the condition that they would hold the mortgage to the system until the time the bonds were fully repaid. One week prior to Thanksgiving on November 20, 1889, the Common Council introduced and adopted an ordinance authorizing the conveyance of the Laguna Creek water rights to the City, and the mortgage to the future City Water Works system to Coffin and Stanton (Santa Cruz Surf 1890a: 1)

Coffin and Stanton received the papers authorizing the construction, and work on the City Water Works system began immediately. The work would entail the construction of a dam on the Laguna Creek, the excavation of a reservoir site on Henry Cowell's property, the installation of a 12-mile-long pipeline from the Laguna Creek Dam to the Reservoir, and pipes connecting the reservoir with Santa Cruz households. Coffin and Stanton sublet the construction contract to the prominent San Francisco firm, Risdon Iron Works, who were known for producing the great iron pipes for steam ships. Risdon had a representative in Santa Cruz by the following week to calculate the number of iron pipes required for the project. The *Santa Cruz Surf* reported that work on the dam on Laguna Creek and the dam at the reservoir site on Henry Cowell's ranch property would be completed by the San Francisco contracting firm Kelso and Dare (Santa Cruz Surf 1889c: 3).

By early December 1889 when work was intended to begin, the representative of Risdon Iron Works, A. Schierholz, was reportedly on-site for the duration of the project, as well as John Kelso and William Baldwin, representatives of contractors, Kelso and Dare. Although work began on a labor camp near the reservoir site on Cowell's property, work on the two dams on the Laguna Creek was delayed for some time by inclement weather. On December 28th, the first shipment of pipes arrived in Santa Cruz, and construction on the pipeline, the Laguna Creek Dam, and the reservoir site commenced over the following months. No photographs or illustrations of the Laguna Creek Dam and pipeline construction were found during the course of research for this project. However, an illustration of segments of a similar pipeline produced for the Crystal Springs Pipeline in San Francisco by the Risdon Iron Works in 1888 demonstrates the likely shape and size of the pipeline segments for the Laguna Pipeline (Exhibit 2) (Santa Cruz Surf 1889d: 3).

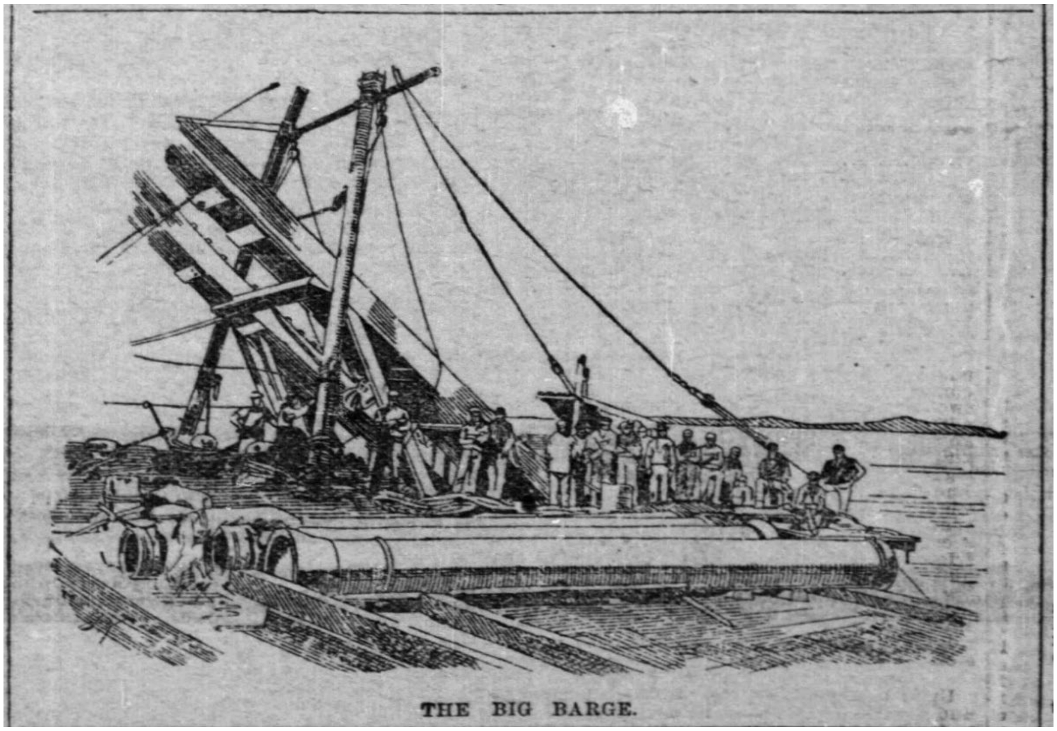


Exhibit 2. An 1888 illustration of the Risdon Iron Works pipes laid to transport water to San Francisco across the Bay from San Mateo for the Crystal Springs project (San Francisco Examiner 1888a: 12)

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 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.

At 5.35 P.M. on October 18, 1890, the last pipe connecting the waters of Laguna Creek to the homes and businesses of Santa Cruz was put into position (Santa Cruz Surf 1890c: 3).

In 1892, Harrison's History of Santa Cruz County, California touted the new Santa Cruz City Water Works (Harrison 1892: 216):

> Without doubt Santa Cruz is the best watered, as well as the best lighted, town on the Pacific Coast. She owns her own water supply and electric light works. The water system especially is a matter of great local pride, and, "naturally enough, those connected with it take great pleasure in exhibiting it.

The same year as the Harrison publication, the City of Santa Cruz published an overview of the recent water-related projects in the City and also a review of the new municipal system after one year of operation. This review included a small photograph of the Laguna Creek Dam that had been completed 2 years prior in 1890 (Exhibit 3; Santa Cruz Surf 1892: 2).

Exhibit 3. The earliest known photograph of the Laguna Creek Dam published in the *Santa Cruz Surf* in 1892 (Santa Cruz Surf 1892: 2)

When the last segment of the cast-iron Laguna Creek pipeline was laid in October 1890, the first municipally funded water works system in the history of Santa Cruz, the Facility began to supply free water to the citizens of the City. The Facility led the way for subsequent municipal water impoundment projects for the City, which continues to rely on multiple sources in the North Coast Watershed for drinking water supply into the present. The Facility is the first example of this type of project in the City, and continues to function as a component of a now-enlarged of water capture and distribution system presently suppling drinking water to the Santa Cruz Water Department service area. While subsequent features have been added to the Facility overtime.

Following the completion of the Facility, the City implemented a measure in 1891 to increase the water flow diverted through the pipeline. A 965-foot-long flume was completed connecting the west branch of Laguna Creek, now called Reggiardo Creek, to the main Laguna Creek by emptying out water to the north of the 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 not enough water 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. The concrete dam on Reggiardo Creek impounded water and conveyed it through a corresponding iron pipeline to the creek approximately 850 upstream from the Laguna Creek Dam. This measure was strictly intended to supplement the water flow distributed through the Transmission Pipeline leading from the Facility. Although a portion of the Reggiardo Creek Pipeline, a 10-inch blow off pipe (Exhibit 4), is located along the west edge of the Laguna Creek Dam and feeds into the creek, it is not a component of the Facility as it is not physically connected and merely changes the volume and flow of water through Laguna Creek (Santa Cruz Evening News 1912: 2).

Exhibit 4. A photograph of the Laguna Creek Dam showing the portion of the Reggiardo Creek Pipeline, c.1960, with the Director of the Santa Cruz Water Department, Wes Weber. Weber oversaw the Water Department during a major expansion of the system during the 1950s and 1960s, including the replacement of the original Laguna Creek Transmission Pipeline in 1965 (SCWD c.1960).

Today, the Laguna Creek Dam structure continues to convey the physical defining features and engineering methods of a diversion facility from the late 19th century, and offers a glance into the earliest efforts by the City to supply water to its residents.

3.6 Architectural Style: Permanent Weir

The Laguna Creek Dam, constructed in 1890 from native stone, is an example of an engineered diversion structure known as a permanent weir (Exhibit 5). The following chapter offers a brief explanation of weir types, their application, and common materials used in the construction of weirs (Axness and Clarkin 2013: 45).

Exhibit 5. An example a Permanent Weir constructed of concrete (Townsend 2012)

A weir is a small barrier that is built to either fully or partially obstruct a creek or river, resulting in a rise in the water level on the upstream side of the structure. Unlike traditional diversion dams that rely on spillways to manage flow, weirs are specifically designed to allow excess water to flow over the crest of the structure, creating a sheet of water called a nappe that flows over the weir. There are two main weir classifications: the permanent weir and the adjustable weir. A permanent weir will raise the impounded water surface to the lowest point of the weir crest. An adjustable weir raises the water level temporarily through either the addition of movable boards or stoplogs into an aperture, tilting or raising movable weir gates, or inflating rubber air bladders. Weirs can be constructed of a wide variety of materials including naturally sourced resources like stone, rock, logs and felled timbers, but also construction materials such as concrete, steel, rubber, and dimensional lumber (Axness and Clarkin 2013: 45-6;).

3.7 Engineer: Risdon Iron Works

The Risdon Iron Works iron foundry was responsible for the design of the Facility system in 1889. The following chapter discusses the development of Risdon Iron Works.

John Nelson Risdon was born on July 10, 1822 in LeRoy, New York. John was the third of seven children born to Orange and Sally Risdon. Orange Risdon was a notable surveyor and a tenacious entrepreneur who was known for founding the City of Saline, Michigan in 1832 (Dikeman 2004).

J. N. Risdon departed for El Dorado during the early 1850s, joining the many tradespeople who flocked to the California during the Gold Rush to support the rapid economic and industrial growth there. He made his way via the Isthmus of Panama, and remained there with his young wife for over a year running a store. After leaving Panama, they changed their plans to go to El Dorado, and instead decided to settle in San Francisco (Dikeman 2004; Jensen 2006: 7; Oakland Tribune 1887: 2).

John received employment at a small foundry and boilermaker under the ownership of John Snow, and it was here that he began to see the economic prospects in iron works and boiler making. In 1853, he formed a partnership with the present foreman of the foundry, James Coffey, and together they purchased Snow's interests in the business. Together, Coffey and Risdon expanded the capacity of Snow's foundry, rebranding the business, Coffey & Risdon's Steam Boiler Works. Coffey and Risdon claimed to be "The only exclusively Boiler Making Establishment on the Pacific Coast (Daily National Democrat 1858:4)" and the company became reasonably well known during their time in operation until 1868 (Dikeman 2004; Jensen 2006: 7; Oakland Tribune 1887: 2).

Like his father, John Risdon was a determined entrepreneur. When Coffey and Risdon experienced considerable success, Risdon decided to also open his own foundry in 1864. Four years later in April 1868, the Risdon Iron and Locomotive Works filed for a certificate of incorporation (Exhibit 6). The company name was colloquially shortened to Risdon Iron Works (Oakland Tribune 1887: 2; San Francisco Examiner 1868: 3).

Exhibit 6. An 1872 advertisement for the Risdon Iron and Locomotive Works (Feather River Bulletin 1872: 4)

The Risdon Iron and Locomotive Works manufactured engines and machinery for mills, sugar refinement, mining, agriculture, locomotives and steam ships. They also produced cast iron pipes to specification, and cast iron architectural components. The company continued to function under the Risdon name following John Risdon's death in 1887. In fact, some of the most prestigious projects undertaken by Risdon Iron Works took place after the time Risdon was involved in the operation of the company (Oakland Tribune 1887: 2).

A sample of known projects contracted to Risdon Iron and Locomotive Works is included below (The Daily Bee 1869:1; San Francisco Examiner 1869: 3, 1873: 3, 1874: 3, 1887: 4, 1888a: 12, 1888b: 4):

- *S.S. Newbern,* steamship for the United States Government, San Francisco, CA (1869)
- Smokestack for the steamship, the *McPherson*: San Francisco, CA (1869)
- 37,000 feet of 12-inch cast iron pipe for the Virginia City Water Works System: Virginia City, NV (1873)
- Boilers for the steamships *Ventura* and *Wyanda*: Unknown location (1874)
- Narrow-gauge train engine for Fredrick. A. Hihn: Aptos, CA (1887)
- Engines and machinery for the Powell-street Railway Company: San Francisco, CA (1887)
- 16 miles of cast iron pipe to carry water from the Sweetwater dam to National City: National City, CA (1887)
- 27 miles of cast iron pipeline to carry water across the San Francisco Bay from the Crystal Springs Reservoir in San Mateo Canyon, including 1 mile of submerged pipe: San Francisco, CA (1888)
- 15 cast iron columns for the tower on the San Francisco City Hall (*destroyed in 1906 earthquake and fire*): San Francisco, CA (1888)

3.8 Contractors: Kelso and Dare

The contracting company Kelso and Dare was owned and operated by John Kelso and John Dare. The company specialized in grading activities for railroad lines and was active during the late 1880s and early 1890s in the San Francisco Bay Area (Poor's Railroad Manual 1893: 471).

A sample of known projects contracted to Kelso and Dare is included below (San Francisco Chronicle 1890a: 8, 1890b: 8):

- Grading for the California-Street Railroad Company Extension : San Francisco, CA (1890)
- Northern Pacific Company from Chelais, WA to South Bend, WA (1890)

4 Field Survey

4.1 Methods

Archeological Resources: Dudek Archaeologist John Schlagheck, M.A., RPA, conducted an archaeological surface reconnaissance of the APE on January 14, 2020. Mr. Schlagheck conducted the reconnaissance using standard archaeological procedures and techniques. All field practices met the Secretary of Interior's standards and guidelines for a cultural resources inventory. The land area was surveyed in pedestrian transects with approximately five meter spacing. All field notes, photographs, and records related to the current study are on file at the Dudek Santa Cruz, California, office.

Built Environment Resources: Dudek Architectural Historian Fallin Steffen, MPS, conducted a pedestrian survey of the subject property on January 14, 2020. The survey entailed walking all accessible portions of the Facility and surrounding portion of the APE and documenting the structure on site with notes and photographs, specifically noting character-defining features, spatial relationships, observed alterations, and examining any historic landscape features on the property. Dudek documented the fieldwork using field notes, digital photography, close-scale field maps, and aerial photographs. Photographs of the subject property were taken with a digital camera. All field notes, photographs, and records related to the current study are on file at Dudek's Santa Cruz, California, office.

4.2 Results

Archaeological Resources: Soil within the APE is a combination of recently deposited loose native alluvial sand and rock. Much greater compaction existing within the east and west perimeter roads. These roads have been graded from the native slope and appear to contain a considerable amount of imported rock and gravel. Cut banks associated with the graded roads offer very good visual access to the soil. The site reconnaissance found no archaeological resources within the APE. Specifically, Dudek found no archaeological soil (midden) or material commonly used as raw materials for prehistoric tool manufacture such as chert or obsidian. Similarly, no other evidence for use of the property during prehistoric times (such as charred faunal remains, marine shell, modified rocks, or charcoal) was observed. No bedrock was found within the APE. Other than the Laguna Creek Dam and its associated facilities, no historical period materials except modern debris (small plastic, glass, and metal fragments) were found in the APE.

Built Environment Resources: During the course of the pedestrian survey, Dudek identified and recorded four structures 45 years old or older associated with the Facility located within the APE. The Significance Evaluation (Chapter 5) provides a detailed physical description of the structures and a significance evaluation under NRHP, CRHR, and SCCHRI criteria. The complete DPR523 form set is located in **Appendix D**

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5 Description and Significance Evaluation

In order to assess the property's historical significance and integrity, the Facility was recorded and evaluated in consideration of NRHP, CRHR and SCCHRI designation criteria and integrity requirements. A physical description of the property and its development history is provided here in Chapter 5.1, The Laguna Creek Diversion Facility. The significance evaluation was prepared by Dudek architectural historians Fallin Steffen, MPS, and Kathryn Haley, MA, who meet the Secretary of the Interior's Professional Qualification Standards for architectural history. The complete DPR523 form set for the historic era components of the Facility are located in **Appendix D.**

5.1 Description: The Laguna Creek Diversion Facility

The Facility (Exhibit 7) located in unincorporated Santa Cruz County, was designed by the Risdon Iron Works of San Francisco and completed in 1890 to serve as the municipal water supply for the City of Santa Cruz. The Facility contains four historic era built environment structures: the Laguna Creek Dam (1890), the Diversion Flume/Intake Structure (1890), the Transmission Pipeline (1890) and the Chlorination Station (1965).

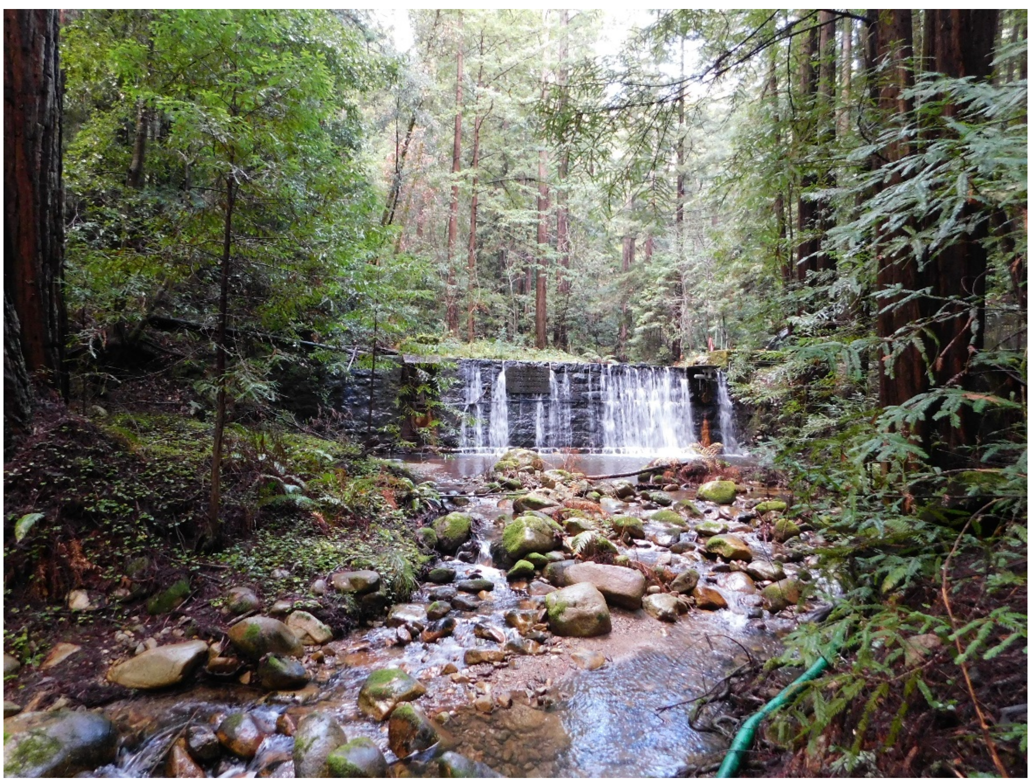

Exhibit 7. The Laguna Creek Diversion Facility site, view looking north (DSCN4800)

5.1.1 Site Access

The Facility is situated in a dense redwood forest beside Smith Grade (see Figure 1, Project Location). A chain-link gate (Exhibit 8) guards the gravel main access road (Exhibit 9) located on the east side of Laguna Creek that leads to the base of the Facility. The east access road located to the southeast of the main access road off Smith Grade leads to the site upstream of the dam. The west access road is located to the west of Laguna Creek and continues on to provide access to privately-owned property.

Exhibit 8. Gate to the Facility main access road off Smith Grade, view looking east (DSCN4900)

Exhibit 9. main access road off Smith Grade, view looking northeast (DSCN4813)

5.1.2 Laguna Creek Dam (1890)

The Laguna Creek Dam is a late-19th century masonry diversion structure that spans the width of Laguna Creek (Exhibit 10), approximately 60 feet, creating a small impoundment above the dam. Historical records suggest that the dam was constructed of native granite stone quarried on-site from the bed of the creek during construction in 1890. Information from the SCWD states that the materials that comprise the dam likely include limestone, marble, granite and concrete. Beaded mortar joints fill the voids between and bind together the large, irregular-shaped blocks of stone.

Exhibit 10. The Laguna Creek Dam, view looking north (DSCN4802)

Water trickles continuously over the crest and down the slightly reclined face of the dam as it is corralled into two spillways formed by the two raised ends of the dam and a single, off-centered masonry column between them. The masonry column covered in thick green moss contains the sediment control bypass valve added to the structure in 1983, located on the western side of the dam and protected by a metal hood (Exhibit 11). A portion of the Reggiardo Creek Pipeline, a 10-inch iron blow off pipe, is just visible extending over the west side of the dam. The remainder of the 14-inch Reggiardo Creek Pipeline empties approximately 850 feet upstream from the Laguna Creek Diversion pond, however it is unclear whether water is still being diverted from Reggiardo Creek through the pipeline at this time.

Exhibit 11. Detail of the west side of Laguna Creek Dam showing the masonry column (red arrow) containing the west sediment control bypass valve which separates the two spillways, as well as the Reggiardo Creek Pipeline blow off pipe (white arrow,) view looking northwest (DSCN4853)

A buildup of sediment upstream from the dam has caused the water level to stand flush with the 2-foot-wide crest of the structure (Exhibit 12).

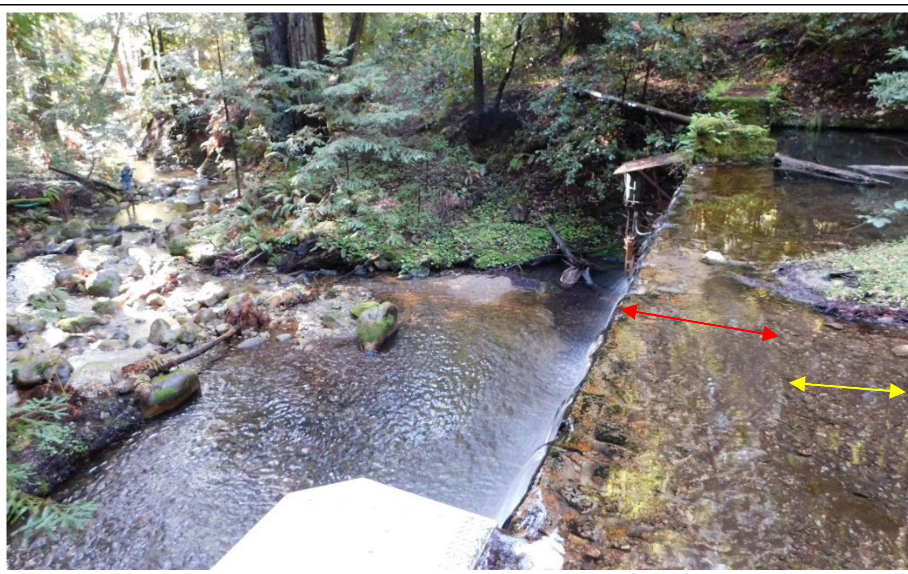

Exhibit 12. The crest of the Laguna Creek Dam (red arrow) submerged in impounded water and sediment (yellow arrow), view looking southwest (DSCN4892)

Beside the raised eastern end of the dam, housing the intake structure (see Chapter 5.1.3, Diversion Flume/Intake Structure), is another sediment control bypass valve that was installed at an unknown time after 1983 sheltered by a horizontal metal hood (Exhibit 13). Multiple metal conduit lines containing control mechanisms for both sediment control bypass valves run across the face of the intake and the dam.

Exhibit 13. Eastern end of the Laguna Creek Dam showing the post-1983 sediment control bypass valve (red arrow) beside the raised corner housing the intake, view looking northwest (DSCN4856)

At the center of the dam is a sizable plaque made of iron crediting the Risdon Iron Works for the completion of the project in 1890 (Exhibit 14). The complete text of the plaque reads:

SANTA CRUZ // WATER WORKS// RISDON IRON WORKS // BUILDERS// S.F. 1890.

Exhibit 14. Risdon Iron Works plaque on the face of the Laguna Creek Dam (DSCN4810)

5.1.3 Diversion Flume/Intake Structure (1890, modified c. 1980)

The Diversion Flume/Intake Structure for the Laguna Creek Dam was initially constructed in 1890 and is situated on the eastern side of the creek. Historical records suggest that these components were constructed from the same irregular-shaped blocks of native granite stone used to construct the dam. Although beaded mortar joints also fill the voids between stones, the flume structure is mostly covered in thick, green moss (Exhibit 15). The flume sits parallel with the Creek and features green fiberglass decking and sections of curved safety handrails that runs the length of the linear structure. The intake was modified in 1980 as described further below.

Exhibit 15. Masonry Diversion Flume beside the Chlorination Station building, view looking northwest (DSCN4830)

The Transmission Pipeline carrying water to the reservoir begins at the southern end of the flume (Exhibit 16). A drain also emerges from the southwestern section of the flume.

Exhibit 16. Masonry Diversion Flume showing the flume drain (foreground) and the head of the Transmission Pipeline (right). Chlorination Station building in background, view looking northeast (DSCN4823)

Near the flume drain, a rectangular relief bearing four sets of initials and the date 1890 is carved into the stone of the flume (Exhibit 17). Research was not able to determine who the individuals represented in the carving were, but it is assumed that they were laborers employed by Kelso and Dare who were responsible for the construction of the Laguna Creek Dam and the Diversion Flume/Intake Structure.

Exhibit 17. Carved plaque on the Flume (DSCN4796)

The intake component of the flume sits at the eastern side of the creek above the dam (Exhibit 18). Overall, the intake appears to have been significantly altered and/or enlarged from its original design during the 1980s and now is predominantly constructed of modern materials. The intake housing has been covered with concrete and includes a sizable platform above with a section of metal railing. A pair of metal gates and a well-placed timber situated across the mouth of the intake prevents debris from entering the flume via the intake.

Exhibit 18. Intake structure, view looking southeast (DSCN4876)

5.1.4 Transmission Pipeline (1890, replaced 1965)

Only a small section of the 14-inch Transmission Pipeline installed in 1965 is visible above the ground at the base of the Diversion Flume/Intake structure (Exhibit 19).

Exhibit 19. Segment of the Transmission Pipeline exiting the Masonry Diversion Flume/Intake Structure, view looking west (DSCN4828)

5.1.5 Chlorination Station Building (1965)

The modest Chlorination Station building (Exhibit 20) located to the east of the Masonry Diversion Flume/Intake structure was constructed in 1965 of standard-size concrete masonry units. Santa Cruz municipal water is no longer treated with chlorine at the Creek, so the building presently houses the various controls for the sediment control bypass valves, and has been retitled the Control Building. It is situated on a concrete slab foundation and features a shallow gable roof clad in rolled composition material. The building features only a single metal door with a single square light. The remainder of the building features no fenestration.

Exhibit 20. Control Building, view looking north (DSCN4832)

5.1.6 Modifications to the Laguna Creek Diversion Facility

The following text provides a summary of subsequent modifications to the Facility following its initial completion in 1890.

Iron Sluice Gate (1897)

The original eight-inch pipe installed through the dam to allow sand, sediment, and debris to escape was found to be ineffective. It was replaced in 1897 by a 24-inch operable iron sluice gate. The gate could be raised and lowered to allow accumulations to flow freely through the dam. A photograph of the dam c.1950-1960s (see Exhibit 4) shows the water flowing through the iron sluice gate in the face of the dam on the left side of the photograph. The sluice gate was replaced by a subsequent alteration during the 1980s (Santa Cruz Sentinel 1897 Dec 10: 1).

Replacement of the Laguna Creek Transmission Pipeline (1965)

In 1965, the original transmission pipeline was replaced by with 12,575 feet of 14-inch water main. Prior to the replacement, it was found that the original, 75-year-old pipeline was leaking nearly 400,000 gallons daily, resulting in an estimated annual loss of $64,000 per year. The replacement pipeline, which was proposed as by Water Department Director, Wes Webber, as early as 1958, allowed the system to capture the water previously lost through leakage each day (Santa Cruz Sentinel 1964: 36; 1965: 20).

20-Inch Sediment Control Bypass Valve Installation (1983)

In 1983, a modern, 20-inch sediment control bypass valve was installed in the position of the 1897 iron sluice gate on the west side of the dam. The new knife gate valve included a pneumatic actuator cylinder and ram for the 20-inch valve, which was fed through the dam via the opening created by the sluice gate. The remaining space around the new pipe through the dam was then infilled with dry grout. The valve mechanism was attached to the downstream face of the dam and was protected by an angled checker-plate, steel hood (SCWD 1983: 1).

Installation of Cribwall on East Bank (1986)

In 1986, the east bank of Laguna Creek upstream of the intake was excavated, and a closed-face, concrete cribwall was installed along the bank. Additional structure added to the Facility north of the Intake. At this same time, the access road was graded and covered with compacted concrete base rock (SCWD 1986: 1).

Fiberglass covering of Flume (2002)

In 2002, the redwood plank cover on the Diversion Flume was replaced with fiberglass grating and addition of a metal handrail (SCWD 2002).

Additional Modifications, Dates Unknown:

- Install additional sediment control bypass valve on east side of the dam (installed post-1983, specifications unknown)
- Modify/expand Intake area to include platform and metal handrails and new intake gate (date unknown)

5.2 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.

The Facility is directly associated with events that have made a significant contribution to the development of water infrastructure in the City of Santa Cruz. Historically, water has played a critical role in the early planning, development, and initial growth of the City of Santa Cruz. Prompted by the continual issue of shortage during the dry months, water rate price-fixing by early private water companies, and concerns over the quality of the water available, the City of Santa Cruz sought to own and operate its own system of Water Works. The Facility was planned after the multiple failed attempts by the Santa Cruz Common Council to legally acquire an existing water system during the 1880s. After the necessary bonds to fund the construction of a new City Water Works were acquired, which included the Facility and the Cowell Reservoir, the development of the Facility was completed in 1890. It constituted the first example of a municipal water supply project completed in the City of Santa Cruz. The period of significance for the Facility is 1890, the year the remaining original features of the Facility, were initially completed.

The Laguna Creek Dam is a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California. As such the dam appears individually eligible for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) under Criterion A/1 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 that resulted in supplying the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The character defining features associated with this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure.

As noted in the description of historic era resources, the Facility features an assortment of structures including the Diversion Flume/Intake Structure, Transmission Pipeline, and the Chlorination Station Building, which all play a role within the Facility and in the larger SCWD system to help divert water from the Laguna Creek aiding in the distribution of the municipal water supply for the Santa Cruz region. The Diversion Flume/Intake Structure and Transmission Pipeline are ancillary diversion dam features. Although they share the same historical associative context they have been modified to the extent that they no longer retain historic integrity and cannot convey significance to their period of significance, 1890. The Chlorination Station Building was constructed outside of the period of significance of 1890, and is merely a 1960s addition to the Facility. Additionally, the Chlorination Station Building is not innovative in design. It is a ubiquitous small utilitarian concrete masonry unit building that can be found throughout California and the nation. As such, although these three structures are part of the Facility they are not considered contributing elements of the Laguna Creek Dam. Additionally, these three structures do not rise to a level of significance where they could be found eligible under any of the NRHP or CRHR Criteria individually or as part of a district.

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 NRHP Criterion B or CRHR Criterion 2, the property has to be directly tied to the important person and the place where the individual conducted or produced the work for which he or she is known. The Facility was constructed and subsequently modified since it was first constructed in 1890 by several individuals and early regional water management developers in order to provide municipal water in the Santa Cruz region. As such the Facility represents the collective efforts of many individuals, rather than the work of any single individual. As such the Facility is does not appear eligible for listing under NRHP Criterion B or the CRHR under 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 Facility itself is a conglomeration of construction methods and lacks sufficient engineering distinction to be significant within any particular diversion dam facility type. San Francisco iron foundry, Risdon Iron Works, designed the initial layout of the Facility and fabricated the original transmission pipeline and iron appurtenances in the late 1800s. The initial Facility was built by San Francisco contracting company, Kelso and Dare. While Risdon Iron Works was responsible for several notable projects in the San Francisco Bay Area, including the Crystal Springs Reservoir submerged pipeline and the cast iron columns for the tower on the San Francisco City Hall, it does not boast achievements in the field of water infrastructure to be considered a Master. Kelso and Dare also do not appear to reach the level of notoriety to be considered Masters. As such the Facility is not associated with a master in the field of engineering.

The Facility has experienced multiple alterations overtime in order to accommodate modern equipment and ensure the ongoing use of the Facility. Overall, the Facility itself is a conglomeration of construction methods and lacks sufficient engineering distinction to be significant within any particular diversion dam facility type. Consequently, the Facility appears to lack significance 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 Facility is likely to yield 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 CRHR Criterion 4.

5.3 Santa Cruz County Statement of Significance

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

As stated for Criterion NRHP Criterion B/CRHR Criterion 2 above, archival research did not reveal an association between the Facility and any persons who significantly contributed to the development of the city, state, or nation. Therefore, the Facility does not appear to be eligible under County of Santa Cruz Criterion 1.

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

For the reasons noted under the NRHP Criterion A/CRHR Criterion 1 significance evaluation noted above. The Laguna Creek Dam, element of the overall Facility appears individually eligible under Santa Cruz County Criteria 2 for its association for its association with pioneering advances in water management in California specifically through creation of the City of Santa Cruz's first municipal water distribution system that resulted in supplying the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The character defining features associated with this dam are its setting, alignment, and continued function as a water management structure.

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 for NRHP Criterion C/CRHR Criterion 3 above, the Facility lacks engineering distinction and association with a master in the field of engineering and does not appear to be eligible under County of Santa Cruz Criterion 3.

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

As discussed for NRHP Criterion D/CRHR Criterion 4 above, there is no evidence to indicate that the Facility is likely to yield and 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 Facility does not appear to be eligible under County of Santa Cruz Criterion 4.

5.4 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. The property must retain, however, 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.

Generally, under NRHP Criterion A and CRHR Criterion 1, a significant water management resource must retain the following physical attributes as they relate to the integrity of location, setting, feeling, and association:

- Original alignment/location
- Setting related to it period of significance
- Continues to function as a water management structure

Despite modifications and improvements made over time to the dam, generally limited to an early sluice gate addition, and bypass values to deal with sediment build up, the structure has a high degree of historic integrity to its period of significance, 1890. As noted, above, elements of the other structures that are part of the Facility have been replaced, added, or altered since the period of significance including the Diversion Flume/Intake Structure, Transmission Pipeline, and the Chlorination Station. As such, they are not considered contributing features of the historic property. The contemporary infrastructural elements on the site, including lighting, utilities, modern valves and housings, also do not date to the 1890 period of significance, and as such, they are considered non-contributing elements to the dam.

5.5 Character-Defining Features

The character-defining features associated with the Laguna Creek Dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, Risdon Iron Works plaque on the face of the Laguna Creek Dam, and the continued function of the water management structure as a dam.

5.6 Historic Property Boundary

The historic property boundary for the Laguna Creek Dam is limited to the dam structure footprint. The historic property boundary for this structure is depicted on Figure 7, Cultural Resources Area of Potential Effects.

6 Findings

Based on Dudek's research, field survey, and property significance evaluation described above, the following chapter presents a summary of eligibility conclusions for the historic property in the APE.

6.1 Summary of Findings

Archaeological Findings

The results of the assessment suggest there are no historic properties of an archaeological nature within the APE. The results also suggest that there is low potential for encountering any unknown archaeological resources during project construction. Specifically, the records search did not identify any known archaeological resources within the APE and the surface reconnaissance was negative for evidence of previously unknown archaeological resources. Native American contact Patrick Orozco noted concern for five specific prehistoric resources associated with lower Laguna Creek. As documented in Chapter 2.1 above, all five sites are at least 0.25 miles from the APE and therefore will not be subject to project impacts. No further effort regarding the discovery of archaeological resources within the APE is warranted.

Built Environment Findings

The Laguna Creek Dam, is a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California. As such the dam appears individually eligible for listing in the NRHP Criterion A, CRHR 1, and Santa Cruz County Criterion 2 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 that supplied the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The character defining features associated with this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure.

As such, the Laguna Creek Dam is considered historic property under Section 106 of the NHPA and historical resource under CEQA.

Table 5. Historic Era Structures Located within the Area of Potential Effect

The Laguna Creek Diversion Facility Component	Year Built/Date of Significant Modifications	Eligibility Criteria: NRHP/CRHR/ *Santa Cruz County*	CRHR Status Code Study Findings*
Laguna Creek Dam	1890	A/1/2	3S/5S3
Diversion Flume/Intake Structure	1890/ c. 1980	N/A	6Z
Transmission Pipeline	1890/ 1965	N/A	6Z

Table 5. Historic Era Structures Located within the Area of Potential Effect

The Laguna Creek Diversion Facility Component	Year Built/Date of Significant Modifications	Eligibility Criteria: NRHP/CRHR/ *Santa Cruz County*	CRHR Status Code Study Findings*
Chlorination Station (Control Building)	1965	N/A	6Z

* Status Code 3S refers to the California Historical Resource Status Code that states the following “Appears eligible for NR as an individual property through survey evaluation.” Status Code 53S refers to the California Historical Resource Status Code that states the following “Appears to be individually eligible for local listing or designation through survey evaluation.” Status Code 6Z refers to the California Historical Resource Status Code that states the following “Found ineligible for NR, CR or Local designation through survey evaluation.”

7 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 Laguna Creek Dam, 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.

7.1 Laguna Creek Dam

The Laguna Creek Dam is a well-preserved masonry water management structure dating to 1890. It is a physical example of early water management infrastructure in California. As such the dam appears individually eligible for listing in the NRHP Criterion A, CRHR 1, and Santa Cruz County Criterion 2 for its association with pioneering advances in water management in California specifically through creation of the City of Santa Cruz's first municipal water distribution system that supplied the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed.

The character defining features associated with this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure. The historic property boundary for the Laguna Creek Dam is limited to the dam structure footprint. The historic property boundary for this structure is depicted on Figure 7, Cultural Resources Area of Potential Effects.

7.2 Physical Effects of the Proposed Project

The Proposed Project would improve the reliability of the City's diversion Facility while ensuring natural sediment transport past the dam and protecting fish species and habitat. The entire Project Description is outlined in detail in Chapter 1. Table 5 provides a list of the Proposed Project activities that could result in direct physical effects to the Laguna Creek Dam, which is the only historic property in the APE.

Table 6. Key Proposed Project Components that Could Result in Adverse Effects to the Laguna Creek Dam

Component	Description	Approximate Dimensions (if applicable)
New Coanda Screen Intake Structure		
Support Structure	Reinforced concrete structure tied (or doweled) into existing dam	12 feet wide × 10 feet long × 12 feet tall
Coanda Screen	Stainless steel wedge wire plate screen (0.5-millimeter openings), accelerator plate, pre-manufactured housing	10 feet wide × 2.5 feet long
Modified Existing Components		
Existing Sediment Control Bypass Valves	Abandoned in place and capped	—

Source: B&V 2020a.

The following text provides brief descriptions of Project Components noted in Table 5 that may result in physical effects to the Laguna Creek Dam. A brief discussion on potential construction related vibration impacts to the dam is also discussed below.

New Coanda Screen Intake Structure

The dam would remain in place and sediment would remain impounded behind the dam as a result of project implementation. However, the New Coanda Screen Intake Structure would change the type and orientation of the water intake so that sediment would not obstruct water intake through use of a Coanda screen.

The Proposed Project includes constructing a new reinforced (tied or doweled) concrete intake support structure along the downstream face of the dam, which is approximately 60 feet in length as it spans across Laguna Creek. The new intake structure would be approximately 12 feet wide (along the face of the dam), 12 feet tall, and 10 feet long (as it projects downstream from the dam). Construction of this structure will involve cutting a notch approximately 16 inches below the top of the dam and 12 feet wide on the left/east side of dam facing downstream. The structure would be tied to the bedrock and the face of the dam with rebar anchors that would be doweled into the dam. When the creek flow is relatively low, approximately 7 cubic feet per second or less, water would flow entirely through the notch. At higher creek flows, water would pass over the notch as well as cascade over the dam crest.

Scaffolding would be installed on the downstream side of the dam to support construction workers during construction of the new structure on the dam. A wire saw would likely be used to notch the dam, and the slurry would be captured using a shop vacuum system and off-hauled from the site. After wire saw cutting is complete, the section of the dam to be removed would be demolished by hand with pneumatic hand tools. The rubble from the removal of materials would either be off-hauled or used as riprap in the erosion control apron, described below.

After the notch in the dam is completed, the downstream face of the dam would be pressure washed with water. Rebar anchors would be secured with epoxy to the dam, on the exposed surfaces, and on bedrock for the Coanda structure foundation. Forms and rebar would be installed, the intake collection chamber and components would be embedded, and concrete would be placed using a line concrete pump. Once the intake structure is set, the Coanda screen would be installed.

Temporary excavation of material (approximately 10 cubic yards) upstream of the dam would be stockpiled on site and the material would be returned to its original location after construction completion. Spoils would be generated during excavation of material on the downstream side of the dam. Approximately 40 cubic yards of material would be excavated downstream of the dam; 10 cubic yards would be reused as engineered fill and 30 net cubic yards of excavated sediments would be hauled off site to the City's Resource Recovery Facility (landfill), approximately 10 miles away. Spoils generated from pipeline trenching and other project excavations would be hauled off site to a disposal location in accordance with state and federal regulations.

Exhibit 21. East Side of the Laguna Creek Dam showing the non-contributing post-1983 sediment control bypass valve and housing (red arrow), as well as the metal conduit presently attached to the face of the dam (yellow arrows), view looking northwest (DSCN4856)

Modified Existing Components (Existing Sediment Control Bypass Valves)

The two existing sediment control bypass valves at the downstream end of the dam would be removed and the bypass pipes abandoned in place and capped as follows (see Exhibit 22). At the dam's west sediment control bypass valve (from the vantage point of looking downstream), the existing gate and actuator and its hood would be removed, and a blind flange would be installed on the end of the bypass pipe. The size of the blind flange will be the same size as the existing opening. The conduits and electrical components would also be removed including the metal conduit/cable across the face of the dam. The dam's east sediment-control bypass valve is at the location where the new intake structure would be installed. Prior to installation of the intake structure, the piece of the bypass pipe that protrudes from the dam and the actuator would be removed and the pipe would be backfilled with concrete.

Exhibit 22. West end detail of the Laguna Creek Dam looking northwest showing the non-contributing 1983 sediment bypass valve. The existing gate, actuator, and hood (yellow arrows) will be removed, and a blind flange installed on the end of the bypass pipe (red arrow). The Reggiardo Creek Pipeline (white arrow) crosses the dam to the west of the sediment bypass valve and will not be impacted by the Project (DSCN4851)

7.3 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 Laguna Creek Dam.

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

No Adverse Effect.

As noted above, there will be numerous steps undertaken to complete the construction of the New Coanda Screen Intake Structure. The City has committed to implementing several measures as part of the project to ensure that the Laguna Creek Dam is not damaged or destroyed during construction. Project activities that could adversely affect the dam are limited to preparing the dam for construction of the New Coanda Screen Intake

Structure, removal of exiting non-contributing east and west value bypasses located on the face of the dam, construction related cleaning and vibration, as well as, the aesthetics of implementation of the New Coanda Screen (i.e. appearance of the dam after construction is complete).

Installing the New Coanda Screen Intake Structure will result in cutting a notch in the dam crest. This work would be done by saw cutting approximately 16 inches deep into the dam crest to score neat lines for stone masonry removal. Use of a wire saw would avoid excess material removal and would prevent unraveling of stone masonry beyond the limits of the new intake structure. Overall, these Dam modifications will be done using hand tools. However, given the strength and hardness of the dam (as confirmed during the condition assessment) the cut may first be initiated using chisel hammers to remove materials as necessary.

In preparing the dam for construction, impounded materials upstream of the dam would be temporarily excavated approximately 3 feet at its deepest point and along the portion of the dam and existing intake as needed to enable construction of the Coanda Screen intake and to abandon the existing intake in place. A mini-excavator is expected to be used to pull material away from the structures at safe temporary cut slopes. In addition hauling equipment will be utilized. This work and equipment will be conducted a distance from the dam. The project does not propose to use equipment known to cause vibration damage to structures including pile driving equipment, vibratory drum compactors, or drilling and blasting.

A condition analysis report prepared in 2018 noted that the dam is founded on bedrock and was found to be in satisfactory condition with no signs of distress or major deterioration that would jeopardize its function. In consideration of the dam's bedrock foundation, liquefaction is not an issue regardless of potential vibration impacts. Testing indicates the materials for the dam structure are in good condition with no evidence of fatigue, delamination, or weakening and has adequate material strengths for continued service. While the analysis concluded that the overall condition of the dam was favorable for continued use and was in line with modern design parameters for masonry structures, it did not directly identify sensitivity of the dam to vibration (B&V 2018). Because the exact vibration damage thresholds have not been formally established, as a precaution, a mitigation measure in the project EIR has been established within the Noise section (Dudek 2020). The Mitigation threshold of the MM NOI-2, Construction Vibration Effects on Historic Structures, in Section 4.12.3.5 of the EIR states the following:

> Prior to construction activities that entail the operation of construction equipment with significant vibration generating sources in the immediate vicinity of the dam, vibration damage thresholds will be established by a qualified engineer. The vibration damage threshold will be developed through the evaluation of the condition of the dam structure, underlying soil conditions, and type of construction operation to be performed. At the City's direction, a construction vibration monitoring plan will be prepared and implemented prior to the potential vibration generating activities within the immediate proximity of the dam. The monitoring plan shall establish the methodology for characterizing the existing baseline vibration levels present on the site, operational construction vibration monitoring consistent with the established threshold, and reporting to be completed during project construction. Should the construction vibration analysis undertaken during the preparation of the monitoring plan reveal that the proposed construction methods would exceed the vibration threshold established for the dam, alternative construction methods will be explored in order to find a method that would allow the project to move forward while avoiding potential vibration related damage to the dam during construction.

Through implementation of this mitigation measure all potential effects of construction related vibration damage to dam will be avoided and will not result in an adverse effect to the dam.

Additional potential impacts to the dam via pre-construction include temporary untreated timber formwork (plywood and dressed lumber) with snap-ties and epoxy would be used for forming new concrete surfaces. The form work would be temporary and would not have a permanent visual impact. Rebar anchors secured with epoxy would be installed on the dam's exposed surfaces and within the bedrock for the Coanda intake structure foundation. The anchors would ultimately be covered by the new intake structure.

As part of completing this work on the dam, portions of the dam will be pressure washed with water to remove loose material and organics such as dirt and moss at the direction of the City and under supervision of the project inspector. Pressure washing methods will depend on effectiveness of material removal without eroding mortar. Surface cleaning of the substrate will be performed to reasonably achieve good bonding of fresh concrete but will not be critical as the new structure is designed to be self-stable. The contractor would be required to test method of cleaning with the gentlest and least invasive method of dam cleaning and, if necessary, to more complicated methods. The contractor would also start with a low-pressure water wash, and if unsuccessful water of slightly higher pressure. As possible the test would be conducted in an inconspicuous location. Pressure washing will be limited to area in which the new intake concrete will be cast against, within a foot buffer. A bonding agent such as a high solids, water-based emulsion admixture suitable for modifying Portland cement compositions would be spray applied to the dam face within the limits of the new concrete formwork for the new intake structure. These measures that are part of the project description and will avoid damage to the structure's masonry material.

The construction will result in removing a small portion of the dam' masonry materials and cover a portion of the face of the dam. The new intake structure would be approximately 12 feet wide (along the face of the dam), 12 feet tall, and 10 feet long (as it projects downstream from the dam). Considering that the dam is approximately 60 feet in length, the area that would be obscured by the intake structure is a relatively small portion of the face of the dam. The new construction will be differentiated from the dam's historic materials, as modern concrete and metal materials will be used. Additionally, it is likely that during higher creek flows, where water would pass over the screen as well as cascade over the dam crest, the new intake structure will mostly obscured and the dam may appear much as it does currently (see Exhibit 21, showing current dam conditions with water flowing over the crest of the dam). Considering that the purpose of the new intake structure is to aid in the functionality of the Facility, and the dam will continue to function as a water management structure, and that the historic property will still retain the majority of 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.

Furthermore, abandoning and capping of the existing control valves located in and on the face of the dam will not result in damage or destruction of the dam and its character defining features. At the dam's right/west sediment control bypass valve (from the vantage point of looking downstream), the existing gate, all metal/electrical, and cable components above the pipe and actuator and its hood would be removed. A blind flange would be installed on the end of the bypass pipe on the face of the Dam. The dam's left/east sediment control bypass valve is at the location where the new intake structure would be installed. Prior to installation of the intake structure, the piece of the bypass pipe that protrudes from the dam, the actuator, protective hood, and electrical conduits would be removed and the pipe would be backfilled with concrete. This sediment control valve location would be ultimately obscured by the new intake structure. Removal of these 1980s non-contributing valves located on the dam will not damage or destroy the dam. The blind flange with just cover the valve shown in Exhibit 22 (lowest yellow arrow). As these valves are not character defining features and no damage or destruction will be done to the dam by these changes, the Proposed Project activity will not result in an adverse effect.

(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.*

In reference to the proposed installation of New Coanda Screen Intake Structure to the historic dam, the Secretary's Standards for the Treatment of Historic Properties indicates that installation of a new 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 this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure. As stated above the City has committed to testing methods for pressuring washing the masonry material of the dam. Cleaning with be undertaken with the gentlest and least invasive method of dam cleaning and, if necessary, to more complicated methods to avoid damage to the dam's materials. These procedures are in line with Secretary's Standards for the Treatment of Historic Properties guidelines for maintenance of masonry structures.

The New Coanda Screen Intake Structure will result in removal of a 16-inch-tall by 12-foot-wide section of original material from the crest of the dam, but otherwise, the installation of the new intake would leave the original, existing materials in place behind the new concrete intake support structure. Since its completion in 1890, the dam has had ongoing complications related to sediment buildup and control, resulting in the first alteration to the original design in 1897 when an iron sluice gate was installed into the face of the dam for this purpose. This gate failed to serve the required purpose, and so have the subsequent alterations installed for this purpose. The New Coanda Screen Intake Structure design will provide the necessary and effective screening capabilities needed to keep the diversion functioning in its original capacity, with minimal disturbance of historic materials. The use of modern concrete materials for the intake structure will create a clear differentiation between historic materials and new construction.

The design for the New Coanda Screen Intake Structure minimizes the overall impact to the character-defining masonry construction materials while ensuring that the Facility can continue to function in its historic capacity by providing water for the municipal supply. Despite a minimal loss of the dam's native stone or limestone masonry construction materials, the Proposed Project design allows the dam to continue to convey its significance under Criterion A as a pioneering water management structure.

Additionally, the abandonment and capping of the two existing non-contributing sediment control bypass valves at the downstream end of the dam are in line Secretary's Standards for the Treatment of Historic Properties. As shown in Exhibit 22, the existing gate and actuator and its hood would be removed, and a blind flange would be installed on the end of the bypass pipe. The conduits and electrical components would also be removed including the metal conduit/cable across the face of the dam. The valves are not character defining features, no damage will be done to the dam by abandoning in the valves in place. The blind flange to be installed on the end of the west end bypass pipe will be the same size as the existing opening. This will not result in a visual obstruction on the face of the dam. Removing non-contributing elements on the face of the dam could be viewed as a beneficial change. 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 Laguna Creek Dam will remain in its historic location, all construction work will be conducted within the Facility'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 dam will maintain its current use as a water management structure within its existing remote creek setting.

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

No Adverse Effect. While the Laguna Creek Dam will be undergo modifications, this action will not introduce visual, atmospheric or audible elements that will diminish the integrity of the structure's significant historic features. The dam will continue to serve its intended function, in its original alignment and configuration, such that the dam will continue to convey its significance under NRHP Criterion A. The modifications to the Facility will not introduce any new incompatible elements that would diminish the integrity of the dam.

(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 Laguna Creek Dam will not be neglected as part of the Proposed Project, rather, it is, and will remain, a functioning water management structure.

(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 Laguna Creek Dam is not federally owned.

The Proposed Project will have **No Adverse Effect** on the Laguna Creek Dam located in Santa Cruz County.

Conclusions

As detailed above, a finding of No Adverse Effect is recommended for the historic components of the Facility which are limited to the Laguna Creek Dam located in the APE as related to 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.

Although no further documentation of the dam is necessary it should be noted that the City has added the following provision as part of their project description:

The City will work with a qualified architectural historian to develop interpretative text and content for a dedicated webpage on the City's public website that explains the history of the site and its importance within the water management system. This text and supporting content (historic era images) will be utilized to develop a brochure with a one-time limited pressing for distribution to local libraries and museums. In addition, the City will include a brief history of the project site as an entry in its Santa Cruz Municipal Utilities Review, a quarterly newsletter that is sent to all customers in the Water Service Area.

7.4 Management Recommendations

Archaeological Recommendations

No further effort regarding the discovery of archaeological resources within the APE is warranted. 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 as described below.

Unanticipated Discovery of Archaeological Resources

In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the Proposed Project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether or not additional study is warranted. Depending upon the significance of the find under CEQA (14 California Code of Regulations Section 15064.5(f); PRC 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, additional treatment may be required.

Unanticipated Discovery of Human Remains

In accordance with California Health and Safety Code Section 7050.5, if potential human remains are found, the lead agency staff and the County Coroner must be immediately notified 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 NAHC within 24 hours. In accordance with PRC Section 5097.98, the NAHC must immediately notify those persons it believes to be the MLD from the deceased Native American. Within 48 hours of this notification, the MLD would recommend to the lead agency her/his preferred treatment of the remains and associated grave goods. Further, federal regulations require that Native American human remains, funerary objects, and object of cultural patrimony are handled consistent with the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) for all discovery situations in accordance with 43 CFR 10.

Built Environment Recommendations

The Laguna Creek Dam, is a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California. As such, the dam appears individually eligible for listing in the NRHP Criterion A, CRHR 1, and Santa Cruz County Criterion 2 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 that resulted in supplying the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed.

The Laguna Creek Dam is considered a historic property under Section 106 of the NHPA and historical resource under CEQA. As recommended in Chapter 7, the Laguna Creek Dam will not sustain adverse effects as a result of project implementation. As such, the Proposed Project would have **no adverse effects** on historic properties under Section 106 of the NHPA. Under CEQA, the finding related to the Laguna Creek Dam as a historical resource would be **less than significant.**

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SCWD. 1986. "Laguna Creek Intake & Access Road Improvements." Measured Drawings by M.C.M. for the Santa Cruz Water Department. Sheet 1 of 2.

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Appendix A

Confidential Records Search Results

Records can be made available upon request

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Appendix B

Native American Information Outreach

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Dudek Project 12287.01: Laguna Creek Diversion Retrofit Project

County: Santa Cruz

USGS Quadrangle Name: Davenport

Township: 10S **Range:** 3W **Section(s):** 31

Company/Firm/Agency: Dudek

Street Address: 725 Front Street, Suite 400

City: Santa Cruz, CA **Zip:** 95060

Phone: (831) 227-6301

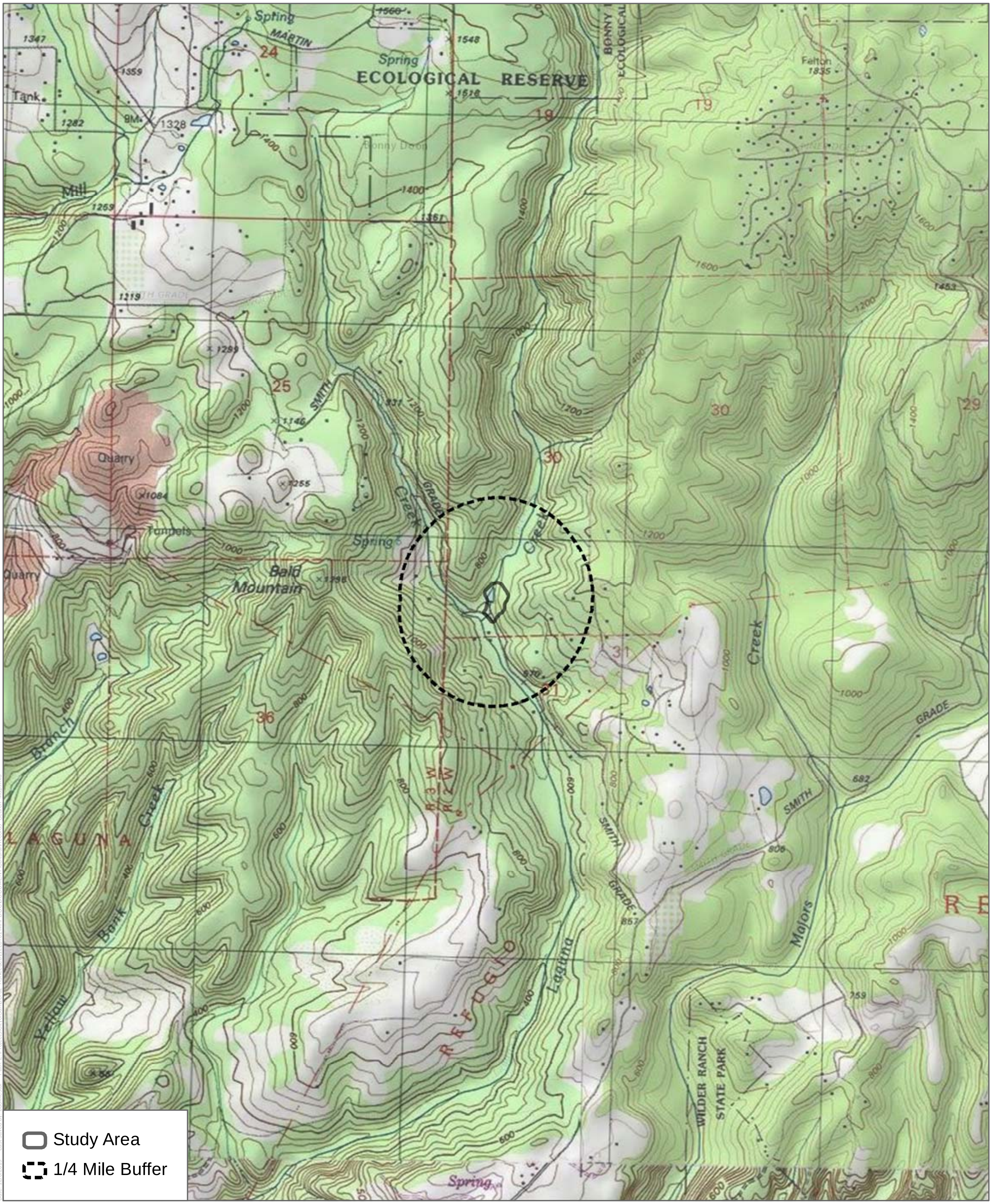
Fax:

Email: sbrewer@dudek.com

Project Description:

The project applicant is seeking permits to retrofit an existing dam at the location noted on the attached map.

Dudek is requesting a NAHC search of the Sacred Lands Files or other Native American cultural resources that may fall within the proposed project location or a surrounding one-quarter-mile buffer. Please provide a Contact List with all Native American tribal representatives that may have traditional interests in the project location or surrounding area.



SOURCE: USGS 7.5-Minute Series Davenport & Felton Quadrangles
Township 10S; Range 3W, 2W; Sections 25, 30, 31, 36

DUDEK

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Records Search

Laguna Creek Diversion Retrofit Project

NATIVE AMERICAN HERITAGE COMMISSION

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

February 4, 2020

Sarah Brewer
Dudek

Via Email to: sbrewer@dudek.com

Re: Dudek Project 12287.01: Laguna Creek Diversion Retrofit Project, Santa Cruz County

Dear Ms. Brewer:

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

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

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

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

Sincerely,

Sarah Fonseca
Associate Governmental Program Analyst

Attachment

Native American Heritage Commission
Native American Contacts List
February 4, 2020

Amah Mutsun Tribal Band
Valentin Lopez, Chairperson
P.O. Box 5272 — Ohlone/Costanoan
Galt ,CA 95632 — Northern Valley Yokuts
vlopez@amahmutsun.org
(916) 743-5833

Amah MutsunTribal Band of Mission San Juan Bautista
Irene Zwierlein, Chairperson
789 Canada Road — Ohlone/Costanoan
Woodside ,CA 94062
amahmutsuntribal@gmail.com
(650) 851-7489 Cell
(650) 332-1526 Fax

Costanoan Ohlone Rumsen-Mutsen Tribe
Patrick Orozco, Chairman
644 Peartree Drive — Ohlone/Costanoan
Watsonville ,CA 95076
yanapvoic97@gmail.com
(831) 728-8471

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 — Ohlone/Costanoan
Hollister ,CA 95024
ams@indiancanyon.org
(831) 637-4238

Muwekma Ohlone Indian Tribe of the SF Bay Area
Charlene Nijmeh, Chairperson
20885 Redwood Road, Suite 232 — Ohlone / Costanoan
Castro Valley ,CA 94546
cnihmeh@muwekma.org
(408) 464-2892
(408) 205-9714

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

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

This list is only applicable for contacting local Native Americans Tribes for the proposed:
Dudek Project 12287.01: Laguna Creek Diversion Retrofit Project, Santa Cruz County.

CITY OF SANTA CRUZ Water Department
Our Water, Our Future
212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Subject: ***Laguna Creek Diversion Retrofit Project***

Dear Dear Valentin Lopez, Chairperson:

The City of Santa Cruz Water Department is working to complete a cultural resources study for an undertaking to retrofit the Laguna Creek Diversion Facility in an unincorporated area of Santa Cruz County near Bonny Doon, California at 3030 Smith Grade and Laguna Creek.

Attached, please find the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice, which includes a description of the proposed Project and a map, which shows the project location and Area of Potential Effect (APE) for the project.

We have submitted for and reviewed the results of a search of the Sacred Lands Inventory on file with the Native American Heritage Commission (NAHC). The NAHC identified no resources within the project APE or 0.25-mile buffer. The NAHC provided us your contact as someone who may have information regarding unrecorded cultural resources or sacred sites in the project vicinity.

We are reaching out to all Native American representatives list by NAHC for this area with a request for any information relating to cultural resources or tribal cultural resources in the vicinity of the proposed project. Any information you provide will remain confidential and would be used for planning purposes for this project only.

If you have any questions or comments, you can reach me by telephone at (831) 420-5322 or by email at jmartinezmckinney@cityofsantacruz.com. Thank you for your assistance with this project.

Sincerely,

____

Jessica Martinez-McKinney Associate Planner II
City of Santa Cruz Water Department
jmartinezmckinney@cityofsantacruz.com
(831) 420-5322

CITY OF SANTA CRUZ Water Department

Our Water, Our Future

212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Subject: ***Laguna Creek Diversion Retrofit Project***

Dear Dear Irene Zwierlein, Chairperson:

The City of Santa Cruz Water Department is working to complete a cultural resources study for an undertaking to retrofit the Laguna Creek Diversion Facility in an unincorporated area of Santa Cruz County near Bonny Doon, California at 3030 Smith Grade and Laguna Creek.

Attached, please find the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice, which includes a description of the proposed Project and a map, which shows the project location and Area of Potential Effect (APE) for the project.

We have submitted for and reviewed the results of a search of the Sacred Lands Inventory on file with the Native American Heritage Commission (NAHC). The NAHC identified no resources within the project APE or 0.25-mile buffer. The NAHC provided us your contact as someone who may have information regarding unrecorded cultural resources or sacred sites in the project vicinity.

We are reaching out to all Native American representatives list by NAHC for this area with a request for any information relating to cultural resources or tribal cultural resources in the vicinity of the proposed project. Any information you provide will remain confidential and would be used for planning purposes for this project only.

If you have any questions or comments, you can reach me by telephone at (831) 420-5322 or by email at jmartinezmckinney@cityofsantacruz.com. Thank you for your assistance with this project.

Sincerely,

____

Jessica Martinez-McKinney Associate Planner II
City of Santa Cruz Water Department
jmartinezmckinney@cityofsantacruz.com
(831) 420-5322

CITY OF SANTA CRUZ Water Department
Our Water, Our Future
212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Subject: Laguna Creek Diversion Retrofit Project

Dear Dear Patrick Orozco, Chairman:

The City of Santa Cruz Water Department is working to complete a cultural resources study for an undertaking to retrofit the Laguna Creek Diversion Facility in an unincorporated area of Santa Cruz County near Bonny Doon, California at 3030 Smith Grade and Laguna Creek.

Attached, please find the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice, which includes a description of the proposed Project and a map, which shows the project location and Area of Potential Effect (APE) for the project.

We have submitted for and reviewed the results of a search of the Sacred Lands Inventory on file with the Native American Heritage Commission (NAHC). The NAHC identified no resources within the project APE or 0.25-mile buffer. The NAHC provided us your contact as someone who may have information regarding unrecorded cultural resources or sacred sites in the project vicinity.

We are reaching out to all Native American representatives list by NAHC for this area with a request for any information relating to cultural resources or tribal cultural resources in the vicinity of the proposed project. Any information you provide will remain confidential and would be used for planning purposes for this project only.

If you have any questions or comments, you can reach me by telephone at (831) 420-5322 or by email at jmartinezmckinney@cityofsantacruz.com. Thank you for your assistance with this project.

Sincerely,

____

Jessica Martinez-McKinney Associate Planner II
City of Santa Cruz Water Department
jmartinezmckinney@cityofsantacruz.com
(831) 420-5322

CITY OF SANTA CRUZ Water Department

Our Water, Our Future

212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Subject: Laguna Creek Diversion Retrofit Project

Dear Dear Ann Marie Sayers, Chairperson:

The City of Santa Cruz Water Department is working to complete a cultural resources study for an undertaking to retrofit the Laguna Creek Diversion Facility in an unincorporated area of Santa Cruz County near Bonny Doon, California at 3030 Smith Grade and Laguna Creek.

Attached, please find the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice, which includes a description of the proposed Project and a map, which shows the project location and Area of Potential Effect (APE) for the project.

We have submitted for and reviewed the results of a search of the Sacred Lands Inventory on file with the Native American Heritage Commission (NAHC). The NAHC identified no resources within the project APE or 0.25-mile buffer. The NAHC provided us your contact as someone who may have information regarding unrecorded cultural resources or sacred sites in the project vicinity.

We are reaching out to all Native American representatives list by NAHC for this area with a request for any information relating to cultural resources or tribal cultural resources in the vicinity of the proposed project. Any information you provide will remain confidential and would be used for planning purposes for this project only.

If you have any questions or comments, you can reach me by telephone at (831) 420-5322 or by email at jmartinezmckinney@cityofsantacruz.com. Thank you for your assistance with this project.

Sincerely,

____

Jessica Martinez-McKinney Associate Planner II
City of Santa Cruz Water Department
jmartinezmckinney@cityofsantacruz.com
(831) 420-5322

CITY OF SANTA CRUZ Water Department | Our Water, Our Future
212 Locust Street, Suite C, Santa Cruz, CA 95060 ◆ (831) 420-5200

March 16, 2020

Subject: Laguna Creek Diversion Retrofit Project

Dear Dear Charlene Nijmeh, Chairperson:

The City of Santa Cruz Water Department is working to complete a cultural resources study for an undertaking to retrofit the Laguna Creek Diversion Facility in an unincorporated area of Santa Cruz County near Bonny Doon, California at 3030 Smith Grade and Laguna Creek.

Attached, please find the Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting Notice, which includes a description of the proposed Project and a map, which shows the project location and Area of Potential Effect (APE) for the project.

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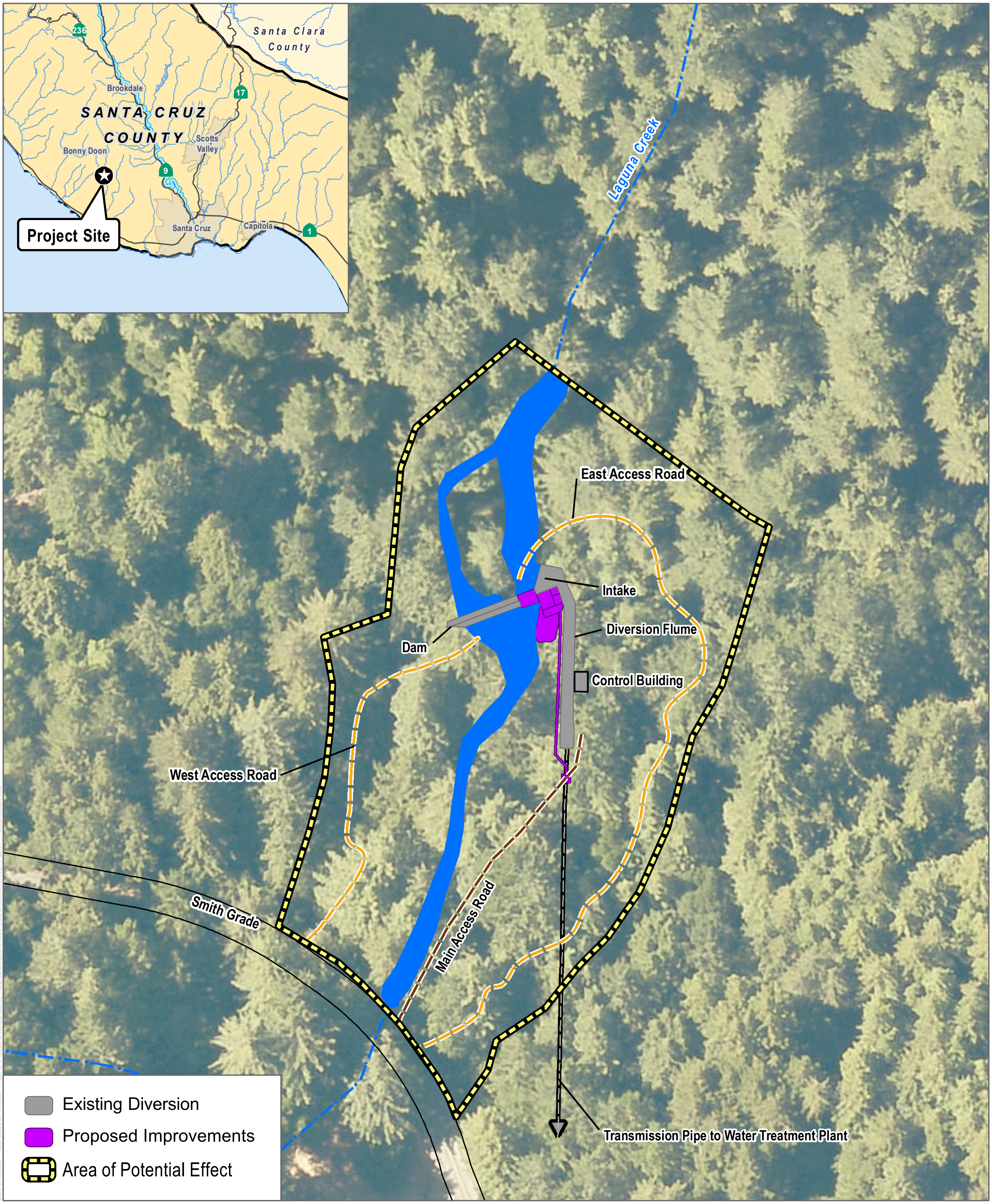
If you have any questions or comments, you can reach me by telephone at (831) 420-5322 or by email at jmartinezmckinney@cityofsantacruz.com. Thank you for your assistance with this project.

Sincerely,

____

Jessica Martinez-McKinney Associate Planner II
City of Santa Cruz Water Department
jmartinezmckinney@cityofsantacruz.com
(831) 420-5322



SOURCE: ESRI 2020, City of Santa Cruz 2019, USGS 2019

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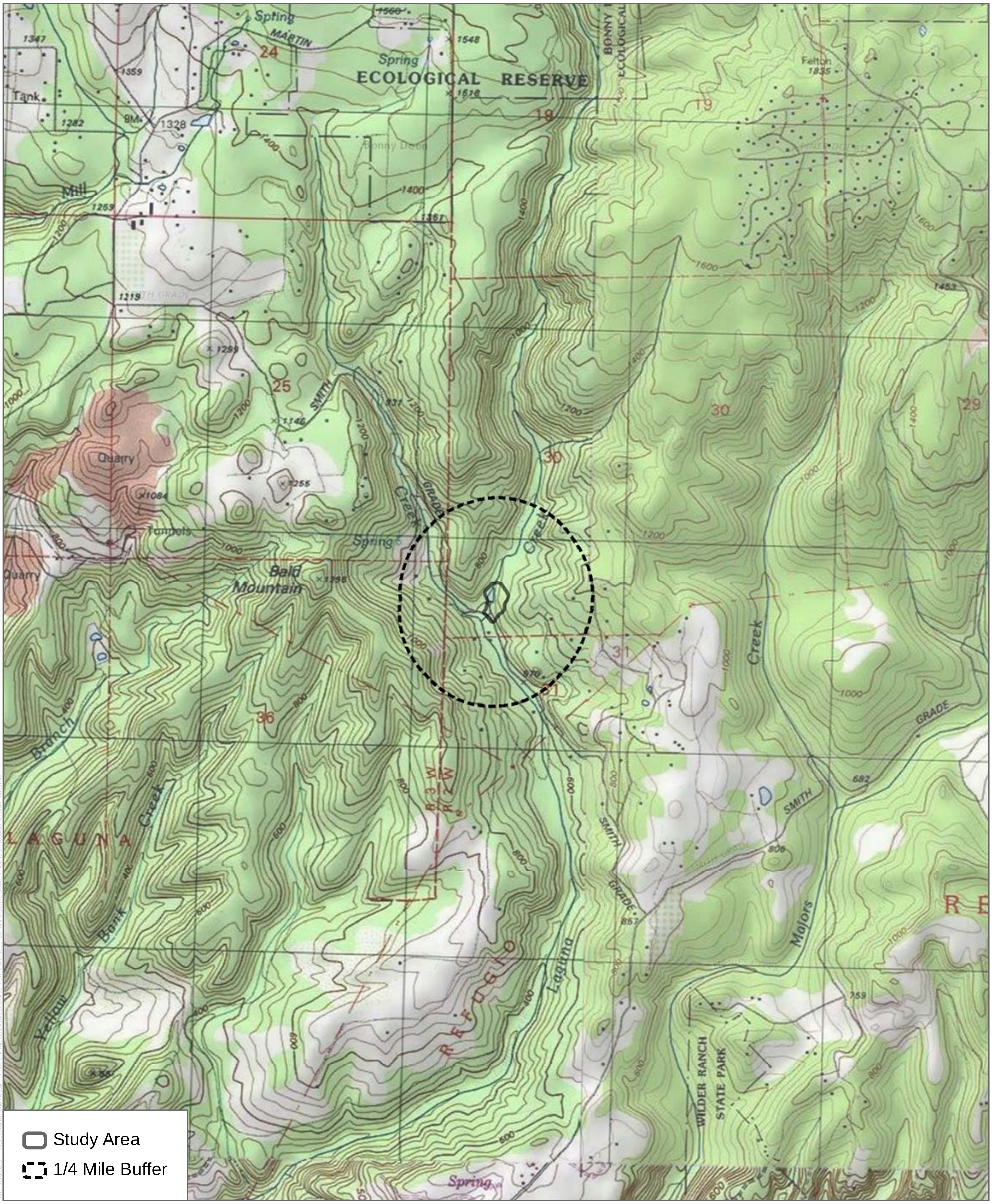
FIGURE 1

Project Location and Area of Potential Effect Map

Laguna Creek Diversion Retrofit Project



SOURCE: USGS 7.5-Minute Series Davenport & Felton Quadrangles
Township 10S; Range 3W, 2W; Sections 25, 30, 31, 36

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0 285 570 Meters
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Records Search

Laguna Creek Diversion Retrofit Project

Native American Contact (as of April 15, 2020)

Date	Contact Type	From	To	Communications
02/03/2020	Email	Dudek	Native American Heritage Commission (NAHC)	Request Sacred Lands file (SLF) search and list of Native American contacts in the Project Area
02/04/2020	Email	Native American Heritage Commission (NAHC)	Dudek	Sacred Lands File indicated **negative** results. Included list of Native American contacts for the Project Area
03/16/2020	Letter	City of Santa Cruz	Valentin Lopez, Chair of the Amah Mutsun Tribal Band	Introduction to the project and request for information on additional resources in the Project Area
03/16/2020	Letter	City of Santa Cruz	Ann Marie Sayers, Chair of Indian Canyon Mutsun Band of Costanoan	Introduction to the project and request for information on additional resources in the Project Area
03/16/2020	Letter	City of Santa Cruz	Irenne Zwierlein, Chair of Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan	Introduction to the project and request for information on additional resources in the Project Area
03/16/2020	Letter	City of Santa Cruz	Patrick Orozco, Chairman, Costanoan Ohlone Rumsen-Mutsun Tribe	Introduction to the project and request for information on additional resources in the Project Area
03/16/2020	Letter	City of Santa Cruz	Charlene Nijmeh, Chairperson, Muwekma Ohlone Indian Tribe of the SF Bay Area	Introduction to the project and request for information on additional resources in the Project Area
06/18/2020	Email	Patrick Orozco	City of Santa Cruz	Mr. Orozco indicated concern for six specific Native American sites near the Project (CA-SCR-13, 14, 15, 16, 17, and 58). He asked for no disturbance to the sites.

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Appendix C

Other Interested Party Correspondence

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 9, 2020

Ashley Holmes
Santa Cruz Museum of Art and History
705 Front Street
Santa Cruz, CA 95060

Subject: Laguna Creek Diversion Retrofit Project

Dear Ms. Holmes:

Dudek has been retained by the City of Santa Cruz Water Department to conduct a cultural resources study for the Laguna Creek Diversion Retrofit (Proposed Project) in Santa Cruz County. The Laguna Creek Diversion Facility directs water from Laguna Creek into the North Coast System by way of the Laguna Pipeline, just north of the Smith Grade roadway in unincorporated Santa Cruz County, in the community of Bonny Doon and approximately 12 miles northwest of downtown Santa Cruz (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address operational and maintenance issues through the retrofit the existing facility to provide for natural sediment transport past the diversion and to protect fish species and their habitat. The Proposed Project would replace the existing intake structure and other related additions and improvements including a valve control vault, riprap apron, new monitoring and control equipment, sediment control bypass valves, along with new access and safety provisions. The Proposed Project would continue to allow the City to operate its diversion while enhancing its ability to meet its in-stream flow requirements.

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 Jessica Martinez-McKinney, Associate Planner with the City of Santa Cruz Water Department, by phone at (831) 222-0069 or by email at jmartinezmckinney@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

Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Project Location and Vicinity

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 9, 2020

Felicia Van Stolk
Santa Cruz Museum of Natural History
1305 E Cliff Drive
Santa Cruz, CA 95062

Subject: Laguna Creek Diversion Retrofit 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 Laguna Creek Diversion Retrofit (Proposed Project) in Santa Cruz County. The Laguna Creek Diversion Facility directs water from Laguna Creek into the North Coast System by way of the Laguna Pipeline, just north of the Smith Grade roadway in unincorporated Santa Cruz County, in the community of Bonny Doon and approximately 12 miles northwest of downtown Santa Cruz (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address operational and maintenance issues through the retrofit the existing facility to provide for natural sediment transport past the diversion and to protect fish species and their habitat. The Proposed Project would replace the existing intake structure and other related additions and improvements including a valve control vault, riprap apron, new monitoring and control equipment, sediment control bypass valves, along with new access and safety provisions. The Proposed Project would continue to allow the City to operate its diversion while enhancing its ability to meet its in-stream flow requirements.

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Sincerely,

Fallin Steffen

Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Project Location and Vicinity

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

April 9, 2020

San Lorenzo Valley Museum
12547 CA-9
Boulder Creek, CA 95006

Subject: Laguna Creek Diversion Retrofit 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 Laguna Creek Diversion Retrofit (Proposed Project) in Santa Cruz County. The Laguna Creek Diversion Facility directs water from Laguna Creek into the North Coast System by way of the Laguna Pipeline, just north of the Smith Grade roadway in unincorporated Santa Cruz County, in the community of Bonny Doon and approximately 12 miles northwest of downtown Santa Cruz (see Figure 1 enclosed). The Santa Cruz Water Department is proposing to address operational and maintenance issues through the retrofit the existing facility to provide for natural sediment transport past the diversion and to protect fish species and their habitat. The Proposed Project would replace the existing intake structure and other related additions and improvements including a valve control vault, riprap apron, new monitoring and control equipment, sediment control bypass valves, along with new access and safety provisions. The Proposed Project would continue to allow the City to operate its diversion while enhancing its ability to meet its in-stream flow requirements.

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Sincerely,

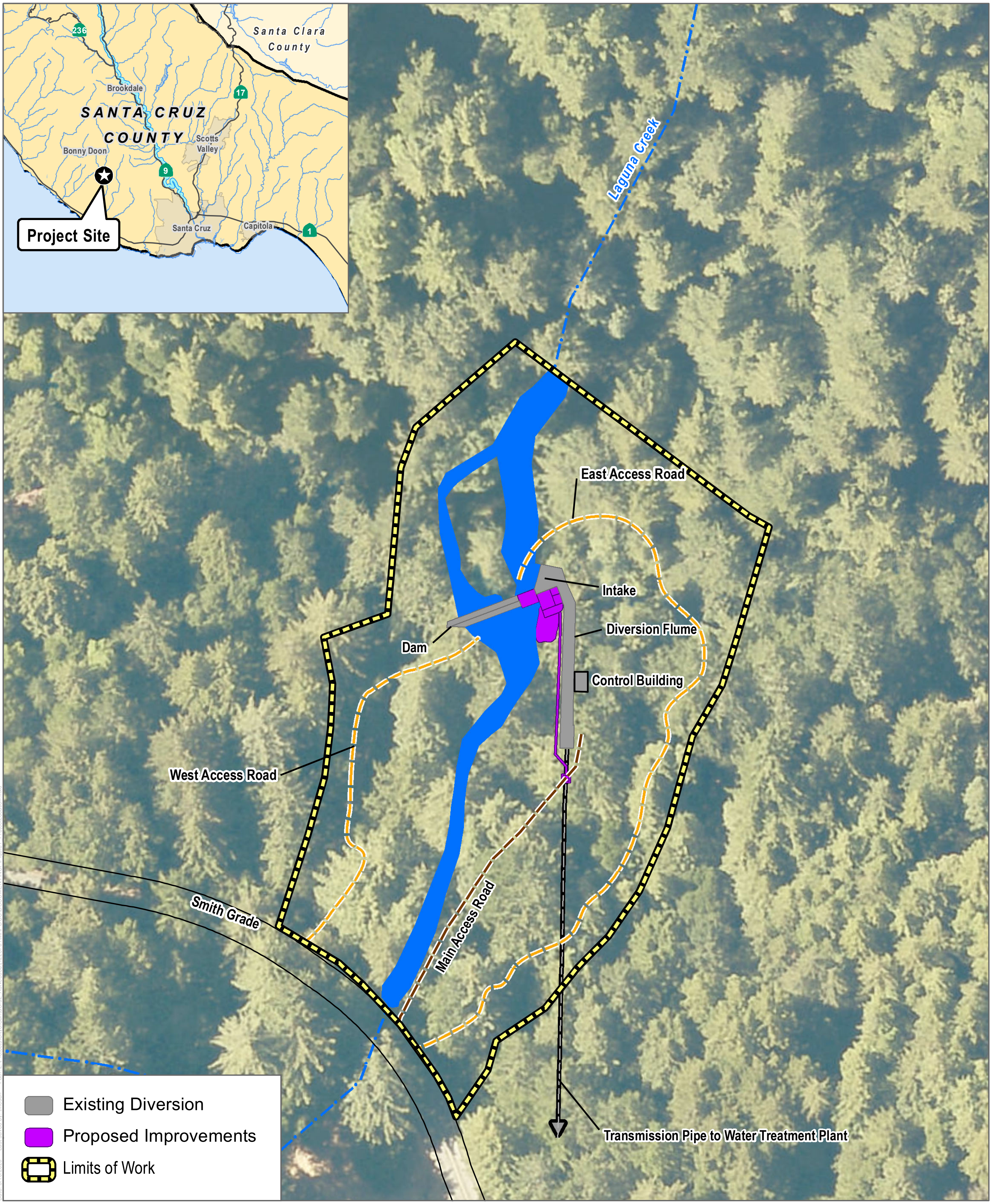
Fallin Steffen

Fallin Steffen, MPS
Architectural Historian

P: 831.400.8882
E: fsteffen@dudek.com

Enclosure

Figure 1. Project Location and Vicinity



SOURCE: ESRI 2020, City of Santa Cruz 2019, USGS 2019

DUDEK 0 40 80 Feet

Project Location and Vicinity

Laguna Creek Diversion Retrofit Project

Fallin Steffen

From:	Felicia Van Stolk <felicia@santacruzmuseum.org>
Sent:	Tuesday, May 5, 2020 4:33 PM
To:	Fallin Steffen
Subject:	Re: Laguna Creek Diversion Retrofit Project

As far as I am aware, none of the archaeological collections that we currently steward have relationships to this area. However, it is within the traditional and unceded territory of the Amah Mutsun Tribal Band and I recommend that you contact them.

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 Thu, Apr 9, 2020 at 1:36 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 Laguna Creek Diversion Retrofit 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**
>
> Architectural Historian
>
> DUDEK

m: 831.400.8882

www.dudek.com

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Appendix D

DPR 523 forms for the Laguna Creek Diversion Facility

State of California ♁ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 3S, 5S3

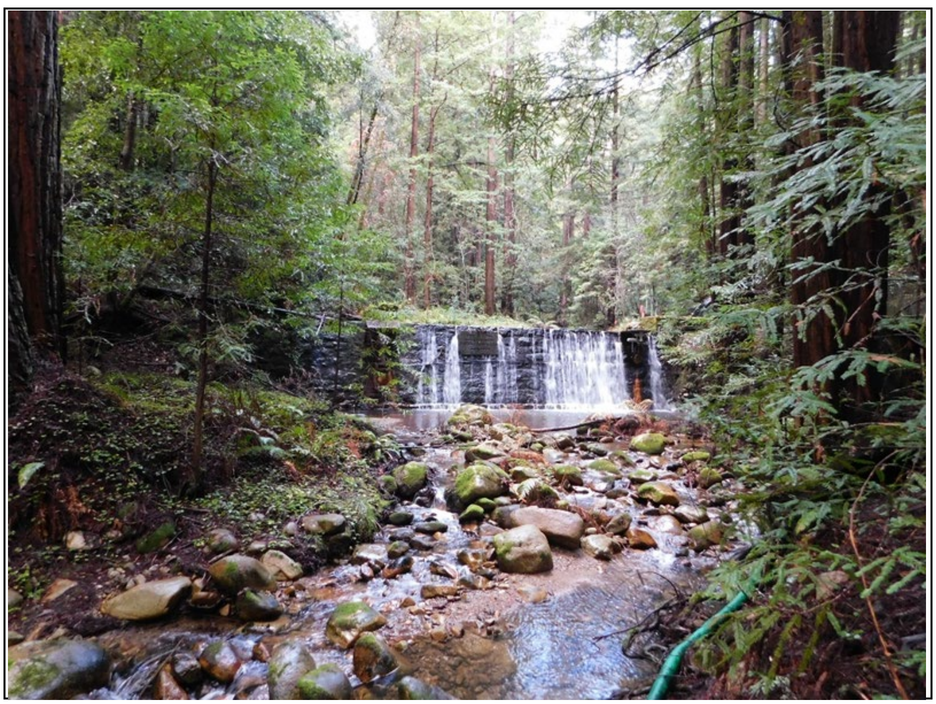
Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) The Laguna Creek Diversion Facility
P1. Other Identifier: The Facility

***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** Davenport, CA **Date** 1997 **T** 10S ; **R** 2W ; _ ☐ **of** _ ☐ **of Sec** 30 ; Mount Diablo **B.M.**
c. Address 3030 Smith Grade City Santa Cruz Zip 55060
d. UTM: (Give more than one for large and/or linear resources) Zone 10S, 577274.59 mE/ 4097921.61 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)
Santa Cruz County Assessor's Parcel Number (APN): 062-101-03
The Facility is located approximately 3.4 miles up Smith Grade from the Empire and Smith Grades intersection on the north side of the road.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The Facility (Exhibit 1) located in unincorporated Santa Cruz County, was designed by the Risdon Iron Works of San Francisco and completed in 1890 to serve as the municipal water supply for the City of Santa Cruz. The Facility contains four historic era built environment structures: the Laguna Creek Dam (1890), the Diversion Flume/Intake Structure (1890), the Transmission Pipeline (1890) and the Chlorination Station (1965).
(See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP4. Ancillary Building; HP9. Public Utility Building; HP11. Engineering Structure; HP21. Dam; HP22. Reservoir



***P4. Resources Present:** ■ Building ■ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)
P5b. Description of Photo: (view, date, accession #) The Laguna Creek Diversion Facility site, looking north (01/14/20; DSCN4800)
***P6. Date Constructed/Age and Source:** ■Historic ☐ Prehistoric ☐ Both
- Laguna Creek Dam (1890)
- Diversion Flume/Intake (1890)
- Transmission Pipeline(1890)
- Chlorination Station (1965)

Source- Santa Cruz Surf 1890b:3 & Santa Cruz Water Department
***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:** 01/14/2020
***P10. Survey Type:** (Describe)
Intensive Pedestrian

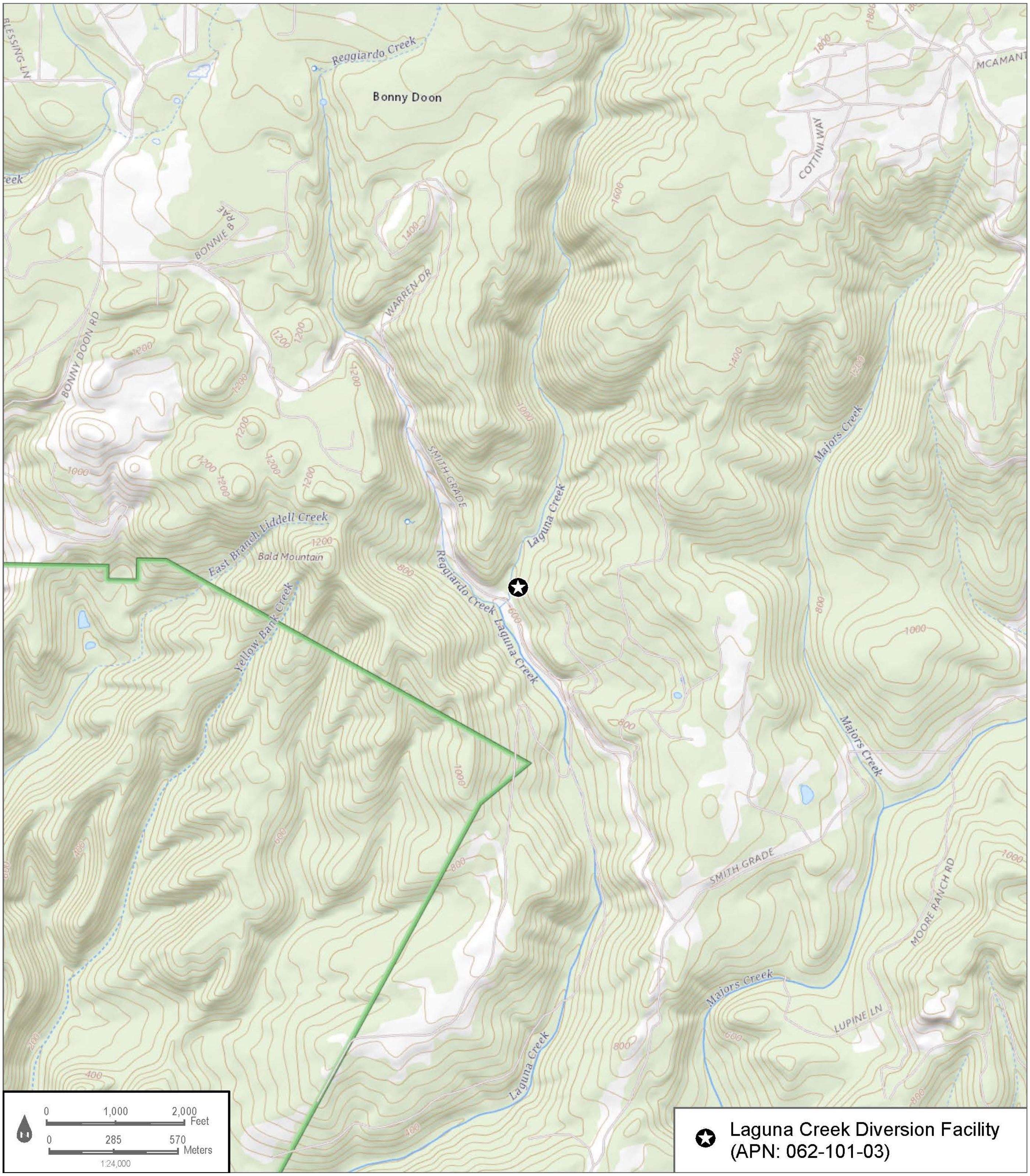
***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Dudek. 2020. Cultural Resources Inventory, Evaluation, and Finding of Effect Report for The Laguna Creek Diversion Retrofit Project.

***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

Page 2 **of** 34 ***Resource Name or #** (Assigned by recorder) The Laguna Creek Diversion Facility
***Map Name:** Davenport Quadrangle ***Scale:** 1:24 000 ***Date of map:** 1997



State of California ♁ The Resources Agency Primary #
DEPARTMENT OF PARKS AND RECREATION HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) The Laguna Creek Diversion Facility ***NRHP Status Code** 3S,5S3

B1. Historic Name: The Laguna Creek Dam
B2. Common Name:
B3. Original Use: Diversion facility B4. Present Use: Diversion facility
***B5. Architectural Style:** Permanent Weir
***B6. Construction History:** (Construction date, alterations, and date of alterations)
The Laguna Creek Diversion Facility was completed in 1890.
(See Continuation Sheet)

***B7. Moved?** ■**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**
***B8. Related Features:**

B9a. Architect: Risdon Iron Works b. Builder: Kelso and Dare
***B10. Significance: Theme** Early Water Management **Area** Santa Cruz, California

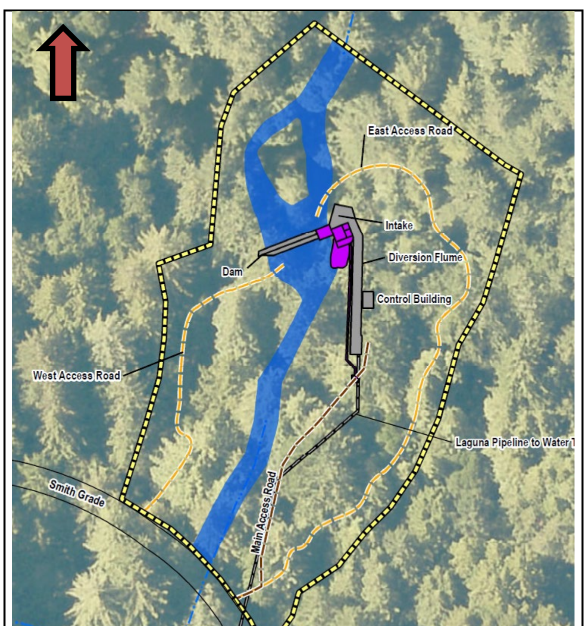
Period of Significance 1890 **Property Type** Diversion facility
Applicable Criteria NRHP/CRHR: A/1 & Santa Cruz County: 2
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Laguna Creek Dam is a well-preserved masonry water management structure dating to 1890. It is a physical example of early water management infrastructure in California. As such the dam appears individually eligible for listing in the NRHP Criterion A, CRHR 1, and Santa Cruz County Criterion 2 for its association with pioneering advances in water management in California specifically through creation of the City of Santa Cruz’s first municipal water distribution system that supplied the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed.
The character defining features associated with this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure. The historic property boundary for the Laguna Creek Dam is limited to the dam structure footprint.
As such, the Laguna Creek Dam is considered historic property under Section 106 of the NHPA and historical resource under CEQA. **(See Continuation Sheet)**

B11. Additional Resource Attributes: (List attributes and codes) N/A
***B12. References: (See Continuation Sheet)**

B13. Remarks: None

***B14. Evaluator:** Fallin Steffen, MPS, and Kathryn Haley, MA
***Date of Evaluation:** May 26, 2020



(This space reserved for official comments.)

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

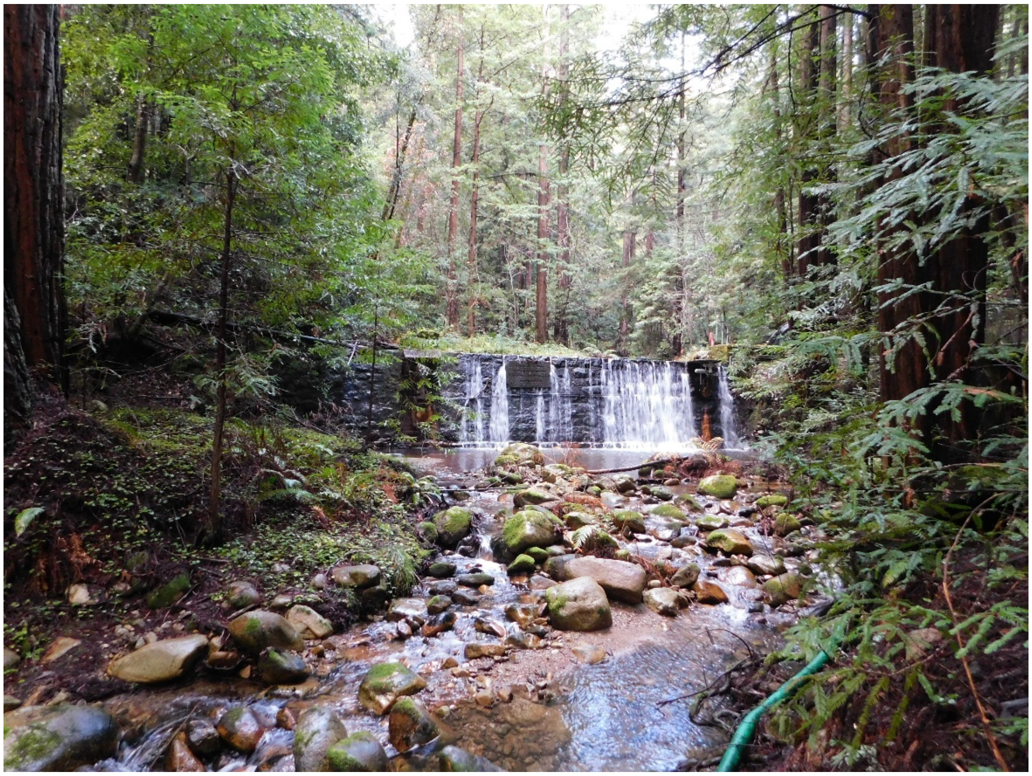


Exhibit 1. The Laguna Creek Diversion Facility site, view looking north (DSCN4800)

Site Access

The Facility is situated in a dense redwood forest beside Smith Grade. A chain-link gate (Exhibit 2) guards the gravel main access road (Exhibit 3) located on the east side of Laguna Creek that leads to the base of the Facility. The east access road located to the southeast of the main access road off Smith Grade leads to the site upstream of the dam. The west access road is located to the west of Laguna Creek and continues on to provide access to privately-owned property.

Exhibit 2. Gate to the Facility main access road off Smith Grade, view looking east (DSCN4900)

Exhibit 3. Main access road off Smith Grade, view looking northeast (DSCN4813)

Laguna Creek Dam (1890)

The Laguna Creek Dam is a late-19th century masonry diversion structure that spans the width of Laguna Creek (Exhibit 4), approximately 60 feet, creating a small impoundment above the dam. Historical records suggest that the dam was constructed of native granite stone quarried on-site from the bed of the creek during construction in 1890. Information from the SCWD states that the materials that comprise the dam likely include limestone, marble, granite and concrete. Beaded mortar joints fill the voids between and bind together the large, irregular-shaped blocks of stone.

CONTINUATION SHEET

Property Name: The Laguna Creek Diversion Facility

Exhibit 4. The Laguna Creek Dam, view looking north (DSCN4802)

Water trickles continuously over the crest and down the slightly reclined face of the dam as it is corralled into two spillways formed by the two raised ends of the dam and a single, off-centered masonry column between them. The masonry column covered in thick green moss contains the sediment control bypass valve added to the structure in 1983, located on the western side of the dam and protected by a metal hood (Exhibit 5). A portion of the Reggiardo Creek Pipeline, a 10-inch iron blow off pipe, is just visible extending over the west side of the dam. The remainder of the 14-inch Reggiardo Creek Pipeline empties approximately 850 feet upstream from the Laguna Creek Diversion pond, however it is unclear whether water is still being diverted from Reggiardo Creek through the pipeline at this time.

Exhibit 5. Detail of the west side of Laguna Creek Dam showing the masonry column (red arrow) containing the west sediment control bypass valve which separates the two spillways, as well as the Reggiardo Creek Pipeline blow off pipe (white arrow,) view looking northwest (DSCN4853)

A buildup of sediment upstream from the dam has caused the water level to stand flush with the 2-foot-wide crest of the structure (Exhibit 6).

Exhibit 6. The crest of the Laguna Creek Dam (red arrow) submerged in impounded water and sediment (yellow arrow), view looking southwest (DSCN4892)

Beside the raised eastern end of the dam, housing the intake structure, is another sediment control bypass valve that was installed at an unknown time after 1983 sheltered by a horizontal metal hood (Exhibit 7). Multiple metal conduit lines containing control mechanisms for both sediment control bypass valves run across the face of the intake and the dam.

Exhibit 7. Eastern end of the Laguna Creek Dam showing the post-1983 sediment control bypass valve beside the raised corner housing the intake, view looking northwest (DSCN4856)

At the center of the dam is a sizable plaque made of iron crediting the Risdon Iron Works for the completion of the project in 1890 (Exhibit 8). The complete text of the plaque reads:

SANTA CRUZ // WATER WORKS// RISDON IRON WORKS // BUILDERS// S.F. 1890.

Exhibit 8. Risdon Iron Works plaque on the face of the Laguna Creek Dam (DSCN4810)

Diversion Flume/Intake Structure (1890, modified c. 1980)

The Diversion Flume/Intake Structure for the Laguna Creek Dam was initially constructed in 1890 and is situated on the eastern side of the creek. Historical records suggest that these components were constructed from the same irregular-shaped blocks of native granite stone used to construct the dam. Although beaded mortar joints also fill the voids between stones, the flume structure is mostly covered in thick, green moss (Exhibit 9). The flume sits parallel with the Creek and features green fiberglass decking and sections of curved safety handrails that runs the length of the linear structure. The intake was modified in 1980 as described further below.

Exhibit 9. Masonry Diversion Flume beside the Chlorination Station building, view looking northwest (DSCN4830)

The Transmission Pipeline carrying water to the reservoir begins at the southern end of the flume (Exhibit 10). A drain also emerges from the southwestern section of the flume.

Exhibit 10. Masonry Diversion Flume showing the flume drain (foreground) and the head of the Transmission Pipeline (right). Chlorination Station building in background, view looking northeast (DSCN4823)

Near the flume drain, a rectangular relief bearing four sets of initials and the date 1890 is carved into the stone of the flume (Exhibit 11). Research was not able to determine who the individuals represented in the carving were, but it is assumed that they were laborers employed by Kelso and Dare who were responsible for the construction of the Laguna Creek Dam and the Diversion Flume/Intake Structure.

Exhibit 11. Carved plaque on the Flume (DSCN4796)

The intake component of the flume sits at the eastern side of the creek above the dam (Exhibit 12). Overall, the intake appears to have been significantly altered and/or enlarged from its original design during the 1980s and now is predominantly constructed of modern materials. The intake housing has been covered with concrete and includes a sizable platform above with a section of metal railing. A pair of metal gates and a well-placed timber situated across the mouth of the intake prevents debris from entering the flume via the intake.

Exhibit 12. Intake structure, view looking southeast (DSCN4876)

Transmission Pipeline (1890, replaced 1965)

Only a small section of the 14-inch Transmission Pipeline installed in 1965 is visible above the ground at the base of the Diversion Flume/Intake structure (Exhibit 13).

Exhibit 13. Segment of the Transmission Pipeline exiting the Masonry Diversion Flume/Intake Structure, view looking west (DSCN4828)

Chlorination Station Building (1965)

The modest Chlorination Station building (Exhibit 14) located to the east of the Masonry Diversion Flume/Intake structure was constructed in 1965 of standard-size concrete masonry units. Santa Cruz municipal water is no longer treated with chlorine at the Creek, so the building presently houses the various controls for the sediment control bypass valves, and has been retitled the Control Building. It is situated on a concrete slab foundation and features a shallow gable roof clad in rolled composition material. The building features only a single metal door with a single square light. The remainder of the building features no fenestration.

Exhibit 14. Control Building, view looking north (DSCN4832)

***B6. Construction History (Continued):**

Modifications to the Laguna Creek Diversion Facility
The following text provides a summary of subsequent modifications to the Facility following its initial completion in 1890.

Iron Sluice Gate (1897)
The original eight-inch pipe installed through the dam to allow sand, sediment, and debris to escape was found to be ineffective. It was replaced in 1897 by a 24-inch operable iron sluice gate. The gate could be raised and lowered to allow accumulations to flow freely through the dam. A photograph of the dam c.1950-1960s (see Exhibit 4) shows the water flowing through the iron sluice gate in the face of the dam on the left side of the photograph. The sluice gate was replaced by a subsequent alteration during the 1980s (Santa Cruz Sentinel 1897 Dec 10: 1).

Replacement of the Laguna Creek Transmission Pipeline (1965)
In 1965, the original transmission pipeline was replaced by with 12,575 feet of 14-inch water main. Prior to the replacement, it was found that the original, 75-year-old pipeline was leaking nearly 400,000 gallons daily, resulting in an estimated annual loss of $64,000 per year. The replacement pipeline, which was proposed as by Water Department Director, Wes Webber, as early as 1958, allowed the system to capture the water previously lost through leakage each day (Santa Cruz Sentinel 1964: 36; 1965: 20).

20-Inch Sediment Control Bypass Valve Installation (1983)
In 1983, a modern, 20-inch sediment control bypass valve was installed in the position of the 1897 iron sluice gate on the west side of the dam. The new knife gate valve included

a pneumatic actuator cylinder and ram for the 20-inch valve, which was fed through the dam via the opening created by the sluice gate. The remaining space around the new pipe through the dam was then infilled with dry grout. The valve mechanism was attached to the downstream face of the dam and was protected by an angled checker-plate, steel hood (SCWD 1983: 1).

Installation of Cribwall on East Bank (1986)
In 1986, the east bank of Laguna Creek upstream of the intake was excavated, and a closed-face, concrete cribwall was installed along the bank. Additional structure added to the Facility north of the Intake. At this same time, the access road was graded and covered with compacted concrete base rock (SCWD 1986: 1).

Fiberglass covering of Flume (2002)
In 2002, the redwood plank cover on the Diversion Flume was replaced with fiberglass grating and addition of a metal handrail (SCWD 2002).

Additional Modifications, Dates Unknown:
Install additional sediment control bypass valve on east side of the dam (installed post-1983, specifications unknown)
Modify/expand Intake area to include platform and metal handrails and new intake gate (date unknown)

*B10. Significance (Continued):

Development of Water Infrastructure in Santa Cruz
The San Lorenzo River, and the many creeks that wind through the greater Santa Cruz County area have historically been subject to seasonal droughts and floods. Coupled with the many upstream diversions and industrial uses of these waterways by settlers and purveyors in the Santa Cruz Mountains, water shortages are present in the earliest records of the County. By the 1860s, acute cyclical shortages and pollution prompted the development of private for-profit water systems by entrepreneurs.

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 1864a: 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 1864b: 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 Carbonero 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 2020b).

The Santa Cruz Water Company (1866)
Competition for Hihn soon followed. 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. H. K. Moore, company President, and E. R. Morgan, the resident engineer and superintendent, operated the Santa Cruz Water Company. By the end of 1876, the Company had also installed a diversion off Branciforte Creek to deliver water 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 San Lorenzo pumping plant for a meager $800 (Santa Cruz Weekly Sentinel 1877a: 1; 1877b: 2; SCWD ND: 1).

For the next several years, the Santa Cruz Water Company focused its attention on the construction of a pipeline to divert water from the newly acquired Majors Creek appropriations. This effort was very costly and the company the slipped into dire financial standing, eventually prompting the sale of the company in 1886.

City of Santa Cruz Water Department
During the 1880s, the rising price of the private, fee-based water systems prompted the City of Santa Cruz to explore their own, City-owned public option that would grant the citizens of Santa Cruz unlimited free water. In August of 1886, the Santa Cruz Water Company along with all of its appurtenances was purchased by the City of Santa Cruz 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 system for over a year when it was re-conveyed to private owners in 1887 (Santa Cruz Weekly Sentinel 1882: 3; SCWD ND: 1; Santa Cruz Surf 1890a: 1).

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

The City revised its approach and by July 1888, the Common Council had secured nearly all of 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 creek was capable of supplying 1.4 million gallons towards a City-owned Water Works, and in August, it was reported that open negotiations with the sole opposing claimant, a land owner concerned with loss of access to water for his own land as a result of the pipeline, were underway and was resolved amicably. Plans 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 were finally in motion. 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)" (Santa Cruz Sentinel 1888: 2; The Santa Cruz Daily Surf 1888b: 2).

Development of the Laguna Creek Diversion Facility

With the rights to the water of Laguna Creek secured, the City of Santa Cruz set in motion plans to construct the first municipal water distribution system, known then as the City Water Works, and later as the Laguna Creek Diversion Facility.

After some difficulty, 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 conducted a survey and inspection of the proposed dam, reservoir and pipeline site. He produced a report in favor of the project that valued the proposed undertaking at $260,000 (Santa Cruz Surf 1889a: 3; 1889b: 3; Santa Cruz Sentinel 1889: 3).

The City of Santa Cruz made an arrangement with the New York banking group, Coffin and Stanton, who agreed to accept the money and construct the City Water Works on the condition that they would hold the mortgage to the system until the time the bonds were fully repaid. One week prior to Thanksgiving on November 20, 1889, the Common Council introduced and adopted an ordinance authorizing the conveyance of the Laguna Creek water rights to the City, and the mortgage to the future City Water Works system to Coffin and Stanton (Santa Cruz Surf 1890a: 1)

Coffin and Stanton received the papers authorizing the construction, and work on the City Water Works system began immediately. The work would entail the construction of a dam on the Laguna Creek, the excavation of a reservoir site on Henry Cowell's property, the installation of a 12-mile-long pipeline from the Laguna Creek Dam to the Reservoir, and pipes connecting the reservoir with Santa Cruz households. Coffin and Stanton sublet the construction contract to the prominent San Francisco firm, Risdon Iron Works, who were known for producing the great iron pipes for steam ships. Risdon had a representative in Santa Cruz by the following week to calculate the number of iron pipes required for the project. The *Santa Cruz Surf* reported that work on the dam on Laguna Creek and the dam at the reservoir site on Henry Cowell's ranch property would be completed by the San Francisco contracting firm, Kelso and Dare were to begin the following week (Santa Cruz Surf 1889c: 3).

By early December 1889 when work was intended to begin, the representative of Risdon Iron Works, A. Schierholz, was reportedly on-site for the duration of the project, as well as John Kelso and William Baldwin, representatives of contractors, Kelso and Dare. Although work began on a labor camp near the reservoir site on Cowell's property, work on the two dams on the Laguna Creek was delayed for some time by inclement weather. On December 28th, the first shipment of pipes arrived in Santa Cruz, and construction on the pipeline, the Laguna Creek Dam, and the reservoir site commenced over the following months. No photographs or illustrations of the Laguna Creek Dam and pipeline construction were found during the course of research for this project. However, an illustration of segments of a similar pipeline produced for the Crystal Springs Pipeline in San Francisco by the Risdon Iron Works in 1888 demonstrates the likely shape and size of the pipeline segments for the Laguna Pipeline (Exhibit 15) (Santa Cruz Surf 1889d: 3).

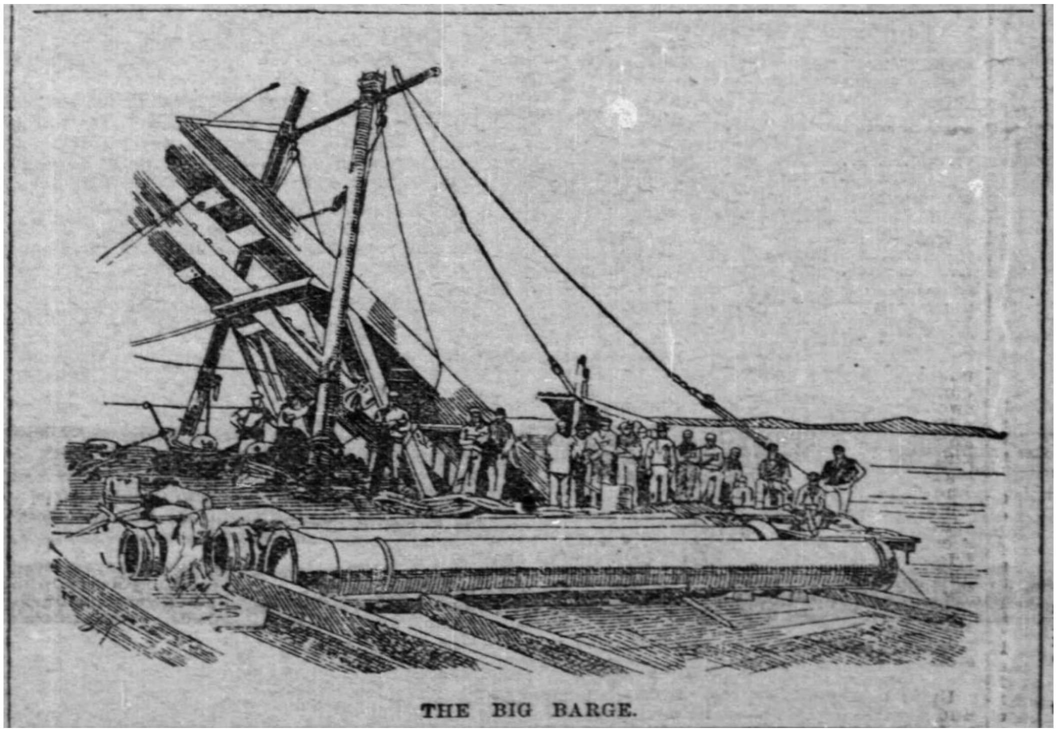


Exhibit 15. An 1888 illustration of the Risdon Iron Works pipes laid to transport water to San Francisco across the Bay from San Mateo for the Crystal Springs project (San Francisco Examiner 1888a: 12)

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 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.

At 5.35 P.M. on October 18, 1890, the last pipe connecting the waters of Laguna Creek to the homes and businesses of Santa Cruz was put into position (Santa Cruz Surf 1890c: 3).

In 1892, Harrison's History of Santa Cruz County, California touted the new Santa Cruz City Water Works (Harrison 1892: 216):

> Without doubt Santa Cruz is the best watered, as well as the best lighted, town on the Pacific Coast. She owns her own water supply and electric light works.

> The water system especially is a matter of great local pride, and, "naturally enough, those connected with it take great pleasure in exhibiting it.

The same year as the Harrison publication, the City of Santa Cruz published an overview of the recent water-related projects in the City and also a review of the new municipal system after one year of operation. This review included a small photograph of the Laguna Creek Dam that had been completed 2 years prior in 1890 (Exhibit 16; Santa Cruz Surf 1892: 2).

Exhibit 16. The earliest known photograph of the Laguna Creek Dam published in the *Santa Cruz Surf* in 1892 (Santa Cruz Surf 1892: 2)

When the last segment of the cast-iron Laguna Creek pipeline was laid in October 1890, the first municipally funded water works system in the history of Santa Cruz, the Facility began to supply free water to the citizens of the City. The Facility led the way for subsequent municipal water impoundment projects for the City, which continues to rely on multiple sources in the North Coast Watershed for drinking water supply into the present. The Facility is the first example of this type of project in the City, and continues to function as a component of a now-enlarged of water capture and distribution system presently suppling drinking water to the Santa Cruz Water Department service area. While subsequent features have been added to the Facility overtime.

Following the completion of the Facility, the City implemented a measure in 1891 to increase the water flow diverted through the pipeline. A 965-foot-long flume was completed connecting the west branch of Laguna Creek, now called Reggiardo Creek, to the main Laguna Creek by emptying out water to the north of the 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 not enough water 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. The concrete dam on Reggiardo Creek impounded water and conveyed it through a corresponding iron pipeline to the creek approximately 850 upstream from the Laguna Creek Dam. This measure was strictly intended to supplement the water flow distributed through the Transmission Pipeline leading from the Facility. Although a portion of the Reggiardo Creek Pipeline, a 10-inch blow off pipe (Exhibit 17), is located along the west edge of the Laguna Creek Dam and feeds into the creek, it is not a component of the Facility as it is not physically connected and merely changes the volume and flow of water through Laguna Creek (Santa Cruz Evening News 1912: 2).

Exhibit 17. A photograph of the Laguna Creek Dam showing the portion of the Reggiardo Creek Pipeline, c.1960, with the Director of the Santa Cruz Water Department, Wes Weber. Weber oversaw the Water Department during a major expansion of the system during the 1950s and 1960s, including the replacement of the original Laguna Creek Transmission Pipeline in 1965 (SCWD c.1960).

Today, the Laguna Creek Dam structure continues to convey the physical defining features and engineering methods of a diversion facility from the late 19th century, and offers a glance into the earliest efforts by the City to supply water to its residents.

Architectural Style: Permanent Weir

The Laguna Creek Dam, constructed in 1890 from native stone, is an example of an engineered diversion structure known as a permanent weir (Exhibit 18). The following chapter offers a brief explanation of weir types, their application, and common materials used in the construction of weirs (Axness and Clarkin 2013: 45).

Exhibit 18. An example a Permanent Weir constructed of concrete (Townsend 2012)

A weir is a small barrier that is built to either fully or partially obstruct a creek or river, resulting in a rise in the water level on the upstream side of the structure. Unlike traditional diversion dams that rely on spillways to manage flow, weirs are specifically designed to allow excess water to flow over the crest of the structure, creating a sheet of water called a nappe that flows over the weir. There are two main weir classifications: the permanent weir and the adjustable weir. A permanent weir will raise the impounded water surface to the lowest point of the weir crest. An adjustable weir raises the water level temporarily through either the addition of movable boards or stoplogs into an aperture, tilting or raising movable weir gates, or inflating rubber air bladders. Weirs can be constructed of a wide variety of materials including naturally sourced resources like stone, rock, logs and felled timbers, but also construction materials such as concrete, steel, rubber, and dimensional lumber (Axness and Clarkin 2013: 45-6;).

Engineer: Risdon Iron Works
The Risdon Iron Works iron foundry was responsible for the design of the Facility system in 1889. The following chapter discusses the development of Risdon Iron Works.

John Nelson Risdon was born on July 10, 1822 in LeRoy, New York. John was the third of seven children born to Orange and Sally Risdon. Orange Risdon was a notable surveyor and a tenacious entrepreneur who was known for founding the City of Saline, Michigan in 1832 (Dikeman 2004).

J. N. Risdon departed for El Dorado during the early 1850s, joining the many tradespeople who flocked to the California during the Gold Rush to support the rapid economic and industrial growth there. He made his way via the Isthmus of Panama, and remained there with his young wife for over a year running a store. After leaving Panama, they changed their plans to go to El Dorado, and instead decided to settle in San Francisco (Dikeman 2004; Jensen 2006: 7; Oakland Tribune 1887: 2).

John received employment at a small foundry and boilermaker under the ownership of John Snow, and it was here that he began to see the economic prospects in iron works and boiler making. In 1853, he formed a partnership with the present foreman of the foundry, James Coffey, and together they purchased Snow’s interests in the business. Together, Coffey and Risdon expanded the capacity of Snow’s foundry, rebranding the business, Coffey & Risdon’s Steam Boiler Works. Coffey and Risdon claimed to be “The only exclusively Boiler Making Establishment on the Pacific Coast (Daily National Democrat 1858:4)” and the company became reasonably well known during their time in operation until 1868 (Dikeman 2004; Jensen 2006: 7; Oakland Tribune 1887: 2).

Like his father, John Risdon was a determined entrepreneur. When Coffey and Risdon experienced considerable success, Risdon decided to also open his own foundry in 1864. Four years later in April 1868, the Risdon Iron and Locomotive Works filed for a certificate of incorporation (Exhibit 19). The company name was colloquially shortened to Risdon Iron Works (Oakland Tribune 1887: 2; San Francisco Examiner 1868: 3).

CONTINUATION SHEET

Property Name: The Laguna Creek Diversion Facility

Exhibit 19. An 1872 advertisement for the Risdon Iron and Locomotive Works (Feather River Bulletin 1872: 4)

The Risdon Iron and Locomotive Works manufactured engines and machinery for mills, sugar refinement, mining, agriculture, locomotives and steam ships. They also produced cast iron pipes to specification, and cast iron architectural components. The company continued to function under the Risdon name following John Risdon's death in 1887. In fact, some of the most prestigious projects undertaken by Risdon Iron Works took place after the time Risdon was involved in the operation of the company (Oakland Tribune 1887: 2).

A sample of known projects contracted to Risdon Iron and Locomotive Works is included below (The Daily Bee 1869:1; San Francisco Examiner 1869: 3, 1873: 3, 1874: 3, 1887: 4, 1888a: 12, 1888b: 4):

- *S.S. Newbern,* steamship for the United States Government, San Francisco, CA (1869)
- Smokestack for the steamship, the *McPherson*: San Francisco, CA (1869)
- 37,000 feet of 12-inch cast iron pipe for the Virginia City Water Works System: Virginia City, NV (1873)
- Boilers for the steamships *Ventura* and *Wyanda*: Unknown location (1874)
- Narrow-gauge train engine for Fredrick. A. Hihn: Aptos, CA (1887)
- Engines and machinery for the Powell-street Railway Company: San Francisco, CA (1887)
- 16 miles of cast iron pipe to carry water from the Sweetwater dam to National City: National City, CA (1887)
- 27 miles of cast iron pipeline to carry water across the San Francisco Bay from the Crystal Springs Reservoir in San Mateo Canyon, including 1 mile of submerged pipe: San Francisco, CA (1888)
- 15 cast iron columns for the tower on the San Francisco City Hall (*destroyed in 1906 earthquake and fire*): San Francisco, CA (1888)

Contractors: Kelso and Dare

The contracting company Kelso and Dare was owned and operated by John Kelso and John Dare. The company specialized in grading activities for railroad lines and was active during the late 1880s and early 1890s in the San Francisco Bay Area (Poor's Railroad Manual 1893: 471).

A sample of known projects contracted to Kelso and Dare is included below (San Francisco Chronicle 1890a: 8, 1890b: 8):

- Grading for the California-Street Railroad Company Extension : San Francisco, CA (1890)
- Northern Pacific Company from Chelais, WA to South Bend, WA (1890)

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.

The Facility is directly associated with events that have made a significant contribution to the development of water infrastructure in the City of Santa Cruz. Historically, water has played a critical role in the early planning, development, and initial growth of the City of Santa Cruz. Prompted by the continual issue of shortage during the dry months, water rate price-fixing by early private water companies, and concerns over the quality of the water available, the City of Santa Cruz sought to own and operate its own system of Water Works. The Facility was planned after the multiple failed attempts by the Santa Cruz Common Council to legally acquire an existing water system during the 1880s. After the necessary bonds to fund the construction of a new City Water Works were acquired, which included the Facility and the Cowell Reservoir, the development of the Facility was completed in 1890. It constituted the first example of a municipal water supply project completed in the City of Santa Cruz. The period of significance for the Facility is 1890, the year the remaining original features of the Facility, were initially completed.

The Laguna Creek Dam is a well-preserved masonry water management structure dating to 1890. It is a physical example of pioneering water management infrastructure in California. As such the dam appears individually eligible for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) under Criterion A/1 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 that resulted in supplying the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The character defining features associated with this dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, the Risdon Iron Works plaque on the face of the Laguna Creek Dam, and its continued use as a water management structure.

As noted in the description of historic era resources, the Facility features an assortment of structures including the Diversion Flume/Intake Structure, Transmission Pipeline, and the Chlorination Station Building, which all play a role within the Facility and in the larger SCWD system to help divert water from the Laguna Creek aiding in the distribution of the municipal water supply for the Santa Cruz region. The Diversion Flume/Intake Structure and Transmission Pipeline are ancillary diversion dam features. Although they share the same historical associative context they have been modified to the extent that they no longer retain historic integrity and cannot convey significance to their period of significance, 1890. The Chlorination Station Building was constructed outside of the period of significance of 1890, and is merely a 1960s addition to the Facility. Additionally, the Chlorination Station Building is not innovative in design. It is a ubiquitous small utilitarian concrete masonry unit building that can be found throughout

California and the nation. As such, although these three structures are part of the Facility they are not considered contributing elements of the Laguna Creek Dam. Additionally, these three structures do not rise to a level of significance where they could be found eligible under any of the NRHP or CRHR Criteria individually or as part of a district.

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 NRHP Criterion B or CRHR Criterion 2, the property has to be directly tied to the important person and the place where the individual conducted or produced the work for which he or she is known. The Facility was constructed and subsequently modified since it was first constructed in 1890 by several individuals and early regional water management developers in order to provide municipal water in the Santa Cruz region. As such the Facility represents the collective efforts of many individuals, rather than the work of any single individual. As such the Facility is does not appear eligible for listing under NRHP Criterion B or the CRHR under 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 Facility itself is a conglomeration of construction methods and lacks sufficient engineering distinction to be significant within any particular diversion dam facility type. San Francisco iron foundry, Risdon Iron Works, designed the initial layout of the Facility and fabricated the original transmission pipeline and iron appurtenances in the late 1800s. The initial Facility was built by San Francisco contracting company, Kelso and Dare. While Risdon Iron Works was responsible for several notable projects in the San Francisco Bay Area, including the Crystal Springs Reservoir submerged pipeline and the cast iron columns for the tower on the San Francisco City Hall, it does not boast achievements in the field of water infrastructure to be considered a Master. Kelso and Dare also do not appear to reach the level of notoriety to be considered Masters. As such the Facility is not associated with a master in the field of engineering.

The Facility has experienced multiple alterations overtime in order to accommodate modern equipment and ensure the ongoing use of the Facility. Overall, the Facility itself is a conglomeration of construction methods and lacks sufficient engineering distinction to be significant within any particular diversion dam facility type. Consequently, the Facility appears to lack significance 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 Facility is likely to yield 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 CRHR Criterion 4.

Santa Cruz County Statement of Significance

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

As stated for Criterion NRHP Criterion B/CRHR Criterion 2 above, archival research did not reveal an association between the Facility and any persons who significantly contributed to the development of the city, state, or nation. Therefore, the Facility does not appear to be eligible under County of Santa Cruz Criterion 1.

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

For the reasons noted under the NRHP Criterion A/CRHR Criterion 1 significance evaluation noted above. The Laguna Creek Dam, element of the overall Facility appears individually eligible under Santa Cruz County Criteria 2 for its association for its association with pioneering advances in water management in California specifically through creation of the City of Santa Cruz's first municipal water distribution system that resulted in supplying the community of Santa Cruz with municipal water services and led to subsequent expansion of water infrastructure in the region. The period of significance for the dam is 1890, the year it was initially constructed. The character defining features associated with this dam are its setting, alignment, and continued function as a water management structure.

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 for NRHP Criterion C/CRHR Criterion 3 above, the Facility lacks engineering distinction and association with a master in the field of engineering and does not appear to be eligible under County of Santa Cruz Criterion 3.

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

As discussed for NRHP Criterion D/CRHR Criterion 4 above, there is no evidence to indicate that the Facility is likely to yield and 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 Facility does not appear to be eligible under County of Santa Cruz 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. The property must retain, however, 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.

Generally, under NRHP Criterion A and CRHR Criterion 1, a significant water management resource must retain the following physical attributes as they relate to the integrity of location, setting, feeling, and association:

- Original alignment/location
- Setting related to it period of significance
- Continues to function as a water management structure

Despite modifications and improvements made over time to the dam, generally limited to an early sluice gate addition, and bypass values to deal with sediment build up, the structure has a high degree of historic integrity to its period of significance, 1890. As noted, above, elements of the other structures that are part of the Facility have been replaced, added, or altered since the period of significance including the Diversion Flume/Intake Structure, Transmission Pipeline, and the Chlorination Station. As such, they are not considered contributing features of the historic property. The contemporary infrastructural elements on the site, including lighting, utilities, modern valves and housings, also do not date to the 1890 period of significance, and as such, they are considered non-contributing elements to the dam.

Character-Defining Features
The character-defining features associated with the Laguna Creek Dam, are limited to its location, setting, alignment, native stone or limestone masonry construction materials, Risdon Iron Works plaque on the face of the Laguna Creek Dam, and the continued function of the water management structure as a dam.

Historic Property Boundary
The historic property boundary for the Laguna Creek Dam is limited to the dam structure footprint. The historic property boundary for this structure is depicted on Figure 7, Cultural Resources Area of Potential Effects.

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Appendix E

Noise Modeling Outputs

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Traffic Noise Modeling Calculations - Summary

Project: **12287.01 - SCWD LCDR EIR**

Number	Name	Segment Description and Location From	To	Existing	Existing + Project	Δ Existing – Existing + Project
Summary of Net Changes						
1	Empire Grade Rd	South of Chinquapin Rd		49.7	49.8	0.14

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Model Calculations

Project: 12287.01 - SCWD LCDR EIR

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

Segment Description and Location			Input											Output				
					Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics							Ldn,	Distance to Contour, (feet)[3]			
Number	Name	Segment	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night		(dBA)[5,6,7]	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
1	Empire Grade Rd	South of Chinquapin Rd	2,327	25	100	100	99.0%	1.0%	0.0%	80.0%		20.0%		49.7	4	10	21	44

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Model Calculations

Project: 12287.01 - SCWD LCDR EIR

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor: 10

	Segment Description and Location		Input										Output				
					Distance to Directional Centerline, (feet)4		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)3			
Number	Name	Segment	ADT	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	(dBA)5,6,7	70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																	
1	Empire Grade Rd	South of Chinquapin Rd	2,401	25	100	100	99.0%	1.0%	0.0%	80.0%		20.0%	49.8	5	10	21	45

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 1, Site Preparation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	410	60.0
Threshold*	107	75.0
Nearest Receiving PL	114	74.4
	100	75.8
	200	68.0
	250	65.5
	300	63.5
	350	61.7
	400	60.2
	450	58.9
	500	57.7
	550	56.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 1, Grading

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	325	60.0
Threshold*	85.5	75.0
Nearest Receiving PL	114	71.8
	100	73.2
	150	68.7
	200	65.5
	250	63.0
	300	60.9
	350	59.2
	400	57.7
	450	56.4
	500	55.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Grader	**1**	85	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Grader	81.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
81.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 2, Cofferdam Installation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	298	60.0
Threshold*	78	75.0
Nearest Receiving PL	114	70.8
	100	72.2
	150	67.7
	200	64.5
	250	62.0
	300	59.9
	350	58.2
	400	56.7
	450	55.4
	500	54.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
80.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 2, Pipe Installation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	425	60.0
Threshold*	112	75.0
Nearest Receiving PL	114	74.8
	100	76.2
	150	71.7
	200	68.5
	250	66.0
	300	63.9
	350	62.2
	400	60.7
	450	59.4
	500	58.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Pumps	**1**	77	0.5
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Pumps	74.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 3, Coanda Screen, Preparation and Concrete

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	442	60.0
Threshold*	116	75.0
Nearest Receiving PL	114	75.2
	100	76.7
	150	72.1
	200	68.9
	250	66.4
	300	64.4
	350	62.6
	400	61.1
	450	59.8
	500	58.6

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Concrete Mixer Truck	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Concrete Mixer Truck	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.4

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 3, Coanda Screen, Diversion Pipeline

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	545	60.0
Threshold*	143	75.0
Nearest Receiving PL	114	77.6
	100	79.0
	150	74.5
	200	71.3
	250	68.8
	300	66.7
	350	65.0
	400	63.5
	450	62.2
	500	61.0

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Saw	**1**	90	0.2
Excavator	**1**	85	0.4
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Saw	83.0
Excavator	81.0
Gradall	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.8

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 3, Coanda Screen, Backfill Structure

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	470	60.0
Threshold*	123	75.0
Nearest Receiving PL	114	75.9
	100	77.4
	150	72.8
	200	69.6
	250	67.1
	300	65.1
	350	63.3
	400	61.8
	450	60.5
	500	59.3

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	**1**	85	0.4
Concrete Saw	**1**	90	0.2

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Mixer Truck	81.0
Concrete Saw	83.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
85.1

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 3, Coanda Screen, Pipe installation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	520	60.0
Threshold*	137	75.0
Nearest Receiving PL	114	77.1
	100	78.5
	150	74.0
	200	70.8
	250	68.3
	300	66.2
	350	64.5
	400	63.0
	450	61.7
	500	60.5

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Saw	**1**	90	0.2
Excavator	**1**	85	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Saw	83.0
Excavator	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.3

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 4, Modify existing intake and valves

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	543	60.0
Threshold*	142	75.0
Nearest Receiving PL	114	77.5
	100	78.9
	150	74.4
	200	71.2
	250	68.7
	300	66.6
	350	64.9
	400	63.4
	450	62.1
	500	60.9

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Pumps	**2**	77	0.5
Generator	**4**	82	0.5
Tractor	**1**	84	0.4
Welder / Torch	**1**	73	0.05

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Pumps	77.0
Generator	85.0
Tractor	80.0
Welder / Torch	60.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.7

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 5, Vault Installation, Excavation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	410	60.0
Threshold*	107	75.0
Nearest Receiving PL	114	74.4
	100	75.8
	150	71.2
	200	68.0
	250	65.5
	300	63.5
	350	61.7
	400	60.2
	450	58.9
	500	57.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
83.6

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 5, Vault Installation, Anchoring

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	227	60.0
Threshold*	60	75.0
Nearest Receiving PL	114	67.8
	100	69.2
	150	64.7
	200	61.5
	250	59.0
	300	56.9
	350	55.2
	400	53.7
	450	52.4
	500	51.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Drill Rig Truck	**1**	84	0.2

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Drill Rig Truck	77.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
77.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 5, Vault Installation, Concrete

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	443	60.0
Threshold*	116	75.0
Nearest Receiving PL	114	75.2
	100	76.7
	150	72.1
	200	68.9
	250	66.4
	300	64.4
	350	62.6
	400	61.1
	450	59.8
	500	58.6

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Excavator	**1**	85	0.4
Concrete Mixer Truck	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Excavator	81.0
Concrete Mixer Truck	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.4

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 6, Electrical Installation

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	548	60.0
Threshold*	143	75.0
Nearest Receiving PL	114	77.6
	100	79.0
	150	74.5
	200	71.3
	250	68.8
	300	66.7
	350	65.0
	400	63.5
	450	62.2
	500	61.0

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Saw	**1**	90	0.2
Excavator	**1**	85	0.4
Gradall	**1**	85	0.4
Pumps	**1**	77	0.5

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Concrete Saw	83.0
Excavator	81.0
Gradall	81.0
Pumps	74.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
86.8

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 7, Access Stairs

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	325	60.0
Threshold*	85.5	75.0
Nearest Receiving PL	114	71.8
	100	73.2
	150	68.7
	200	65.5
	250	63.0
	300	60.9
	350	59.2
	400	57.7
	450	56.4
	500	55.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	**1**	85	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level [2]	L_{eq} dBA at 50 feet[2]
Concrete Mixer Truck	81.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
81.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 7, Install Riprap

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	297	60.0
Threshold*	78	75.0
Nearest Receiving PL	114	70.8
	100	72.2
	150	67.7
	200	64.5
	250	62.0
	300	59.9
	350	58.2
	400	56.7
	450	55.4
	500	54.2

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Tractor	**1**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Tractor	80.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
80.0

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

Project-Generated Construction Source Noise Prediction Model
Laguna Creek Diversion Retrofit - Phase 8, Startup and Testing

Location	Distance to Nearest Receiver in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold*	443	60.0
Threshold*	116	75.0
Nearest Receiving PL	114	75.3
	100	76.7
	150	72.2
	200	68.9
	250	66.4
	300	64.4
	350	62.7
	400	61.2
	450	59.8
	500	58.7

Equipment Assumptions	Qty.	Reference Emission Noise Levels (Lmax) at 50 feet[1]	Usage Factor[1]
Generator	**1**	82	0.5
Tractor	**2**	84	0.4

Ground Type	Soft
Source Height	5
Receiver Height	5
Ground Factor	0.58

Predicted Noise Level[2]	L_{eq} dBA at 50 feet[2]
Generator	79.0
Tractor	83.0

Predicted Combined Noise Level (L_{eq} dBA at 50 feet)
84.5

Sources:
1 - Obtained from the FHWA Roadway Construction Noise Model, January 2006.
2 - Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006.
L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)
Where: E.L. = Emission Level;
U.F.= Usage Factor;
G = Constant that accounts for topography and ground effects; and
D = Distance from source to receiver.
*Project specific threshold

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Appendix F

Trip Generation Estimates

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Table 1
Peak Day Construction Trip Generation Estimates

Vehicle Type	Daily Quantity		Daily Trips[1]	AM Peak Hour			PM Peak Hour		
				In	*Out*	*Total*	*In*	*Out*	*Total*
Cofferdam and Temporary Stream Bypass System									
Pipe Installation (Non-PCE Trips)									
Construction Workers	5	workers	10	5	0	5	0	5	5
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Pipe Installation	*10*	*5*	*0*	*5*	*0*	*5*	*5*
Pipe Installation (PCE-Adjusted Trips)									
Construction Workers	5	workers	10	5	0	5	0	5	5
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Pipe Installation (PCE)	*10*	*5*	*0*	*5*	*0*	*5*	*5*
New Coanda Screen Intake and Valve Vault Structures									
Excavation (Non-PCE Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	1	trucks	2	1	0	1	0	1	1
		Excavation	*4*	*2*	*0*	*2*	*0*	*2*	*2*
Excavation (PCE-Adjusted Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	3	trucks	6	3	0	3	0	3	3
		Excavation (PCE)	*8*	*4*	*0*	*4*	*0*	*4*	*4*
Doweling and Anchorage (Non-PCE Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Doweling and Anchorage	*2*	*1*	*0*	*1*	*0*	*1*	*1*
Doweling and Anchorage (PCE-Adjusted Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Doweling and Anchorage (PCE)	*2*	*1*	*0*	*1*	*0*	*1*	*1*
Installation of Rebar and Pouring Concrete (Non-PCE Trips)									
Construction Workers	5	workers	10	5	0	5	0	5	5
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	2	trucks	4	2	0	2	0	2	2
		Installation of Rebar and Pouring Concrete	*14*	*7*	*0*	*7*	*0*	*7*	*7*
Installation of Rebar and Pouring Concrete (PCE-Adjusted Trips)									
Construction Workers	5	workers	10	5	0	5	0	5	5
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	6	trucks	12	6	0	6	0	6	6
		Installation of Rebar and Pouring Concrete (PCE)	*22*	*11*	*0*	*11*	*0*	*11*	*11*
Installation of Coanda Screen and Valve Vault (Non-PCE Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	1	trucks	2	1	0	1	0	1	1
		Installation of Coanda Screen and Valve Vault	*4*	*2*	*0*	*2*	*0*	*2*	*2*
Installation of Coanda Screen and Valve Vault (PCE-Adjusted Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	0	trucks	0	0	0	0	0	0	0
Haul trucks	3	trucks	6	3	0	3	0	3	3
		Installation of Coanda Screen and Valve Vault (PCE)	*8*	*4*	*0*	*4*	*0*	*4*	*4*
Electrical Installations									
Electrical Conduit Installation (Non-PCE Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	1	trucks	2	1	0	1	0	1	1
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Electrical Conduit Installation	*4*	*2*	*0*	*2*	*0*	*2*	*2*
Electrical Conduit Installation (PCE-Adjusted Trips)									
Construction Workers	1	workers	2	1	0	1	0	1	1
Vendor trucks	2	trucks	4	2	0	2	0	2	2
Haul trucks	0	trucks	0	0	0	0	0	0	0
		Electrical Conduit Installation (PCE)	*6*	*3*	*0*	*3*	*0*	*3*	*3*
Access Stairs and Riprap Apron									
Access Stairs (Non-PCE Trips)									
Construction Workers	4	workers	8	4	0	4	0	4	4
Vendor trucks	1	trucks	2	1	0	1	0	1	1
Haul trucks	1	trucks	2	1	0	1	0	1	1
		Access Stairs	*12*	*6*	*0*	*6*	*0*	*6*	*6*
Access Stairs (PCE-Adjusted Trips)									
Construction Workers	4	workers	8	4	0	4	0	4	4
Vendor trucks	2	trucks	4	2	0	2	0	2	2
Haul trucks	3	trucks	6	3	0	3	0	3	3
		Access Stairs (PCE)	*18*	*9*	*0*	*9*	*0*	*9*	*9*
		Project Total	***50***	***25***	***0***	***25***	***0***	***25***	***25***
		Project Total (PCE)	***74***	***37***	***0***	***37***	***0***	***37***	***37***

Source: Dudek 2020

Notes: PCE = Passenger Car Equivalents

[1]Daily trips represent the number of trips to and from the project site (i.e., two trips represents one vehicle traveling to the work area and leaving the work area)

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