CHAPTER 1
SUMMARY

1.1 INTRODUCTION

This chapter provides a brief description of the proposed project, known areas of controversy or concern, project alternatives, all potentially significant impacts identified during the course of this environmental analysis, and issues to be resolved. This summary is intended as an overview and should be used in conjunction with a thorough reading of the EIR. The text of this report, including figures, tables and appendices, serves as the basis for this summary.

1.2 PROJECT OVERVIEW

This Environmental Impact Report (EIR) addresses the potential environmental effects of replacement of the existing aging inlet/outlet works at the Newell Creek Dam (NCD), which impounds Loch Lomond Reservoir (Reservoir). The proposed Project consists of the following primary components:

- Three new inlets located within the Reservoir that function to control and convey flows in and out of the Reservoir;
- An outlet structure with valves and controls at the toe of the dam to convey flows in and out of the inlet/outlet works; the structure would provide for energy dissipation for water releases to the NCP or beneficial releases;
- A new dam seepage collection and monitoring system;
- A 14-foot maximum diameter tunnel containing 48-inch and 10-inch inlet/outlet pipelines through the right (west) dam abutment and under the dam;
- Replacement of an approximately 2,000-linear-foot section of the Newell Creek Pipeline (NCP) between the existing outlet structure and the first isolation valve;
- A new control house on the dam crest to house controls for the inlets;
- Improvements along the dam's access roads to improve access for construction, including a new culvert crossing at the spillway plunge pool; and
- Decommission of the existing inlet/outlet works once the replacement inlet/outlet system is operational.

A full description of all project components is provided in the Chapter 3, Project Description, of this EIR.

1.3 AREAS OF CONTROVERSY OR CONCERN

The City of Santa Cruz, as the Lead Agency, has identified areas of concern based on the EIR Notice of Preparation (NOP), which is included in Appendix A. In response to the NOP, letters of comment were received from two public agencies and two individuals. Two agency and public scoping meetings were held on July 18 and July 19, 2018 to receive public comments on the scope of the EIR's analyses. No public comments were presented at the scoping meetings.

The written comments received at the scoping meeting have been taken into consideration in the preparation of this EIR for comments that address environmental issues. The comments concerns regarding biological resources, compliance with air regulations, and site access. There are no known areas of controversy.

1.4 SUMMARY OF ALTERNATIVES

CEQA Guidelines require that an EIR describe and evaluate alternatives to the project that could eliminate significant adverse project impacts or reduce them to a less-than-significant level. The following alternatives are evaluated in Section 5.5.

- ❒ No Project – Required by CEQA
- ❒ Alternative 1 – Reduced Project
- ❒ Alternative 2 – Reduced Construction Area

None of the alternatives, including the No Project Alternative, would eliminate significant Project impacts, although Alternatives 1 and 2 would reduce the level of impact, but not to a less-than-significant level. Table 5-1 in Chapter 5 presents a comparison of project impacts between the proposed Project and the alternatives. Both Alternatives 1 and 2 would reduce impacts, but would not substantially lessen significant impacts. Excluding the No Project Alternative, Alternative 2 – Reduced Construction Area Alternative – is considered the environmentally superior alternative of the CEQA alternatives considered. Although it would not reduce significant impacts to less-than-significant levels, it would reduce some of the identified significant impacts and would best meet project objectives. However, it would not substantially lessen the identified significant environmental impacts.. See Chapter 5 for a full discussion of project alternatives.

1.5 SUMMARY OF IMPACTS AND MITIGATION MEASURES

All impacts identified in the subsequent environmental analyses are summarized in this section. This summary groups impacts of similar ranking together, beginning with significant unavoidable impacts, followed by significant impacts that can be mitigated to a less-than-significant level, followed by impacts not found to be significant. The discussions in the Initial Study of impacts that are not being addressed in detail in the text of the Draft EIR are intended to satisfy the

requirement of CEQA Guidelines section 15128 that an EIR "shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and therefore were not discussed in detail in the EIR." The Initial Study is included in Appendix A of this EIR. A summary of less-than-significant and no impacts identified in the Initial study is presented at the end of this section.

1.5.1 Significant Unavoidable Impacts

No significant unavoidable impacts were identified as a result of the impact analyses.

1.5.2 Significant Impacts

The following impacts were found to be potentially significant, but could be reduced to a less-than-significant level with implementation of identified mitigation measures should the City's decision-makers impose the measures on the project at the time of final action on the project.

Impact BIO-1A: **Special-status Species – Federally-listed Species.** The Project could result in direct impacts to federally-listed steelhead, if any individuals are present, and indirect impacts to habitat for steelhead and federally and state-listed coho salmon species.

MITIGATION BIO-1A-1: All in-stream construction activities shall be limited to the low-flow period between June 15 through November 1, except by extension approved by CDFW and NOAA Fisheries.

MITIGATION BIO-1A-2: If native fish or native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a native fish and aquatic vertebrate rescue and relocation plan shall be prepared, approved by CDFW and NOAA Fisheries, and implemented by a qualified biologist during dewatering of the spillway plunge pool and Newell Creek to ensure that significant numbers of native fish and aquatic vertebrates are not stranded.

Impact BIO-1B: **Special-Status Species – State-Listed Species.** The Project could result in impacts to foothill yellow-legged frog, a candidate for state listing, if any individuals are present at the construction sites.

MITIGATION BIO-1B-1: Seasonal surveys based on guidance provided by the CDFW, including survey methods outlined in CDFW's "Considerations for Conserving the Foothill Yellow-Legged Frog." (May 2018) shall be initiated at least one year prior to construction. Not more than 48 hours prior to commencement of construction activities occurring between March 1 and

September 30 in or adjacent to Newell Creek associated with the installation of the NCP, new culvert bridge crossing downstream of the spillway plunge pool, and establishment of the construction platform work area at the toe of NCD, a qualified biologist, or trained designee (as approved by CDFW), shall conduct a pre-construction survey for foothill yellow-legged frog. The survey shall be conducted within suitable habitat that could be directly or indirectly impacted by construction activities associated with the Project components and at the locations described above. The surveys shall be conducted pursuant to currently accepted methods/protocols for this species as determined by CDFW.

If no individual foothill yellow-legged frogs are observed during the pre-construction surveys, monitoring and inspection of suitable habitat shall occur each day during construction activities implemented during March 1 – September 30 unless otherwise approved by CDFW, to ensure that no individual foothill yellow-legged frogs have moved into the work areas in the time since the focused pre-construction survey was completed.

If foothill yellow-legged frogs are detected during the pre-construction survey or during the monitoring and inspections during construction, CDFW shall be consulted to determine the appropriate course of action to avoid take of the species. Such actions could include avoidance of the occupied area until it is determined that the individual is no longer present in the habitat area to be disturbed; establishment of exclusion fencing or similar measures; increased frequency or duration of inspections and monitoring; and/or relocation of any individual frogs that could be adversely affected by the Project.

Impact BIO-1C: Special-status Species – State Species of Special Concern. The Project could result in impacts to animals that are identified as state Species of Special Concern that could be present at the sites during construction.

MITIGATION BIO-1C-1. Due to the presence of suitable aquatic and upland habitats for Western pond turtle, Santa Cruz black salamander, and California giant salamander in the Project construction footprint, wildlife exclusion fencing shall be installed to: (1) prevent individuals of these species from accessing the active work and staging areas; and (2) define the boundary of and protect all suitable aquatic and upland habitat areas that will not be directly affected by construction activities. The wildlife exclusion fencing will be established between the identified construction areas and upland and aquatic habitats to be avoided.

The specific locations and placement of fencing will be determined by the City in coordination with a qualified biologist and will be based on the extent

of proposed construction activities and field conditions at each work area. The fencing alignment and work areas enclosed by the fencing shall be thoroughly inspected by a qualified biologist prior to installation by searching under rocks, logs, leaf litter, etc. to find and relocate any individuals of these species in the area. Following completion of fencing installation, the fence alignment will be inspected once daily for the duration of construction activities by a qualified biologist, or trained designee (as approved by CDFW), to confirm the integrity and function of the fencing and ensure wildlife are not becoming entrapped in the fencing.

MITIGATION BIO-1C-2: Western Pond Turtle. Not more than five days prior to the commencement of construction activities in Loch Lomond Reservoir and any ground disturbing activities associated with establishment of Staging Areas 1 and 7, the access road to these staging areas, construction platform at the toe of NCD, and associated work areas in or adjacent to Newell Creek and spillway plunge pool, a qualified biologist shall conduct a focused survey for Western pond turtle, its nests, and/or eggs within these work areas and within 50 feet of the construction/ground disturbance footprint. If no Western pond turtles are observed, construction activities may begin without the need for further surveys or protection measures. If Western pond turtles are observed, then a qualified biologist shall capture the turtles and translocate them to an area of equally suitable habitat away from the construction footprint. Approval from CDFW would be required prior to handling/translocating individuals of this species.

If occupied nests are observed during the pond turtle nesting season (March – July), the nests will be marked and fenced with exclusion fencing in such a manner that emerging young would not be able to move into areas where they could be crushed by vehicles or equipment. If nests cannot be avoided, construction activities within 50 feet of the identified nest location shall be delayed until the qualified biologist determines that the nests are no longer occupied.

MITIGATION BIO-1C-3: Santa Cruz Black Salamander. Not more than 48 hours prior to initial ground disturbing activities, a pre-construction survey for Santa Cruz black salamander shall be conducted within all areas of Santa Cruz black salamander suitable habitat that will be directly or indirectly affected by Project construction activities and within 50 feet of such areas. Suitable habitat for this species in the study area consists of damp upland areas near/adjacent to existing aquatic features at the base of NCD including Newell Creek, the spillway plunge pool, seepage channel, ephemeral drainage, and seeps. Monitoring for this species shall also be conducted at least once daily during initial ground disturbing activities. If any individuals of Santa Cruz black salamander are observed during the pre-construction survey

or subsequent monitoring, they shall be moved to the nearest appropriate habitat outside of the construction footprint by a qualified biologist. Approval from CDFW would be required prior to handling/translocating individuals of this species.

MITIGATION BIO-1C-4. California Giant Salamander. Not more than 48 hours prior to initial ground disturbing activities, a pre-construction survey for California giant salamander shall be conducted within all areas of suitable habitat for this species (i.e., Newell Creek, the seepage channel, seeps and surrounding upland areas associated with these aquatic features) that will be directly or indirectly affected by Project construction activities and within 50 feet of such areas. Monitoring for this species shall also be conducted at least once daily during initial ground disturbing activities. If any individuals of California giant salamander are observed during surveys, they shall be moved to the nearest appropriate habitat outside of the construction footprint by a qualified biologist. Approval from CDFW would be required prior to handling individuals of this species.

MITIGATION BIO-1C-5. San Francisco Dusky-footed Woodrat. Not more than thirty (30) days prior to commencement of ground disturbing activities at each work area, a qualified biologist shall conduct a pre-construction survey to locate existing San Francisco dusky-footed woodrat nests. Any nests that are identified in the construction footprint or within 20 feet shall be photographed, mapped and flagged or fenced for avoidance. For the protection of San Francisco dusky-footed woodrat individuals that may be present in the construction footprint, complete avoidance of San Francisco dusky-footed woodrat middens/nests is recommended.

If avoidance of identified middens/nests is not feasible, the following measures are recommended prior to the commencement of ground disturbing activities to avoid and reduce impacts on San Francisco dusky-footed woodrat:

a) After obtaining approval of the biologist qualifications from CDFW, a qualified biologist shall dismantle the nest by hand to allow for adult San Francisco dusky-footed woodrat individuals to escape (this work shall be conducted outside of the breeding season for this species which is April through June);
b) If young are observed during the dismantling process, the qualified biologist shall stop work for a minimum of 24 hours to allow the adult woodrats to relocate their young;
c) Once the nest is determined to be vacant, the dismantling process shall be completed and the nest materials shall be collected and moved to

another suitable location nearby and outside of the construction footprint to allow for nest reconstruction; and

d) Where feasible, piles of cut vegetation and slash generated by project clearing and grubbing activities shall be left outside of, but near the work area, to provide refuge for woodrats that may become displaced by project activities.

MITIGATION BIO-1C-6. Special-status Bats. Not more than 15 days prior to the initiation of any construction activities that involve tree trimming or removal, including clearing and grubbing of work areas and staging areas, that could affect potential daytime or maternity roost sites, a focused visual survey shall be completed by a qualified biologist to determine if any potential roost sites are present. Surveys for daytime roosts are required year round while surveys for potential maternity roost sites are only required from April through July.

If active daytime roosts are discovered, disturbance to the roost site shall not occur until it is determined by the biologist that any bats using the roost are no longer present.

If active maternity roosts are discovered that could be directly impacted by tree trimming/removal and/or Project construction activities, an appropriate no disturbance buffer will be established by a qualified biologist in coordination with City staff and maintained until it is determined by the biologist that all young have fledged and are no longer dependent upon the roost site for survival. The no disturbance buffer distances will be a minimum of 25 feet, but this distance may be increased or decreased based on site specific conditions, including location and relationship of the roost site to the construction zone, and type of construction activities being conducted.

Impact BIO-1D: Special-status Plant Species. Project construction and ground disturbance in proposed staging and work areas could result in impacts to special-status plant species if any are present.

MITIGATION BIO-1D-1: If ground disturbing activities will occur in Staging Areas 5-7 or are proposed outside of these or any of the other (previously surveyed) staging or work areas, protocol-level surveys shall be performed for woodland woolythreads plant species during the blooming period for this species which is typically March to July. If this species is not detected, no further surveys or mitigation would be necessary. If any individuals or populations of woodland woolythreads are detected, the location(s) shall be mapped, and a mitigation plan shall be prepared and implemented that includes, but is not limited to, the following elements and criteria:

a) A description of any areas of habitat occupied by special-status plants to be preserved and/or removed by the Project;
b) Identification and evaluation of the suitability of on-site or off-site areas for preservation, restoration, enhancement or translocation;
c) Analysis of species-specific requirements and considerations and specific criteria for success relative to the Project's impact on this species and restoration, enhancement or translocation.
d) A description of proposed methods of preservation, restoration, enhancement, and/or translocation;
e) A description of specific performance standards, including a required replacement ratio and minimum success standard of 1:1 for impacted individuals or populations;
f) A monitoring and reporting program to ensure mitigation success; and
g) A description of adaptive management and associated remedial measures to be implemented in the event that performance standards are not achieved.

Impact BIO-2: **Sensitive Habitats.** Project construction and ground disturbing activities in proposed staging and work areas could result in impacts to and loss of sensitive vegetation communities that are present in these areas.

MITIGATION BIO-2-1: When working in or adjacent to the active stream channel (i.e., construction of the culvert bridge crossing and NCP crossing), avoid disturbance of retained riparian vegetation (Red alder-Bigleaf maple forest), to the maximum extent practicable.

Mitigation BIO-2-2: For unavoidable impacts to the Red alder-bigleaf maple forest (which constitutes the only riparian community in the study area), coast live oak-madrone woodland, and bigleaf maple forest communities, a project-specific revegetation and restoration plan shall be developed and implemented. The plan shall specify the criteria and standards by which the revegetation and restoration actions will compensate for impacts of the proposed Project on these communities and shall at a minimum include discussion of the following:

a) the restoration objectives and type and amount of restoration to be implemented (in-kind at a minimum restoration to impact ratio of 1:1);
b) the location of the proposed restoration site(s) (either on-site or within the San Lorenzo River watershed, if possible);
c) the methods to be employed for restoration implementation;
d) success criteria and a monitoring program to ensure vegetation community restoration success;

e) adaptive management and remedial measures to be implemented in the event that performance stands are not achieved; and

f) a mechanism for long term management and protection of the restoration area.

Impact BIO-3: **Jurisdictional Aquatic Resources.** The Project could result in impacts to jurisdictional aquatic resources, including wetlands and non-wetland waters of the United States.

MITIGATION BIO-3-1: Future refinements to the proposed Project (i.e., as Project components are further developed from the 50% design level to 100% design) shall endeavor to avoid jurisdictional aquatic resources, to the extent practicable, through Project design changes or implementation of alternative construction methodologies.

MITIGATION BIO-3-2: For unavoidable impacts to jurisdictional aquatic resources, a project-specific mitigation plan shall be developed, approved by the ACOE and RWQCB through their respective regulatory permitting processes, and implemented. The mitigation plan shall specify the criteria and standards by which the mitigation will compensate for impacts of the proposed Project and include discussion of the following:

a) the mitigation objectives and type and amount of mitigation to be implemented (in-kind mitigation at a minimum mitigation ratio of 1:1);

b) the location of the proposed mitigation site(s) (within the San Lorenzo River watershed, if possible);

c) the methods to be employed for mitigation implementation (wetland establishment, re-establishment, enhancement, preservation);

d) success criteria and a monitoring program to ensure mitigation success;

e) adaptive management and remedial measures in the event that performance stands are not achieved; and

f) a mechanism for long term management and protection of the mitigation area.

MITIGATION BIO-3-3: Where feasible and appropriate, all jurisdictional aquatic resources not directly affected by construction activities will be avoided and protected by establishing staking, flagging or fencing between the identified construction areas and aquatic resources to be avoided/preserved.

Impact BIO-4: **Nesting Birds.** The Project could result in impacts to nesting birds if vegetation removal and/or construction activities occur during the nesting season.

MITIGATION BIO-4-1: If ground disturbing activities are to commence during the nesting season (February 1 – August 31), no more than two weeks prior to any ground disturbing activities, including site preparation, staging, removal of vegetation, and clearing and grubbing activities, a nesting bird survey shall be completed by a qualified biologist to determine if any native birds are nesting in or adjacent to the study area (including within a 50-foot buffer for passerine species and a 250-foot buffer for raptors). If any active nests of native birds are observed during surveys, a suitable avoidance buffer from the nests should be determined by a qualified biologist in coordination with City staff, based on species, location, and extent and type of planned construction activity. Impacts to active nests shall be avoided until the chicks have fledged and the nests are no longer active, as determined by the qualified biologist.

MITIGATION BIO-4-2: Bald Eagle Pre-construction Nest Survey. A focused nest survey shall be conducted by a qualified biologist if construction activities are initiated during the nesting season for bald eagle (February—July for this species in California). The survey shall be conducted not more than 30 days prior to the initiation of construction activities including tree removal, other site preparation or ground disturbing activities adjacent to the Reservoir (e.g., clearing and grubbing/grading for establishment of staging areas), or any in-reservoir work, a focused nest survey shall be conducted by a qualified biologist. Surveys shall be conducted within all suitable nest habitat within the study area and within one half mile (or as otherwise determined appropriate by the qualified biologist) of the study area. If an active nest is located, the biologist, in coordination with City staff, shall determine the level of direct/indirect impacts that would likely occur to the nest and tree if construction activity will occur during the nesting season. The determination shall be made taking into consideration the type/extent of the activity, the location of the nest, and the direct line of sight of the activity from the nest. If no-disturbance buffers are determined to be necessary to protect nesting bald eagles, the buffer distances shall be established based on application of the criteria and standards described in the National Bald Eagle Management Guidelines (USFWS 2007).

If it is determined that no direct impacts to an active nest will occur (i.e., the tree would not be removed, trimmed, etc.), measures to mitigate indirect impacts will be taken depending on if there is visual line of sight to the construction activity

a) If the tree with an active nest is within a visual line of sight of construction activity, then efforts will be made to conduct the construction activity outside the period when the nest is occupied, as determined by the biologist. Construction can begin/continue once it is determined that any young have fledged from the nest and are no longer dependent upon the nest for survival.

b) If the tree with an active nest is outside the direct line of site from the construction area, but construction will occur during the period of time the nest is active, an appropriate no disturbance buffer, taking into consideration factors such as the type/extent of the activity, the age of any young in the nest, tree cover, and topography, shall be established and maintained, until any young have fledged from the nest and are no longer dependent upon the nest for survival.

c) If it is determined that a tree with an active bald eagle nest will be directly impacted (i.e., removed, trimmed, etc.) or that indirect impacts could result in take (e.g., nest abandonment, nest failure) of eggs or young in the nest, then the CDFW shall be consulted regarding the need for an Incidental Take Permit pursuant to Section 2081 of the California Fish and Game Code, and the United States Fish and Wildlife Service shall be consulted to determine the need for a take permit pursuant to the Bald and Golden Eagle Protection Act.

Impact BIO-8: **In-Reservoir Fish and Water Quality.** The Project could result in impacts to existing non-native game fish due to adverse effects on water quality from in-reservoir construction activities.

MITIGATION BIO-8-1.A Turbidity Monitoring Plan (Plan) shall be developed, submitted to RWQCB for review and approval, and implemented to guide appropriate management practices and corrective actions to ensure elevated turbidity levels in Loch Lomond Reservoir do not occur. This Plan would protect water quality in Loch Lomond Reservoir and ensure turbid water and/or water with elevated levels of contaminants are not released into Newell Creek via the continuous 1 CFS beneficial release. The Plan will describe the sampling methods, frequency, and criteria as well as thresholds for corrective action. The Plan will also specify a program for monitoring and reporting to the Central Coast RWQCB.

Impact CUL-5: **Paleontological Resources.** Ground-disturbing activities during construction could result in damage to previously undiscovered, intact paleontological resources below the ground surface.

MITIGATION CUL-5-1: Prior to commencement of any grading activity on-site, the City shall retain a qualified paleontologist to prepare a Paleontological

Resources Impact Mitigation Program (PRIMP), consistent with the guidelines of the Society of Vertebrate Paleontology (SVP) (2010) that outlines requirements for: worker environmental awareness training; locations and timing of construction monitoring; procedures for discoveries treatment; and paleontological methods (including sediment sampling for microvertebrate fossils), reporting, and collections management.

The qualified paleontologist shall attend a preconstruction meeting to provide construction worker training regarding procedures in the event of discovery of paleontological resources during construction. Monitoring shall consist of onsite spot-checking once a week for five weeks during the excavation for the staging area, for two days during the first week of the tunnel excavation (to get a sense of the equipment operations), and several intermittent spot-checks thereafter. Monitoring of excavation shall consist of reviewing tunnel spoils but not entering the tunnel.

In the event that significant paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor shall coordinate with the Construction Manager or City Staff to temporarily halt and/or divert grading activity within a 50-foot radius to examine the resource. If the find is significant, the City shall require treatment of the find in accordance with the recommendations of the paleontologist, which may include, but are not limited to, specimen recovery and curation or thorough documentation. Once documentation and/or collection of the find is completed, grading may recommence in the area of the find.

Impact FOR-2: Loss of forest land or conversion of forest land to non-forest use. The proposed Project would result in conversion of forest land.

MITIGATION FOR-2-1: Replant trees where removed in temporarily disturbed areas resulting from Project construction where planting would meet forest management or habitat enhancement goals and recommendations identified in the City's Draft Watershed Lands Management Plan (City of Santa Cruz, 2013) or the Watershed Resources Management Plan Planning Analysis and Recommendations Report (Swanson et al., 2002).

MITIGATION FOR-2-2: Implement forest management measures on retained forest land consistent with City's Draft Watershed Management Plan (City of Santa Cruz, 2013). Management acreage should equal the total of permanently impacted forest land. Management may include:

- Recruitment of snags or other elements to facilitate the development of late-seral forest conditions.
- Removal of dead, dying, diseased, or hazardous trees.

- Management of fuel loads (e.g., fuel breaks, treatment of ladder fuels) to minimize the threat of catastrophic wildfire.
- Treatment and/or removal of invasive species, notably French broom.

MITIGATION FOR-2-3: Implement measures to protect retained trees/stands from construction damage. This would be based a project-specific Tree Protection Plan to be prepared by an International Society of Arboriculture (ISA) Certified Arborist or Registered Professional Forester (RPF). The intent of the Plan is to minimize the potential for tree damage or mortality caused by construction-related activity. The Plan will address retained trees/stands adjacent to areas where soil disturbance is proposed and where tools or equipment have the potential for damaging tree roots and canopies. The Plan will include specific protection measures for the root zone, bole, and canopies of retained trees. The Plan will be consistent with ANSI A300 standards (ANSI 2012) for management and protection of trees during site development and construction activities and should include a construction monitoring and reporting component.

MITIGATION FOR-2-4: 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. Implement additional prevention methods for SOD (University of California, 2010, COMTF, 2014) and pitch canker (University of California, 2013). 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 a location outside the SOD Regulated Area). 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.

Impact HAZ-1B: Disposal of Hazardous Waste. Project construction would potentially generate bedrock/soil spoils with metals concentrations in excess of disposal standards for a Class III landfill.

MITIGATION HAZ-1B-1 The City Water Department shall require testing of representative bedrock/soil spoil samples, to be exported offsite, in accordance with the acceptance criteria of the anticipated disposal facility.

MITIGATION HAZ-1B-2 In the event that offsite disposal of spoils would occur at construction projects in the area, the City shall require testing of representative bedrock/soil spoil samples, to be exported offsite, in

accordance with regulatory criteria with respect to reuse on other properties located off the Project site.

Impact HAZ-2A: Upset and Release of Hazardous Materials. Project construction would potentially result in accidental spills of petroleum products and hazardous materials.

MITIGATION HAZ-2A-1 The City shall direct the contractor to wash out concrete trucks in a designated area, either on site or off site, where the material cannot run off into Loch Lomond Reservoir or Newell Creek. This area shall be specified on all applicable construction plans and be in place before any concrete is poured. The City shall direct the contractor to service construction vehicles in a manner that contains fluids, such as lubricants, within an impervious area to avoid spill-related water quality impacts.

MITIGATION HAZ-2A-2 The City shall direct the contractor to inspect and, as necessary, service all equipment before it enters the construction site and regularly thereafter, and before working adjacent to the Loch Lomond Reservoir and Newell Creek, to avoid equipment leak-related water quality impacts. The City shall direct the contractor to repair any leaks or hoses/fittings in poor condition before the equipment begins operating.

MITIGATION HAZ-2A-3 The City shall direct the contractor to prepare a spill contingency/containment plan prior to equipment use on the Project site, including in-reservoir and on the ground construction. The City shall direct the contractor to follow the spill contingency/ containment plan, which shall include, but not be limited to:

a) Specific bermed equipment maintenance and refueling areas.
b) Spill containment boom around the dredge.
c) Bermed and lined hazardous materials storage areas on-site that are covered during the rainy season.
d) Hazardous material spill cleanup equipment for onshore areas (e.g., absorbent pads, shovels, and bags to contain contaminated soil) and within the reservoir (e.g., skimmers, socks and boom, absorbent pads, dispersants).
e) Workers trained in the location and use of cleanup equipment.

Impact HAZ-2B: Upset and Release of Hazardous Materials. Project construction would potentially result in health hazards to construction workers, due to exposure to metals in submerged Reservoir sediments, upland bedrock excavations, and upland excavation spoils.

MITIGATION HAZ-2B-1 The City shall direct the contractor to consult with an industrial hygienist to determine the appropriate level of personal protective equipment (PPE), if any, would be required for construction personnel during handling of Reservoir bottom sediments and participation in tunneling, excavating, stockpiling, and handling of on site bedrock and associated spoils. The contractor shall implement the recommendations by the industrial hygienist in order to minimize potential exposure of construction personnel to metals concentrations in bedrock/sediments during construction. All recommendations shall be completed in accordance with Occupational Safety and Health Administration (OSHA) Training Requirements (29 CFR 1910.132 and 1910.134, Subpart I – Personal Protective Equipment).

Impact HYDRO-4: Water Quality. Proposed dredging, tunneling, excavations, and grading would potentially violate water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality due to potential erosion or inadvertent transport of construction debris or materials into Newell Creek or the Reservoir.

MITIGATION HYDRO-4-1 Develop and maintain construction access roads to minimize erosion and sediment generation in accordance with recommendations in the Draft Watershed Lands Management Plan, including, but not limited to:

a) Install and maintain effective water bars and rolling drain dips.
b) Maintain out-sloped roads wherever possible.
c) Surface and/or resurface Project access roads with rock or other appropriate material to reduce erosion where road surface is visibly eroding and being transported off of the road, particularly where sediment can enter a watercourse.
d) Reduce the use of inside ditches and culverts by installing rolling dips at appropriate intervals.

MITIGATION HYDRO-4-2 Conduct field inspections of roads and drainage systems, including:

a) Conduct field inspections prior to the rainy season, and during rainfall events greater than 2 inches, as needed.
b) Clear road inlets, culverts, and other stream crossing structures of obstructions prior to and throughout the wet season.

1.5.3 Less-Than-Significant Impacts

The following impacts were found to be less-than-significant. Mitigation measures are not required.

Impact AIR-2: **Criteria Pollutant Emissions.** The proposed Project would result in emissions of criteria pollutants, but would not exceed adopted thresholds of significance, violate any air quality standard or contribute substantially to an existing or projected air quality violation.

Impact AIR-3: **Cumulative Criteria Pollutant Emissions.** The proposed Project would not result in cumulatively considerable net increase of any criteria air pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

Impact AIR-4: **Expose Sensitive Receptors to Substantial Pollutant Concentrations.** The proposed Project would result in short-term emissions of TACs, but would not result in exposure of sensitive receptors to substantial pollutant concentrations.

Impact AIR-5: **Odors.** The proposed Project would not create objectionable odors that would affect a substantial number of people.

Impact AIR-6: **Greenhouse Gas (GHG) Emissions.** The proposed Project would result in GHG emissions, although in amounts not considered significant.

Impact CUL-1: **Historical Resources.** The proposed Project would result in construction of new facilities and improvements that would result in minor physical alteration to the Newell Creek Dam. However, the alterations would not materially impair the historical significance of the dam.

Impact CUL-2/3: **Archaeological Resources and Human Remains.** Ground-disturbing activities during construction could result in damage to unknown or previously discovered archaeological resources and/or human remains, although the area is not considered archaeologically sensitive.

Impact CUL-4: **Tribal Cultural Resources.** Project construction would not result in a substantial adverse impact to a tribal cultural resource.

Impact GEO-1: **Exposure to Seismic Hazards.** The Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death resulting from rupture of a known earthquake fault, seismic ground shaking, landslides, or seismic related ground failure,

including liquefaction, which cannot be mitigated through the use of standard engineering design techniques.

Impact GEO-2: **Slope Stability.** The Project would be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide or slope failure/instability.

Impact GEO-3: **Expansive Soil.** The Project would not likely be located on expansive soil, as defined by the 2016 California Building Code, creating substantial direct or indirect risks to life or property caused in whole or in part by the Project's exacerbation of the existing environmental conditions.

Impact HAZ-1A: **Use and Transport of Hazardous Materials.** Project construction and operation would require use and transport of petroleum products and small quantities of hazardous materials, but would not result in a significant hazard to the public or environment.

Impact HYDRO-2: **Alteration of Drainage Patterns.** Diversion of downstream flows during periods of emergency Reservoir drawdown to Newell Creek would not alter the existing drainage pattern at the Project site, in a manner that would potentially result in substantial off-site erosion or siltation.

Impact HYDRO-3: **Increased Surface Flows.** Increased surface flows associated with 10 percent Reservoir drawdown requirements, from 10 days to 7 days, would increase the rate or amount of surface runoff, which would potentially exceed capacity of existing or planned storm drain facilities, cause downstream or off-site drainage problems, or increase the risk or severity of flooding in downstream areas.

Impact HYDRO-5: **Flood Hazard Area.** The Project would locate at least one of two proposed control houses within a 100-year flood hazard area. However, flooding of this structure would not substantially impede or redirect flood flows.

Impact HYDRO-7: **Seiches, Tsunamis, and Mudflows.** The Project would not expose people or structures to a significant risk of loss, injury, or death as a result in inundation by seiche, tsunami, or mudflow.

Impact NOISE-2: **Permanent Noise Increases.** The Project would not result in a substantial permanent increase in ambient noise levels.

Impact NOISE-3: **Temporary Noise Increases.** The Project would result in a temporary increase in ambient noise levels during construction, but would not exceed the County's 75 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime thresholds.

Impact NOISE-4: **Temporary Construction Vibration.** The Project could generate groundborne vibration during periods of controlled detonation, but would not expose residents to or generate excessive groundborne vibration.

Impact TRAF-1: **Traffic Circulation System Impacts.** Project construction would result in temporary increases in vehicular traffic on area roads, but would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the transportation circulation system.

1.5.4 No Impacts

The following were found to have no impacts. No mitigation measures are required.

AIR-1 *Conflicts with Air Quality Management Plan*.

AIR-7 *Conflicts with GHG Emission Reduction Plans*.

BIO-4 *Impacts to Wildlife Corridors*.

BIO-6 *Conflicts with Habitat Conservation Plan, Natural Community Conservation Plan (NCCP), or Other Approved Habitat Conservation Plans*.

BIO-7 *Substantially Reduce Fish or Wildlife Species Habitat*.

BIO-9 *Threaten to eliminate a plant or animal community.*

FOR-1 *Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g) or timberland (as defined in Public Resources Code section 4526)*.

FOR-3 *Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of forest land to non-forest use*.

GEO-5 *Soils-Septic Suitability*.

HAZMAT-3 *Location on Hazardous Materials Site*.

HAZMAT-4 *Location Near Schools*.

HYDRO-1 *Groundwater Impacts*.

HYDRO-6: *Dam Failure*.

NOISE-1 *Expose Persons to Noise Levels in Excess of Standards Due to Project Operations*.

NOISE-4 *Expose People to Vibration*.

NOISE-5 *Expose People to Aircraft Noise*.

TRAF-2 *Conflicts with Congestion Management Plan*.

TRAF-3 *Substantially Increase Hazards Due to Design Features.*

TRAF-4 *Emergency Access.*

TRAF-5 *Conflict with Adopted Policies Regarding Transit, Bicycle or Pedestrian Facilities.*

TRAF-6 *Change in Air Traffic Patterns*.

1.6 ISSUES TO BE RESOLVED

CEQA Guidelines section 15123 requires the Summary to identify "issues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects." This EIR has presented mitigation measures and project alternatives, and the City Council will consider the Final EIR when considering the proposed project. In considering whether to approve the project, the City Council will take into consideration the environmental consequences of the project with mitigation measures and project alternatives, as well as other factors related to feasibility.

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CHAPTER 2
INTRODUCTION

2.1 PURPOSE OF THE EIR

This EIR has been prepared by the City of Santa Cruz (City), which is the lead agency for the Newell Creek Dam Inlet/Outlet Replacement Project (Project). This EIR has been prepared in accordance with the California Environmental Quality Act (CEQA), which is found in the California Public Resources Code, Division 13, and with the CEQA Guidelines, which are found in Title 14 of the California Code of Regulations, commencing with Section 15000.

As stated in the CEQA Guidelines Section 15002, the basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Pursuant to CEQA Guidelines Section 15121, an EIR is an informational document which will inform public agency decision-makers and the public generally of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency. While the information in the EIR does not control the ultimate decision about the project, the agency must consider the information in the EIR and respond to each significant effect identified in the EIR by making findings pursuant to Public Resources Code Section 21081.

Pursuant to CEQA (Public Resources Code Section 21002), public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which would substantially lessen the significant environmental effects of such projects. Pursuant to Section 15021 of the CEQA Guidelines, CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible. In deciding whether changes in a project are feasible, an agency may consider specific economic, environmental, legal, social, and technological factors. According to the CEQA Guidelines, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. This section further indicates that CEQA recognizes that, in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors. The

agency shall prepare a "statement of overriding considerations" as to reflect the ultimate balancing of competing public objectives when the agency decides to approve a project that will cause one or more significant effects on the environment. The environmental review process is further explained below in Section 2.4.

2.2 PROJECT OVERVIEW

This Environmental Impact Report (EIR) addresses the potential environmental effects of replacement of the existing aging inlet/outlet works at the Newell Creek Dam (NCD), which impounds Loch Lomond Reservoir (Reservoir). The proposed Project consists of the following primary components:

- Three new inlets located within the Reservoir that function to control and convey flows in and out of the Reservoir;
- An outlet structure with valves and controls at the toe of the dam to convey flows in and out of the inlet/outlet works; the structure would provide for energy dissipation for water releases to the NCP or beneficial releases;
- A new dam seepage collection and monitoring system;
- A 14-foot maximum diameter tunnel containing 48-inch and 10-inch inlet/outlet pipelines through the right (west) dam abutment and under the dam;
- Replacement of an approximately 2,000-linear-foot section of the Newell Creek Pipeline (NCP) between the existing outlet structure and the first isolation valve;
- A new control house on the dam crest to house controls for the inlets;
- Improvements along the dam's access roads to improve access for construction, including a new culvert crossing at the spillway plunge pool; and
- Decommission of the existing inlet/outlet works once the replacement inlet/outlet system is operational.

A full description of all project components is provided in the Chapter 3, Project Description, of this EIR.

2.3 SCOPE OF THE EIR

A Notice of Preparation (NOP) was published for the Project to determine the scope and extent of environmental issues to be addressed in this EIR. The NOP is included in Appendix A. Pursuant to CEQA Guidelines Section 15060(d), "if the lead agency can determine that an EIR will be clearly required for a project, the agency may skip further initial review of the project and begin work directly on the EIR process….in the absence of an initial study, the lead agency shall still focus the EIR on the significant effects of the project and indicate briefly its reasons for determining that

other effects would not be significant or potentially significant." Section 4.1, Impacts Not Found to be Significant, of this Draft EIR is intended to satisfy the requirement of CEQA Guidelines Section 15128 that an EIR "shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and therefore were not discussed in detail in the EIR.". Based on review of the Project and responses to the NOP (as discussed below), this EIR evaluates potentially significant impacts for the topics listed below. The EIR also evaluates topics required by CEQA and CEQA Guidelines, including growth inducement, project alternatives, and cumulative impacts. The environmental analysis for this EIR includes:

- Air Quality and Greenhouse Gas Emissions
- Biological Resources
- Cultural and Tribal Cultural Resources
- Forest Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Transportation and Traffic
- Land Use

As indicated above, the focus of the environmental review process is upon significant environmental effects. As defined in Section 15382 of the CEQA Guidelines, a "significant effect on the environment" is:

> ... a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether a physical change is significant.

In evaluating the significance of the environmental effect of a project, the CEQA Guidelines require the lead agency to consider direct physical changes in the environment and reasonably foreseeable indirect physical changes in the environment which may be caused by the project (CEQA Guidelines Section 15064[d]). A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project. An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. An indirect physical change is to be

considered only if that change is a reasonably foreseeable impact which may be caused by the project.

CEQA Guidelines Section 15064(e) further indicates that economic and social changes resulting from a project shall not be treated as significant effects on the environment, although they may be used to determine that a physical change shall be regarded as a significant effect on the environment. In addition, where a reasonably foreseeable physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project.

2.4 ENVIRONMENTAL REVIEW AND APPROVAL PROCESS

2.4.1 Scoping

Under CEQA, the lead agency for a project is the public agency with primary responsibility for carrying out or approving the project, and for implementing the requirements of CEQA. CEQA Guidelines Section 15083 authorizes and encourages an early consultation or scoping process to help identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed and considered in an EIR, and to help resolve the concerns of affected regulatory agencies, organizations, and the public. Scoping is designed to explore issues for environmental evaluation, ensuring that important considerations are not overlooked and uncovering concerns that might otherwise go unrecognized.

The NOP for this EIR was circulated for a 30-day comment period from June 28 to July 31, 2018. The NOP was circulated to the State Clearinghouse and to local, regional, and federal agencies in accordance with the CEQA Guidelines. The NOP also was sent to organizations and interested citizens that have requested notification in the past for the proposal project or any project. Additionally, the NOP was circulated to owners of property contiguous to the Project site in accordance with noticing requirements in the City's CEQA Guidelines. Two agency and public scoping meetings were held on July 18, 2019 in the City of Santa Cruz and on July 19, 2018 in the community of Ben Lomond to take public comments on the scope of the EIR's analyses.

Written comments were received from two public agencies and two individuals. These letters are included, along with the NOP, in Appendix A. These written comments, as well as oral comments received at the scoping meetings, have been taken into consideration in the preparation of this EIR for comments that address environmental issues. Comments received during the scoping period regarding environmental issues generally include the following concerns, which are further discussed in the EIR chapters that discuss the relevant topic:

- California Department of Fish and Wildlife;
- Monterey Bay Air Resources District; and
- Jeff and Kathleen Yee.

Agency and public comments that were received raise the following concerns:

- *Biological Resources:* The EIR should Identify and assess impacts to state rare, threatened or endangered species, Fully Protected Species, and other special status species known to occur or with potential to occur in the study area, including, but not limited to: California giant salamander, coho salmon, Santa Cruz black salamander, steelhead, and western pond turtle.
- *Biological Resources:* Botanical surveys for special-status plant species including those listed by the California Native Plant Society must be conducted during the blooming period.
- *Biological Resources:* The analysis should evaluate potential for "take" of special-status species; loss or modification of breeding, nesting, dispersal and foraging habitat; permanent and temporary habitat disturbances; and obstruction of movement corridors or fish passage. All feasible mitigation measures to avoid potentially significant impacts should be identified.
- *Biological Resources:* Reasonably foreseeable future projects in the vicinity should be identified with disclosure of cumulative impacts.
- *Air Quality:* Concern is expressed on potential significant fugitive dust from construction activities if not mitigated and the Air District suggests that when possible cleaner construction equipment be used, as well as, alternative fuels, such as compressed natural gas, propane, electricity or biodiesel. The Air District also notes that permits may be required for generators and District rules may apply to building demolition.
- *Security:* Concern is expressed regarding maintaining access gate security.

2.4.2 Public Review of Draft EIR

This Draft EIR was published and circulated for review and comment by the public and other interested parties, agencies, and organizations for a public review period from November 7 through December 21, 2018. Written comments to the City of Santa Cruz were accepted by mail to the address below and by email to Sarah Easley Perez at seasleyperez@cityofsantacruz.com.

Sarah Easley Perez, Associate Planner
City of Santa Cruz Water Department
212 Locust Street, Suite C
Santa Cruz, CA 95060

Copies of the document were distributed to the State Clearinghouse, regional and local agencies, and interested organizations and individuals for their review and comment. A Notice of Availability of the Draft EIR was sent to neighboring property owners. The Draft EIR also was available for public review during normal business hours during the comment period at the following locations:

- Reference Desk of the Downtown Public Library, located at 224 Church Street, Santa Cruz.
- Reference Desk of the Felton Branch Public Library, located at 6299 Gushee Street, Felton.

- City of Santa Cruz Water Department Engineering Counter, located at 212 Locust Street, Suite C.
- Online at: http://www.cityofsantacruz.com/government/city-departments/water/online-reports/environmental-documents.

The City of Santa Cruz encouraged public agencies, organizations, community groups, and all other interested persons to provide written comments on the Draft EIR prior to the end of the 45-day public review period. Two public meetings were held on December 11, 2019 in the City of Santa Cruz and on December 13, 2018 in the community of Ben Lomond to provide project information and take public written comments on the Draft EIR. Section 15204(a) of the CEQA Guidelines provides guidance on the focus of review of EIRs, indicating that in reviewing draft EIRs, persons and public agencies "should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated," and that comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects. This section further states that "CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters. When responding to comments, lead agencies need only respond to significant environmental issues and do not need to provide all information requested by reviewers, as long as a good faith effort at full disclosure is made in the EIR."

Letters of comment on the Draft EIR were received from two public agencies, one organization, and one individual. Comments and responses are included in Chapter 8. Responses have been prepared for all comments received during the public review period that raise CEQA-related environmental issues regarding the Project.

2.4.3 Final EIR/Project Approval

This Final EIR includes written responses to any significant environmental issues raised in comments received during the public review period in accordance with CEQA Guidelines Section 15088. The Final EIR also includes changes and revisions to the EIR text after consideration of public comments.

The Final EIR document will be presented to the Santa Cruz City Council for a final decision on the proposed Project. The City Council must certify that it has reviewed and considered the information in the EIR, that the EIR has been completed in conformity with the requirements of CEQA, and that the document reflects the City's independent judgment.

Pursuant to Sections 21002, 21002.1, and 21081 of CEQA and Sections 15091 and 15093 of the CEQA Guidelines, no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects unless both of the following occur:

(a) The public agency makes one or more of the following findings with respect to each significant effect:

1. Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects on the environment.
2. Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by such other agency.
3. Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the environmental impact report.

(b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

Although these determinations (especially regarding feasibility) are made by the public agency's final decision-making body based on the entirety of the agency's administrative record as it exists after completion of a Final EIR, the Draft EIR must provide information regarding the significant effects of the proposed project and must identify the potentially feasible mitigation measures and alternatives to be considered by that decision-making body.

2.4.4 Adoption of Mitigation Monitoring and Reporting Program

CEQA requires that a program to monitor and report on mitigation measures be adopted by a lead agency as part of the project approval process. CEQA requires that such a program be adopted at the time the agency approves a project or determines to carry out a project for which an EIR has been prepared to ensure that mitigation measures identified in the EIR are implemented. The Mitigation Monitoring and Reporting Program will be included in the Final EIR.

2.5 PROJECT APPROVALS AND USE OF EIR

This EIR is an informational document for decision-makers. The EIR includes a "project-level" analysis, meaning that no additional CEQA review should be required if the Project is approved and constructed without change. Pursuant to CEQA Guidelines Section 15161, the EIR examines all phases of the Project including construction and operation.

The City of Santa Cruz is the lead agency and responsible for approving and implementing the proposed Project. CEQA requires that decision-makers review and consider the EIR in their consideration of this Project.

In addition to City of Santa Cruz as lead agency, other public agencies that have review or approval authority of the project are outline below.

- U.S. Army Corps of Engineers: Approval of a Clean Water Act Section 404 Individual Permit,
- California Central Coast Regional Water Quality Control Board: Approval of Clean Water Act Section 401 Water Quality Certification Permit, NPDES Waste Discharge Permit for discharge of dam seepage and tunnel dewatered waters into Newell Creek and Loch Lomond Reservoir, respectively, and Review Notice of Intent and Stormwater Pollution Prevention Plan (SWPPP) filed by City.
- California Department of Fish and Wildlife: Approval of California Fish and Game Code Section 1602, Lake or Streambed Alteration Agreement and potential Incidental Take Permit
- California Department of Forestry and Fire Protection: Approval of a Timber Harvesting Plan for sale of removed trees

It is noted that while 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 section 53091(d) and (e) provides that facilities for the production, generation, storage, treatment, or transmission of water supplies are exempt from local zoning and building ordinances.

The City is applying for financial assistance through the State Water Resources Control Board (State Water Board) Drinking Water State Revolving Fund. The application submittal process includes requests for environmental information. In addition to CEQA documentation prepared for a project, the application requirements include completion of an evaluation form for federal environmental coordination that is commonly referred to as "cross-cutter requirements" or "CEQA Plus". This form has been completed for the proposed Project and is included in Appendix C.

2.6 ORGANIZATION OF EIR

The content and format of this Draft EIR are designed to meet the requirements of CEQA and the CEQA Guidelines (Sections 15122 through 15132). This Draft EIR is organized into the following chapters:

- **Chapter 1, Summary**, presents an overview of the Project, provides a summary of the impacts of the Project and mitigation measures, provides a summary of the alternatives being considered, includes a discussion of known areas of controversy, and lists the topics not carried forward for further analysis.
- **Chapter 2, Introduction**, explains the CEQA process, describes the scope and purpose of this Draft EIR, provides information on the review and approval process, lists the likely approvals for the Project, and outlines the organization of this Draft EIR.
- **Chapter 3, Project Description**, provides information about the location, setting, and background of the Project; identifies project-specific objectives; and provides a detailed description of the Project elements and components.

- **Chapter 4, Environmental Setting, Impacts, and Mitigation Measures**, explains the approach to the environmental analysis for this EIR, and provides environmental setting, impacts, and mitigation measures for the topics identified for inclusion in the EIR. Each topical section in this EIR presents information in three parts. The "Environmental Setting" section provides an overview of the existing conditions on and adjacent to the Project site. Local, State and federal regulations also are identified and discussed, when relevant.

  The "Impacts and Mitigation Measures" section provides an outline of the criteria used to evaluate whether an impact is considered significant based on standards identified in CEQA and the CEQA Guidelines. Agency policies or regulations and/or professional judgment also are used to further define what actions may cause significant effects. Any Project feature or element that may cause impacts, as well as project features that may serve to eliminate or reduce impacts, is identified and addressed for both direct and reasonably foreseeable indirect impacts. Mitigation measures that would reduce significant impacts are identified. The significance of the impacts after mitigation also is identified. For impacts found to be less than significant, mitigation measures are not required but, where relevant, the EIR recommends project modifications or construction best management practices (BMPs).

  Each topical section includes a Cumulative Impacts section, which evaluates cumulative impacts based on cumulative projects identified in the chapter introduction in section 4.0.3. The references cited in each section are included at the end of the section.

- **Chapter 5, Project Alternatives**, evaluates alternatives to the Project that would eliminate or substantially reduce significant impacts identified in the EIR while reasonably attaining Project objectives. Alternatives that were reviewed but eliminated from further consideration in the EIR also are discussed.

- **Chapter 6, Other CEQA Considerations**, evaluates the topics required to be included in an EIR, including significant and unavoidable impacts, significant irreversible environmental changes, growth-inducing impacts, and energy conservation.

- **Chapter 7, References and List of Preparers**, identifies all agencies contacted during the preparation of the EIR, all references that were cited or utilized in preparation of the EIR, individuals who were involved in preparing this Draft EIR, and the individuals who provided information.

- **Chapter 8, Draft EIR Comments and Responses**, includes comment letters received on the Draft EIR and provides responses. A summary of changes to the EIR text after consideration of public comments is also included.

- **Chapter 9, Mitigation Monitoring and Reporting Program**, identifies monitoring and reporting requirements for each mitigation measure and Project Best Management Practice (BMP).

- **Appendices** contain additional information used in preparing this Draft EIR. Appendix A contains the NOP and the comments that were submitted in response to the NOP. Appendix B includes a summary of construction phases, estimated workers and vehicle trips, and

construction equipment. Appendix C includes results of the CalEEMod air emission modeling. Appendix D includes results of the noise modeling. Appendix E includes three biological studies prepared for the Project. Appendix F includes three cultural resources studies prepared for the project.

CHAPTER 3
PROJECT DESCRIPTION

This section provides a detailed description of the proposed Newell Creek Dam (NCD) Inlet/Outlet Replacement Project (Project) and includes information about Project objectives; design and location of Project components; construction sequencing, methods, equipment, and schedule; and operations and maintenance (O&M) upon completion of construction. The section draws from descriptions, reports, and 50% Design drawings prepared by the City of Santa Cruz's (City's) design engineer (AECOM, February 2018a and July 2018a).

3.1 PROJECT LOCATION AND SETTING

3.1.1 Project Location

NCD, which impounds Loch Lomond Reservoir (Reservoir), is located in unincorporated Santa Cruz County, approximately 10 miles north of the City of Santa Cruz and two miles east of the community of Ben Lomond (see Figure 3-1). NCD and the southern half of the Reservoir are located on an approximate 520-acre site owned by the City of Santa Cruz (Assessor's Parcel Number 076-251-24). Newell Creek feeds the Reservoir from the north, and continues south from the dam where it eventually joins the San Lorenzo River and flows into the Pacific Ocean. Access to NCD is provided by Newell Creek Road off Glen Arbor Road; approximately 0.8 miles south of the toe of the dam, Newell Creek Road access is restricted by a gate. Details of the Project site area are provided in Section 3.1.3.

NCD and the Reservoir are located in the forested Santa Cruz Mountains. Elevations in the vicinity of the dam range from approximately 780 feet above mean sea level above the dam to 390 feet above mean sea level at the dam toe. Water levels in Loch Lomond Reservoir are generally maintained between approximate elevation 562.2 feet and the spillway crest at elevation 577.2 feet above mean sea level. The surrounding area is characterized by steeply forested terrain with some residential homes on large lots. Rural residential subdivisions are located approximately 0.5 miles south and in the Ben Lomond area. The County's Ben Lomond Refuse Transfer Station, which accepts Class III non-hazardous residential, commercial and industrial waste that is trucked to the County's Buena Vista Landfill in southern Santa Cruz County, is located approximately 0.3 miles south of NCD.

3.1.2 Existing Facilities

Completed in 1961, NCD is a zoned earthfill dam approximately 195 feet high with a crest length of about 750 feet. The impounded Loch Lomond Reservoir has a maximum storage capacity of approximately 8,646 acre-feet. The City of Santa Cruz Water Department (SCWD) operates the Reservoir as the primary surface water storage facility for the City's water supply system.

The existing NCD inlet/outlet works are used to transfer untreated water into and out of the Reservoir and were designed to deliver surface water diversions from the San Lorenzo River to the Reservoir, convey raw water from storage in the reservoir to the City's Graham Hill Water Treatment Plant (GHWTP), provide beneficial releases to downstream Newell Creek, and implement operational and emergency flow releases from the Reservoir (AECOM, July 2018a). It includes the following components, which are shown on Figure 3-2:

- **Intake Structure**: The existing NCD inlet/outlet structure (intake structure) consists of five 12-inch-diameter inlet/outlet gates (inlets) connected to a 24-inch-diameter cement mortar-lined steel pipe encased in reinforced concrete, which is located on the upstream face of the dam near the left/east abutment. Four of the original five sluice gates were replaced with new stainless steel knife gate assemblies in 2012, and the fifth and lowest inlet is currently inoperable because it is buried by sediment and surficial landslide material.
- **Conduit under the Dam:** The 24-inch-diameter sloping intake pipeline enlarges to a 30-inch-diameter conduit connected to a 36-inch-diameter inlet/outlet conduit. The 36-inch-diameter inlet/outlet conduit extends under the dam and terminates at a vault at the downstream toe of the dam.
- **Outlet Vault and Releases**: At the vault, the 36-inch-diameter conduit bifurcates to a 22-inch-diameter pipe connected to the Newell Creek Pipeline (NCP) and a 24-inch plug valve for making emergency releases (AECOM, July 2018a).

Appurtenant structures at NCD and the Reservoir include the spillway and spillway appurtenances (spillway bridge, spillway plunge pool, spillway plunge pool crossing), a seepage channel (a portion of Newell Creek's original alignment) at the toe of NCD, a control house on the crest of NCD, and the NCP. Two seepage monitoring weirs are located adjacent to the existing outlet structure. Dam embankment seepage currently flows through a French drain under the downstream portion of the dam to these regularly monitored weirs. An existing release pipe and meter at the toe of the dam delivers water to the seepage channel for Newell Creek beneficial fish flows.

The NCP is a 22-inch-diameter cement mortar-lined steel pipe installed in 1960 in conjunction with construction of NCD. A segment of the pipeline, located at the foot of the spillway, was replaced in 1982. The repaired segment (approximately 185 linear feet) is encased in concrete and located under a concrete cap, which serves as a ford for vehicles to cross the spillway plunge pool. The NCP alignment runs south from the dam's existing outlet structure at the toe of the dam, below the concrete ford, under or adjacent to the dam access road, and then follows the alignment of Newell Creek Road. At the southern end of the project area, NCP is suspended from the Newell Creek Road Bridge where it crosses Newell Creek. Exposed sections of the pipeline are enamel-wrapped (AECOM, February 2018a). From the bridge, the NCP extends approximately 5 miles to the GHWTP.

The NCP conveys untreated water to and from Loch Lomond Reservoir. As an outlet pipe, flows are released from the Reservoir via the inlet/outlet works and conveyed to the City's GHWTP via the Felton Booster Pump Station. Water is also conveyed through the pipeline from the Felton Diversion on the San Lorenzo River into the Reservoir via the inlet/outlet works at times when the river has high flows and storage is available in the Reservoir.

The City also operates and maintains the Loch Lomond Recreation Area (LLRA), located north of NCD and accessed by local roads. The LLRA provides a range of recreational opportunities including boat rentals, picnicking, fishing, hiking, and natural resources interpretive programming. LLRA staff also provide surveillance and security on surrounding City watershed lands. The LLRA is open to the public during daytime hours between March and mid-October.

3.1.3 Project Site Area

The Project area includes the following:

- The Newell Creek Dam
- The southern portion of the Loch Lomond Reservoir where the existing and proposed intakes are located
- The spillway plunge pool and plunge pool crossing
- The existing outlet structure and seepage channel at the toe of the of the dam,
- The control house on the crest of the dam
- Newell Creek Road and access roads to the toe and crest of the dam
- A portion of the NCP
- A portion of an emergency access road (Haul Road) along the right bank of the reservoir
- The LLRA boat launch
- Areas surrounding NCD and the Reservoir that would be used for construction staging and/or storage of excavated spoils

The "Area of Potential Effect" (APE) is shown on Figure 3-3. The APE includes all areas that could be potentially affected due to installation of permanent Project components or as part of temporary construction activities.

3.1.4 Surrounding Land Uses

Areas surrounding NCD and the Reservoir are predominantly open space and forest lands with scattered residences. The Project area is primarily surrounded by watershed lands owned by the City on the same 520-acre property on which the Project area is located. An approximate 20-acre parcel with one residence, located at the southern end of the Project area, was recently acquired

by the City. Six privately owned parcels abut the City-owned NCD property in the vicinity of the project site; all have single-family homes except for one parcel. The nearest of these private residences not owned by the City is approximately 2,000 feet from the Project area.

3.2 PROJECT BACKGROUND

3.2.1 Overview of Existing Operations

The Reservoir impounded by NCD is the City of Santa Cruz's only surface water storage facility and a critical component of the City's permitted drinking water system. The existing NCD inlet/outlet works provides for the City's operation of the Reservoir by enabling the City to:

- Deliver surface water diversions from the San Lorenzo River (Felton Diversion) to the Reservoir (via the NCP);
- Convey stored raw water in the Reservoir to the City's surface water treatment plant (also via the NCP);
- Provide beneficial water releases to downstream Newell Creek;
- Release emergency flows from the Reservoir; and
- Implement periodic controlled releases for maintenance (e.g., for valve testing or water quality management).

Typical Inflows to Loch Lomond Reservoir

The current pumping rate into the Reservoir from the San Lorenzo River is approximately three million gallons per day (MGD) or less due to assumed pressure limitations of the NCP.

Typical Outflows from Loch Lomond Reservoir

The following outflows are typical to the operation of the Reservoir:

- The pumping rate from the Reservoir to the GHWTP via the Felton Booster Pump Station varies from approximately two MGD to 13 MGD (3.0 to 20.1 cubic feet per second [cfs]).
- The typical winter pumping flow rate from the Reservoir averages approximately eight MGD (12.4 cfs). During rainy months, turbidity levels in water from the San Lorenzo River can exceed the treatment capacity at the GHWTP. During these times of high turbidity in the river, the less turbid water from the Reservoir becomes an important source of raw water for GHWTP.
- The typical summer pumping flow rate from the Reservoir averages approximately two MGD to three MGD (3 to 4.6 cfs).

- Releases into Newell Creek for instream beneficial flows are typically a continuous one cfs (0.6 MGD). During the months of July and August, as a minimum, the flow released into Newell Creek must equal natural inflow into the Reservoir. Historically, flows have not exceeded two cfs (1.3 MGD) and are typically less. The City may request variances (that may or may not be granted) from the State Water Quality Control Board and fisheries resource agencies to reduce flows to 0.2 cfs (0.1 MGD), although this is rare (AECOM, July 2018a).

3.2.2 Existing Inlet/Outlet Facility Conditions

The existing NCD inlet/outlet works is approaching the end of its useful design life as illustrated by three primary identified deficiencies: inlet/outlet conduit deterioration, an inoperable and partially closed plug valve at the toe of the dam, and an inoperable fifth inlet/outlet gate in the reservoir as further described below.

The conduit portion of the inlet/outlet works is original construction and is corroding as is typical of unlined steel infrastructure of this age. There were three unmanned inspections of the existing inlet/outlet in 2008, 2013 and 2015. The 2008 and 2013 inspections made it through the 24-inch sloping intake and the 30-inch conduit connecting the sloping intake to the 36-inch inlet/ outlet conduit under the dam but were only able to go short distances into the 36-inch conduit. The 2015 remotely operated vehicle (ROV) inspection reached 711 feet into the inlet/outlet conduit (starting at the sloping intake), but was unable to access approximately 900 feet of the 36-inch inlet/outlet conduit (AECOM, July 2018a). The 2015 ROV inspection revealed that the steel liner for the sloping intake and concrete conduit is deteriorating due to lack of protective lining (AECOM, February 2018a).

A 24-inch plug valve in the outlet structure at the downstream toe of the dam that would normally control emergency releases from the Reservoir to Newell Creek is currently stuck in a partially open position and is inoperable (AECOM, July 2018a). The purpose of this valve is to control the flow rate of water being released from the reservoir outlet works for both emergency and operational releases. The outlet works allows the Reservoir to be drawn down quickly in the event of an emergency. In addition to the issues with the plug valve and the conduit deterioration, the fifth and lowest inlet of the five original inlets of the sloping intake portion of the works is buried by sediment and surficial landslide material. As part of the Inlet/Outlet Gate Replacement Project, this inlet was partially dug out, modified, and capped with a blind flange in 2012 (AECOM, February 2018a).

3.2.3 Emergency Reservoir Drawdown Conditions and Requirements

The California Department of Water Resources Division of Safety of Dams (DSOD) regulates non-federal dams in California. DSOD requires dams with a storage capacity greater than 5,000 acrefeet to have an outlet capable of drawing down 10 percent of the hydraulic head in 7 to 10

days. NCD has historically been required by DSOD to have an inlet/outlet structure with sufficient capacity to lower the maximum reservoir storage by 10 percent of the hydraulic head[1] within 10 days and to fully drain the reservoir to the "deadpool"[2] in 90 days. The sizing of outlets for new dam projects and major outlet modifications of existing dams should meet standards as recommended by DSOD. Because of proposed work to the Newell Creek Dam inlet/outlet works, DSOS has advised that the standard should be that it have the capacity to lower reservoir storage by 10 percent of the hydraulic head within 7 days and to fully drain the reservoir to deadpool in 90 days as stated in letters to the City in October 2014 and October 2018.

In November 2013, DSOD required the City to provide an interim plan for how the City would meet emergency drawdown requirements while developing long-term infrastructure improvements due to the condition of the inoperable plug valve at the outlet structure. In response, the City prepared the Newell Creek Dam Inspection Alternatives Technical Memorandum and Interim Drawdown Plan, which were submitted to DSOD in September 2014. In October 2014, DSOD accepted the inspection plan and required the City to make efforts to repair the 24-inch plug valve, and if unsuccessful, implement interim improvements to enable alternative measures to be available for emergency drawdown of the reservoir.

The City made several improvements along the 22-inch pipeline downstream of the 24-inch plug valve to facilitate emergency drawdown releases. Under the Interim Drawdown Plan (URS, 2014), emergency releases would be made through a combination of three downstream valves (8 inches, 10 inches, and 12 inches) until long-term improvements are made. In June 2015, DSOD accepted the City's request to operate NCD under the Interim Drawdown Plan under the condition that the City provide a long-term strategy to address the inlet/outlet works deficiencies in accordance with DSOD drawdown requirements. Improvements were made by the City to the NCP in early 2015 to allow for implementation of the Interim Plan. The City can draw down the entire contents of the Reservoir in 90 days using the Interim Drawdown Plan, but permanent improvements are needed to address the 10 percent drawdown in seven days requirements (AECOM, February 2018a). The City has never experienced a situation that required an emergency drawdown of the Reservoir.

3.3 PROJECT PURPOSE AND OBJECTIVES

3.3.1 Purpose and Need

As previously indicated, the existing NCD inlet/outlet works is approaching the end of its useful design life as illustrated by three primary identified deficiencies: inlet/outlet conduit deterioration, an inoperable fifth inlet/outlet gate in the reservoir, and an inoperable and

[1] In accordance with documented communications between DSOD and SCWD, the hydraulic head behind NCD is defined as the vertical height between the spillway crest (elevation 577.2) and the upstream dam toe (elevation 436), or 141.5 feet.

[2] Deadpool refers to the elevation of the lowest operable intake gate.

partially closed plug valve at the toe of the dam. The proposed Project is necessary to protect the City's ability to deliver drinking water to its customers.[3] Currently, the Reservoir is the only asset that provides drinking water security in the City's water system in the form of raw water storage. Future failure of the existing inlet/outlet works may eliminate the City's ability to provide drinking water to its customers during two curtail periods: during dry summer months when other sources cannot meet demand and during winter when other water sources are too turbid due to storm runoff. Furthermore, the proposed improvements would improve the City's overall operational efficiency, improve system performance, and maintain long-term reliable storage for the City's drinking water supply. Additionally, the Project is also necessary for the City to meet DSOD requirements for Reservoir draw down in an emergency.

3.3.2 Project Objectives

Section 15124 of the California Environmental Quality Act (CEQA) Guidelines indicates that the environmental impact report (EIR) project description shall include a statement of the objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project. The objectives for the Project are as follow:

1. Protect the City's water supply system by addressing deficiencies in the NCD inlet/outlet works to maintain full system functionality and reliability, including the ability to collect water from different elevations in the Reservoir for treatment at the Graham Hill Water Treatment Plant.

2. Address deficiencies in the NCD inlet/outlet works to meet DSOD requirements to lower the maximum reservoir storage by 10 percent of the hydraulic head within seven days and to fully drain the reservoir to the deadpool in 90 days.

3. Improve overall operational efficiency and system performance of the NCD inlet/outlet works to provide flexibility to efficiently meet water demands and reservoir maintenance.

4. Improve access and ability to inspect and maintain the inlet/outlet system.

5. Implement an inlet/outlet replacement project that is relatively cost-effective in terms of both capital and operation/maintenance costs.

[3] The City of Santa Cruz Water Department serves approximately 24,535 connections in an approximate 20-square-mile area. The service area includes the entire 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. The current population residing in the Santa Cruz water service area is estimated to be 95,251 people. Approximately two-thirds of the total population, almost 64,000, lives inside the City limits.

6. Complete the first segment replacement of the existing aging Newell Creek Pipeline to prevent damage during construction of the NCD inlet/outlet replacement project.

7. Maintain uninterrupted beneficial flow releases during construction of a new inlet/outlets works project.

3.4 PROJECT COMPONENTS

3.4.1 Project Overview

The proposed project would consist of replacement of the existing aging inlet/outlet works in new locations at the Reservoir and other associated improvements. The Project is comprised of the following primary components:

- Three new inlets located within the Reservoir that function to control and convey flows in and out of the Reservoir,
- An outlet structure with valves and controls at the toe of the dam to convey flows in and out of the inlet/outlet works; the structure would provide for energy dissipation for water releases to the NCP or beneficial releases,
- A new dam seepage collection and monitoring system,
- A 14-foot maximum diameter tunnel containing 48-inch and 10-inch inlet/outlet pipelines through the right (west) abutment and under the dam,
- Replacement of an approximate 2,000 linear-foot segment of the NCP between the existing outlet structure and the first isolation valve,
- A new control house on the dam crest to house controls for the inlets,
- Improvements along the dam's access roads to improve access for construction, including a new culvert crossing at the spillway plunge pool, and
- Decommissioning the existing inlet/outlet works once the replacement inlet/outlet system is operational.

Figure 3-4 illustrates the location of the primary new facilities in relation to existing facilities. Each of the Project components is further explained in Section 3.4.2. Figures 3-5A and 3-5B show a more detailed overall site plan from the Project's 50% Design package. These plans are not final and will undergo further refinements in the 90% and final design drawings.

The proposed Project would be constructed independently of the existing inlet/outlet works with minimal disruption to the Reservoir and current water delivery operations. There are no proposed changes to existing operations at NCD and the Reservoir.

Project on-site construction would take approximately 24 months. Eight sites adjacent to NCD and the Reservoir, totaling approximately 15 acres, have been identified as potential construction staging areas as shown on Figure 3-6. These areas may be used for storage of construction equipment and materials, as well as storage and/or permanent placement of excavated materials. Details of construction phasing, methods and schedule are provided in Sections 3.5 and 3.6.

Major construction elements include grading to create an approximate 0.5-acre "construction platform" at the toe of the dam; excavation of a tunnel under the dam to house the inlet/outlet conduit; and subsurface dredging and installation of the new intakes in the Reservoir. A temporary boat launch facility would be installed near the intake construction area for equipment and materials during construction within the Reservoir. Grading and excavation of the construction platform and 14-foot diameter tunnel would result in approximately 22,600 cubic yards (cy) of spoils that would be permanently placed on site (at identified staging areas) or hauled off site to a suitable user or disposal site.

3.4.2 Description of Proposed Dam and Inlet/Outlet Project Components

New Intake Structure

The existing NCD sloping intake structure consists of five 12-inch diameter inlet/outlet gates connected to a 24-inch diameter cement mortar-lined steel pipe encased in reinforced concrete on the upstream face of the dam. The proposed new intake structure consists of three inlets/outlets (inlets), lower, middle, and upper, that each tie into the conduit in the proposed tunnel via vertical shafts drilled through the Reservoir bed (see Figure 3-7 for the intake system layout). The structure would be placed on the right abutment of the dam and would include an air vent that extends up the dam embankment to the dam crest. The inlets and air vent would cover a submerged Reservoir area of approximately 13,000 square feet (0.3 acres).

The three inlets would each be founded on shafts excavated in rock and backfilled with concrete. The shafts for the upper and lower inlets would be 60 inches in diameter with a 30-inch-diameter standpipe that would connect to the inlet/outlet conduit in the tunnel. The shaft for the middle inlet would be 84 inches in diameter to accommodate a 10-inch-diameter pipe for making instream beneficial releases in addition to the 30-inch-diameter pipe. A reinforced-concrete ring mat would surround, but not be structurally connected to, the backfilled shafts. A profile of the intake structure is shown on Figure 3-8.

The ring mat, founded on rock (or on grout founded on rock) would support a steel caisson-type debris barrier to protect the intakes from sloughing of adjacent material into the trough area excavated to bedrock for construction of the intake structure, especially during an earthquake. The debris barriers on the upper and lower inlets would have an interior diameter of 12 feet, and the middle inlet would have an interior diameter of 14 feet. The foundations for the barriers

would be anchored into the foundation rock in order to accommodate potential full height debris loading on a portion or all of the 10-foot height of the barrier (AECOM, July 2018a).

The three inlets themselves would include a connection to the air vent, an isolating butterfly valve, and a vertically configured drum screen. The middle inlet would also have a connection to the 10-inch-diameter instream beneficial release pipe. A 20-inch-diameter air vent would provide an air connection to allow the system to be dewatered and to allow air to escape when the system is rewatered (AECOM, July 2018a). The air vent would then be founded on supports drilled into unconsolidated materials between the upper inlet and the embankment and into embankment near the left dam abutment up to the dam crest.

Each of the three inlets would include a drum-style inlet screen. Based on preliminary discussions with manufacturers, the screens would be 48 inches in diameter, 54 inches tall, and have a 30-inch outlet flange connection. Screen wires would be constructed with copper-nickel alloy with a slot width of 0.5 inches. For normal releases, each screen would be sized to pass a volumetric flow of approximately 20 cfs with a through velocity of 0.5 foot/second. Under an emergency drawdown scenario, a flow of approximately 164 cfs would be distributed through a minimum of two of the three inlet screens.

New Inlet/Outlet Conduit Tunnel

A tunnel with a maximum diameter of 14 feet would be constructed through the dam's right/west abutment using conventional tunneling methods. The tunnel would be approximately 1,500 feet long, with two short straight segments near the tunnel portal located on the downstream side of the dam and at the terminus within the reservoir, and a 600-foot radius curve connecting the two, as shown in Figure 3-9. The tunnel would be approximately 50 to 200 feet below ground surface with sufficient bedrock cover of approximately 40 to 50 feet under the reservoir. The tunnel lining would consist of an initial support system consisting of minimum six-inch-thick fiber reinforced shotcrete and grouted rock anchors in the wall and crown area on four to five-foot centers.

A 48-inch-diameter inlet/outlet conduit steel pipe and a secondary 10-inch-diameter carrier pipe for instream beneficial releases would be routed within the tunnel; see Figure 3-9 for a cross section. The pipe would be welded in place on concrete saddle supports placed at a maximum spacing of 60 feet on center. After the 48-inch-diameter and 10-inch-diameter pipes are installed in the tunnel supported by the initial lining, the annular space (about 27 inches wide) between the carrier pipe and the initial lining would be backfill grouted with cellular concrete or similar, forming the final lining. The final lining would be designed to protect the steel inlet/outlet pipes and to withstand ground loads, hydrostatic groundwater pressures, and seismic loads in accordance with the design criteria.

The tunnel portal would be located on the ridge adjacent to the existing outlet structure. The ridge would be excavated, and the area downstream of the existing outlet structure would be

filled in to a matching grade to create a "construction platform," which is described in Section 3.5.1.

New Outlet Yard

A new outlet yard would be constructed at the tunnel portal at the toe of the dam after the tunnel has been completed and backfilled as shown on Figure 3-10. The 48-inch-diameter inlet/outlet conduit in the tunnel bifurcates into two main lines at the outlet structure: one that connects to the NCP and another that directs emergency release flows to an energy dissipation chamber and ultimately to the spillway plunge pool. A third line, the instream beneficial release line, continues from the 10-inch-diameter conduit in the tunnel to release flows into the stream release chamber, just downstream of the energy dissipation chamber.

The new outlet yard at the toe of the dam would be approximately 720 square feet in area and enclosed with a fence. The outlet yard would house valves and associated control and electrical equipment. From the outlet yard, the City would be able to adjust instream beneficial flows, isolate the NCP from the inlet/outlet conduit, and make operation and emergency releases (AECOM, July 2018a).

Control Building

A new dam crest control building is proposed adjacent to the existing inlet control house on the crest of the dam, similar to the existing control building. This building will house the hydraulic pressure unit and other control and electrical equipment. The structure itself has not been designed, but the preliminary design is an approximate 200-square-foot, concrete-masonry structure on a reinforced-concrete slab. It could also be a prefabricated building.

3.4.3 Appurtenant Facilities

Beneficial Instream Flow Pipeline

At the outlet yard, the 10-inch-diameter pipe would reduce to a 6-inch-diameter pipe for making normal beneficial stream releases as currently provided. The instream beneficial flows would be released into the stream release chamber and ultimately the spillway plunge pool via a 48-inch diameter reinforced concrete pipe. Additionally, when the 48-inch-diameter inlet/outlet conduit is out of service, the 10-inch-diameter secondary carrier pipe could be used as a bypass to provide up to three MGD to the NCP (AECOM, February 2018a).

Dam Seepage Discharge

The dam was constructed with seepage collection systems located at the base of the dam, along the east and west extents. Seepage is monitored at two weirs at the toe of the dam. Existing dam seepage is collected in a channel that is conveyed to the spillway plunge pool, which flows into Newell Creek. A new seepage monitoring point would be designed as part of the Project because once the existing outlet structure is decommissioned, it would be buried along with the seepage weirs. The new seepage monitoring point would have two troughs in a well rather than the current exposed arrangement.

The construction of the seepage monitoring point would be performed in two phases. During construction of the new inlet/outlet works, a concrete seepage monitoring well would be placed downstream of the existing outlet structure, with the construction platform filled in around it as shown on Figure 3-11. During the first phase, weir flow would continue to be measured at the existing weirs. The flow would then be collected into one or both seepage inlet pipes. It is expected that instream beneficial releases would also be discharged to one of these pipes and thereby be conveyed through the well to the spillway plunge pool during construction.

In the second phase, once the new outlet works are ready for commissioning, instream beneficial releases would be made at the new outlet structure to the stream release chamber. The seepage inlet pipes would be extended to the base of the embankment and connected to perforated seepage collector pipes at the base of the dam. The final layout (second phase) is shown on Figure 3-10. The construction phase site layout is shown on Figure 3-11.

Newell Creek Pipeline

As previously indicated, the existing 22-inch-diameter NCP serves as both an inlet and outlet pipe to convey untreated water to and from the Reservoir. Approximately 2,000 linear feet of the NCP would be replaced with a new 30-inch pipeline from the toe of the dam to just upstream of the Newell Creek Road Access Bridge. The pipeline was installed at the same time as NCD, and due to age and deteriorating conditions, the pipeline could be damaged during construction. Therefore, replacement is included in the proposed Project. It is also noted that the full replacement of NCP is being considered as part of the SCWD's capital improvement program.

The northern portion of the new NCP segment would be installed adjacent to the existing pipe in the narrow unpaved access road. In the southern portion of the Project area, where the existing NCP is in a vegetated area west of the access road, the new NCP would be installed several feet west of the existing NCP. Figure 3-12 shows the general location of proposed pipeline replacement. The replacement pipeline would cross Newell Creek just west of the spillway plunge pool and the new proposed culvert crossing within a trench protected by concrete; see Figure 3-13. The replacement pipeline would be 30 inches in diameter and would be made of ductile iron pipe with restrained joints or fusible PVC.

3.4.3 Site Improvements

Access Road Improvements

Newell Creek Road functions as the access road to the dam crest. The Project does not include provisions to improve the paved road prior to construction. Post construction, repairs to the pavement would be required to address damage resulting directly or indirectly from construction.

From Newell Creek Road, access to the toe of the dam is currently provided by a dirt and gravel-surfaced road that branches off of Newell Creek Road approximately 1,400 feet downstream from the dam crest. This approximately 14-foot-wide access road would be regraded and topped with an aggregate base. The access road crosses the spillway plunge pool with a concrete ford and continues towards the seepage channel at the toe of the dam. The spillway plunge pool crossing would be improved as described in the following subsection.

From the dam crest, equipment and materials can be taken along the right (west) abutment via the emergency access road (Haul Road). Road widening and slope stabilization measures could be needed to allow open areas along Haul Road to be used for staging. Without modification, some of the slopes on the ridge adjacent to Haul Road could be unstable and cause road blockages or damage during construction. Slope stabilization measures could include rock slope protection such as cable, mesh, fencing, and rock curtains, slope grading and terracing, or application of erosion control blankets or mats. Haul Road needs to remain open for emergency access vehicles; however, plans to close the road temporarily may be approved by the City on a case-by-case basis depending on time of year and fire hazard levels.

Spillway Plunge Pool Crossing

Access to the toe of the dam currently involves crossing a concrete ford that is located at the discharge point of the spillway plunge pool. When the Reservoir is spilling, depending on the volume of spill, special equipment (large utility vehicle) is required to access the toe of the dam via the concrete ford or the ford is not crossable. A new culvert bridge crossing is proposed as part of the Project to provide improved access to the new outlet structure and the toe of the dam. The new crossing consists of a culvert bridge with a roadway. The culvert is designed to pass a 100 year flood event. The new spillway plunge pool bridge would consist of the following:

- pre-cast reinforced-concrete box culverts (five total)
- cast-in-place reinforced concrete retaining walls (four total)
- cast-in-place reinforced concrete parapet and cut-off wall

The span of the bridge would consist of five pre-cast reinforced-concrete box culverts laid down adjacent to each other. Due to the orientation of the flow from the spillway plunge pool to Newell Creek, the culverts would have a 45-degree skew to the roadway alignment. Cast-in-place

retaining walls would be installed to contain the raised existing access road as it approaches and leaves the culvert bridge. The culvert bridge site plan is shown on Figure 3-14.

3.4.5 Utility Improvements

Electricity is currently provided to the existing control house at the crest of the dam and the utility poles that support existing power lines would remain in place. A new electrical transformer may be needed for the new control house at the dam. Electrical power would be brought from the utility pole to the proposed dam crest control building. New electrical distribution equipment includes disconnect switches, a 480-volt (V) panel, a 120-V panel, and 480-to 120-V transformer. Once the new control house is operational, backup power could be provided by connecting a standby generator to the load bank.

In the Reservoir, the hydraulic tubing and electrical conduits for inlet valve position sensing would be routed inside PVC conduit, which would be placed on pipe racks along the air vent. On the dam crest, the electrical conduits and hydraulic tubing would be routed in trenches to the proposed dam crest control building. Controls for the inlets would be located within the proposed dam crest control building near the existing control house or on the right abutment near the Haul Road.

New 480-V power and fiber optic lines from a new panel in the proposed dam crest control building to the toe of the dam would be buried in a conduit duct bank at a depth of about two feet along the left groin of the dam (looking downstream). At the toe of the dam, outside of the dam embankment, the conduit duct bank would be lowered to a depth of about four feet. A new control panel will be located at the outlet yard.

3.4.6 Decommissioning Existing Inlet/Outlet Works

The existing inlet/outlet would be decommissioned once the replacement inlet/outlet system is constructed, tested, and made operational. The sloping intake would be abandoned in place, and the existing inlet/outlet 30-inch and 36-inch conduits would be dewatered, plugged, and grouted, starting at the junction between the 30-inch and 36-inch pipeline segments and extending to all areas under the dam. After the existing inlet/outlet is decommissioned, excess material from the tunnel and portal excavations could be used to bury the existing outlet structure and buttress the dam within an one-acre area at the lower embankment and toe.

3.5 CONSTRUCTION APPROACH

Project construction activities would include importing materials (i.e., concrete, steel reinforcement, steel pipe, valves, riprap and asphalt), grading to develop the “construction platform” at the toe of the dam, improving dam access routes, dredging to rock and drilling from a barge to complete the in-water intake structure work, tunneling with mechanical excavators,

hauling spoils from the site, fabricating and assembling infrastructure, and decommissioning existing infrastructure.

3.5.1 Construction Methods

Temporary Bypass for Continuous Beneficial Release Flows

At the toe of the dam, the City maintains a continuous instream beneficial release to Newell Creek comprised of a 4-inch-diameter pipe, valving, and flow meter. This release would need to be maintained at all times during construction. Therefore, a temporary bypass pipe would be installed between the existing outlet structure and the spillway plunge pool or Newell Creek to provide continuous beneficial release flows during construction.

Creation of Tunnel Portal-Construction Site

The staging area at the tunnel portal would require grading to create a "construction platform" and to provide adequate turning radii for haul trucks (i.e., cut, fill, and grading). An approximate 0.5-acre area would be graded. The staging area would accommodate tunneling and other equipment, such as spoil removal system, guidance and control system, and cranes.

The tunnel portal is proposed to be located on an existing ridge adjacent to the existing outlet structure. The ridge would be excavated approximately to an elevation of 392 feet, and the area downstream of the outlet structure would be filled in to a matching grade to create a "construction platform." The top of the platform would have a two percent grade, sloping down towards the spillway plunge pool to direct surface runoff towards Newell Creek. The platform would be topped with aggregate base to prevent erosion from runoff and vehicles (AECOM, July 2018a). Figure 3-11 shows existing topography and grading for construction. Figure 3-15 shows grading sections.

The southeastern edge of the platform would have a 1.5:1 (horizontal to vertical) slope down to the spillway plunge pool and would be protected by riprap or retaining wall. The southwestern edge of the platform runs along an ephemeral creek. To prevent the creek from flooding the platform, a five-foot-wide "berm" has been provided at a minimum of five feet above the thalweg[4] of the creek (see details D and E on Figure 3-15). The slope from the top of the berm to the platform face was set at 2:1 for stability. On the northern edge of the platform fill, a 3:1 slope was left to allow access to the existing outlet structure during the construction period. Once the new outlet works is fully operational, and the existing outlet works is decommissioned, the area between the platform at the dam embankment would be filled in to provide a straight line of access for embankment repair work; see Figure 3-10.

[4] Thalweg is the lowest elevation in a water course.

Tunneling Excavation

The proposed inlet/outlet conduit tunnel would be excavated by conventional mining equipment and methods, which would be carried out in a series of repeated excavation steps using roadheaders or other mechanical excavators followed by temporary ground support and initial lining. A roadheader is a boom-mounted cutting head, mounted on a crawler that cuts through rock face. As the roadheader or excavator tunnels forward, the excavated material would be transported by truck from the tunnel face back to the tunnel entrance. Initial support systems would be installed during tunneling to provide support before, during, or immediately after excavation. Support for the portal excavation could include rock bolts and soil nails with shotcrete facing, and soldier pile and lagging with tiebacks or internal struts.

Groundwater control measures would be applied proactively to manage groundwater inflows. For example, pre-excavation grouting could be applied in areas ahead of the excavation(AECOM, February 2018a). Based on the results of test borings, groundwater may be encountered in the portal excavation, approximately 10 to 20 feet below the existing ground surface. Groundwater from the excavation would be captured in a system of drains and directed to a treatment tank, receiving treatment as necessary to settle out sediments and treat for pH. Discharge of this "dewatered" water from the tunneling excavation would be discharged in the spillway plunge pool or ephemeral drainage/Newell Creek at the toe of the dam or alternately within the Reservoir within the area contained by the silt curtains. All water discharges would be subject to approval of a National Pollutant Discharge Elimination System (NPDES) Waste Discharge permit, and the project would be required to comply with all water quality standards set forth in this permit. The water treatment system would be designed and selected to satisfactorily treat all discharged water including groundwater inflows and water resulting from the construction process. Treatment would include removal of suspended solids, oil, grease, and other contaminants introduced by or resulting from construction operations to reduce contaminants in the discharged water to the levels specified in the applicable permits, NPDES Waste Discharge Requirements Order, and applicable discharge water quality requirements.

Since the public review period for the Draft EIR, the City and its consulting engineers have clarified that there may be situations in which controlled detonation may be necessary for portions of the tunnel excavation to support the utilization of roadheaders. Roadheaders have been commonly used for many local projects to excavate tunnels in similar sedimentary rock. However, particularly hard rock, if encountered, may require the use of controlled detonation to excavate short sections where the roadheader would have insufficient power. Under these circumstances, a blast would be carefully designed and controlled to provide a distribution of charge to excavate the rock. It is anticipated that controlled detonation would be considered as an alternative to supplement roadheader excavation where particularly hard rock is encountered or where the equipment is not effective or productive. Controlled detonation is expected to be required in this manner approximately three to six times during the seven to eight months the tunnel is being excavated, but requirements may vary based upon conditions encountered.

When utilized, controlled detonation would typically occur twice per day (morning and evening) for a number of consecutive days, with each blast event lasting about 13 seconds.

The controlled detonation process is planned and designed with safety as the primary goal. The process generally involves layout and drilling, charging and hook-up, blast initiation, spoils removal, and results evaluation.

- **Layout and Drilling** – In general, two types of drilled holes are commonly used in blasting excavation. Control holes are often drilled around the perimeter of the designed excavation in order to control the limits of the cut. Production holes are drilled in a predefined pattern and subsequently loaded with explosive material.
- **Charging and Hook-Up** – Individual production holes are loaded with explosive materials based on the carefully designed blast plans in order to enhance fragmentation and improve excavation results. In general, the types of explosive material commonly used in controlled detonation for similar applications include ANFO, Emulsion, ANFO/Emulsion Blend, and/or Water-Gel classifications.
- **Blast Initiation** - Blasters can use a combinations of electric and non-electric (e.g. shock tube) initiation systems to create choice of delay times and firing patterns.
- **Spoils Removal** – Displaced material is removed and any remaining material within the designated excavation limits/design lines is removed using mechanical means.
- **Results Evaluation** - Blasting results are evaluated after each individual blast to continually refine and improve subsequent blast designs/performance.

Intake Structure

The intake structure would be installed in the water while Reservoir elevations are within the normal operating range (typically between elevations of 562.2 feet and 577.2 feet). A temporary boat launch facility would likely be built on the right bank of the Reservoir within staging area 1 as further described in Section 3.5.4. Barges and boats would be launched from this facility when constructing the intake structure in the Reservoir; although, initial construction barge commissioning and decommissioning may occur from the existing boat launch at the LLRA. Silt curtains (turbidity barriers) would be installed in the Reservoir to contain the work area during construction.

Dredging in the area of the intake structure down to bedrock would be required to provide an adequate foundation for the new inlets and air vent. The proposed dredging would be within an approximately 1.5-acre area. Bedrock is anticipated to be approximately 13 feet to 30 feet deep. It is currently anticipated that the bedrock would be laid back to a 1.5-to-1 (horizontal to vertical) height. Unconsolidated material outside of the bedrock area would be laid back at a 2:1 (horizontal to vertical) height for stability (AECOM, July 2018a). Dredging in the area of the intake structure is conceptually shown on Figure 3-5A. Dredged material would be deposited in

the thalweg of the Reservoir. All dredging and spoils placement in the Reservoir would be performed within the confines of silt curtains to minimize turbidity impacts to the Reservoir.

Upon completion of dredging, vertical shafts would be drilled into the reservoir bed at each of the three inlets from a barge. The vertical shafts would be a minimum of 60-inch-diameter shafts with a casing pipe. Vertical steel standpipes would be placed inside the casing and grouted. An inlet valve and cap would then be placed on top of each standpipe for a double seal. Upon completion of the shafts, any necessary detail excavation to accommodate the surrounding concrete mat would be completed, and a concrete mat to support the debris barrier would be installed, followed by installation of the debris barriers.

Outlet Yard

Construction of the outlet yard would include excavation, concrete work, valving, and installation of the control system. The outlet yard could include both prefabricated and cast-in-place concrete elements. Pre-cast concrete would be transported to the construction site and positioned into place. Cast-in-place concrete would be poured into the specific formwork on the site and cured.

Newell Creek Pipeline

The majority of the NCP, from just north of the concrete ford at Newell Creek to the Newell Creek Road bridge, would be replaced prior to construction of the new tunnel and inlet/outlet works. The new 30-inch diameter NCP segment would be installed just south of the new culvert bridge crossing with a temporary 12-inch or 16-inch diameter bypass pipe installed from the existing outlet structure to just north of the concrete ford, where it will connect into the new NCP. After the new outlet structure is in place and functional, a final 30-inch diameter pipe segment would be installed to connect the new outlet structure to the new NCP, and the temporary pipe would be disconnected. The contract documents would allow the contractor to come up with the best alignment of the temporary bypass pipe that works with their construction sequencing.

The replacement pipeline would be installed using conventional (open cut) trenching with excavators and loaders. The pipeline construction trench would be approximately five feet wide and eight feet deep, and construction activities are expected to occur within an approximate 10-foot-wide to 15-foot-wide construction corridor.

The NCP would cross Newell Creek for a distance of approximately 65 feet just west of the new culvert crossing and would be within an approximately 5-foot wide by 5-foot deep trench protected by a concrete cap. A coffer dam would be installed at approximately 30 feet downstream of the culvert bridge, and the spillway plunge pool would be dewatered to a point in which the existing crossing would be dry. The coffer dam type would be identified by the construction contractor, but based on typical coffer dams, it is expected that it would either be

an inflatable feature or possibly gravel-filled bags. Prior to the spillway plunge pool, the beneficial bypass flows would be routed to bypass the plunge pool and to discharge directly into Newell Creek. During this period, the existing beneficial release flow and seepage flows will be routed directly to Newell Creek instead of the spillway plunge pool. Upon completion of this construction phase, the beneficial release and seepage flows would be route to the spillway plunge pool as currently exists.

When taken out of service, the existing pipeline would be plugged at or near the outlet structure, and the decommissioned section of the NCP would be severed and capped and/or filled with concrete.

Spillway Plunge Pool Culvert Bridge Crossing

Once the NCP segment across Newell Creek is installed, the existing concrete ford would be excavated, and the concrete culvert bridge would be installed. The existing pipeline in this section may be taken out or filled with concrete. Once the culvert crossing bridge is in place, the downstream coffer dam and re-routed bypass flow would be removed to return flows into the spillway plunge pool and Newell Creek.

3.5.2 Construction Staging Areas

Staging areas would be used for storage of materials and products, treatment and storage of spoils, tunnel equipment laydown, boat launch, and potentially a concrete batch plant. Staging areas would be required for tunnel, outlet structure, and inlet construction.

The proposed staging areas are shown on Figure 3-6. These staging areas are in various locations along Newell Creek Road, the outlet structure access road, Haul Road, and along an existing road to the east bank of the Reservoir. Relatively flat sections of these areas would be cleared and grubbed to provide usable space for staging of construction materials and equipment. The areas labeled as 3, 5, and 6 on Figures 3-5A and 3-5B are proposed for permanent disposal of excavated spoils, which is explained in the following section.

3.5.3 Spoils Disposal

On-Land Excavated Spoils

Spoils would be primarily generated from excavation for the construction platform and tunnel. These materials would primarily be siltstone rock, which has geologic properties similar to a weak sandstone (AECOM, February 2018b). Table 3-1 provides estimated spoil quantities, assuming a bulking factor of 1.5, to account for expected volume change of the excavated material compared to the volume of the material in situ. The amount of excess material excavated from the portal staging area and tunnel could be as much as 22,600 cy.

Excavated spoils would be temporarily stored at identified staging areas as shown on Figures 3-5A and 3-5B. It is estimated that approximately 13,700 cy could be permanently disposed on the Project site (AECOM, February 2018b) within the staging areas 3, 5, and 6 as shown on Figures 3-5A and 3-5B. Additionally, it is anticipated that approximately 800 cy of excavated material from the construction platform would be used as fill for the access road at the toe of the dam. Decommissioning the existing seepage monitoring system would allow the City to dispose of an additional 800 cy or more of material on site and to buttress the dam with additional excess material. Any material used to fill the outlet structure area and buttress the dam would need to be stored temporarily on site until the end of construction. Any remaining material may be either used on site to "buttress" the downstream dam face near the toe of the dam or it would be hauled off site to a permanent disposal site (AECOM, February 2018b).

Table 3-1: Spoil Quantities

Spoils Source	Cut (cy)	Fill (cy)	Net (cy)*
Portal Staging and Outlet Structure	9,000	3,000	9,000
Main Tunnel	9,100	0	13,600
		TOTAL	22,600

* Bulked Net.

SOURCE: AECOM

It is currently estimated that approximately 8,900 cy of material would require offsite disposal. Options for disposal of spoils that cannot be disposed of on site include finding construction projects in the area that require fill and/or hauling spoils to a landfill.

Submerged Dredged Spoils

Within the Reservoir, material would need to be dredged to provide an adequate foundation for the new inlets and connecting piping. The estimated quantity of dredged materials in the Reservoir is expected to be 23,000 cy, with an estimated maximum quantity of 34,00 cy. The dredged material would likely be disposed of by placement in the thalweg of the Reservoir (AECOM, July 2018b).

All dredging and spoils placement in the Reservoir would be performed within the confines of silt curtains to contain the area of high turbidity and to maintain water quality elsewhere in the Reservoir. Silt curtains can be made from semi-porous material or from material with nearly no porosity.

Excavation within the reservoir would occur using either mechanical or hydraulic dredging equipment. Examples of potential dredging equipment include a grab or clamshell dredger, hydraulic crane, suction dredger, and cutter suction dredger. Mechanical dredging uses draglines or clamshells mounted on barges. Hydraulic dredging pumps water and spoils from the head of the dredge back through a vessel and through a pipeline to a dewatering area. The pumped water creates a negative pressure that allows the sediment to be moved in a slurry form through the pump and pipeline system. Hydraulic dredging requires a settling basin to accommodate the slurry mixture. Although hydraulic dredging could be used, mechanical dredging with a clam shell dredger would be more likely due to the depth of water within the reservoir during dredging (AECOM, July 2018b).

Figure 3-8 schematically shows the approximate 1,600-linear-foot perimeter of the proposed silt screens. Assuming that the Reservoir is full and that the silt screens would need to extend down to the bed of the reservoir, approximately 140,000 square feet of silt screen would be required to enclose an area of approximately 4.6 acres. Dredged materials could be placed up to elevation 460 feet, or approximately the top elevation of the lowest vertical shaft. The area required to place 28,000-34,000 cy of material in the thalweg up to that elevation would be approximately 1.3 acres.

3.5.4 Construction Access Routes

Construction Access Routes

Access for vehicles carrying materials, equipment, and personnel to and from the construction area would be provided via several existing roadways in the Project vicinity. The primary routes for construction traffic would likely include Highway 17 to Mount Hermon Road, Graham Hill Road, Highway 9, Glen Arbor Road, and Newell Creek Road. Access to the LLRA is via a long, curving road through residential areas, which would include traveling along East Zayante Road to Lompico Road, West Drive, Sequoia Avenue, and Loch Lomond Way. Figure 3-16 shows potential construction access routes for the Project.

Publicly accessible roads are not expected to be closed for extended durations during construction. Some private and public roads could be closed temporarily during transport of the barge components for mobilization and demobilization from the LLRA. If temporary road closures are required, alternative access routes would be provided where feasible. Legal loads would be used on all roads, and once construction is completed, the roads would be returned to a condition similar to what they were prior to construction.

Access to the toe of the dam is currently provided by a dirt and gravel-surfaced road that branches off of Newell Creek Road. As previously indicated, the road to the toe of the dam would be regraded and topped with an aggregate base, and the spillway crossing would be improved with installation of pre-cast reinforced-concrete box culverts.

Another access road leads to the left embankment of the dam, crosses the spillway at the spillway bridge, and continues along the dam crest to the Haul Road on the right shore. Road widening and slope stabilization measures would be needed to allow open areas along Haul Road to be used for staging. Another unused access road to the east/left embankment staging areas would require widening and improvement to accommodate construction vehicles.

Boat and Barge Launches

The LLRA is located on the east side of the reservoir about 4,000 feet upstream of the dam crest, from which boats and barges are currently launched. The construction barge could be initially launched from the existing LLRA boat ramp and could be decommissioned from there at the end of construction. While some service boats may also use this launch, activity at this facility is expected to be minimal. Access to the LLRA, as described above, is via a long, relatively narrow, steeply ascending road through residential areas with many tight curves.

As previously indicated, a temporary boat launch facility would likely be built on the right (west) bank of the Reservoir within staging area 1. To accommodate the temporary boat launch facility, construction grading is expected on the right bank of the Reservoir. Although a specific design for this facility has not been developed, it is anticipated that sheet piles would be placed adjacent to shore and backfilled to create a pier. It is estimated that the temporary pier would cover a maximum of 600 square feet of water. A crane may be provided at Staging Area 7 on the low point on the east bank to load equipment and supplies onto boats in the Reservoir.

Boats for accessing the construction barge would primarily be launched from this facility. The boat launch would be used periodically throughout construction and at the end of the construction during project commissioning and decommissioning of the existing inlet/outlet works.

The construction barge could also be commissioned and decommissioned in the water via a crane stationed on the temporary boat launch facility. The construction barge would be temporary and be approximately 400 square feet in size.

3.5.5 Reservoir Operations During Construction

Loch Lomond Reservoir is the City's only raw water storage reservoir. The City keeps the Reservoir as full as possible in an effort to maintain a backup supply for critical drought conditions. Lowering the Reservoir makes the water supply system more vulnerable to shortage during extended dry periods or critically dry years. The Reservoir is expected to be maintained in its normal operating range throughout construction.

3.6 CONSTRUCTION SCHEDULE AND SEQUENCING

3.6.1 Construction Schedule

Project construction would take approximately two years. A preliminary construction schedule was prepared in conjunction with the 50% Design Report that estimated an approximate two-year construction schedule, starting in the year 2021. The actual start date will be refined as final engineering plans are prepared, but the actual construction start date could be as early as mid-2020 with an estimated a completion date in mid-2022.

There may also be an "accelerated" construction schedule in which some work activities/sequences are scheduled during consecutive evening/nighttime periods to complete a particular phase in a shorter amount of time. Under this scenario, a 16-hour work day is anticipated with two work shifts. The tunnel excavation construction may include 24-hour construction with three eight-hour shifts. If an accelerated construction schedule were to be implemented, there could be a brief overlap of construction workers arriving to and leaving the site. However, the amount of equipment would remain the same, although the duration of use per day would be extended. Construction assumptions with an accelerated schedule are included in Appendix B.

Construction Sequencing

The anticipated construction sequence, which would be further developed by the selected contractor, is outlined below and summarized in Table 3-2.

Year 1

1. Equipment would be mobilized to the site using ground transportation.
2. Staging areas would be developed at the site.
3. Bypasses for the NCP and instream beneficial flows would be constructed.
4. The NCP replacement segment would be installed.
5. Access roads to the outlet area would be improved.
6. The "construction platform" at the toe of the dam would be developed.
7. The spillway plunge pool culvert bridge would be installed.
8. The temporary boat launch would be installed, and silt curtains would be placed to contain the intake structure work area.
9. The intake structure would be constructed in the Reservoir from a barge.
10. The launch pit would be excavated at the tunnel portal and tunnel excavation would commence.

Year 2

11. The tunnel excavation would continue.
12. The inlet/outlet conduit and carrier pipe would be installed in the tunnel and connected to the vertical intakes, and the tunnel would be backfilled.
13. The control house for the inlets would be constructed on the crest of the NCD.
14. The outlet structure would be constructed and connected to the inlet/outlet conduit, the carrier pipe, and the NCP.
15. The new system would be tested, and the old inlet/outlet works would be decommissioned.

Construction Equipment and Workers

The proposed Project would require use of heavy equipment such as cranes, excavators, bulldozers, dump trucks, loaders, backhoes, and generators. Roadheaders[5] with pre-excavation probing and grouting would likely be used construction of the tunnel. Haul trucks would be used to transport materials to the site and to transport spoils off site to a permanent disposal location. Flatbed trucks would be used to transport smaller qualities of material at the site. Water trucks and fuel trucks would also be used at the site. Table 3-2 summarizes equipment used for each construction phase; construction assumptions and equipment use are detailed in Appendix C.

On average during Project construction, approximately 10 construction workers are estimated to be working at the Project site each day, with a maximum of 20 during peak construction periods (AECOM, February 2018a). As currently proposed, construction would occur on weekdays with a typical 10-hour work shift. Construction activities would typically occur during normal weekday work hours, e.g., between 7 AM and 7 PM with potential work on Saturdays. It is likely that tunnel construction will include two 8-hour shifts. There may be occasional work during evening/nighttime periods for other Project features.

[5] A roadheader is a piece of excavating equipment, consisting of a boom-mounted cutting head, a loading device usually involving a conveyor, and a crawler traveling track to move the entire machine forward into the rock face.

Table 3-2: Summary of Estimated Construction Sequencing, Duration and Equipment Use

Project Component	Construction Duration	Construction Equipment (see Appendix B – Construction Assumptions for more details)	Construction Shifts and Work Hours
Mobilization	5 days	haul truck, forklift, bobcat	One / 10 hours
Develop staging areas	5days	haul truck (2), excavator, grader (2), water truck (2), crane/boom truck	One / 10 hours (some equipment used four to eight hours)
Construct NCP and instream beneficial flow release construction bypass	12 days	haul truck (2), excavator, dozer, grader, loader, roller, water truck, forklift	One 10-hour shift
NCP installation	32 days	haul truck (2), excavator, dozer, grader, loader, roller, water truck, forklift	One / 10 hours (some equipment used four to eight hours)
Improve access to outlet area	3 days	haul truck (2), excavator, dozer, grader, loader, roller, water truck, forklift	One / 10 hours (some equipment used four to eight hours)
Grade/develop portal construction platform	28 days	haul truck (3), dozer (2), loader (2), roller, water truck (2), concrete mixer, crane/boom truck	One / 10 hours (some equipment used four to eight hours)
Install culvert bridge	38 days	haul truck, excavator, dozer, roller, forklift (2), crane/boom truck	One / 10 hours (some equipment used four to eight hours)
Install temporary boat launch and silt curtain	20 days	diesel generator, haul truck (2), excavator, grader, roller, water truck, forklift, crane/boom truck, bobcat	One / 10 hours (some equipment used four to eight hours)
Barge construction work	55 days	clamshell dredger, drill rig, roadheader (tunneling)	One / 10 hours
Construct intake structure and components	165 days	concrete transit mixers (2), forklift, crane/boom truck, work boats, generator, diving equipment	One / 10 hours
Tunnel construction	225 days	diesel generator, haul truck, concrete transit mixer, crane/boom truck, roadheader (2), ventilator fan; water treatment plant	Two-Three / 16–24 hours
Install inlet/outlet conduit and pipes and backfill tunnel		diesel generator, concrete transit mixers (4), forklift (2), air compressor (2), bobcat	One / 10 hours
Outlet structure construction	75 days	diesel generator, haul truck, excavator, grader, roller, concrete transit mixers (2), forklift (2), crane/boom truck, Bobcat	One / 10 hours (some equipment used four hours)
Decommissioning Existing Outlet and Project Completion	75 days	Haul truck, crane/boom truck, bobcat	One / 10 hours

3.7 OPERATIONS AND MAINTENANCE

Current O&M activities at the NCD, in addition to the primary inflow/outflow, include releasing one cfs to two cfs of beneficial flow to Newell Creek, operational testing of the hydraulic system and shutoff valves, and monitoring seepage from the dam. Continuous flow releases and monthly seepage monitoring would continue during and after construction of the new inlet/outlet works.

O&M for the new intakes and the inlet/outlet conduit system include inspections of the intakes and interiors of the conduit and operational testing. O&M requirements for the new inlet/outlet works is anticipated to increase from current requirements because of the more complex design of the new system compared to the existing inlet/outlet (AECOM, July 2018a). The new outlet would be in a fenced yard, and the new seepage monitoring location would be enclosed in a structure. Anticipated O&M requirement changes are described in Table 3-3.

Table 3-3: Estimated Changes to Operations and Management Requirements

Project Component	Existing	Proposed	O&M Requirements
Intake Structure	Sloping intake	Three vertical inlets	May be somewhat increased due to the longer hydraulic and control lines.
Dam Crest Control Building	Building on dam crest	Building on dam crest	No anticipated change
Inlet/Outlet Conduit	Telescoping conduit (24 inch/30 inch/36 inch)	Telescoping, 20-inch air vent, 30-inch standpipe and 48-inch conduit	Proposed conduit would be easier to access for inspections and maintenance than the existing one
Outlet Structure	Concrete encasement of outlet conduit with an isolation valve in a vault	Outlet yard with energy dissipation chambers.	New yard would require more inspections and maintenance.
Seepage Monitoring Point	Weirs outside at dam embankment	Weirs enclosed in structure downstream of dam embankment	No major change anticipated for typical seepage monitoring. Seepage monitoring well would need to be inspected occasionally and is considered a confined space
Spillway Plunge Pool Culvert Bridge	Concrete ford	Culvert bridge spanning spillway plunge pool	Requires occasional inspection and maintenance similar to the existing site bridges.

3.8 PROJECT-PROPOSED BEST MANAGEMENT PRACTICES

The Project 50% Design Plans include standard construction specifications, including decontamination of boats before entering the Reservoir and implementation of traffic control

plans during construction. The City has identified other best management practices (BMPs) and conservation practices to include with the construction specifications for erosion control and protection of water quality and sensitive habitats. These are identified below.

Erosion Control and Air Quality Control

1. Implement erosion control Best Management Practices (BMPs) for all construction activities occurring in or adjacent to jurisdictional aquatic resources, including the Reservoir, spillway, spillway plunge pool, Newell Creek, ephemeral drainage, and undisturbed wetlands. These measures may include, but are not limited to: (1) installation of silt fences, fiber rolls, and/or bales along limits of work/construction areas and from the edge of the water course; (2) covering of stockpiled spoils; (3) re-vegetation 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 rolls, gravel bags, and/or hydroseed).

3. Provide runoff control devices (e.g., fiber rolls, gravel bag barriers/chevrons, etc.) used during construction phases conducted during the rainy season.

4. Implement wind erosion (dust) controls, including
    - Use of 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.
    - Install appropriately effective track-out capture methods at the construction site for all existing trucks.

5. Limit level of road use, including:
    - Limit road use based on road conditions, surfacing, cumulative rainfall, and saturation.
    - Close roads seasonally and as needed to prevent excessive erosion and sedimentation.
    - Restrict access on low-use roads with gates or other barriers.

Water Quality Protection

6. Utilize sediment curtains, silt fences and/or coffer dams where construction activities could cause sediment to enter Newell Creek. These measures would be placed at the perimeter of the construction zone to prevent sediment disturbed during

excavation/grading activities from being transported and deposited outside of the construction zone. Silt fencing would be installed in upland areas based on topography and where construction occurs within 50 feet of Newell Creek or tributaries.

7. Silt curtains or silt screens shall be employed during dredging and disposal activities in the Reservoir to isolate the dredged material and maintain water quality elsewhere in the Reservoir in compliance with Central Coast RWQCB Basin Plan objectives. The silt curtains shall be designed and installed without holes in which pond turtles could become trapped. Silt curtains will encompass the in-reservoir work area and extend from the water surface to the bed of the reservoir.

8. Spoil disposal sites and other debris areas such as concrete wash sites shall be located, stabilized, and sediment control measures implemented so that sediment is not conveyed to Newell Creek.

9. Minimize potential for hazardous spills from heavy equipment by not storing equipment or fueling within a minimum of 65 feet of the 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.

10. Other than watercraft, heavy equipment (such as cranes) for loading water craft, barges, and in-reservoir equipment that cannot be readily removed from the Reservoir, no equipment fueling or servicing shall be done in the Reservoir, or within 50 feet of the Reservoir boundary.

11. Ensure that gas, oil, or any other substances that could be hazardous to aquatic life or pollute habitat are prevented from contaminating the soil and/or entering waters of the state and/or waters 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 provided on the barge, shall be stored in water-tight containers with secondary containment. Emergency spill kits shall be onsite at all times.

12. Prevent equipment fluid leaks through regular equipment inspections.

13. Tremie-placed concrete shall contain an anti-washout admixture and shall be placed in an area isolated from the main area of the reservoir or stream by a silt curtain or other means. Other fresh concrete shall be isolated from wetted channels for a period of 30 days after it is poured. If a 30-day curing period is not feasible, a concrete sealant as approved by NMFS and CDFW may be applied to the surfaces of the concrete structure. If a sealant is

used, the manufacturer's guidelines for drying times would be followed before re-establishing surface flows within the work area.

14. Implement proper waste/trash management.

In-Channel Work and Fish Species Protection

15. Activities in the active (i.e., flowing) channel will be avoided whenever possible. If activities must be conducted in the active channel, best management practices #16, 17, and 21-27 shall be applied.

16. Isolate work areas as needed and bypass flowing water around work site (see dewatering measures below).

17. 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

18. When working in or adjacent to the active stream channel (i.e., construction of the culvert crossing and NCP crossing), avoid disturbance of retained riparian vegetation to the maximum extent practicable.

19. Restore all temporarily disturbed natural communities/areas by replanting native vegetation using a vegetation mix appropriate for the site.

20. Require decontamination of any vessels, including tools and equipment, prior to entering the Reservoir and Newell Creek, to prevent introduction of invasive species into the Reservoir.

Dewatering

21. Prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred 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.

22. When work in a flowing stream is unavoidable, the work area will be isolated 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 both upstream and downstream 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. Coffer dam 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 stream flows to gravity flow around or through the work site. If gravity flow is not feasible, stream flows 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, etc.).

23. If a bypass will be of open channel design, the berm confining the channel may be constructed of material from the channel.

24. 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.

25. To the extent that stream bed design changes are not part of the project, the stream bed, including the low-flow channel, will be returned 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.

26. All temporary diversion structures and the supportive material shall be removed as soon as reasonably possible, but no more than 72 hours after work is completed.

27. Temporary fills, such as for access ramps, diversion structures, or cofferdams, shall be completely removed upon finishing the work.

Others

28. 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. 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 California Code of Regulations Section 15064.5(f); 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, additional treatment may be required.

29. In accordance with Section 7050.5 of the California Health and Safety Code, 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 Native American Heritage Commission (NAHC) within 24 hours. In accordance with Public Resources Code Section 5097.98, the NAHC must immediately notify those persons it believes to be the Most Likely Descendant (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.

30. 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.

31. 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 and 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 project to protect special-status species, including breeding birds and their nests. Any personnel joining the work crew later shall receive the same training before beginning work.

3.9 REFERENCES

AECOM.

- February 2018a. Newell Creek Dam Outlet Conduit Replacement Project Description Technical Memorandum, Final Draft.
- February 2018b. Newell Creek Dam Outlet Replacement Project Spoil Disposal Technical Memorandum.
- July 2018a. Newell Creek Dam Inlet/Outlet Replacement Project 50% Design Report. Final Draft Memorandum.
- July 27, 2018b. Newell Creek Dam Outlet Replacement Project Submerged Spoil Disposal Technical Memorandum.

California Department of Water Resources, Division of Safety of Dams.

- Letter to City of Santa Cruz Water Department. July 12, 2018.
- Letter to City of Santa Cruz Water Department. October 31, 2014.

URS Corporation. August 2014. "Technical Memorandum - Newell Creek Dam Interim Drawdown Plan." Prepared for City of Santa Cruz Water Department.