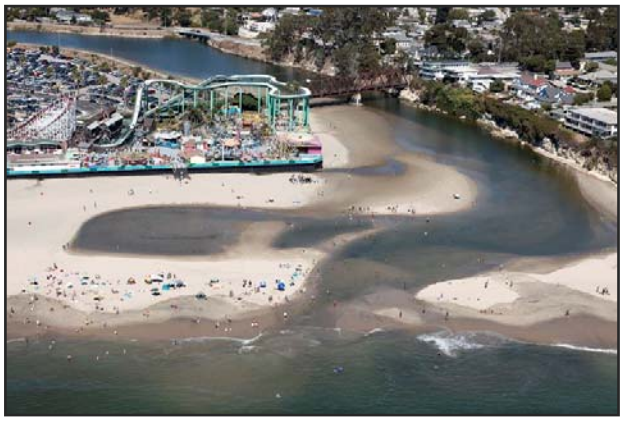
City of Santa Cruz

SAN LORENZO RIVER LAGOON INTERIM MANAGEMENT PROGRAM

Initial Study / Mitigated Negative Declaration

March 2015



CONTENTS

- ❒ Mitigated Negative Declaration
- ❒ Initial Study
  - I. Background & Project Description
  - II. Environmental Setting
  - III. Environmental Checklist
  - IV. Determination
  - V. References and Data Source List
  - VI. Explanation of Environmental Checklist Responses

  FIGURES
- ❒ Attachments (Available on CD)
  - Interim Management Program Project Description
  - Biological Assessment
  - Coastal Processes Report
  - Geomorphic and Engineering Feasibility Study

CITY OF SANTA CRUZ

Mitigated Negative Declaration

The Administrator of Environmental Quality of the City of Santa Cruz has prepared this Mitigated Negative Declaration for the following described project:

Project: San Lorenzo River Lagoon Interim Management Program

Project Location: San Lorenzo River mouth in city of Santa Cruz; see attached map

Project Description: The San Lorenzo River Lagoon Interim Management Program (IMP) focuses on prevention of unauthorized river lagoon breaching affecting listed aquatic species and control of water elevation of the lagoon at elevation 5.0 feet NGVD to prevent localized flooding to public and private properties and infrastructure. The IMP is designed as an adaptive management program for addressing activities related to fisheries habitat, flooding, and public access and safety where the river mouth empties at Santa Cruz Main Beach. The IMP includes two management activities to be implemented during the proposed three-year management period of 2015 through 2017 between May 1 and November 15. The two management activities include installation of: 1) a Temporary Outlet Channel that would be implemented in 2015 and 2016; and 2) a Head Driven Culvert that would be implemented in 2016 (if funding is secured) and in 2017. Implementation of Best Management Practices and monitoring actions will be conducted as part of the project.

Project Applicant: City of Santa Cruz
Office of the City Manager
809 Center Street, Room 10
Santa Cruz, CA 95060

The City of Santa Cruz has reviewed the proposed project and has determined that the project, based on the Initial Study attached hereto, will not have a significant effect on the environment. An Environmental Impact Report is not required pursuant to the California Environmental Quality Act of 1970 as amended. This environmental review process and Mitigated Negative Declaration has been completed in accordance with the State CEQA Guidelines and the local City of Santa Cruz CEQA Guidelines and Procedures.

The following mitigation measures will be incorporated into the project design or as conditions of approval, to ensure that any potential environmental impacts will not be significant.

Impact	Mitigation
Biological Resources – Sensitive Habitat. Installation of the temporary outlet channel or the temporary culvert would not adversely affect tidewater goby habitat, but could result in indirect impacts to individual tidewater gobies present in the work area.	MITIGATION MEASURE 1: Avoid construction activities in the wetted areas of the lagoon, and implement fish survey prior to installation of the temporary outlet channel or head driven culvert, collect any tidewater gobies on the dewatered sandbars and in the outlet channel, and release them in a safe location.

Biological Resources – Fish Migration. The temporary outlet channel may affect, but will not likely adversely affect juvenile steelhead or coho salmon migration, and would not result in a significant impact. The Head Driven Culvert would have an effect on steelhead smolt migration if installation would cause earlier closure of the lagoon than would be the case otherwise.

MITIGATION MEASURE 2: If the head driven culvert is installed prior to July 1st, delay the operation start date (i.e. when the valve is opened) until the City has decided that the first seasonal longer-term closure has started and the steelhead and coho salmon migration period to the ocean has ended. This typically happens after July 1st, but the date may vary depending on how dry the year is. The culvert valve can be closed prior to the first major rainstorm of the year (when natural breaching would have occurred at the end of fall or beginning of winter). This will allow the lagoon to breach normally.

3-27-15

By: Martin Bernal
City Manager

Date

City of Santa Cruz
INITIAL STUDY / ENVIRONMENTAL CHECKLIST

I. BACKGROUND & PROJECT DESCRIPTION

1. **Project Title:** San Lorenzo River Lagoon Interim Management Program

2. **Lead Agency Name and Address:**
   City of Santa Cruz
   809 Center Street
   Santa Cruz, CA 95060

3. **Contact Person and Phone Number:** Scott Collins, (831) 420-5017
   SCollins@cityofsantacruz.com

4. **Project Location:** San Lorenzo River mouth in city of Santa Cruz (APN 007-321-04, 007-321-07, 007-321-09; 007-291-01); see Figures 1A and 1B[1].

5. **Project Applicant's/Sponsor's Name and Address:**
   City of Santa Cruz
   Office of the City Manager
   809 Center Street, Room 10
   Santa Cruz, CA 95060

6. **General Plan Designation:** Natural Areas, Coastal Recreation

7. **Zoning:** F-P (Floodplain District), OF-R (Oceanfront Recreational)

8. **Public Agencies Whose Approval or Review Is Required:**
   - California Coastal Commission: Coastal Development Permit
   - California Department of Fish and Wildlife (CDFW): 1600 Lake and Streambed Alteration Agreement
   - California Regional Water Quality Control Board (RWQCB): Clean Water Act Section 401 Water Quality Certification
   - U.S. Army Corps of Engineers: Clean Water Act Section 404 Permit
   - Monterey Bay National Marine Sanctuary: Determination Pending

   The City and the above state agency staffs reviewed the project, and concluded that the City is the lead agency for environmental review.

[1] All figures are included at the end of the document for ease of reference.

9. **Background:** The mouth of the San Lorenzo River is characterized by both natural and built features. Historically the San Lorenzo River meandered across a floodplain extending from Neary Lagoon to the eastern bluff. Following severe flooding in downtown Santa Cruz in the winters of 1938, 1941, and 1955, the U.S. Army Corps of Engineers (ACOE) constructed a flood control project in 1957 that included construction of levees and straightening and dredging the river channel. The project created a channelized flood control channel for its lower 2.5 miles of the river below Highway 1, which disconnected the lower river from its historical floodplain.

   Each summer and fall a seasonal lagoon is formed at the mouth of the river. This is typical of coastal watersheds in California in which lagoons form due to decreasing freshwater inflow during the summer and fall months and wave action that deposits sand to create a barrier beach and prevents the river from flowing to the Monterey Bay (SOURCE V3a[2]). Figure 2 shows the San Lorenzo River when the lagoon is formed and when the river is flowing to the Monterey Bay.

   History of Flooding and Lagoon Breaching: Due to the constricted nature of the lower river, under closed conditions the lagoon water makes its way to low lying infrastructure such as storm drains, basements, residential streets, and the levee's internal drainage system. Closed lagoon conditions have resulted in flooding of public and private infrastructure and properties in the immediate vicinity of the lower river and in downtown Santa Cruz. Facilities impacted by flooding include: the Santa Cruz Beach Boardwalk; the U.S. Army Corps San Lorenzo River Flood Control Project levee system and drainage facilities; the City of Santa Cruz storm drain system; streets and traffic light electrical systems along East Cliff Drive; the bikeway along San Lorenzo River; and residential properties to the north at Lower Ocean Street that experience high groundwater and flooding in yards and basements. The historic Del Mar Theater in downtown Santa Cruz experienced basement flooding in 2014 during a prolonged lagoon closure period (SOURCE V.3b).

   Additional issues with closed lagoon conditions include public access and safety for Santa Cruz Main Beach, an area visited by over 3 million people annually. Under closed conditions, a spillover channel eventually forms, and in recent years has bifurcated the beach in a westerly direction (see Figure 3). This can make lifeguard access to the ocean edge difficult and hazardous. The spillover channel is also attractive to inexperienced swimmers who wish to avoid the ocean, creating additional safety concerns for beach lifeguards due to an uneven bottom and depth that may be present, as well as water quality concerns.

   The City of Santa Cruz has documented issues with flooding, public access and safety at the river mouth. A history of emergency and unauthorized breaching of the closed lagoon has been documented at the river mouth due to a variety of factors including flooding in the surrounding developed area. Federal and state resource agencies have documented concerns about unauthorized and emergency breaching actions at the river mouth. The river mouth also is known as a prime surfing location when sediments from the river mouth deposit

[2] All source (document) references are summarized in SECTION V of this document.

offshore and south swells come in the summer months. These favorable surfing conditions have allegedly resulted in illicit barrier beach manipulation by surfers to encourage sediment transfer onto the sandbar at the river mouth (SOURCE V.3a).

In March 2012, following late season heavy rains, the San Lorenzo River deflected to the west and threatened the Santa Cruz Beach Boardwalk. The California Coastal Commission (CCC) issued an emergency coastal development permit (ECDP 3-12-009-G-San Lorenzo River Management), authorizing the Santa Cruz Seaside Company, acting as contractor and agent for the City of Santa Cruz, to divert the flow of the San Lorenzo River to help protect the existing Santa Cruz Beach Boardwalk structures as a result of heavy rains that resulted in the river course being altered. An emergency permit was also approved by the ACOE. The emergency work entailed creating a channel to direct the river to the sea through two berms to avoid/minimize damage to existing Boardwalk. One of the CCC permit conditions encouraged the Permittee to apply for a regular coastal development permit to provide a comprehensive response to the issue of San Lorenzo River flood in a manner most protective of the beach area, San Lorenzo River resources and public recreational access. A coastal development permit application subsequently was submitted, and the CCC requested that an interim management plan for the San Lorenzo River be provided.

2014 Controlled Lagoon Breaching: Under separate permit approvals, a controlled breach of the lagoon was conducted on September 26 and 27, 2014. The purpose was to lower lagoon water levels from 7 to 5 feet NGVD through a managed channel without a complete breach that would rapidly dewater the lagoon. On both days, a channel was excavated at the far eastern end of Main Beach near the Trestle Bridge. The channel was approximately 10 feet in width and 750 feet in length at its initial cut. The orientation of the channel was roughly southwest and directed approximately toward the mid-point on the wharf. The channel was opened on an incoming tide. At the end of both days, the channel was mechanically closed by filling with sand to prevent further drainage and scouring of the channel. The volume of sand needed to close the channel at the end of the day was estimated between 1,000 and 1,200 cubic yards (SOURCE V.7a). Biological monitoring before and after water quality conditions were also documented for this event. Photos of the steps of the event are shown on Figure 4.

City Plans and Efforts Addressing Lagoon Issues: The City has considered management options for the San Lorenzo River Lagoon since the late 1980s. The *San Lorenzo River Enhancement Plan*, adopted by the City Council in 1989 contained a series of recommendations to restore the environmental integrity of the San Lorenzo River, including construction of a summer river mouth drain system. The purpose of the drain system was to allow a regulated flow of water from the river mouth when the natural flow of water is blocked during the summer months by a sandbar. Such a proposal was partially developed with Coastal Conservancy funding, but was suspended in 1993 due to costs, feasibility and potential legal issues for the City.

The *Lower San Lorenzo River and Lagoon Management Plan* provided an update to the 1989 *San Lorenzo River Enhancement Plan*. This Plan included a recommendation for lagoon water management during the summer, including artificial management of the sandbar at the lagoon upon completion of a water quality study. The Plan also recommended consideration

of alternative management strategies to address steelhead needs in case it was not feasible to control summer lagoon water levels artificially. The Lagoon Management was included as an appendix in the *San Lorenzo Urban River Plan* (SLURP), adopted by the City Council in June 2003. The 2003 Plan did not include specific recommendations or actions related to the barrier beach and associated issues with flooding, public safety and access, and habitat conditions at the river mouth. However, policies developed from the SLURP for inclusion in the City's Local Coastal Plan (LCP) recommend developing a strategy for summer lagoon management.

Preparation of the IMP: The proposed "Interim Management Program" was developed following review of existing data on water quality, stream flow, biological resources, and fisheries on the San Lorenzo Lagoon. A "Coastal Process and Data Integration Report" was completed to add to the scientific understanding of the lagoon physical processes and conditions (ESA, 2014-SOURCE V.7b). Management plans, biological opinions, and permits for other coastal lagoon management programs underway in California also were reviewed, including those for Soquel Creek, Scott Creek, Russian River and Pajaro River.

IMP alternatives were developed and were further analyzed in the "San Lorenzo River Lagoon Interim Management Program Geomorphic and Engineering Channel Feasibility Study" (ESA, 2015-SOURCE V.7a). Feasibility analysis included: creation of a water balance model for the lagoon; developing flow rate criteria for the alternatives; calculating and verifying lagoon filling rate; and habitat considerations including estimates of the amount of freshwater volume associated with the target lagoon volume.

In 2014, the City of Santa Cruz convened a series of meetings with federal and state natural resource agencies to develop a framework for the IMP based on existing conditions, agreed objectives, and a timeframe for implementation. Meetings were held in the fall of 2014 to review existing conditions and coastal process findings; management alternatives; and a preferred set of management activities. The final three alternatives were reviewed with agencies in December 2014, and no fatal flaws for the alternatives were identified for the proposed management activities.

10. Project Description:

Project Purpose and Overview: The San Lorenzo River Lagoon Interim Management Program (IMP) seeks to prevent unauthorized breaching of the river mouth and to prevent localized flooding to public and private properties and infrastructure. The IMP encompasses management activities in the lagoon area which is the area of inundation under closed sandbar conditions from the river mouth to Water Street Bridge (see Figure 1A). Management activities will take place only at the lower 700 feet of the river channel and beach.

The IMP is a project of the City of Santa Cruz in cooperation with State and Federal agencies and private property owners. The IMP addresses a condition of U.S. Army Corps of Engineers Regional General Permit No. 5 - File Number 2012-00092S (San Lorenzo Emergency Repairs) issued on April 3, 2012 and a condition of California Coastal Commission ECDP 3-12-009-G

(San Lorenzo River Management) issued on March 20, 2012 requiring development of an interim management approach for the San Lorenzo River Lagoon to address flooding and mechanized breaching.

The IMP sets forth the following objectives as agreed by City of Santa Cruz and federal and state resource agencies[3].

- OBJECTIVE 1: Reduce frequency of artificial breaches of the barrier beach.
- OBJECTIVE 2: Establish a perched lagoon for a sustained period to provide habitat for aquatic species concurrent with acceptable species habitat.
- OBJECTIVE 3: Maintain a perched lagoon at elevation 5.0 NGVD29 to prevent flooding of surrounding public and private properties.
- OBJECTIVE 4: Identify overriding considerations for emergency actions for lagoon management and establishes best management practices for such actions.

The IMP seeks to establish a management program by which lagoon habitat, flooding of public and private properties, and public safety and access conditions can be addressed during the interim period and evaluated for cost, reliability, and effectiveness. Table 1 summarizes existing management issues for the project area. The IMP proposes two management activities to maintain the surface elevation of the San Lorenzo Lagoon at 5.0 NGVD29[4], which is the level determined to avoid localized flooding that leads to emergency or unauthorized breaches. The IMP also is designed as an adaptive management program for addressing activities related to fisheries habitat, flooding, and public access and safety where the river mouth empties at Santa Cruz Main Beach.

Due to multiple constraints at the location of the river mouth, including a heavily visited public beach and private ownership of some portions of the beach, the IMP was developed as an interim step to a long-term management plan for the area. The IMP will help document success of the proposed management activities as well as costs, roles, and efficiencies in addressing long-standing habitat, flooding, infrastructure, and access issues at the river mouth. Based on the results of the IMP, the activities included in the IMP may be considered as part of the long-term management plan developed with local, state and private partners. A long-term management program would be subject to subsequent environmental review and permits at the time the program is developed and proposed for implementation.

[3] U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Coastal Commission, California Department of Fish and Wildlife, and California Regional Water Quality Control Board.

[4] National Geodetic Vertical Datum (NGVD29)-Datum are established references for vertical and horizontal locations. In addition to NGVD, NAVD88 (North American Vertical Datum) and MLLW (Mean Lower Low Water) are used in some technical documents. Tidal datums provided by the National Oceanic and Atmospheric Administration (NOAA) indicate that MLLW=0.00 feet, and NGVD29=2.60 feet (SOURCE V.7b).

Table 1. Existing San Lorenzo River Lagoon Management Issues

Management Issue	Description
Suitable habitat conditions	- Extent and quality of lagoon/estuary - Suitable water quality conditions - Tidewater Goby – disturbance of substrate/scour
Direct species impacts	- Fish washing out of lagoon during breaches - Fish stranding - Fish migration - High temperatures
Property flooding at elevation 5.0 NAVD29 on Trestle gage	- Santa Cruz Boardwalk maintenance bay and eastern retaining wall - City of Santa Cruz storm drain system - ACOE levee pump stations and internal levee drainage system
Emergency access	- Limited use of access ramp below Trestle Bridge to address emergency situations at eastern end of Main Beach including life-saving at river mouth
Public access to Main Beach	- Eliminated below Trestle Bridge at access ramp on eastern edge of Boardwalk facility
Lifeguard access/public safety	- River mouth swim area - Eastern areas of Main Beach when lagoon forms westerly flow direction - Bacteria levels of lagoon waters on beach

Project Components: As previously indicated the proposed Interim Management Program seeks to prevent unauthorized breaching of the river mouth during spring and summer months. The IMP includes two management activities to be implemented during the proposed three-year management period from 2015 thru 2017. The season proposed for IMP activities is May 1 – November 15. The two activities, which are described below, include: (1) a Temporary Outlet Channel that would be implemented in 2015 and 2016; and (2) a Head Driven Culvert that would be implemented in 2016 (if funding is secured) and in 2017 management periods. Each of these two components, as well as proposed avoidance and minimization measures and monitoring actions are described below.

Description of Proposed Temporary Outlet Channel & Culvert

TEMPORARY OUTLET CHANNEL. The purpose of the Temporary Outlet Channel is to provide a controlled drawdown of the lagoon elevation to prevent exceedence of the 5.0 NGVD elevation designated by the IMP (OBJECTIVE 3). The Temporary Outlet Channel will be constructed up to six times during the season as needed to achieve the above flood control water level. This activity will be implemented in the 2015 season and possibly the 2016 season if funding for the Head Driven Culvert has not been secured. The Temporary Outlet Channel will be installed to draw the lagoon down to 3.0 to 4.0 NGVD, and then the channel will be closed. The work would take place on one day for each channel that may be installed in a season.

Construction involves excavation of a variable width channel diagonally on the beach to establish a controlled, slow draining channel. Typical dimensions would be on the order of 35 to 50 feet in width and 75 feet in length, but each channel will be designed at the time of implementation according to beach elevation, lagoon elevation, tides and other factors. The channel will result in approximately 1,000 cubic yards of beach sand being moved each time a channel is built over an estimated at 0.126-acre area.

Based on the results of a successfully installed Temporary Outlet Channel in September 2014, an approach for implementation has been developed, including a notification process involving the resource agencies once conditions exist to design the channel outlet approach. An outline of this process, including construction techniques, is presented below. The proposed action includes implementation of "Minimization Measures" and "Best Management Practices" that also are described further below.

- ❒ *Action Triggers.* Once flows at the USGS Santa Cruz gage lower to 20 cfs, the City of Santa Cruz will consider that lagoon closure could happen soon, and will initiate preparations that include communication with the regulatory agencies to alert them that closure is likely within several weeks. When the lagoon rises above 4.5 feet NGVD, the City would anticipate that the water level is likely to reach or exceed 5.0 feet NGVD. This condition could initiate mobilization of equipment and resources for outlet channel implementation within one week.

  Construction of the outlet channel is desired prior to the lagoon water level going above 5.0 NGVD. Analysis of lagoon data from 2003 to 2014 showed that mouth closure typically occurs within two weeks after river flows at the Santa Cruz gage drop below 20 cubic feet per second (cfs). For the majority of documented closure events, the lagoon stage rises to the IMP target flood stage of 5.0 NGVD within several days and typically less than one week (SOURCE V.7a).

- ❒ *Notification Process.* When lagoon stage rises above 4.5' NGVD, the City will convene City departments and resource agencies to discuss and evaluate site conditions, weather predictions, identify preferred lagoon outlet channel location, review construction standards, and determine desired final stage of the lagoon after water level lowering. Key considerations will include the following:
  - Weather, swell and tide predictions – the City and resource agencies will evaluate the best available long-term weather forecast to determine weather, swell and tide conditions for optimal channel configuration and placement,
  - River discharge,
  - Channel establishment evaluation – In all cases, the principal goal of establishing the lagoon outlet channel will be to minimize the likelihood of uncontrolled lagoon draining. Targeted outlet channel location and specifications, width and height of the outlet breach, outflow discharge, and current lagoon water quality conditions will be evaluated and discussed prior to developing a final plan,
  - Fish presence and utilization of habitats to be affected by outlet channel,

- Coordination - the City will confer with heavy equipment operators and biological monitors to coordinate efforts.

❒ *Final Plan Developed and Documented* . Targeted conditions to establish the seasonal outlet channel include:
  - Outlet channel drains the lagoon to elevation 3.0' to 4.0' NGVD before closure
  - Outlet channel is located in an agreed diagonal position at eastern end of Main Beach and staked accordingly
  - Outlet channel details include excavation location, depth, length and width
  - Identify need and locations of necessary control berms
  - Identification of tidal conditions including timing to appropriate tidal phases
  - Resulting lagoon water surface elevation documented

❒ *Public Notification Plan*. The City of Santa Cruz will develop and implement a Public Notification Plan including issuing adequate press release information to local media outlets and announcement on City website.

❒ *Construction Description.* A shallow part of the lagoon (~2 feet deep) will be used as a sill to reduce the likelihood of headcutting and scour up to the thalweg[5] to reduce the chance of a complete draining of the lagoon. A sand track "peninsula" will be graded in the lagoon near the outlet opening on the beach side. This peninsula will act to control the direction of flow and headcutting. Once established, a blade will be used to cut a shallow opening to begin flow from the lagoon to the ocean. As headcutting occurs, documented by periodic walking depth measurements, sand will be pushed into the headcut/thalweg to reduce further scour and channel formation. Walking surveys will be performed every 30 minutes. Sand piles will be maintained adjacent to the inlet to provide immediate ability to control headcutting. Once the desired elevation of 3.0 to 4.0 feet NGVD is reached, the outlet channel will be closed. The most up-to-date equipment Best Management Practices will be deployed during construction as summarized in Table 2. Measures to avoid and/or minimize potential environmental impacts also will be implemented and are described at the end of this subsection.

HEAD DRIVEN CULVERT. The purpose of the Head Driven Culvert (Culvert) is to allow the lagoon elevation to reach 5.0 feet NGVD under normal river mouth closure conditions and then maintain that elevation through passive removal of water from the lagoon via overflow of surface waters through a small weir and infiltration through the barrier sandbar as an additional contribution. A series of three 4-foot diameter standpipes (risers) would be partially buried in the lagoon adjacent to San Lorenzo Point, and would be connected to a 450-foot horizontal culvert buried in the beach connecting the lagoon to the ocean. A site plan is shown on Figure 5, and a cross section and detail of the culvert and outlet is shown on Figure 6.

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

Table 2. Equipment Best Management Practices

- Contractors must have a supply of fuel and hydraulic fluid spill containment supplies onsite to facilitate a quick response to unanticipated or fuel or hydraulic fluid spill emergencies.
- Construction equipment must be checked at the beginning of the workday. If leaks occur during work in the channel (top of bank to top of bank), the contractor must contain the spill and remove the affected soils.
- Staging/storage areas for equipment, materials, fuels, and lubricants, must be located outside of the stream's normal high water height and above ocean high tide levels. Stationary equipment such as motors, pumps, generators, compressors, located on the beach must be positioned over drip pans.
- Cleanup of all spills must begin immediately. NMFS must be notified immediately of spills into sensitive aquatic resources and must be consulted regarding cleanup procedures. If an incident occurs after normal business hours or on a weekend, a voice mail message must be left at the phone number of 831-420-5017.
- After channel outlet establishment or a breach, all temporary, construction-related material must be removed from Santa Cruz Main Beach.
- City of Santa Cruz staff or their qualified designee must provide on-site training for work crews to ensure protection of the stream zone and listed wildlife species. City of Santa Cruz staff or their qualified designee is empowered to halt construction activities if they determine the project is resulting in unintended or unanticipated adverse impacts to listed species or their habitats.
- Construction monitoring to ensure no harm or harassment of state and federally protected species such as, tidewater gobies, steelhead, and coho salmon occur during operation of heavy equipment or shovel activities.

Lagoon water would seep into the porous bottoms of the risers, feeding flows into the horizontal culvert. Outflows through the culvert would be driven by the head difference between the closed lagoon (3.0 to 5.0 feet NGVD) and the ocean (typically less than 3.0 feet NGVD). All risers would be connected to the horizontal culvert at approximately 3.0 feet NGVD. Since the culvert will act to export water supplied to it by the risers, setting the connection at this level will maintain a head difference between the lagoon (water surface at 3-5.0 feet NGVD) and riser (water surface constant at 3feet). Seepage flows into the riser will be driven by this head difference, so that flows into the riser will be zero when the lagoon is at 3.0 feet NGVD and will increase to 0.5-1.0 cfs per riser at 5.0 feet NGVD.

Installation will require excavation of approximately 700 linear feet of the channel bed at a depth of two to three feet at the east end of the Main Beach, and the culvert will be constructed in 100-foot segments with backfill between each segment. An estimated 500 cubic yards of material will be excavated and refilled to bury the pipe within an approximate area of 0.026 acres. It is estimated the culvert could be constructed in less than two weeks.

A notification process involving the resource agencies is outlined below, as is a description of the construction techniques, best management practices, and minimization measures that will be utilized.

- *Notification Process.* Notify City departments and resource agencies to discuss and evaluate site conditions, weather predictions, and construction window. Key considerations will include the following:
  - Weather, Swell and Tide Predictions – the Involved Parties and resource Agencies will evaluate the best available long-term weather forecast to determine weather, swell and tide conditions for optimal channel configuration and placement,
  - River discharge,
  - Coordination - the City will confer with heavy equipment operators and biological monitors to coordinate efforts.

- *Public Notification Plan.* The City of Santa Cruz will prepare and implement a Public Notification Plan including issuing adequate press release information to local media outlets and announcement on City website.

- *Construction Description.* The horizontal culvert would be constructed from 100-foot pipe sections, which would be connected with flanges. At the connection points, the culvert would be weighted down with concrete weights. The purpose of the weights is to hold the culvert in place and prevent it from being washed out during flood events. A series of H-piles would hold the risers in place; see Figure 6. The proposed culvert is a temporary facility that can be removed during the wet season. However, it is likely that removal just prior to mouth breaching is not practical and hence the weights have the additional function of limiting migration of the outfall pipe and thereby facilitating recovery. Lifting hooks can be incorporated into the weight supports, and bolted flange connections allow pipe detachment.

  A 100-foot long trench with a bottom elevation of 3.0' NGVD would be excavated for construction of each 100-foot segment. Segments will be pre-assembled by thermal fusion with factory-applied flanges on both ends. The segments would then be connected by bolting the flanged ends together in place. For each segment added, a new 100-foot long trench will be excavated, and the prior trench will be backfilled. This procedure of excavating and filling trenches sequentially as segments are bolted together is intended to prevent a single trench from spanning the entire width of the beach. The intake structures and H-piles will be installed and then connected to the outfall pipe via a bolted connection.

  To minimize the overall duration of the construction, installation of the intake structure (risers, H-piles, gate valve) and the outlet culvert can be performed at the same time. For the intake structure, a track-mounted hydraulic excavator, similar to that used for the previous breach excavations, could be used to place materials at the intake structure location while crews assemble and install the elements. Concurrently, the outlet culvert pipe and anchors would be installed in approximately 100-foot segments. The most up-to-date equipment Best Management Practices will be deployed during construction as summarized in Table 2.

The culvert and intake structures would be installed in the spring season after flood flows have subsided. Installation can occur when the mouth is open or closed as long as equipment can access the work area safely, although construction during open mouth conditions is preferable, before flows on the San Lorenzo River at the USGS Santa Cruz gage drop below 20 cfs. The benefits of this approach are the following:

- Lagoon water levels are typically lower than 3.0' NGVD (the proposed invert elevation of the culvert) during open-mouth conditions.
- Since 2002, closure events were common after San Lorenzo flows dropped below 20 cfs for the season (SOURCE V.7b). Installation of the facility before flows approach this level would allow for the structure to be in place for most or all closure events of the dry season.
- Avoiding construction during closed mouth conditions averts the risk of construction activities unintentionally inducing a breach event.

Demobilization of the structure may occur in October or November, prior to the first major rainfall events, if practicable. It is possible that removal of some or all of the structure may be impeded by conditions such as high river flows, a deep mouth which prevents access or powerful wave runup. Therefore, the precise timing is not known and will require assessment of conditions and risks. Demobilization of the culvert would involve a similar procedure as installation: segments would be removed in pieces, sequentially excavating and backfilling until all segments are removed, so that the excavation never spans the full width of the beach.

Proposed Avoidance and Minimization Measures

The primary avoidance measure associated with the IMP is the beneficial action of preventing unauthorized breaches of the barrier beach that can result in drawdown of the lagoon and impacts to aquatic habitats and threatened and endangered fish species. The IMP establishes a management objective to maintain the lagoon elevation at 5.0 feet NGVD thus alleviating localized flooding. Secondary avoidance measures include flood proofing of the Santa Cruz Beach Boardwalk that occurred in December 2014 as part of the IMP planning process. Minimization also is achieved through limiting the number of temporary channels installed to six in a season and establishing an Action Trigger and Notification process with resource agencies for outlet channel design and placement. Additional minimization measures associated with installation of the Temporary Outlet Channel include the following:

- ❒ Establish nets for intercepting any fish that may be carried towards channel opening.
- ❒ Survey location of the thalweg and beach profile before breach.
- ❒ Side cast material on the ocean side of the channel.
- ❒ Open the outlet channel on an incoming tide.
- ❒ Draw water down into the outlet channel over a wide shallow area.
- ❒ Stockpile sand peninsula and monitor frequently for headcutting.

Installation of the Head Driven Culvert installed in season 2017 provides another minimization measure in that it will eliminate the need for installation of temporary outlet channels. The culvert will be installed at low tide in open mouth conditions thereby avoiding closed lagoon habitat conditions or affecting natural closure of the lagoon. The culvert is designed to draw water into a riser system and is a passive system not requiring any pumps or intake structures thus avoiding impacts to fish. The culvert system maintains a slow seep into the culvert that flows to the ocean under the sand. This structure allows for natural wave runup and overtopping and closure and opening of the lagoon according to natural wave and inflow conditions.

Monitoring Program

The City of Santa Cruz has a well-established monitoring program for the San Lorenzo River Lagoon that will be utilized to document the management activities implemented from the IMP. The IMP will include monitoring of conditions resulting from management actions. These monitoring data will inform the process of developing a long-term management plan, as well as add to the existing dataset established for the San Lorenzo Lagoon by the City of Santa Cruz since 2002. Monitoring parameters proposed for the IMP include the following:

- ❒ Biological monitoring by City staff to prevent construction impacts on habitat f listed species,
- ❒ Beach topography surveys, before and after construction,
- ❒ Stationary camera placement to monitor vandalism of risers and culvert,
- ❒ Continued gaged monitoring of lagoon water levels after construction to assess effectiveness of alternative compared to existing conditions.

II. ENVIRONMENTAL SETTING

Regional Setting

The San Lorenzo River drains an approximately 137-square mile watershed. The River drains to the Pacific Ocean at the north end of the Monterey Bay. The City of Santa Cruz is located adjacent to the lower 3 miles of the River and encompasses much of the River's historic floodplain. The County of Santa Cruz has jurisdictional authority of the area of the watershed outside of the City limits.

As previously indicated, the ACOE constructed a flood control project along the San Lorenzo River in the late 1950s. The San Lorenzo River is a channelized flood control channel for its lower 2.5 miles below Highway 1. In 1994 the COE approved plans for the San Lorenzo River Flood Control and Environmental Restoration Project. The project, which was completed in 2003, raised the levee height, replaced storm drains, and revegetated the outer levee slopes with native riparian species. The channelized flood control project, just upstream of the river mouth, completely disconnects the lower river from its historical floodplain and Jessie Street Marsh.

Project Site Setting

The proposed project is located within an existing developed area of the City of Santa Cruz, just east of the downtown area along the San Lorenzo River. The project area encompasses the San Lorenzo River lagoon, which is defined as the area of inundation under closed sandbar conditions from the river mouth to Water Street Bridge, and adjacent beach areas (see Figure 1A). Proposed management activities will take place only at the lower 700 feet of the river channel and beach. The potential area of disturbance would encompass approximately an estimated 0.15 acres. The project site is located on private property as well as within sovereign tidelands and submerged lands that have been transferred, in trust, to the City of Santa Cruz from the State Lands Commission.[6]

The mouth of the San Lorenzo River is characterized by both natural and built features including San Lorenzo Point, a rock outcrop of the Purisima mudstone formation, on its eastern edge and the Santa Cruz Main Beach to the south and west. The lagoon that forms seasonally, is situated at the confluence of the San Lorenzo River and the Pacific Ocean, and is constrained by the river levees, the historic Santa Cruz Boardwalk to the west, and San Lorenzo Point.

As previously indicated, a seasonal lagoon is formed at the mouth of the San Lorenzo River each summer and fall, which is typical of many coastal watersheds in California. The beach that forms the downstream side of the lagoon evolves seasonally in response to coastal processes of waves, wave run up, tides and sand supply. All of these processes vary seasonally and can affect the lagoon water level. The lagoon receives both freshwater river flows and oceanic tides and waves, and these systems exchange of flows with the ocean is controlled by the shape and depth of the river mouth, which is primarily formed by wave action and tidal scour (SOURCE V. 7a).

III. ENVIRONMENTAL CHECKLIST

Environmental Factors Potentially Affected by the Project: The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

✓	Aesthetics		Agricultural & Forest Resources	✓	Air Quality
✓	Biological Resources		Cultural Resources	✓	Geology / Soils
	Greenhouse Gas Emissions		Hazards & Hazardous Materials	✓	Hydrology / Water Quality
	Land Use / Planning		Mineral Resources	✓	Noise
	Population / Housing		Public Services		Recreation
	Transportation / Traffic	✓	Mandatory Findings of Significance		

[6] September 19, 2014. Letter to U.S. Army Corps of Engineers from California State Lands Commission regarding "Jurisdictional Determination of an Emergency Breach of a Sandbar Located in the Mouth of the San Lorenzo Lagoon, in the city of Santa Cruz, Santa Cruz County."

Instructions to Environmental Checklist

1. A brief explanation is required (see VI. "Explanation of Environmental Checklist Responses") for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question (see V. Source List, attached). A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that any effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level.

5. Earlier Analysis may be used where, pursuant to the tiering, program EIR, or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case a discussion should identify the following on attached sheets:
    a) *Earlier Analysis used*. Identify earlier analyses and state where they are available for review.
    b) *Impacts adequately addressed*. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) *Mitigation measures.* For effects that are "Less than Significant with Mitigation Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluation each question; and
    b) The mitigation measure identified, if any, to reduce the impact to less than significance.

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?				✓
b) Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				✓
2. AGRICULTURE AND FOREST RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement Methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? (V.1b-Figure 4.15-1 in DEIR)				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				✓
b) Violate any air quality standard or contribute to an existing or projected air quality violation?			✓	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				✓
d) Expose sensitive receptors to substantial pollutant concentrations?				✓
e) Create objectionable odors affecting a substantial number of people?				✓
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				✓
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			✓	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				✓
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				✓
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?				✓
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				✓
d) Disturb any human remains, including those interred outside of formal cemeteries?				✓
6. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. (V.Ic)				✓
ii. Strong seismic ground shaking?			✓	
iii. Seismic-related ground failure, including liquefaction?				✓
iv. Landslides? (V.Ib-Figure 4.10-3 in DEIR)				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
c) 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, lateral spreading, subsidence, liquefaction or collapse?				✓
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				✓
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
7. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				✓
8. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				✓
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				✓
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ miles of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				✓
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				✓
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? (V.Ib-Figure 4.6-1 in DEIR)				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
9. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?				✓
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (for example, the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				✓
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			✓	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			✓	
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?				✓
f) Otherwise substantially degrade water quality?			✓	
g) Place housing within a 100-year flood-hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				✓
h) Place within a 100-year flood-hazard area structures which would impede or redirect flood flows?			✓	
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				✓
j) Inundation by seiche, tsunami, or mudflow?			✓	
10. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?				✓
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Conflict with any applicable Habitat Conservation Plan or Natural Community Conservation Plan?				✓
11. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? (V.1a)				✓
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				✓
12. NOISE: Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?				✓
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?				✓
c) Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				✓
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				✓
13. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				✓
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				✓
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
14. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or need for new or physical altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
a) Fire protection?				✓
b) Police protection?				✓
c) Schools?				✓
d) Parks?				✓
e) Other public facilities?				✓
15. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				✓
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				✓
16. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				✓
b) Conflict with an applicable congestion management program, including, but not limited to level of service standard and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				✓
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?				✓
d) Substantially increase hazards due to a design feature (for example, sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment)?				✓
e) Result in inadequate emergency access?				✓
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				✓

ENVIRONMENTAL IMPACTS Issues (and Supporting Information Sources):	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
17. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				✓
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction or which could cause significant environmental effects?				✓
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				✓
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				✓
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				✓
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				✓
g) Comply with federal, state, and local statutes and regulations related to solid waste?				✓
18. MANDATORY FINDINGS OF SIGNIFICANCE. Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			✓	
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.)				✓
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				✓

DISCUSSION OF ENVIRONMENTAL CHECKLIST

See Section **VI--ENVIRONMENTAL EVALUATION** for discussion.

IV. DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	✓
I find that the proposed project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	

Scott Collins
Assistant to the City Manager

3/26/2015
Date

V. REFERENCES AND DATA SOURCE LIST

Agency Plans & Reports

1. City of Santa Cruz General Plan and EIR
   a) Adopted June 26, 2012. *General Plan 2030*.
   b) April 2012. "City of Santa Cruz *General Plan 2030* Final EIR." [SCH#2009032007] Certified June 26, 2012. Includes Draft EIR document, dated September 2011.

2. City of Santa Cruz Plans and Reports
   a) City of Santa Cruz. October 25, 1994 as amended. *The City of Santa Cruz General Plan and Local Coastal Program 1990-2005.* [LOCAL COASTAL PLAN PORTION]
   b) Adopted February 28, 2006 and certified by the California Coastal Commission on May 9, 2008. *City-wide Creeks and Wetlands Management Plan*.
   c) Adopted June 24, 2003. *San Lorenzo Urban River Plan*. Includes "Lower San Lorenzo River and Lagoon Management Plan" (January 2002).

3. Proposed Interim Management Program
   a) August 29, 2014. "City of Santa Cruz San Lorenzo Lagoon Interim Management Program, DRAFT". Prepared by Conservation Collaborative.
   b) February 3, 2015. "City of Santa Cruz San Lorenzo Lagoon Interim Management Program – Project Description and Supplemental Project Information." Prepared for California Coastal Commission, California Department of Fish and Wildlife LSA Program, Central Coast Regional Water Quality Control Board and U.S. Army Corps of Engineers - Regulatory Division. Prepared by Conservation Collaborative.

4. Monterey Bay Unified Air Pollution Control District.
   a) April 17, 2013, Adopted. "Triennial Plan Revision 2009 – 2011." Final.
   b) August 2008. *2008 Air Quality Management Plan for the Monterey Bay Region*.
   c) February 2008. "CEQA Air Quality Guidelines."

5. National Marine Fisheries Service, Southwest Region, Santa Rosa, California.
   a) 2012. *Final Recovery Plan for Central California Coast Coho Salmon Evolutionarily Significant Unit*. Online at: http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/north_central_california_coast/central_california_coast_coho/ccc_coho_salmon_esu_recovery_plan_vol_i_sept_2012.pdf
   b) November 2011. "North-Central California Coast Recovery Domain 5-Year Review: Summary and Evaluation of Central California Coastal Steelhead DPS and Northern California Steelhead DPS." Southwest Region. Online at: http://www.nmfs.noaa.gov/pr/pdfs/species/ccc_nc_steelhead_5yearreview.pdf

c) 2007. "Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead." Online at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/comments_rdeir/cdfg/attachment_c.pdf

6. United States Fish and Wildlife Service, Pacific Region. 2005. *Recovery Plan for the Tidewater Goby*.

Project-Related and City Technical Studies

7. ESA
   a) January 2015. "San Lorenzo River Lagoon Interim Management Program: Geomorphic and Channel Feasibility Study." Prepared for City of Santa Cruz
   b) October 2014. "San Lorenzo River Lagoon Interim Management Program: Coastal Processes and Data Integration Report".
   c) Personal Communications with ESA: Dane Behrens, PhD and Bob Battalio, PE, March , 2014

8. Griggs, Gary. 2012. "Santa Cruz Main Beach, Coastal Processes and the Historic Course of the San Lorenzo Rivermouth."

9. Hagar Environmental Science. March 15, 2015. "Biological Assessment for San Lorenzo River Lagoon Interim Management Program."

10. 2nd Nature, LLC.
   a) June 2014. "San Lorenzo and Laguna Lagoon Annual Water Quality 2013 Santa Cruz, California." Submitted to the City of Santa Cruz Water Department. Annual Report - Final Draft.
   b) May 2013. "San Lorenzo and Laguna Lagoon Annual Water Quality 2012 Santa Cruz, California." Submitted to the City of Santa Cruz Water Department. Annual Report.

Initial Study Preparation: Strelow Consulting in association with the City of Santa Cruz and Conservation Collaborative

VI. EXPLANATION OF ENVIRONMENTAL CHECKLIST RESPONSES

1. Aesthetics

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Eliminate or substantially adversely affect a scenic vista,*
- *Substantially damage scenic resources, including visually prominent trees, rock outcrops, or historic buildings along a state scenic highway;*
- *Substantially degrade the existing visual character or quality of the site and surroundings, i.e., be incompatible with the scale or visual character of the surrounding area; or*
- *Create a new source of substantial light or glare.*

(a) Scenic Views. The project site is located in a developed, urbanized area of the City of Santa Cruz. Maps developed for the City's *General Plan 2030* and included in the General Plan EIR identify "urban views" as being available along the San Lorenzo River, however, the project area is within an area of mapped "panoramic views" (SOURCE V.1b-Figure 4.3-1 in DEIR). According to these maps, the project site is within a mapped panoramic view as seen from the City's Wharf. Panoramic views are also mapped along East Cliff including from a small park on San Lorenzo Point above the San Lorenzo River mouth. The City's Local Coastal Program (LCP) also shows the site within a mapped scenic viewpoint as seen from the Wharf, and viewpoints are depicted from the Main Beach (SOURCE V.2a-Map CD-3). The river mouth area also is visible from the railroad trestle that crosses the San Lorenzo River.

The proposed project would result in temporary installation of a temporary outlet channel and possible culvert to allow water from a closed river lagoon to flow to the ocean. The channel would be excavated and closed in one day. Depending on funding, in the third year of the proposed program, a buried culvert would be installed near the edge of the San Lorenzo Point. In either case, the installation of the temporary outlet channel or culvert would not result in construction of habitable structures and would not affect, remove or obstruct a scenic view. Thus, the project would not result in impacts to scenic or panoramic views. The impacts of the project on the visual character of the surrounding site are discussed below in subsection 1(c).

(b) Scenic Resources. The project site and immediate area are characterized by water levels in the San Lorenzo River, the adjacent sandy beach, and the waters of Monterey Bay. The project site does not contain trees nor is it located adjacent to a state-designated scenic highway. The project site is located adjacent to San Lorenzo Point, a rock outcrop of the Purisima mudstone formation, that in the context of the adjacent beach and ocean, could be considered a scenic resource. Implementation of the proposed interim program would result in temporary installation of either an outlet channel or culvert, but would not remove, affect or otherwise damage scenic resources or natural features that could be considered scenic.

(c) Effects on Visual Character of Surrounding Area. As indicated above, the project site is within a developed urban area. The visual character of the surrounding area is characterized by: Monterey Bay on the south, a prominent natural feature; the Santa Cruz Beach Boardwalk on the west side of the project site; and the San Lorenzo River that runs through developed commercial and residential neighborhoods on either side of the river. The river provides an open space corridor through the City. The project site is characterized by the San Lorenzo Point formation that extends into the ocean and the river channel. The river and project site are visible from the railroad trestle that crosses San Lorenzo River and parts of the Boardwalk. The river and project site are partially visible from the edge of the small park on top of San Lorenzo Point. Seabright Beach, a part of Twin Lakes State Beach, is located east of San Lorenzo Point. Views of the proposed project area from Seabright Beach are generally blocked by San Lorenzo Point, except from an opening in the San Lorenzo Point formation.

Impact Analysis. The proposed project would result in installation of either a temporary outlet channel or head driven culvert to allow water from a closed river lagoon to flow to the ocean. The outlet channel would be excavated and closed in one day. An approximate 75-foot long trench will be excavated to allow water to flow from the lagoon to the ocean. Initial widths would be on the order of 35 to 50 feet expanding to approximately 75 feet. During the day in which it is excavated, water from the lagoon would flow to the ocean. The channel would be closed at the end of the day with the beach sand that was excavated to create the channel. Given the tide and wave action, it is likely that the disturbed beach sand would regain its appearance within a day or two. During the controlled lagoon breach in 2014, the beach had returned to its natural state the morning after the breach event as shown on Figure 4.

The head driven outlet culvert that may be installed in the third year of the program would be buried. The majority of the culvert system will either be submerged or buried under the sand. Three "risers" would extend slightly above the culvert (see cross section in Figure 6). Final designs have not been completed. Final designs have not been completed, but it is not expected that the risers would extend more than two feet above the culver. The risers would either be under water or would not be visually perceptible from any distance due to fact that they would be under water or would be low-profile features near the water/ground surface. The outlet may be exposed during some tide periods. Examples of duck-bill outlets used on other beaches in California are shown on Figure 7. However, the feature sits on the ground and would not be visually obtrusive or noticeable by a wide area for an extended period of time.

Neither project element would result in permanent habitable structural development. The project elements will not be permanently visible, and to the extent that portions of the head driven culvert may be visible, the feature is low profile and would not visually detract from the ocean, beach and San Lorenzo Point rock formation that are present in the area. Because neither activity is visually intrusive and would be temporary features,

implementation of the proposed management activities wound not substantially degrade the visual character of the area, and thus, would not result in a significant impact on the visual character of the site or surrounding area. No mitigation measures are required.

(d) Create New Source of Substantial Lighting or Glare. Implementation of the proposed management program and activities would not result in any permanent structural development that would have lighting. Thus, there would be no impact related to creation of new sources of light or glare.

2. Agriculture & Forest Resources

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Convert prime farmland, unique farmland or farmland of state importance to non-agricultural uses;*
- *Conflict with existing zoning for agricultural use or a Williamson Act contract;;*
- *Conflict with existing zoning for, or cause rezoning of, forest land;*
- *Result in the loss of forest land or conversion of forest land to non-forest use; or*
- *Involve other changes to the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.*

The project site is located at the mouth of the San Lorenzo River where it meets Monterey Bay and the City of Santa Cruz Main Beach. The project site and temporary construction area is part of the San Lorenzo River and/or adjacent beach, and does not contain prime or other agricultural lands as mapped on the State Farmland Mapping and Monitoring Program, (SOURCE V.1b-Figure 4.3-1in DEIR). The site is not designated for agricultural uses in the City's General Plan, and is not located adjacent to agricultural lands. The project site is not zoned Timberland Preserve, and does not support trees or timber resources. Thus, the proposed project would not result in conversion of agricultural or forest lands or lead to conversion of agricultural or forest lands.

3. Air Quality

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Conflict with or obstruct implementation of the applicable air quality plan;*
- *Violate any air quality standards or contribute substantially to an existing or projected air quality violation, i.e. result in generation of emissions of or in excess of 137 pounds per day for VOC or No_x, 550 pounds per day of carbon monoxide, 150 pounds per day of sulfur*

oxides (SO_x), and/or 82 pounds per day of PM_{10} (due to construction with minimal earthmoving on 8.1 or more acres per day or grading/excavation site on 2.2 or more acres per day for PM_{10}) pursuant to impact criteria for significance developed by the MBUAPCD (MBUAPCD, "CEQA Air Quality Guidelines," February 2008);

- *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);*
- *Expose sensitive receptors to substantial pollution concentrations; or*
- *Create objectionable odors affecting a substantial number of people.*

(a) Consistency with Air Quality Plans. The project consists of implementation of a three-year interim management program, consisting of two activities to control lagoon water at the San Lorenzo River mouth. The activities would result in installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth. Thus, the project would not result in conflicts with or obstruction of the existing air quality management plan for the region.

(b-c) Project Emissions. Federal and state ambient air quality standards (AAQS) address six criteria pollutants, including ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, fine particulate matter (both PM_{10} and $PM_{2.5}$, which refer to particles less than 10 microns and 2.5 microns, respectively), and lead. The state standards, which are generally more stringent than the federal standards, apply to the same pollutants as the federal standards do, but also include sulfate, hydrogen sulfide, and vinyl chloride.

The North Central Coast Air Basin (NCCAB), in which the project site is located, is under the jurisdiction of the MBUAPCD and includes Santa Cruz, Monterey and San Benito Counties. The NCCAB is currently in attainment for the all federal criteria pollutant standards. The basin is designated non-attainment for the state ozone and PM_{10} standards, and is in attainment for all other state standards, except for carbon monoxide for which it is unclassified (SOURCE V.5a).

Impact Analysis. The proposed project would result in installation of a temporary outlet channel or culvert to allow water from the San Lorenzo River lagoon when it is in a closed condition to flow to the ocean. The project would not result in new structural development and would not cause or indirectly support increases in vehicle traffic that could increase mobile-source air emissions nor does the project include any sources of stationary pollutants. Therefore, the project would have no long-term operational phase impacts on air quality.

Project construction would result in short-term, localized increases in exhaust emissions due to construction activities, but would not exceed construction thresholds. This is considered a less-than-significant impact as discussed below. Construction projects generally have the potential to cause short-term increases in exhaust emissions from worker trips to and from the construction site, construction equipment, and grading and

site preparation activities that can generate fugitive dust, which may increase volatile organic compounds (VOC) or nitrogen oxides (No_x), the precursors of ozone. The MBUAPCD does not generally require projects to quantify VOC and NO_x emissions from typical construction equipment, because these temporary emissions have been accommodated in State and federally required air plans (SOURCE V.4c).

Installation of a temporary outlet channel would occur up to six times during each annual season of operation. The channel would be opened and closed in one day. Approximately 1,000 cubic yards of beach sand would be moved for each installation, with an estimated disturbance area of approximately 0.126 acre for each installation. Installation of the head driven culvert would occur in the second or third year of the proposed interim program, and would require excavation of approximately 500 cubic yards of material with an estimated disturbance area of 0.026 acres. The culvert would be installed in less than two weeks and removed before winter rains.

Construction activities would involve limited equipment and site disturbance. Equipment expected to be used is limited to a small grader/excavator for installation of the temporary channel, and a track-mounted hydraulic excavator is expected to be used for installation of the temporary culvert. Site disturbance would substantially under 0.25 acres for installation of either the temporary outlet or culvert. The Monterey Bay Unified Air Pollution Control District and its CEQA Air Quality Guidelines indicate that 8.1 acres may be graded per day with minimal earthmoving or 2.2 acres per day with grading and excavation without exceeding the PM_{10} threshold of 82 lbs/day, which could result in a significant effect. The area of disturbance, grading or excavation, are well below these thresholds. Therefore, no significant impacts related to emissions would occur, and no mitigation measures are required.

(d) Sensitive Receptors. The project site is located within a developed area of the City of Santa Cruz and is surrounded by the Santa Cruz Beach Boardwalk on the west and residential uses further to the east of the San Lorenzo River and above San Lorenzo Point. As indicated above, the proposed project would not result in stationary emissions. Thus, the proposed project will not expose sensitive receptors to substantial pollutant concentrations. For CEQA purposes, a sensitive receptor is defined as any residence, including private homes, condominiums, apartments, and living quarters; education resources such as preschools and kindergarten through grade twelve (k-12) schools; daycare centers; and health care facilities such as hospitals or retirement and nursing homes (SOURCE V.4c).

Diesel particulate matter was identified as a toxic air contaminant (TAC) by the State of California in 1998. Diesel exhaust is emitted from a broad range of on- and off-road diesel engines. Following the identification of diesel as a TAC, the California Air Resources Board (CARB) developed a comprehensive strategy to control diesel PM emissions. The "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (approved by CARB in September 2000) set goals to reduce diesel PM emissions in California by 75% by

2010 and 85% by 2020. This objective would be achieved by a combination of approaches (including emission regulations for new diesel engines and low sulfur fuel program). Since approval of the "Diesel Risk Reduction Plan," CARB has adopted adopted regulations for in-use, off-road diesel vehicles that will significantly reduce particulate matter emissions.

As described above, construction of proposed temporary outlet or culvert would use limited equipment, which may emit diesel exhaust, including diesel particulate matter, which is classified as a toxic air contaminant. However, the proposed construction will be temporary and of limited duration—one day for the outlet channel and less than two weeks for the culvert. There are no sensitive receptors in the immediate vicinity. Thus, no sensitive receptors would be exposed to substantial pollutant concentrations or diesel emission during construction. Furthermore, compliance with state regulations regarding diesel equipment will substantially reduce diesel emissions.

(e) Odors. According to the MBUAPCD CEQA Guidelines, land uses associated with odor complaints typically include landfills, agricultural uses, wastewater treatment plants, food processing plants, chemical plants, refineries, and landfills (SOURCE V.4c). The proposed project does not include construction activities that are generally associated with the creation of objectionable odors. Upon completion of construction, there would be no long-term operations associated with the proposed path that would result in generation of odors.

4. Biological Resources

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Have a substantial adverse effect, either directly or through habitat modifications on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;*
- *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service;*
- *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;*
- *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;*
- *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or*

- *Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan.*

(a) Special Status Species. The San Lorenzo River and Lagoon supports steelhead (*Oncorhynchus mykiss*), Pacific lamprey (*Entosphenus tridentatus*), and tidewater goby (*Eucyclogobius newberryi*). The coho salmon (*Oncorhynchus kisutch*) population in the San Lorenzo River is identified as being nearly extirpated, however the watershed is identified as a focus population for recovery by the National Marine Fisheries Service (SOURCE V.3a). Each of these species is further addressed below based on a biological assessment prepared by Hagar Environmental Science (SOURCE V.9.) No special status plant species are expected to occur within the project site.

Steelhead and coho salmon are anadromous fish, spending time in both freshwater and saltwater. Older juvenile and adult life stages occur in the ocean until adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Both smolts and adults go through physiological changes as they emigrate from fresh- to saltwater (smolts) and immigrate from salt- to freshwater (adults). Timing of migrations, freshwater habitat preferences for spawning and rearing, duration of freshwater and ocean rearing, ocean distribution, age at maturity, and other traits vary by species. Coho salmon die after spawning, whereas steelhead can sometimes survive to spawn (SOURCE V.9).

San Lorenzo River Lagoon Background and Survey/Sampling Efforts. Lagoon habitat has been shown to be very important for rearing juvenile steelhead. Lagoons in central California typically close sometime in late-spring or summer. The timing of closure and opening varies depending on inflow, beach dynamics, lagoon volume, and other factors. In unaltered natural systems, these "closed" lagoons provide a highly productive environment for rearing juvenile steelhead due to their predominantly freshwater condition with cooler temperatures, high food production, and provision of cover from predators. Coastal lagoons are typically closed until stream flows from the watershed reach a level to influence the sandbar stability and/or waves reach a height and frequency to scour the barrier each and reopen it to the ocean. Once the barrier beach opens, the lagoon will become tidally influenced and turns into an estuary (SOURCE V.3a).

Studies conducted on the lagoon by 2nd Nature in both open and closed conditions have identified three physical conditions that affect aquatic habitat. Macrotidal conditions exist when there is no sandbar present at the lagoon mouth and surface water is exchanged daily between the ocean and river. Microtidal conditions occur when the barrier beach is partially present, reducing surface water exchange to every few days and limiting water circulation in the lagoon. Closed conditions are those when the barrier beach is fully formed and tidal influence is limited likely to wave overtopping. Closure of the lagoon results from natural coastal processes

including tides, swell, and wave power and run-up. These three conditions in turn have an effect on the aquatic habitat conditions necessary for species utilizing the lagoon for foraging, rearing, and cover, including conditions necessary for species utilizing the lagoon for foraging, rearing, and cover. These conditions include water quality (temperature, dissolved oxygen, salinity, turbidity) and nutrients and depth of water (SOURCE V.3a).

The San Lorenzo River lagoon typically experiences intermittent open conditions in the summer, varying from very little closure in years with high freshwater inflow to longer periods of closure in dry years. Based on data over the last 10 years, closures tend to be intermittent from April to July and longer (greater than 2 weeks) from August to November. Review by ESA, which is summarized below on Table 3, indicates that on average, closures in May through June lasted less than 3 days and the stage only surpassed 5 feet for an average of less than 24 hours. This is likely because of the high flows (greater than 30 cfs) in those months, which cause breaching before waves can build the beach higher than 5 feet. Closures are most common in August-October (greater than 13 days per month) and less common in Nov-Dec (less than 5 days per month). Late summer closures sometimes lasted longer than one month. Figure 8 graphically shows lagoon levels based on review of data from 2002 to 2013.

Table 3. San Lorenzo River Lagoon Stage and Closure Data Summary
(For City of Santa Cruz Data Collected 2002-2013)

Month	Average Number of Hours Exceeding Water Level:			Average Number of Days Closed	Level at Time of Breach (ft NGVD)		Average Monthly Stream Flow at Tait Street (cfs)
	5 ft NGVD	6 ft NGVD	7 ft NGVD		Mean	Max	
May	5	0	0	1.4	4.5	5.8	67
June	22	3	0	2.6	5.2	6.3	36
July	26	5	0	6.8	5.1	6.1	19
August	138	11	0	13.4	5.0	6.1	12
September	262	88	14	20.8	5.1	7.2	9
October	163	36	3	15.7	5.1	6.7	22
November	17	5	0	4.1	5.8	6.6	27
December	7	0	0	2.0	5.3	5.4	194

SOURCE: ESA, March 2015

The City of Santa Cruz has conducted spring and fall fish population sampling in the San Lorenzo River lagoon since 2002 at multiple sites and also records water quality conditions and whether the lagoon is in an open or closed condition. To date, fisheries studies have documented steelhead using a wide range of water quality conditions (salinity, temperature, and dissolved oxygen) and no apparent correlation of presence with particular water quality conditions (SOURCE V.3a). Steelhead are documented using the lagoon in both open and closed conditions with comparable abundance. Fish sampling has documented a diversity of marine, estuarine, and freshwater species using the San Lorenzo Lagoon with 29 fish species and a number of invertebrate species captured (Hagar 2013, cited in SOURCE V.3a).

Water quality and stream inflow studies have been ongoing in the San Lorenzo River Lagoon since 2002 and have continued for the past 12 years (except for one year-2006) under the supervision of the City of Santa Cruz Water Department and the County of Santa Cruz. The water quality program measures general parameters important for aquatic habitats, including dissolved oxygen [DO], salinity, temperature, and nutrients (nitrogen and phosphorous). These constituents are measured in both surface waters and bottom waters (SOURCE V.3a). In 2010, following 7 years of consistent data collection, data analysis was expanded to include a statistical analysis to identify the measured lagoon variables that show significance as driving factors of observed lagoon dissolved oxygen (DO) patterns. Results from this initial statistical analysis indicated that nitrate loading played an important role in the occurrence of low DO conditions (SOURCE V.10a).

The San Lorenzo Lagoon Annual Water Quality Reports for 2012 and 2013 state that monitoring efforts have not identified one distinguishable variable driving poor water quality as measured by dissolved oxygen (SOURCE V.3a). Trends over the 8 years of monitoring suggest seasons with low August discharge (years 2007, 2008, 2009) and/or prolonged periods of reduced circulation experience more frequent elevated surface water temperatures and relatively low bottom water DO concentrations (less than 3mg/L) (SOURCE V.10a). Conversely, seasons that exhibited both higher average August discharge values and fewer consecutive days of reduced circulation (years 2010, 2011, 2012 and 2013) had a lower frequency of both elevated surface water temperatures and low bottom water DO concentrations. In general, the water quality patterns observed to date suggest that when circulation of San Lorenzo Lagoon is frequently mixed, either due to lack of sandbar formation or periodic breaches with relatively short closure durations, it appears less susceptible to low bottom water dissolved oxygen values (Ibid.). Higher frequency of limited lagoon circulation correlates to poor water quality as measured by bottom water dissolved oxygen (SOURCE V.10b).

In 2013 the San Lorenzo Lagoon tallied the most number of days closed per season relative to previously observed years, yet the maximum duration of sustained closure was 18 consecutive days. The total number of days closed was 114 cumulative days through 13 distinct and relatively short closures. Daily average bottom water temperature was greater than 22^{o}C (PH11) for 34% of the season, which is higher than the current mean as a result of repeated closure and the immediate trapping and warming of saline waters. The frequency of surface temperatures above 22^{o}F was only 4% of the season, below the reported mean of 10%. Although the lagoon was closed for 69% of the season, the daily average bottom water salinity was never less than 8.5ppt (SOURCE V.10a).

A review of the lagoon and coastal conditions was conducted by ESA for the years 2003 through 2013 based on data collected during this time by 2nd Nature (SOURCE V.7b). The review found that lagoon parameters collected by 2nd Nature show a strong response to mouth state, and also exhibit a number of clear trends in the data:

- ❒ The lagoon is usually salt-stratified during muted and recently closed conditions, as evidenced by a large difference between bottom and surface salinity.
- ❒ Salinity drops significantly during closures. Bottom and surface salinity usually declined to the same value (5-10 ppt) about three weeks after closure without additional wave overtopping.
- ❒ When the lagoon is stratified, bottom DO typically drops to anoxic conditions and bottom temperature rises. When de-stratification occurs (due to bottom salinity decreasing to surface levels) the bottom DO increases and the bottom temperature decreases to surface levels.
- ❒ When the mouth is closed and waves are energetic, high wave overtopping events often correspond to an increase in bottom salinity and DO, and a decrease in bottom temperature.
- ❒ Surface temperature varies diurnally regardless of mouth condition, while bottom temperature usually rises during closure events until de-stratification occurs. Bottom temperatures surpass surface temperatures during closure. Peak bottom temperatures reached the 25-35°C range.
- ❒ Surface DO varies diurnally regardless of mouth condition. When the mouth is closed and there are no high total water level (TWL) events (no wave overtopping with cool, oxygenated water), bottom DO declines below 3 mg/L (hypoxia) within several days and often reaches near 0 mg/L (anoxia).
- ❒ Lagoon conditions were noticeably altered when the TWL exceeded 7 feet NGVD. This may be an indication of wave overwash into the lagoon. TWL estimates here may be underestimates, as beach slopes vary alongshore and as the beach berm is likely higher during closure events.
- ❒ "First Flush" inflows may actually lower the lagoon DO, as shown in October 2008 (SOURCE V.7b).

Tidewater Goby. Tidewater goby is a federally-listed endangered species, but has been proposed for reclassification as threatened. Tidewater goby also is a State Species of Special Concern. The San Lorenzo River, including the project area, is not within the designated critical habitat for tidewater goby.

Tidewater goby are a small, short-lived species that inhabit coastal brackish water habitats entirely within California, ranging from Del Norte County near the Oregon border to northern San Diego County. The species is uniquely adapted to coastal lagoons and the uppermost brackish zone of larger estuaries, rarely invading marine or freshwater habitats.

The tidewater goby favors the calm conditions that prevail when the lagoons are cut off from the ocean by beach sandbars. They are bottom dwellers and are typically found at water depths of less than three feet. Male tidewater gobies begin digging breeding burrows in relatively

unconsolidated, clean, coarse sand in April or May after lagoons close to the ocean. Tidewater gobies typically inhabit areas of slow-moving water, avoiding strong wave action or currents. Particularly important to the persistence of the species is the presence of backwater, marshy habitats, which provide refuge habitat during winter flood flows Open areas are critical for breeding, while vegetation is critical for overwintering survival (providing refuge from high flows) and probably for feeding as well. Tidewater gobies are known to be preyed upon by native species such as small steelhead (*Oncorhynchus mykiss*), prickly sculpin (*Cottus asper*), and staghorn sculpin (*Leptocottus armatus*).

Certain physical or biological features and habitat characteristics are believed required to sustain the species' life-history processes. These include persistent, shallow (in the range of approximately 0.3 to 6.6 feet), still-to-slow-moving lagoons, estuaries, and coastal streams with salinity up to 12 ppt, that contain one or more of the following:

a) Substrates (e.g., sand, silt, mud) suitable for the construction of burrows for reproduction;
b) Submerged and emergent aquatic vegetation that provides protection from predators and high flow events; or
c) Presence of a sandbar(s) across the mouth of a lagoon or estuary during the late spring, summer, and fall that closes or partially closes the lagoon or estuary, thereby providing relatively stable water levels and salinity.

The USFWS characterizes tidewater goby populations (i.e., localities) along the California coast as metapopulations (a group of distinct populations that are genetically interconnected through occasional exchange of animals). While individual populations may be periodically extirpated under natural conditions, a metapopulation is likely to persist through colonization or recolonization events that establish new populations. Local populations of tidewater gobies occupy coastal lagoons and estuaries that in most cases are separated from each other by the open ocean. Currently, the majority of the most stable and largest tidewater goby populations consist of lagoons and estuaries of intermediate sizes (5 to 125 acres) that have remained relatively unaffected by human activities.

A small population of tidewater gobies were first observed in the San Lorenzo River Lagoon in May 2004, which may be the result of a colonization event from Moore Creek although genetic testing has not been conducted to test this theory. Tidewater gobies were captured incidentally in seining surveys for steelhead in the San Lorenzo lagoon in 2008, 2009, and 2014. During the managed lagoon drawdown in September 2014, a total of 90 tidewater gobies were found stranded on sandbars near the beach, in ponded areas in front of the Boardwalk, and in the drawdown channel. Eighty-six of these were released to deeper waters of the lagoon, with 4 mortalities. The available tidewater goby habitat in the San Lorenzo River lagoon encompasses approximately 66 acres.

Impact Analysis-Tidewater Goby. Installation of the temporary outlet channel or the temporary culvert would not adversely affect tidewater goby habitat, but could result in indirect impacts to individual tidewater gobies present in the work area. Due to the species' listed status, this is considered a potentially significant impact.

The Biological Assessment prepared for the IMP concluded that implementation of the proposed management actions may affect, but will not likely adversely affect tidewater goby in the lagoon. Overall, more stable water levels in the lagoon and the absence of unauthorized breach events resulting from implementation of the proposed IWP actions will be beneficial for tidewater goby. Tidewater goby are bottom dwellers and are generally found in water less than 3 feet deep. The pattern of gradual lagoon filling to up to 7.5 feet NGVD and then breaching with lagoon water levels dropping rapidly to 5 to 7 feet followed by a period of tidal oscillation is very disruptive to tidewater goby habitat. Management of the lagoon water levels with the temporary outlet channel will result in less variability with water level oscillations maintained between 3 and 5 feet NGVD, conditions that are more suitable for tidewater goby. This would have a beneficial effect on tidewater goby populations. Similarly, management of the lagoon with the head driven culvert will result in gradually rising water levels from 3.0 to 5.0 feet NGVD and a stable lagoon level near 5.0 feet NGVD during much of the low flow season. Stable water levels would provide more suitable habitat conditions for tidewater goby, and the project would likely have a beneficial effect on tidewater goby populations.

Construction of the Temporary Outlet Channel in particular, and to some degree, installation of the Head Driven Culvert, may result in stranding a small number of tidewater goby or destruction of tidewater goby in burrows as described below. These effects can be mitigated to some degree by providing for capture and relocation of tidewater goby in the work area during construction and installation activities. Stranding will likely be less with the project than without it since transitions from very high to very low water levels during breach events will be avoided. Maximum drawdown expected to occur with the temporary outlet channel should only involve maximum stage reductions of 2 feet (from 5 to 3 feet NGVD) and the rate of drawdown will be slower than unauthorized breach events.

Temporary Outlet Channel: The Temporary Outlet Channel will be installed to draw the lagoon down to 3.0 or 4.0 feet NGVD, and then it will be closed. There may be extensive areas of sandbar in the vicinity of the river mouth, near the bend in the lagoon across from Jessie Street Marsh, and around Riverside Bridge that will become dewatered as lagoon stage falls. Based on previous experience in September 2014, tidewater gobies may be stranded on these sandbars. Tidewater gobies may also swim or be swept into the outlet channel and potentially enter Monterey Bay. Tidewater gobies present in the outlet channel when it is closed will be buried and perish.

Head Driven Culvert: Tidewater goby burrows may be disturbed during installation of the culvert and risers. Disturbance would occur during excavation in the lagoon and moving equipment through the open lagoon to reach the location where the culvert and risers will be placed. Tidewater gobies are known to be present near the areas where construction will occur and are likely to have burrows at the time of year construction is planned. Relocation of tidewater goby while in their burrows is not practical. Effects can be minimized by avoiding construction activity in wetted areas of the lagoon and conducting preconstruction surveys to determine whether gobies are present and relocating them to the extent possible.

Mitigation Measures. Implementation of the following measure will reduce the impact to a less-than-significant level.

MITIGATION MEASURE 1: Avoid construction activities in the wetted areas of the lagoon, and implement fish survey prior to installation of the temporary outlet channel or head driven culvert, collect any tidewater gobies on the dewatered sandbars and in the outlet channel, and release them in a safe location.

Central California Coast (CCC) Steelhead. The Central California Coast (CCC) steelhead is a federally-listed threatened species. The CCC steelhead ESU (Evolutionarily Significant Unit) includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun Bay, San Pablo Bay, and San Francisco Bay, California. CCC steelhead occur in the San Lorenzo River, and the river, including the project area, is designated as critical habitat for CCC steelhead. The project area also provides habitat for migrating steelhead adults and smolts. "Critical habitat" is habitat key to the survival of threatened and endangered species, which may require special management considerations or protection. Essential features of critical habitat for steelhead in the project area are estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders and side channels; and juvenile and adult forage, including aquatic macroinvertebrates and fishes, supporting growth and maturation (SOURCE V.9).

Although variation occurs in coastal California, steelhead usually live in freshwater for one to three years in central California, then spend an additional one to three years in the ocean before returning to their natal stream to spawn. Steelhead may spawn one to four times over their life. Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead both as a velocity refuge and as a means of avoiding predation. Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are

sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4 degrees Celsius (°C) and can survive in water up to 29°C with saturated dissolved oxygen conditions and a plentiful food supply. Sustained low dissolved oxygen concentrations and elevated water temperatures impact lagoon ecology and influence the productivity of steelhead and coho salmon populations (SOURCE V.9). See subsection 4(d) below regarding steelhead migration periods.

Central California Coast (CCC) Coho Salmon. The Central California Coast (CCC) coho salmon is a state and federally-listed endangered species. The CCC coho salmon ESU ranges from Punta Gorda in southern coastal Humboldt County to Aptos Creek in Santa Cruz County, and the drainages of San Francisco Bay, California. CCC coho salmon have occurred in San Lorenzo River historically. The San Lorenzo River, including the project area, is designated as critical habitat for CCC coho salmon. For coho salmon, essential habitat types in the project area include: juvenile (smolt) migration corridors and adult migration corridors.

The San Lorenzo River is at the extreme southern end of the range of coho salmon. Recent information documents CCC coho salmon abundance is very low. A self-sustaining run of wild coho has been presumed to be extirpated from the San Lorenzo River since the drought of the late 1980s. Small numbers of adult coho salmon have been observed in the San Lorenzo River in recent years during trapping operations conducted at the Felton Diversion Dam by the Monterey Bay Salmon and Trout Project. The number of coho captured peaked at 183 adults in 1989-1990. In most years, however, few coho have been captured. Possible origins for these fish include: straying from more hospitable nearby drainages including San Vicente, Scott and Waddell Creeks; return of hatchery reared fish released in various locations in the San Lorenzo drainage; and returns from natural production in the basin. No juvenile coho salmon were captured during electrofishing surveys conducted throughout the San Lorenzo River watershed (including both mainstem and tributary locations) between 1994 and 2002 (SOURCE V.9).

Impact Analysis-Steelhead and Coho Salmon. Implementation of the proposed IMP actions would result in periods of altered lagoon water volumes that could affect water quality and temperature, but are not expected to adversely affect steelhead rearing habitat provided in the San Lorenzo River lagoon (SOURCE V.9). Thus, the implementation of the proposed IMP actions would not result in a significant impact to steelhead habitat, and no mitigation measures are required as discussed below. (See subsection 4(d) below regarding steelhead migration.)

Coho salmon are not expected to use the lagoon for rearing so they will not be affected by alterations in lagoon volume or water quality parameters related to construction of the temporary outlet channel (SOURCE V.9). Coho salmon use the lagoon primarily for migration between the lower San Lorenzo River and Monterey Bay. Impacts related to migration are addressed in subsection 4(d) below. The remainder of this section addresses potential impacts to steelhead.

Potential impacts include direct during installation of the proposed IMP activities as well as potential impacts to aquatic habitat due to water level changes. Installation of the temporary channel or outlet would not result in impacts to steelhead that may be present. Since steelhead have high mobility and are most likely to be in the water column in deeper water, they are not generally susceptible to stranding during breach events. Minimizing the magnitude and rate of drawdown in the lagoon, as would be accomplished by the temporary outlet channel, would have little influence on steelhead stranding in the lagoon (SOURCE V.9).

The use of mechanical equipment in the project area during installation of the temporary outlet channel or culvert could result in accidental spillage of toxic fluids into the lagoon or outlet channel along the beach, which can adversely affect salmonids. However, implementation of the proposed Best Management Practices (BMPs) as shown on Table 2 would minimize potential water quality impacts due to use of mechanical equipment in the action area that could result in accidental spillage of toxic fluids into the lagoon or outlet channel along the beach, which can adversely affect salmonids. Impacts would be minimized by implementing the proposed BMPs, which include: keeping equipment outside the wetted perimeter of the lagoon and outlet channel, maintaining spill containment and remediation material on site, and avoiding re-fueling or otherwise servicing equipment adjacent to the lagoon. If these measures are followed, accidents would be minimized and toxic chemical contamination of the action area would be minimized to levels which are unlikely to adversely affect listed salmonids or their designated critical habitat (SOURCE V.9).

Other potential impacts to steelhead rearing habitat due to water volume changes are addressed below. The Temporary Outlet Channel will be installed in order to keep the lagoon water surface elevation at 5.0 feet NGVD by drawing down the lagoon when it begins to rise to 4.5 feet NGVD, up to six times total throughout the season. The Head Driven Culvert would result in more stable lagoon levels when it is operational, generally holding the level at about 5.0 feet NGVD after initial closure of the lagoon.

Currently, there are cycles of gradual lagoon filling up to about 7.0 feet NGVD before the lagoon breaches when water levels drop rapidly and are followed by a period of tidal oscillation. Multiple cycles can occur during the low-flow season. Under existing conditions, the San Lorenzo River Lagoon typically experiences intermittent open conditions with tidal exchange in the summer, varying from very little closure in years with high freshwater inflow to longer periods of closure in dry years. The Temporary Outlet Channel is intended to prevent high lagoon water stage and unauthorized breach events. Although implementation of the proposed IMP would not prevent natural breaches to occur, maintaining flows at 5 feet NGVD could potentially result in the lagoon being closed for a greater duration than would otherwise occur. This would mostly likely be later in the

summer (after July 1). It is unlikely that a temporary outlet channel would be implemented before July 1, partly because mouth closure is rare before that date, and also partly because lagoon inflows tend to be so high that closures that do happen tend to be over within 24 hours (breaching before stage even gets to 5 feet) (SOURCE 7.c).

The Head Driven Culvert relies on passive removal of water from the lagoon via overflow of surface waters through a small weir and infiltration through the barrier sandbar as an additional contribution. The Head Driven Culvert would begin to collect seepage water through the beach when the lagoon stage is at 3.0 feet NGVD. It would allow stage to gradually increase to 5.0 feet NGVD and then maintain that elevation through passive removal of water via the overflow weir.

Following closure, the lagoon habitat is expected to go through a temporary period (two to three weeks) of degraded conditions due to low dissolved oxygen levels and high temperature (SOURCE V.9). As the lagoon transitions to a freshwater system, these conditions should improve although indications are that the lagoon is warmer when closed than during tidal or muted tidal conditions. During the period of transition from tidally influenced water to freshwater, steelhead are likely to respond by remaining in surface waters where higher levels of dissolved oxygen and cooler temperatures are generally found. It is also possible that they will move out of the lagoon into the lower reaches of the San Lorenzo River to avoid unsuitable conditions in the lagoon as has been seen in Scott Creek to the north of Santa Cruz (SOURCE V.9).

The amount of freshwater habitat available in coastal lagoons generally increases as water levels increase during mouth closure events. If freshwater inflows to the lagoon are greater than losses, the freshwater volume increases as this water is trapped behind the beach. Trapped oceanic saltwater from previous tides or from wave overwash limit the freshwater volume, and typically rests as a contiguous saline layer at the lagoon bottom. Vertical salinity profiles were developed based on water quality sampling conducted by the City and used to delineate the boundary between salty and fresh layers of water in the lagoon and to provide estimates of typical freshwater volumes in the lagoon for different water levels as shown on Table 4.

The maximum estimated freshwater volume increases from 135 acre-feet at a water level of 4 feet NGVD to 246 acre-feet at a level of 7 feet NGVD. If the lagoon is managed at a level of 5 feet NGVD, it would potentially maintain a long-term freshwater volume of 48-170 acre-feet. Although this is lower than the volume available at higher levels, it is likely to be significantly larger than the freshwater volume available during the subsequent open-mouth tidal periods that result when the mouth breaches (SOURCE V.7b).

Table 4. Lagoon Freshwater Volume for Different Water Levels

Lagoon Water Level (ft NGVD)	Lagoon Water Volume[1] (acre-ft)	Median Salt Volume[2] (acre-ft)	Salt Volume[2] (acre-ft)	Median Freshwater Volume[3] (acre-ft)	Freshwater Volume[3] (acre-ft)
4	151	72	16-138	79	13-135
5	186	72	16-138	114	48-170
6	223	72	16-138	151	85-207
7	262	72	16-138	190	125-246

1. Estimated using stage-storage information provided by Waterways (2014). See Appendix A.
2. Estimated from elevations of 10 ppt salinity values measured by2nd Nature (2014). See Appendix B.
3. Estimated as the difference between total lagoon volume and salt volume

SOURCE: ESA, 2014

Installation of the temporary outlet channel will result in lagoon volume that is not as high or as low as can occur under the current lagoon functional regime. The effect of lagoon volume on steelhead habitat is not certain. If steelhead were using all depths and areas of the lagoon equally, then lower lagoon volume would result in less habitat space for steelhead. However, steelhead appear to prefer certain areas of the lagoon that are deeper such as the deep channel from near the railroad trestle up to near Jessie Street marsh and the deeper water upstream from Riverside Bridge upstream. They also likely do not use the entire water column, probably avoiding the extreme surface waters that are generally warmer and exposed to predation by birds, as well as the deepest waters that can be low in dissolved oxygen and can also be very warm after the lagoon closes (SOURCE V.9).

Breach events can result in very low lagoon water levels and potentially expose steelhead to greater predation by fish eating birds. Maintaining the lagoon stage at more moderate levels with installation of temporary channel outlets is not likely to have a significant effect on steelhead in the lagoon, except that predation risk may be reduced. Maintaining the lagoon at a higher stable level, as would be achieved by the temporary head driven culvert, could have potentially beneficial effects by reducing predation rates (SOURCE V.9).

Steelhead distribution in the lagoon likely tracks with the distribution of their food resources (SOURCE V.9). Closure of the lagoon likely results in decline in populations of marine and euryhaline invertebrate species important in steelhead diets. Steelhead will have to shift much of their diet to populations of freshwater dependent species. Unlike many Central California coastal lagoons that support steelhead during closed conditions, the San Lorenzo River Lagoon lacks significant amounts of emergent or submerged aquatic vegetation as a source of organic material to support this food base. Steelhead can survive and support high growth rates under warm temperatures but only with high rates of consumption (SOURCE V.9).

In summary, full season lagoon closures have not been observed in the San Lorenzo River Lagoon. Available evidence suggests that steelhead are more abundant in the San Lorenzo River Lagoon during periods with tidal circulation than during periods of extended closure such as that which occurred in 2014. The IMP may affect, but will not likely adversely affect steelhead rearing in the San Lorenzo River lagoon (SOURCE V.9). Although extended closure of the lagoon may cause temporary and possibly extended periods of poor conditions for steelhead in the lagoon, steelhead are known to persist in estuaries during periods of poor water quality conditions, and closure is a natural process for Central California coastal lagoons. Steelhead are known to rear successfully in nearby Soquel Creek Lagoon, which is artificially maintained in a closed condition throughout the dry season, and in Laguna Creek Lagoon which is naturally closed during most of the dry season. Steelhead also have the ability to leave the lagoon and migrate upstream to riverine rearing areas when conditions in the lagoon are unfavorable.

The project is proposed as an interim program lasting only three years. Monitoring during the interim program will be undertaken to determine whether there are any negative effects related to the activities proposed. Water quality conditions will be considered in the IMP monitoring efforts, and the IMP activities may be adapted.

(b-c) Wetland, Riparian and Sensitive Habitats. The project site is located within the San Lorenzo River and adjacent beach. According to maps developed for the City's *General Plan 2030* and included in the General Plan and General Plan EIR, the San Lorenzo River north of the project area is within a mapped "sensitive habitat area" due to presence of riparian habitat (SOURCE V.1a-page 129 & V.1b-Figure 4.8-3 in DEIR). However, there is no riparian habitat present in the project area. The San Lorenzo Point is a rocky cliff that borders the site on the east, with the Santa Cruz Beach Boardwalk bordering the project area on the east as does the Santa Cruz Main Beach. Monterey Bay lies to the south and the San Lorenzo River within constructed levees are located to the north. adjacent to both the San Lorenzo River and Branciforte Creek is identified as sensitive riparian habitat (SOURCE V.1a-page 129 & V.1c-Figure 4.8-3). The San Lorenzo River waters are considered waters of the U.S.

The project would not result in removal of riparian habitat nor would it result in permanent fill of wetlands. Thus, the project would not result in impacts to riparian or wetland habitat. However, construction within the channel San Lorenzo River is within the jurisdiction California Department of Fish and Wildlife (CDFW), California Regional Water Quality Control Board (RWQCB), and U.S. Army Corps of Engineers (ACOE).

The Temporary Outlet Channel will need to be designed before each implementation, but channel width is anticipated to be 35 to 50 feet in width and 75 feet in length. This will require approximately 1,000 cubic yards of beach material to be moved during each outlet channel construction. The channel will be closed with the existing material at the end of each day. Construction of the temporary outlet channel will not require placement of fill within the river

channel. The Head Driven Culvert will require excavation of approximately 3 feet for about 500 linear feet, resulting in approximately 500 cubic yards of excavated material for installation and demobilization. All construction activity will take place in the tidal channel/bed and beach area of the San Lorenzo River mouth.

Approximate acreage affected within the river channel is 0.026 acre and 0.13 affected areas in the bay or ocean for a total. "Wetlands" under the jurisdiction of the ACOE total 0.156 acres along approximately 1,450 linear feet of area. Implementation of the proposed IMP could result in an annual total excavation of approximately 7,000 cubic yards of material if six temporary outlet channels are installed during the season.

(d) Wildlife Movement/Breeding. As previously indicated, San Lorenzo River provides habitat for migrating steelhead adults and smolts. For coho salmon, essential habitat types in the action area include juvenile (smolt) and adult migration corridors. Although variation occurs in coastal California, steelhead usually live in freshwater for one to three years in central California, then spend an additional one to three years in the ocean before returning to their natal stream to spawn. Steelhead may spawn one to four times over their life. Adult CCC steelhead typically immigrate from the ocean to freshwater between December and April, peaking in January and February, and juveniles migrate as smolts to the ocean from January through May, with peak emigration occurring in April and May.

Impact Analysis-Steelhead and Coho Salmon Migration. The temporary outlet channel may affect, but will not likely adversely affect juvenile steelhead or coho salmon migration, and would not result in a significant impact. The Head Driven Culvert would have an effect on steelhead smolt migration if installation would cause earlier closure of the lagoon than would be the case otherwise, which would be considered a potentially significant impact.

During the spring and early summer it is possible for the lagoon to close early, particularly in dry years, before all steelhead or coho salmon smolts have left the lagoon. Naturally-occurring breaches during this period can occur if the lagoon rises to high levels, and the lagoon may remain open for several days after the breach event, allowing smolts to migrate from the lagoon to Monterey Bay, as occurred in late May 2013. For the 2002-2013 period, on average, lagoon closures in May and June lasted less than three days and the lagoon stage only surpassed 5.0' NGVD for an average of less than 24 hours (SOURCE V.7c). In most years, it is unlikely that a Temporary Outlet Channel would be implemented before July 1. Most steelhead and coho salmon smolts are expected to leave the lagoon prior to July 1 and effects on migrating steelhead smolts could be avoided (SOURCE V.9).

After July 1, with declining lagoon inflows and wave action building the beach higher, implementation of the Temporary Outlet Channel will be used when needed to maintain stage below 5.0' NGVD and avoid uncontrolled breach events. Unless the lagoon breaches naturally at a stage lower than 5.0' NGVD, the lagoon will remain closed until a Temporary

Outlet Channel is needed. A closed lagoon will prevent steelhead from moving between the ocean and the lagoon. Construction of the Temporary Outlet Channel could also provide for movement of steelhead and other fish species in and out of the lagoon, however, the duration of an open condition would be much shorter with the project (the lagoon would be drawn down in one or two days and mechanically closed at night and when drawn down to 3.0' NGVD). Although there is some indication that steelhead do move between the ocean and lagoon later in the dry season (after July 1), the degree to which this is important or beneficial to the population is not known (SOURCE V.9).

The Head Driven Culvert and risers will be installed before the initial lagoon closure in the spring. Steelhead smolts and adults returning to the ocean are likely to be migrating through the lagoon to Monterey Bay during the construction period. If the culvert is installed prior to July 1, but not operated (i.e. the valve maintained in a closed position) until the period of intermittent closures is past (presumably by July 1), effects to steelhead migration could be avoided. Once the Head Driven Culvert is in place there would be no opportunities for steelhead smolts to enter the ocean. Steelhead smolts prevented from migrating to sea can revert to the parr stage and continue rearing in the lagoon with ocean entry delayed until winter or the following spring. This effect could be minimized by delaying operation of the culvert until after smolts have completed migration to the sea (July 1) (SOURCE V.9).

In summary, early, extended closure of the lagoon may also limit its suitability as a juvenile migration corridor for both steelhead and coho salmon. It is likely that, even under pre-development conditions the lagoon did not usually close or was intermittently open until after the smolt migration was complete. However, in most years it is unlikely that the Temporary Outlet Channel will be implemented before July 1, after the majority of smolts have migrated, and the Head Driven Culvert can remain closed (and not in operation) until the smolt migration season has ended. Installation of the culvert will occur in the spring after flood flows have subsided, but while flows are still high enough to keep the mouth open (20 cfs or more), and will be implemented when the mouth is still open because water levels are typically lower than 3.0 feet NGVD. Between July 1st and the November 15th, the culvert will tend to prolong existing closure events (by passing some of the inflows out of the lagoon), but it can be operated so as not to alter closure behavior before July 1st or after the first rainfall of the year.

Mitigation Measures. Implementation of the following measures will reduce the impact to a less-than-significant level.

> MITIGATION MEASURE 2: If the head driven culvert is installed prior to July 1st, delay the operation start date (i.e. when the valve is opened) until the City has decided that the first seasonal longer-term closure has started and the steelhead and coho salmon migration period to the ocean has ended. This typically happens

after July 1st, but the date may vary depending on how dry the year is. The culvert valve can be closed prior to the first major rainstorm of the year (when natural breaching would have occurred at the end of fall or beginning of winter). This will allow the lagoon to breach normally.

(e) Conflicts with Local Ordinances. There are no known local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance that are applicable to the proposed project, except for Part 21 of the Zoning section of the City's Municipal Code. Under this chapter, development within or adjacent to a watercourse as defined in the *City-wide Creeks and Wetlands Management Plan* must apply for a watercourse development permit. Projects that concurrently are reviewed and approved by another authorizing permitting agency (CDFG, NOAA, USFWS or ACOE) for maintenance, flood protection, restoration or enhancement of a natural resource are exempt from the watercourse development permit provisions, where the regulatory process involves procedures for protection of the environment and proof of permit approval is submitted to the City Planning Director. While the proposed project is exempt from this process, implementation of the proposed IMP includes construction BMPs to prevent inadvertent release of contaminants or pollutants into the San Lorenzo River or lagoon or the Monterey Bay, which consistent with directives in the Municipal Code and Creeks Plan. Thus, the project would not result in potential conflicts with such policies or ordinances.

(f) Conflicts with Habitat Conservation Plans. There are no Habitat Conservation or Natural Community Conservation Plans for the project area.

5. Cultural Resources

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Cause a substantial adverse change in the significance of an archaeological resource.*
- *Disturb any human remains, including those interred outside of formal cemeteries.*
- *Cause a substantial adverse change in the significance of an historic resource pursuant to Section 15064.5 of the State CEQA Guidelines. A "substantial adverse change in the significance of an historical resource" means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources or local register of historical places.*
- *Pursuant to CEQA Guidelines, "historical resources include a resource listed in, or determined to be eligible for listing in the California Register of Historical Resources; a resource included in a local register of historical resources; and any object, building,*

structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

(a) Historical Resources. There are no existing structures in the project site that would be affected by implementation of the proposed interim lagoon management activities.

(b, d) Archaeological Resources. According to maps developed for the City's *General Plan 2030* and included in the General Plan EIR, the project site is not within a mapped "sensitive" archaeological or "sensitive" historical archaeological area (SOURCE V.1b-Figures 4.9-1 and 4.9-3, DEIR). The project area, including both the river and beach areas, are not within mapped sensitive archaeological areas as shown in the City's Local Coastal Plan (SOURCE V.2a-Map CR-2).

(c) Paleontological Resources. According to maps developed for the City's *General Plan 2030* and included in the General Plan and General Plan EIR (SOURCE V.1a-page 23 & V.1b-Figure 4.9-5), the sandy beach that is part of and adjoins the project site is within an area mapped as Holocene Alluvium geologic formation. Although this formation is generally considered too young to contain paleontological resources, it is considered moderately sensitive for paleontological resources because it is underlain by sedimentary geologic units that have a high paleontological sensitivity (SOURCE V.1b-DEIR). San Lorenzo Point on the east is mapped as Purisima Formation (Late Miocene to Pliocene), which is considered sensitive for paleontological resources (Ibid.).

The proposed project will result in very limited excavation or land disturbance within beach and adjacent areas, which have been highly disturbed due to natural wave, tidal and river processes. Therefore, the limited disturbance for installation of the temporary outlet and culvert is not expected to result in the discovery of unknown paleontological resources during construction. Nonetheless, section 24.12.431 requires that the City notify applicants with development projects within sensitive paleontological areas of the potential for encountering such resources during construction with project conditions that construction will be halted and resources examined in the event that paleontological resources are encountered during construction. If the find is significant, the city will require the treatment of the find in accordance with the recommendations of the evaluating paleontologist. Treatment may include, but is not limited to, specimen recovery and curation or thorough documentation. The City would abide by these requirements for installation of either the proposed Temporary Outlet Channel or Head Driven Culvert, though paleontological resources are not expected to be discovered.

6. Geology and Soils

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Expose people or structures to potential substantial adverse effects resulting from the rupture of a known earthquake fault, seismic ground shaking, landslides, or seismic-related ground-failure, including liquefaction, and that cannot be mitigated through the use of standard engineering design techniques.*
- *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 an onsite or offsite landslide or slope failure.*
- *Result in substantial soil erosion or the loss of topsoil and subsequent sedimentation into local drainage facilities and water bodies.*
- *Be located on an expansive soil, as defined by the Uniform Building Code (1997) or subject or other soil constraints that might result in deformation of foundations or damage to structures, creating substantial risks to life or property.*

(a-i) Fault Rupture. The project site is located in a seismically active region of California and the region is considered to be subject to very intense shaking during a seismic event. The City of Santa Cruz is situated between two major active faults: the San Andreas, approximately 11.5 miles to the northeast, and the San Gregorio, approximately 9 miles to the southwest. There are no active fault zones or risk of fault rupture within the City (SOURCE V.1b). Therefore, fault rupture through the site is not anticipated.

(aii-iv,c) Seismic & Geologic Hazards. The project would be subject to seismic shaking. According to maps developed as part of the City's recently adopted *General Plan 2030* and included in the General Plan and General Plan EIR, the project site is located in an area identified as being subject to liquefaction hazards (SOURCE V.1a-page 105 & V.1c-Figure 4.10-4). The project will not result in construction of any habitable structures, and thus would not expose people or structures to seismic hazards.

(b) Erosion. According to maps developed as part of the City's recently adopted *General Plan 2030* and included in the General Plan EIR, the project site is not located within an area that is mapped as having soils with a high erosion potential (Beaches) (SOURCE V.1b, DEIR-Figure 4.10-6). Installation of the proposed temporary outlet or culvert would not result in substantial excavation or grading, and would not result in substantial erosion of beach sand that is present in the area and already influenced by coastal tidal and wave processes. See also subsection 9c below for discussion of effects alteration or a stream channel related to erosion.

(f) Expansive Soils. Implementation of the proposed Interim Management Plan would not result in new development.

(e) Use of Septic Systems. The project consists of implementation of a three-year interim

management program, consisting of two activities to control lagoon water at the San Lorenzo River mouth. The activities would result in installation of a temporary drainage outlet channel or culvert. The project will not require sanitary sewer service and will not use septic systems.

7. Greenhouse Gas Emissions

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;*
- *Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.*

(a) Greenhouse Gas Emissions. Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of greenhouse house gas (GHG) emissions in the atmosphere. Greenhouse gases trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities (SOURCE V.1b). Climate change models predict changes in temperature, precipitation patterns, water availability, and rising sea levels, and these altered conditions can have impacts on natural and human systems in California that can affect California's public health, habitats, ocean and coastal resources, water supplies, agriculture, forestry, and energy use (Ibid.).

The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide (SOURCE V.1b). The primary contributors to GHG emissions in California (as of 2008) are transportation (about 37%), electric power production (24%), industry (20%), agriculture and forestry (6%), and other sources, including commercial and residential uses (13%). Approximately 81% of California's emissions are carbon dioxide produced from fossil fuel combustion (Ibid.).

The State of California passed the Global Warming Solutions Act of 2006 (AB 32), which requires reductions of GHG emissions generated within California. The Governor's Executive Order S-3-05 and AB 32 (Health & Safety Code, § 38501 et seq.) both seek to achieve 1990 emissions levels by the year 2020. Executive Order S-3-05 further requires that California's GHG emissions be 80 percent below 1990 levels by the year 2050. AB 32 defines GHGs to

include carbon dioxide, methane, nitrous oxide, hydrocarbons, perfluorocarbons and sulfur hexafluoride.

The California Air Resources Board (CARB) is the lead agency for implementing AB 32. In accordance with provisions of AB 32, CARB completed a statewide Greenhouse Gas (GHG) Inventory that provides estimates of the amount of GHGs emitted to, and removed from, the atmosphere by human activities within California. In accordance with requirements of AB 32, CARB has prepared and updated a "Scoping Plan", which includes elements for reducing the state's greenhouse emissions to 1990 levels. The Scoping Plan identifies 18 emissions reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related greenhouse gas targets, vehicle efficiency measures, goods movement, solar roofs program, industrial emissions, high speed rail, green building strategy, recycling, sustainable forests, water and air (SOURCE V.1c).

The City's *General Plan 2030* includes goals, policies and actions on climate change, including reducing community-wide greenhouse gas emissions 30 percent by 2020, reducing 80 percent by 2050 (compared to 1990 levels), and for all new buildings to be emissions neutral by 2030. In October 2012, the City also adopted a "Climate Action Plan" that outlines the actions the City will take over the next ten years to reduce greenhouse gasses by 30%.

Impact Analysis. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth. The project will not result in new vehicular or stationary emissions. Thus, there would be no permanent greenhouse emissions associated with the proposed project, and further quantification and analysis of greenhouse gas emissions was not deemed necessary.

(b) Conflict with Applicable Plans. The project would not conflict with state plans adopted for the purpose of reducing greenhouse gas emissions. The State's "Scoping Plan" includes strategies for transportation, energy, water and other sectors that are not directly applicable to the proposed project.

In October 2012, the Santa Cruz City Council adopted a Climate Action Plan (CAP) that addresses citywide greenhouse emissions and reduction strategies. The CAP outlines the actions the City and its partners may take pertaining to reduction of greenhouse gas emissions to meet the goals and implement the policies and actions identified in the *General Plan 2030*. The CAP provides City emissions inventories, identifies an emissions reduction target for the year 2020, and includes measures to reduce energy use, reduce vehicle trips, implement water conservation programs, reduce emissions from waste collection, increase solar systems, and develop public

partnerships to aide sustainable practices. Measures are outlined for the following sectors: municipal, residential, commercial, and community programs. The CAP includes an implementation chapter that identifies tracking and reporting of the success of the measures, including City staff responsibilities. There are no specific measures that would apply to the proposed project. Thus, the project would not conflict with provisions of the CAP.

8. Hazards & Hazardous Materials

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*
- *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.*
- *Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.*
- *Impair the implementation of or physically interfere with an adopted emergency response or evacuation plan.*
- *Expose people or structures to a significant risk of loss, injury or death involving wildland fires.*

The project site is not located near an airport, air strip or wildland fire hazards area.

(a,c) Use/Create Hazardous Materials. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or employee growth. Thus, the project will not result in operations that would create risks associated with hazardous material use. Construction would not include development that would store or use hazardous materials. The project is not located within ¼ mile of an existing or proposed school, and would not result in a stationary source of emissions.

9. Hydrology and Water Quality

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge;*

- *Substantially alter the existing drainage pattern of the site or area or result in offsite drainage or flood problems;*
- *Substantially increase the rate or amount of surface runoff which would exceed capacity of existing or planned storm drain facilities, cause downstream or offsite drainage problems, or increase the risk or severity of flooding in downstream areas;*
- *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality;*
- *Result in construction of habitable structures within a 100-year floodplain as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, which would expose people or structures to a significant risk of loss, injury or death due to flooding;*
- *Locate structures within a 100-year flood hazard area that would impede or redirect flood flows;*
- *Expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam; or*
- *Expose people or structures to a significant risk of loss, injury or death as a result in inundation by seiche, tsunami, or mudflow.*

(a-b) Waste Discharge Requirements Quality and Groundwater. The project site is located within a developed area and would not affect groundwater supplies. Implementation of the proposed IMP and temporary outlet channel or culvert use would not involve new discharges that would violate any water quality standards or waste discharge requirements. The water released from the lagoon would be the same as that released under naturally-occurring breaches.

(c-d) Alteration of Stream Channel. As previously indicated, the mouth of the San Lorenzo River is characterized by both natural and built features. Each summer and fall a seasonal lagoon is formed at the mouth of the river, which is typical of coastal watersheds in California in which lagoons form due to decreasing freshwater inflow during the summer and fall months and wave action that deposits sand to create a barrier beach. A "Coastal Processes" report (SOURCE V.7b) prepared as part of the development of the IMP reviews and summarizes the influence of the coastal processes (waves, tides, sand movement) and stream flow on the river mouth, which affect water levels in the lagoon.

"Bar built" estuaries receive both freshwater inflows and oceanic tides, and their exchange of flows with the ocean is controlled by the shape of the mouth, which is primarily formed by wave action. Waves act to construct a beach at the river mouth (effectively blocking it), while tidal motions and freshwater inputs (if available) act to scour the mouth back open. Since these inputs vary seasonally, the mouth cycles between closed, various degrees of tidal connection with the ocean, and short periods of high river discharge (SOURCE V7b).

Once the mouth is closed off by waves, the lagoon water levels typically rise due to wave overwash into the lagoon and freshwater inputs, causing water to pond behind the barrier

beach. During closure, evaporative losses and seepage from the lagoon to the ocean slowly draw water from the system. The relative contribution of salty ocean water overtopping the beach compared with the seepage of salt water through the beach determines the salinity of the lagoon (SOURCE V7b). The beach adjacent to the San Lorenzo River is particularly susceptible to overtopping when energetic southerly waves with long periods approach the site. If inflows are greater than seepage and evaporative losses, the lagoon stage eventually reaches the beach berm crest elevation, causing a spillover channel which typically erodes a new mouth ("mouth breach event"). This breaching is typically associated with a rainfall/runoff event but in some cases a significant wave overtopping event can also be a catalyst. Regardless of the cause, breach events cause downcutting (scouring) of a channel through the beach, reintroducing tidal exchange (salt water) to the lagoon. If nearshore waves push more sand into the mouth than can be scoured by the available tidal and freshwater currents, sand begins to accumulate in the mouth again, and the beach forms a sill which limits the amount of tidal influence in the lagoon. During this phase, the system is predominantly freshwater flow controlled. Often salt water remains trapped at the bottom of the lagoon even while freshwater is flowing over the beach and into the ocean. This is evident in the San Lorenzo River during periods of muted tides that precede inlet closure. Eventually, the beach builds up and closes off the mouth, causing ponding to occur again (Ibid.).

Table 5 summarizes the observed high water levels in the San Lorenzo River Lagoon for each year dry season since 2002 when data collection began. The following trends were identified based on review of the lagoon hydrologic data:

- The highest lagoon stages occur during mouth closure events, typically just prior to breach.
- Lagoon water levels during closure are often much higher than extreme oceanic levels measured at the NOAA Monterey Gage.
- When the mouth is open, the lagoon tides are usually muted during the dry months.
- Closure events typically coincide with energetic waves and/or neap tides.
- Energetic waves influence the lagoon even when the lagoon is closed, as evidenced by abrupt changes in lagoon stage during periods of high wave run-up.

A review of coastal processes and the historic course of the San Lorenzo River mouth was prepared for the City of Santa Cruz by Gary Griggs In 2012 (SOURCE V.8) and is summarized below. In the late spring to fall of recent years, the San Lorenzo River has frequently begun to flow to the west or upcoast, in front of the Santa Cruz Beach Boardwalk, rather than directly into the ocean along San Lorenzo Point, which has been its historic pattern (SOURCE V.8). The width of the Main Beach, which fronts the Boardwalk, is due to a high rate of littoral drift that moves sand downcoast from the north and to San Lorenzo Point, which traps sand moving along the shoreline. The course of the San Lorenzo River has historically been fixed against San Lorenzo Point, adjacent to the east side of the river mouth. Sand moving downcoast or west to east along Main Beach has held the river mouth up against the point (Ibid.). Due to construction of the Santa Cruz Small Craft Harbor south of the project area, Seabright Beach to the east of San

Lorenzo Point has widened and by summer has often merged with the Main Beach. The Main Beach width prior to the harbor averaged 315 feet and has increased by 140 feet since construction of the harbor (SOURCE V.8).

Table 5. San Lorenzo River Lagoon Water Stage & Closure Conditions (2002-2013)

Year	Peak State (Ft NGVD) [1]	Number of Closures	Number of Days Closed
2002	7.2	1	38
2003	7.0	4	36
2004	6.8	2	48
2005	7.5	4	105
2006	---[2]	---[2]	---[2]
2007	7.7	8	97
2008	7.2	1	97
2009	7.4	2	86
2010	6.9	10	52
2011	7.6	2	6
2012	4.7	9	55
2013	6.4	9	136

[1] Local conversion to NAVD is approximated [Elevation (ft NGVD29) = Elevation (ft NAVD88) + 2.73 ft]
[2] Data not collected in 2006

Under "natural" conditions that existed prior to construction of the harbor jetty, the San Lorenzo River typically was able to maintain its course across the beach even during lower summer and fall flow conditions (SOURCE V.8). By the mid-1980s when Seabright Beach had widened out to the end of San Lorenzo Point, Main beach began to widen due to a new downcoast littoral transport barrier created by the east harbor jetty. Seabright and Main Beaches usually tended to merge into a single beach in the summer months, which in combination led to widening of Main Beach near the river mouth. Under low flow conditions, the San Lorenzo River was not able to maintain its path across this wider beach, and a sand bar/berm formed. Because the outer edge of the berm is higher in elevation than the back beach, as the dammed up river forms a lagoon and the water levels rise, the lowest elevation and only path for the river to follow is along the back beach to the west in front of the Boardwalk (SOURCE V.8). This situation became a concern in the mid-1980s, and the lagoon was breached for several years until the California Department of Fish and Game intervened, believing that the lagoon was an important habitat for fish (Ibid.).

Impact Analysis. The proposed project would result in installation of a temporary outlet channel or culvert to allow water from the San Lorenzo River when it is in a closed condition to flow to the ocean. Although, installation would temporarily alter the conditions of the San Lorenzo River Lagoon, neither of these activities nor the physical installation would not substantially alter the course of the river or the river's existing

drainage patterns or result in substantial erosion, siltation or flooding. Therefore, this is considered a less-than-significant impact, and no mitigation measures are required.

Installation of the proposed temporary outlet channel would only commence once a lagoon has formed and is approaching an elevation of 5.0 feet NGVD. The proposed project would not prevent the lagoon from breaching under natural conditions. Review of the lagoon closures and breaches by ESA indicates that since 2002, the mouth of the river has normally opened via beach overtopping more than five times per year (SOURCE V3a). As previously indicated, subsequent review by ESA, which is summarized above on Table 3, indicates that on average, closures in May through June lasted less than 3 days and water levels surpassed 5 feet for an average of less than 24 hours, likely due to high flows (> 30 cfs) in those months, which cause breaching before waves can build the beach higher than 5 feet. Closures are most common in August-October (>13 days per month) and less common in Nov-Dec (<5 days per month).

The temporary outlet channel will be installed to minimize channel scour. On both days of the September 2014 permitted lagoon breach, a channel was excavated in the beach that was approximately 10 feet in width and 750 feet in length. The orientation of the channel was roughly southwest and directed approximately toward the mid-point on the wharf. The September 2014 breach event used a shallow part of the western lagoon (~2 feet deep) as a sill to reduce the likelihood of headcutting and scour up to the thalweg to reduce the chance of a complete draining of the lagoon. The channel was opened on an incoming tide.

The channel expanded laterally through bank erosion, until it was roughly 35 feet wide at the lagoon and 55 feet wide near the ocean. A sand track "peninsula" was graded in the lagoon near the beach, which acted to control the direction of river flow and reduce headcutting. As headcutting and channel formation was observed by periodic walking depth measurements, sand was pushed into the headcut/thalweg to reduce further scour and channel formation. These walking surveys were performed every 15-30 minutes. Sand piles were maintained adjacent to the inlet to provide a source of sand should a rapid closure of the outlet channel be necessary. A similar process is envisioned with implementation of the IMP, thus, minimizing channel scour and/or alteration during installation of the temporary facilities. At the end of both days, the channel was mechanically closed by filling with sand to prevent further drainage and scouring of the channel. (SOURCE V.7a). Photos of the steps of the event are shown on Figure 4.

(e) Stormwater Runoff. The San Lorenzo River watershed covers 139 square miles and is a watershed within the Big Basin Hydrologic Unit. It has its headwaters in the Santa Cruz Mountains within Castle Rock State Park, and discharges into Monterey Bay in the City of Santa Cruz. The City portion of the San Lorenzo River includes the leveed lower portion of the river

from the river mouth to Highway 1 and approximately one mile upstream from Highway 1 Bridge to the City limits near Sycamore Grove (SOURCE V.2b).

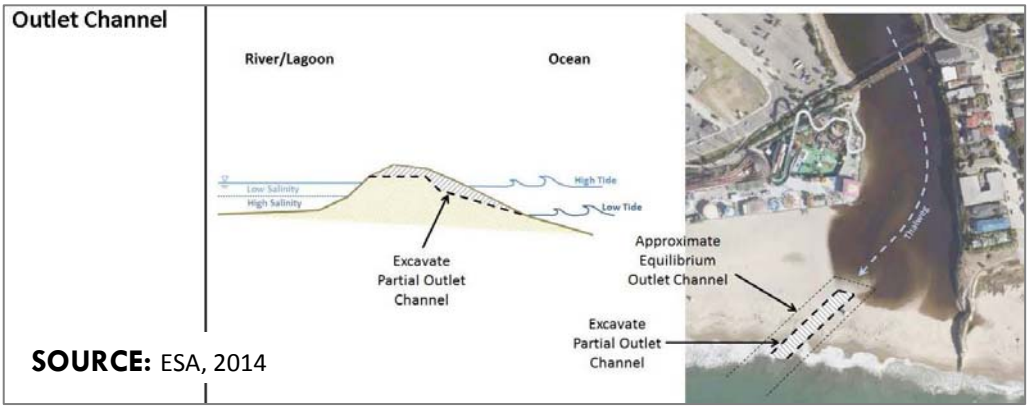
The project consists of implementation of a three-year Interim Management Program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or head-driven culvert. The project will not result in new structural development. Therefore, the project would not result in or affect stormwater runoff volumes or patterns.

(f) Water Quality. The proposed project is located mouth of San Lorenzo River where it discharges into Monterey Bay. The river is listed on the 2010 Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments. The San Lorenzo River also is listed as impaired for pathogens (*Enterococcus*, *E. coli*, and fecal coliform), pesticides (chlordane, chlorpyrifos), nutrients, and sediment (SOURCE V.1b).

As discussed above in subsection 4(a), water quality monitoring has been ongoing in the San Lorenzo River Lagoon since 2002 and have continued for the past 12 years (except for one year-2006) under the supervision of the City of Santa Cruz Water Department and the County of Santa Cruz. The water quality program measures general parameters important for aquatic habitats, including dissolved oxygen, salinity, temperature, and nutrients (nitrogen and phosphorous). These constituents are measured in both surface waters and bottom waters. In 2010, following 7 years of consistent data collection, data analysis was expanded to include a statistical analysis to identify the measured lagoon variables that show significance as driving factors of observed lagoon dissolved oxygen (DO) patterns.

Impact Analysis. The proposed project could inadvertently result in discharge of construction-related contaminants, but implementation of proposed Best Management Practices would avoid or minimize impacts to a less-than-significant level, and no mitigation measures are required.

Construction activities will require the use of heavy equipment for installation of both the temporary outlet channel and head driven culvert, consisting of a bulldozer and excavator. The excavator will be equipped with rubber tires. Equipment staging will be from the Santa Cruz Beach Boardwalk parking area (APN 007-321-09 as shown on Figure 1B) and along the beach (APN 007-321-04 and -07). Equipment will be stored in the parking area when not in use. Equipment will be washed off before and after daily. Construction of the temporary outlet channel will occur on the sandbar at the mouth of the San Lorenzo River approximately 200 feet west of San Lorenzo Point as shown on the schematic below. The Head Driven Culvert will be constructed on the sandbar near the base of San Lorenzo Point as shown on Figure 5.



SOURCE: ESA, 2014

Access routes will be along the Santa Cruz main beach in front of the Santa Cruz Beach Boardwalk and under the trestle bridge between the lagoon edge and the eastern wall of the Boardwalk. Equipment will enter the area via the access ramp under the Trestle Bridge and stay to the west of the lagoon area or will access through Santa Cruz Boardwalk ramps along parcel 007-321-03 or City of Santa Cruz parcel 007-321-03 if conditions are not appropriate at the direct project site. Installation will occur during low tide periods and contact with ocean waters is not expected.

Equipment breakdowns resulting in the release of hydraulic fluid or fuel/petroleum, concrete wash waters and waste, chemical solvents, and welding waste all represent potential constituents that can change the affected water bodies as a result of the project's construction. Implementation of the proposed Best Management Practices (BMPs) as shown on Table 2 would minimize potential water quality impacts due to use of mechanical equipment in the action area and would prevent spillage of toxic fluids into the lagoon or outlet channel along the beach. Impacts would be minimized by implementing the proposed BMPs, which include: keeping equipment outside the wetted perimeter of the lagoon and outlet channel, maintaining spill containment and remediation material on site, and avoiding re-fueling or otherwise servicing equipment adjacent to the lagoon.

The Temporary Outlet Channel may result in release of nutrients, fecal coliform, and enterococcus that may be present in the San Lorenzo River waters. Nutrient levels in the lagoon have been previously documented by the City of Santa Cruz, but were not sampled as part of the September 2014 Outlet Channel. Release of water from the lagoon as proposed in the Interim Management Program would not result in release of water that wouldn't otherwise at some time be released into the Monterey Bay as a result of natural lagoon opening.

(g-h) Flood Hazards. Following severe flooding in downtown Santa Cruz in the winters of 1938, 1941, and 1955, the Army Corps of Engineers (ACOE) constructed a flood control project along San Lorenzo River in 1957 to straighten and confine the river within its current configuration. The project created a channelized flood control channel for its lower 2.5 miles of the river below Highway 1, which disconnected the lower river from its historical floodplain. The project included rip-rap levee banks, removal of all vegetation from the banks, and dredging of the river channel bottom. During construction of the levee project, Jessie Street Marsh was filled and the lower Branciforte Creek was channelized in a cement culvert. The ACOE completed another levee improvement project in 2000 that improved and raised the levees. The design incorporated native vegetation concepts and a continuous bicycle and pedestrian path along the length of the levees.

The purpose of the proposed project is to prevent flooding of private and public properties. In the vicinity of the project site, the San Lorenzo River is contained by earthen levees. Flooding has occurred at the adjacent Santa Cruz Beach Boardwalk. Flood-proofing of the Santa Cruz Beach Boardwalk occurred in December 2014 as part of the IMP planning process. Other facilities and properties subject to flooding due to lagoon water exceeding 5.0 NGVD are summarized below.

- *San Lorenzo River Flood Control Levee Pump Facilities*. These facilities are designed to be standby storm water pumps and not as continuous water circulating pumps. From July 28, 2014 to October 8, 2014 (73 days) pumps at San Lorenzo/Bixby ran a total of 121 hours while the river was shoaled. Pumping starts at an approximate 4' river level. There was no significant change in run times even with a 1-foot control drop that was made in September 2014. In comparison to July 2010 to July 2011 when river flows were greater and 33.89 inches of rain fell, the pumps at San Lorenzo/Bixby ran a total of 205 hours over a one-year period.

- *Ground saturation along low-lying areas north of levee*. The associated rise of lagoon waters under streets and into infrastructure north of the levee incudes impacts to pavement and street conditions and to stoplight electrical system along San Lorenzo Boulevard and Ocean Street as documented in the *Interim Management Plan Project Description and Supplemental Project Information* document.

- *Flooding in basements of buildings along Pacific Avenue in Santa Cruz*. The City of Santa Cruz received reports of flooding in basements of buildings along Pacific Avenue in Santa Cruz on September 14, 2014. The historic Del Mar Theater in downtown Santa Cruz experienced basement flooding in 2014 during a prolonged lagoon closure period where lagoon elevations reached approximately 7.0 feet NAVD29 (SOURCE V.3b).

Water levels above 5.0 feet NGVD in the San Lorenzo River induce flood-related problems. The breach was minimally successful in lowering the lagoon from an elevation of approximately 7.0 NGVD to 5.0 NGVD. The water elevation rose rapidly and provided only 10 days of relief from

flooding. The results indicated that controlled breaching starting at elevation 7.0 NGVD is problematic for providing flooding relief (short-lived), maintaining control of the breach, and costs and operational ability. However, the project provided construction protocols for successful controlled outlet channels. The proposed project seeks to maintain the lagoon water level at 5 feet NGVD when it is in a closed condition. Lagoon outflow rates required to maintain water levels below 5.0 ft NGVD were estimated with a water balance model conducted by ESA in developing project alternatives (SOURCE V.7b). The purpose of the model is to quantify the expected flows into and out of the lagoon under dry-season flooding conditions (i.e. during periods of mouth closure), which makes it possible to quantify the necessary outflow rates of the alternatives.

The proposed project will not result in construction of habitable structures or siting of structures within the 100-year floodplain, and would not expose people or structures to flood hazards.

Recent projections of sea level rise and modeling of coastal hazards show a predicted increase in extent of flooding, wave overtopping, and coastal erosion for much of the area around the lower San Lorenzo River (SOURCE V.7b). As sea level rises, it is anticipated that the wave run-up elevations will likely increase at a similar rate. In general, the elevation of the beach berm crest results from the combination of tides, waves, and sediment which affects wave run-up elevations. Wave run-up transports sand onto the beach, and higher combinations of tide level and wave run-up generally lead to higher potential beach berm crests. With projections of sea level rise to reach three to five feet higher by 2100 (NRC 2012 as cited in SOURCE V.7b), the outlook for the beach elevation at the mouth of the San Lorenzo River is to rise accordingly. Given that the lagoon water surface elevations currently cause management and flooding problems at 5 feet NGVD29, an increase of 5 feet in ocean levels would result in substantial flooding for longer periods of time and some areas may be permanently inundated (Ibid.). As a result, the current flooding issues near the mouth of the San Lorenzo River will likely worsen, and become more difficult to mitigate. Therefore, it may not be practical to achieve the multiple objectives identified in the IMP into the future. These issues would be addressed as part of a future long-term management program.

j) Tsunami Inundation. According to maps developed as part of the *General Plan 2030* and included in the General Plan and General Plan EIR (SOURCE V.1a-page 106 & V.1.b-Figure4.7-1, DEIR), the project site is located within a tsunami inundation zone, as are most of the downtown and beach areas of Santa Cruz. Tsunamis are produced when movement occurs on faults in the ocean floor, usually during very large earthquakes. California is at risk from both local and distant source tsunamis. Eighty-two possible or confirmed tsunamis have been observed or recorded in California during historic times, most of which were small and only detected by tide gages. Eleven were large enough to cause damage and four events resulted in deaths. Santa Cruz, like many coastal cities, is exposed to impacts from tsunamis. The National Oceanic and Atmospheric Administration operates a tsunami warning system, giving several hours notice to allow evacuation of threatened areas to prevent injuries. The project does not include

construction of habitable structures that would expose people or structure to tsunami inundation.

10. LAND USE AND PLANNING

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Physically divide an established community;*
- *Conflict with any applicable City land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect; or*
- *Conflict with any applicable Habitat Conservation Plan or Natural Community Conservation Plan.*

(a) Divide An Established Community. The project site is located at the mouth of the San Lorenzo River. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development and would not divide an established community.

(b) Consistency with Local Policies. The project is policies in the City's certified Local Coastal Plan (LCP). LCP Environmental Quality Policy 4.2.6 indicates that river or stream alterations must be consistent with the natural characteristics of the stream and limited to those allowed under Coastal Act Section 30236 which includes those necessary for water supply, flood control and habitat improvement projects. Implementation of the IMP is proposed for flood control purposes, with also protecting habitat. The proposed project is also consistent with LCP Safety Policy 3.1.2 that calls for minimizing the alteration of natural flood plains, stream channels and natural protective barriers that accommodate or channel flood waters. The project will not alter a natural flood plain, and will not result in stream channel alteration. LCP Community Facilities Policy 9.4 calls for management of the San Lorenzo River floodway consistent with the requirements of the Corps of Engineers, Coastal Commission, California Department of Fish and Wildlife and other responsible and trustee groups, using the *San Lorenzo River Design and Enhancement Plan* as the basis for this management. Coastal policies of the *San Lorenzo River Design and Enhancement Plan* were replaced with coastal policies derived from the City-adopted *San Lorenzo Urban River Plan*. These policies, which were approved by the Coastal Commission as part of the City's LCP, call for development of a management strategy for summer lagoon water level (RES-2) and actions to address illegal breaching activities at the river mouth (SRFA-24). The proposed project is consistent with these policies, which were approved by the Coastal Commission as part of the City's LCP.

The *City-wide Creeks and Wetlands Management Plan* (2006) was adopted by the City Council in February 2006 to provide a comprehensive approach to managing all creeks and wetlands

within the City. The long-term goals of the Management Plan are to reduce and/or eliminate pollutants discharged to aquatic bodies; improve water quality; improve and restore natural habitat; increase biodiversity; lower water temperatures; and increase public awareness of the value of watershed quality. The Management Plan recommends specific development setback requirements for various watercourse types within the City as well as development standards. Implementation of the temporary outlet channel or culvert would be within the San Lorenzo River management area. However, as previously indicated, projects that concurrently are reviewed and approved by another authorizing permitting agency (CDFG, NOAA, USFWS or ACOE) for maintenance, flood protection, restoration or enhancement of a natural resource are exempt from watercourse development permit requirements (see subsection 4(e)).

Implementation of the proposed Interim Management Plan would not result in conflicts with any plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

(c) Conflict with Habitat Conservation Plan. The project site is not located within an area covered by an adopted Habitat Conservation Plan or Natural Community Conservation Plan.

12. NOISE

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Expose persons to or generate noise levels in excess of standards established in the County's "Land Use Compatibility for Community Noise" chart.*
- *Expose persons to or generate excessive groundborne vibration or groundborne noise levels.*
- *Result in a substantial permanent increase in ambient noise levels above existing levels if it will expose outdoor activity areas of noise-sensitive land uses to a 5 dB increase in noise where existing noise levels are below 60 dBA L_{dn}, a 3 dB increase in noise where existing noise levels are between 60 and 65 dBA L_{dn}, or a 1.2 dB increase in noise where existing noise levels are above 65 dBA L_{dn}. An outdoor noise standard of 65 dBA (CNEL) at the property line shall be used in the assessment of operational noise impacts.*
- *Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels authorized by the General Plan or Noise Ordinance.*

The project site is not located near an airport or private airstrip.

(a-b) Exposure to Noise. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or

growth. The project will not result in new structural development, and thus, would not expose residents, workers or visitors to noise levels above compatibility standards.

(d) Temporary Construction Noise. Ambient noise levels in the project area are characterized by ocean waves and rides and activities at the adjacent Santa Cruz Beach Board. Intermittent train passage occurs on the railroad tracks over the San Lorenzo River.

Impact Analysis. The proposed project would result in short-term construction equipment noise over a short duration, but would not result in a substantial temporary increase in ambient noise levels. Temporary, short-term noise would result in a less-than-significant impact, and no mitigation measures are required.

The proposed project would result in some temporary construction-related noise over the short period of time that either the temporary outlet channel or head driven culvert would be installed. The temporary channel would be installed in one day, and the culvert would be constructed in two weeks. During these periods there would be times when a bulldozer or excavator would be in operation. Given other sound sources in the area, most notably the ocean and Boardwalk, the limited duration of use of equipment would not result in a substantial increase in ambient noise levels and would not substantially affect residences to the east of the project site. Due to the limited duration and short-term nature of the construction and limitations to weekday, daytime construction periods, temporary construction noise is considered a less-than-significant impact.

13. POPULATION AND HOUSING

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure;*
- *Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere; or*
- *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.*

(a) Population Growth. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth. The project will not result in new structural development or population or growth.

(b-c) Housing and Resident Displacement. The project will not result in displacement of housing units or residents as none exist within the proposed path alignment.

14. PUBLIC SERVICES

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Result in substantial adverse physical impacts associated with provision of new or physically altered facilities, the construction of which could cause significant impacts, in order to maintain acceptable service for fire protection, police protection, schools and parks.*

The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth.. The project will not result in new structural development, population or growth or demand for services.

15. RECREATION

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Increase the use of existing parks or recreational facilities such that substantial physical deterioration would occur or be accelerated; or*
- *Include recreational facilities or require construction or expansion of recreational facilities which might have an adverse physical effect on the environment.*

The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth. The project will not result in new structural development, population or growth or demand for recreational services.

16. TRANSPORTATION/TRAFFIC

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of*

the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

- *Change the level of service of a State Highway roadway segment from acceptable operation (LOS A, B, or C) to deficient operation (LOS D, E or F);*
- *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;*
- *Substantially increase hazards due to a design feature (for example, sharp curves or dangerous intersections) or incompatible uses (for example, farm equipment);*
- *Result in inadequate emergency access; or*
- *Conflict with adopted policies, plans, programs that support supporting alternative transportation (for example, bus turnouts, bicycle racks).*

There are no adopted congestion management programs for the project area, and the project would not conflict with adopted policies, plans or programs that support alternative transportation. The project is not located near an airport. The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert. The project will not result in new structural development, and will not result in new population or growth. The project will not result in new structural development or generation of vehicular trips.

17. UTILITIES & SERVICE SYSTEMS

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

- *Result in a water demand that exceeds water supplies available from existing entitlements and resources, and new or expanded supplies may be needed.*
- *Result in water demand that exceeds capacity of the water supply or infrastructure system or would require expansion of water supply, treatment or distribution facilities, the construction of which could cause significant environmental effects.*
- *Result in wastewater flows exceed treatment plant capacity or require expansion of existing facilities.*

The project consists of implementation of a three-year interim management program, consisting of two activities at the San Lorenzo River mouth. The activities would result in temporary installation of a temporary drainage outlet channel or culvert to release water from a closed river lagoon to the ocean. The project will not result in new structural development or increased demand for sewer or water service or result in solid waste generation.

18. MANDATORY FINDINGS OF SIGNIFICANCE

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, City of Santa Cruz plans and policies, and agency and professional standards, a project impact would be considered significant if the project would:

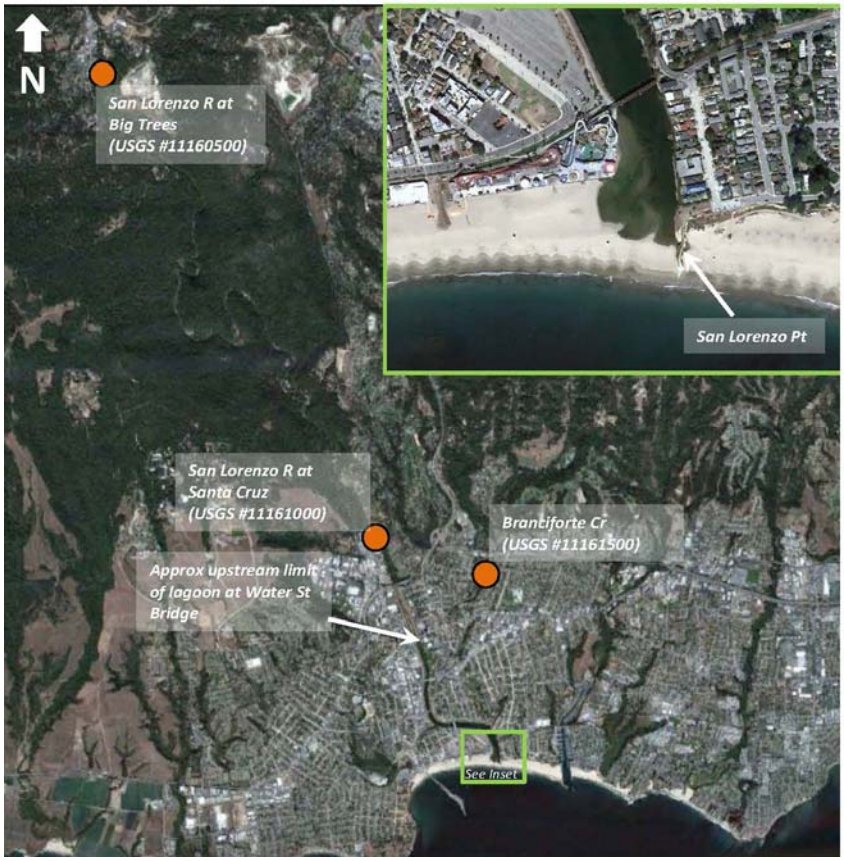
- *Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory;*
- *Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of the past projects, the effects of other current projects, and the effects of probable future projects.); or*
- *Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.*

(a) Quality of the Environment. The proposed project would have no significant effect on fish migration with implementation of mitigation measures as discussed in subsection 4 above. There would be no reduction of fish habitat. The Biological Assessment prepared for the project concludes that project actions would not adversely affect habitat for the tidewater goby, steelhead or coho salmon, and as a result would not cause a fish population to drop below self-sustaining levels. A potentially significant impact on steelhead juvenile migration can be mitigated to a less-than-significant level through controlling the operational start date of the head-driven culvert. Potential impacts to tidewater gobies during construction activities also can be mitigated to a less-than-significant level. The proposed project would not reduce, restrict or threaten with elimination, the range of a fish species. The project would not result in significant impacts to cultural resources ore eliminate important examples of major periods of California history or prehistory as discussed in section 5 above.

(b) Cumulative Impacts. The EIR prepared for the City's recently adopted *General Plan 2030* identified potential significant cumulative impacts related to traffic, water supply, population and noise associated with growth and development accommodated by the General Plan. The proposed implementation of the Interim Management Plan action at the San Lorenzo River lagoon would not contribute to these cumulative impacts. There are no known cumulative projects in the area to which the project would contribute cumulative impacts.

(c) Substantial Adverse Effects on Human Beings. No environmental effects have been identified that would have direct or indirect substantial adverse effects on human beings.

FIGURE 1A: Project Location



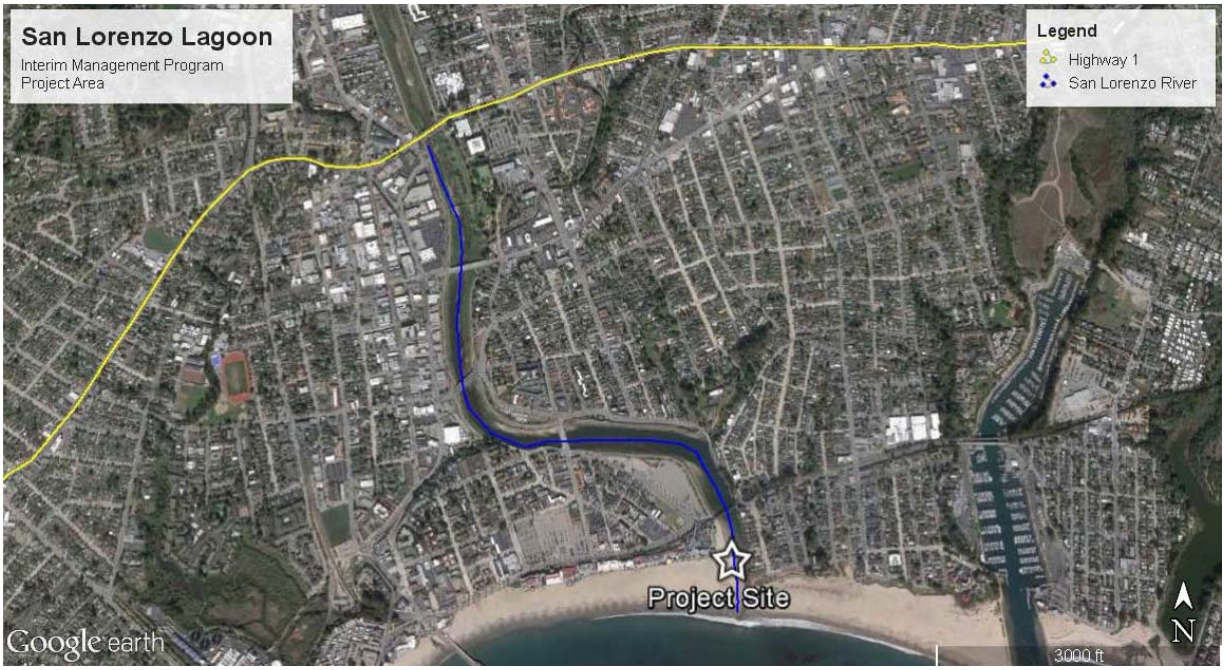


FIGURE 1B: Project Properties

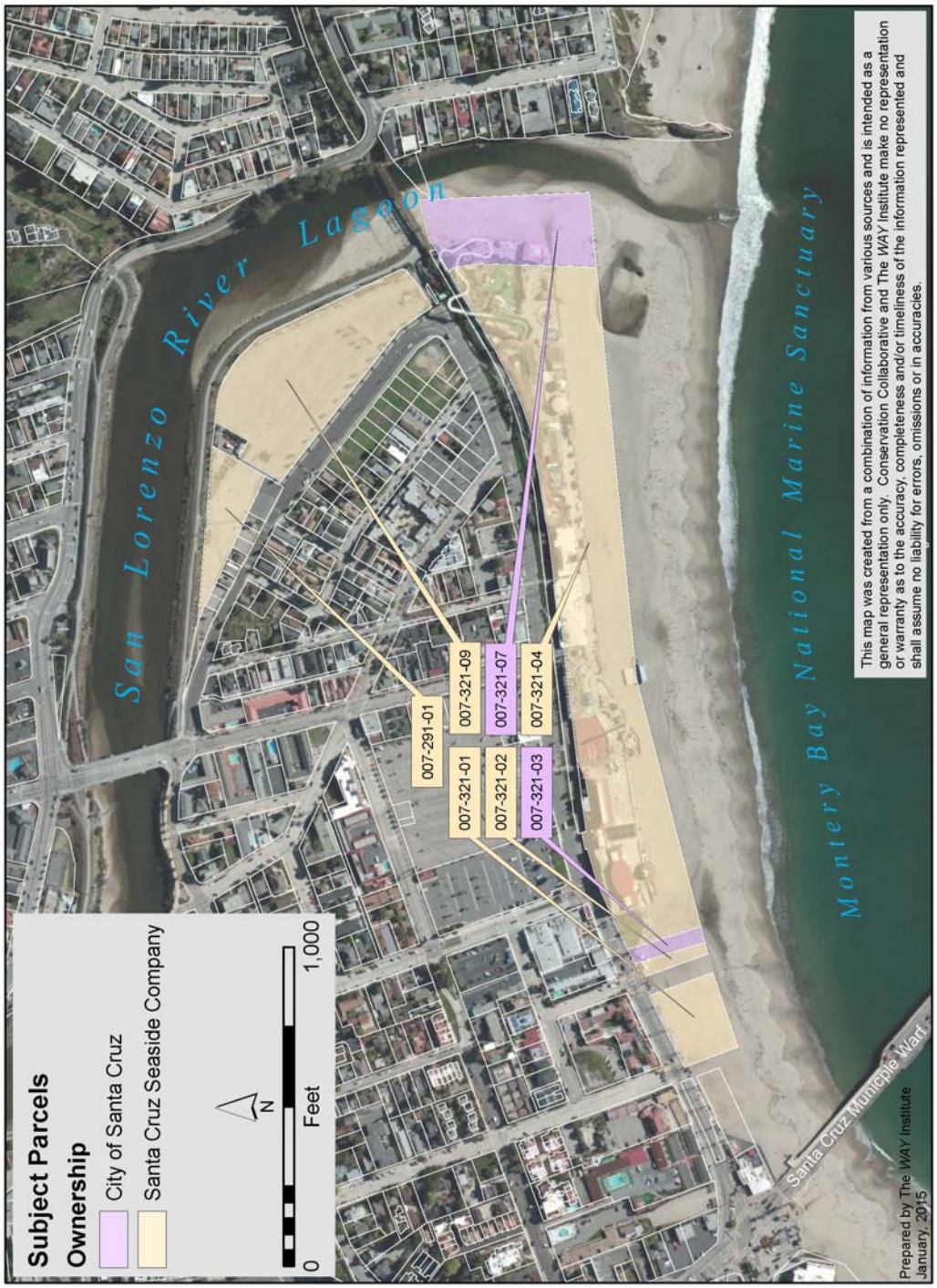


FIGURE 2: San Lorenzo River Mouth Conditions

San Lorenzo River – example of barrier beach open condition (March 16, 2002)**. Photo from California Coastal Records Project**

San Lorenzo River – example of barrier beach closed condition (October 1, 2008)**. Photo from California Coastal Records Project**

FIGURE 3: Examples of San Lorenzo River Channel Migration

Spillover channel condition, 2014. Photo by Conservation Collaborative.

Western channel migration example, October 2005. Photo from California Coastal Records

FIGURE 4: 2014 Controlled Lagoon Breach

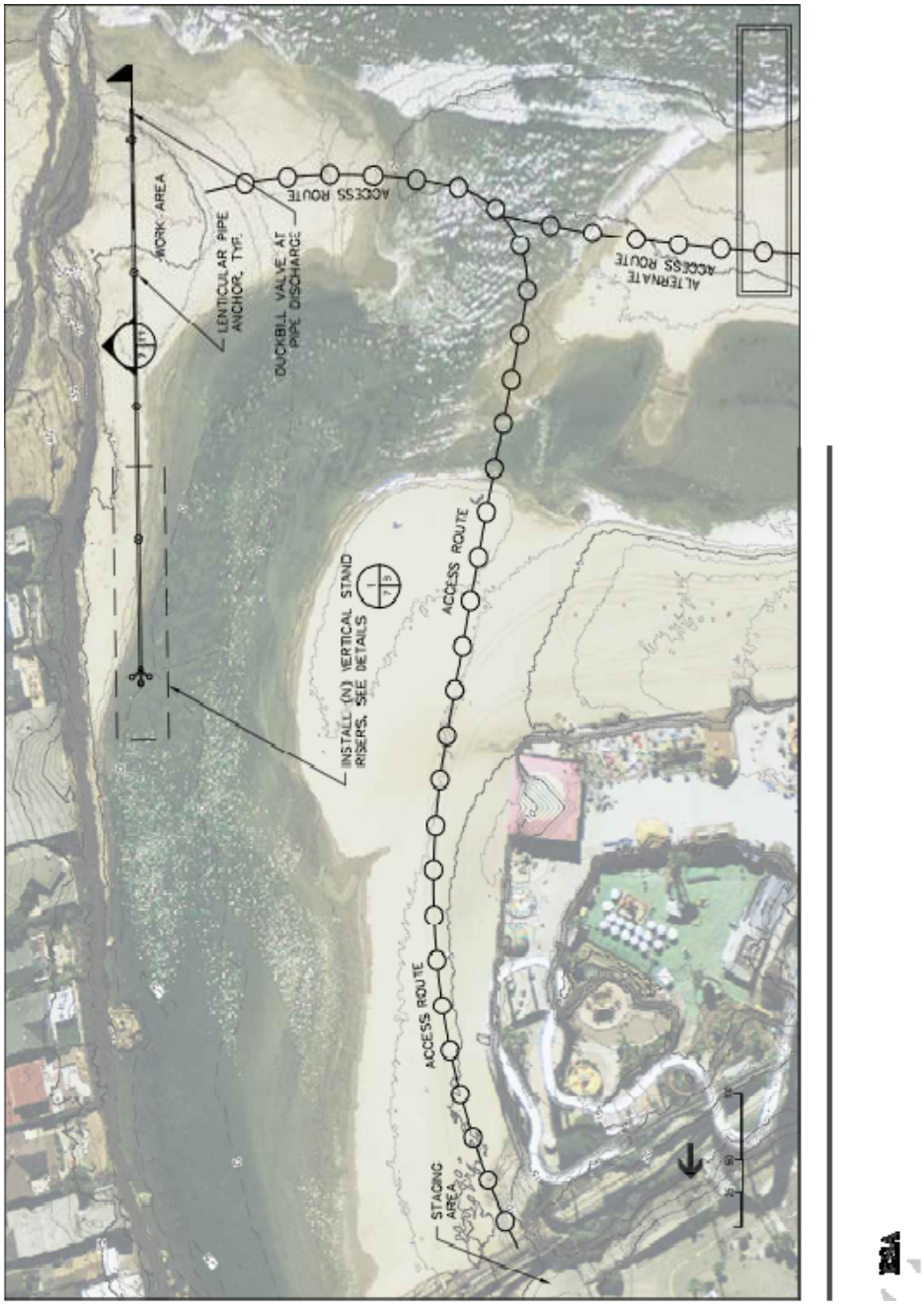
1- Setting net.

2- Beginning of channel excavation.

3 - Temporary Outlet Channel flowing.

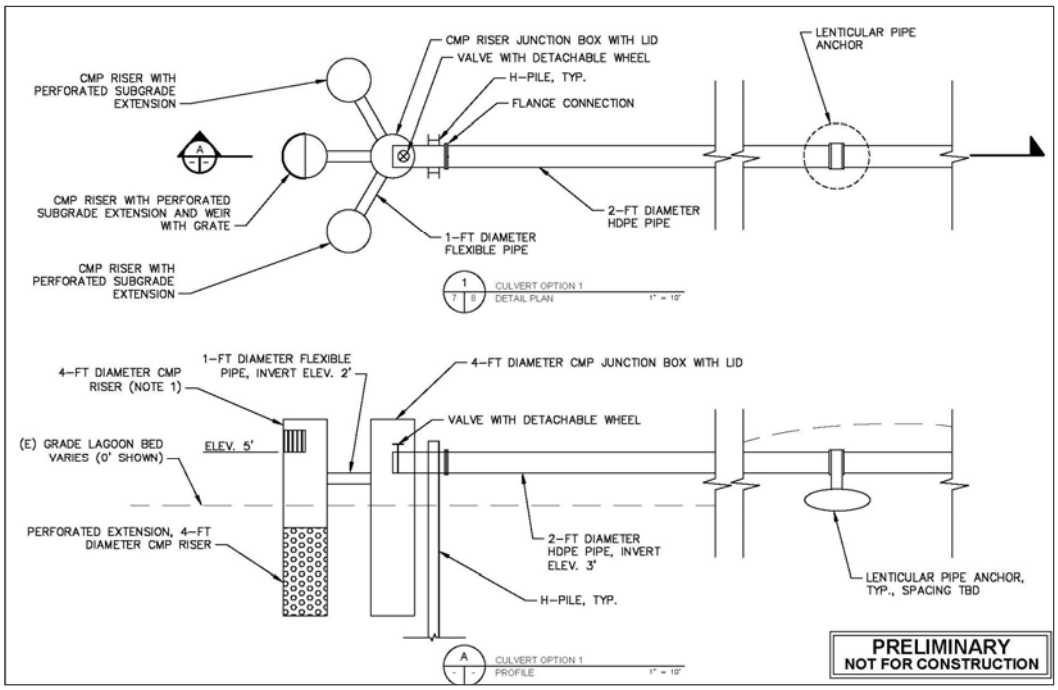
4 - Post channel closure and high tide.

FIGURE 5: Head-Driven Culvert Site Plan

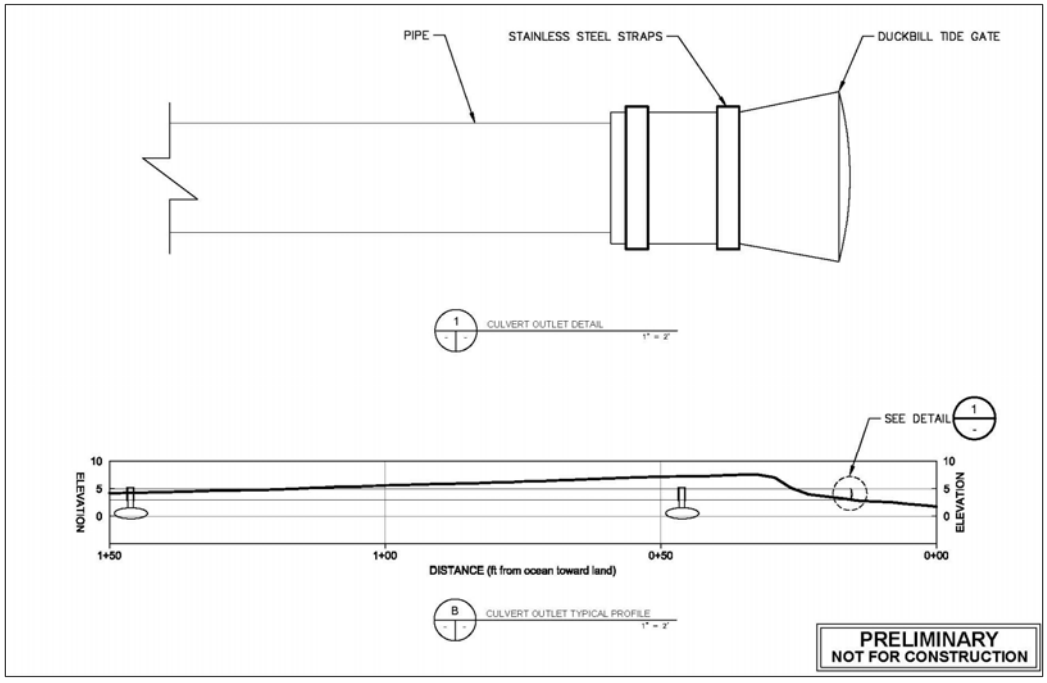


SOURCE: ESA

FIGURE 6: Culvert and Outlet Details



Culvert



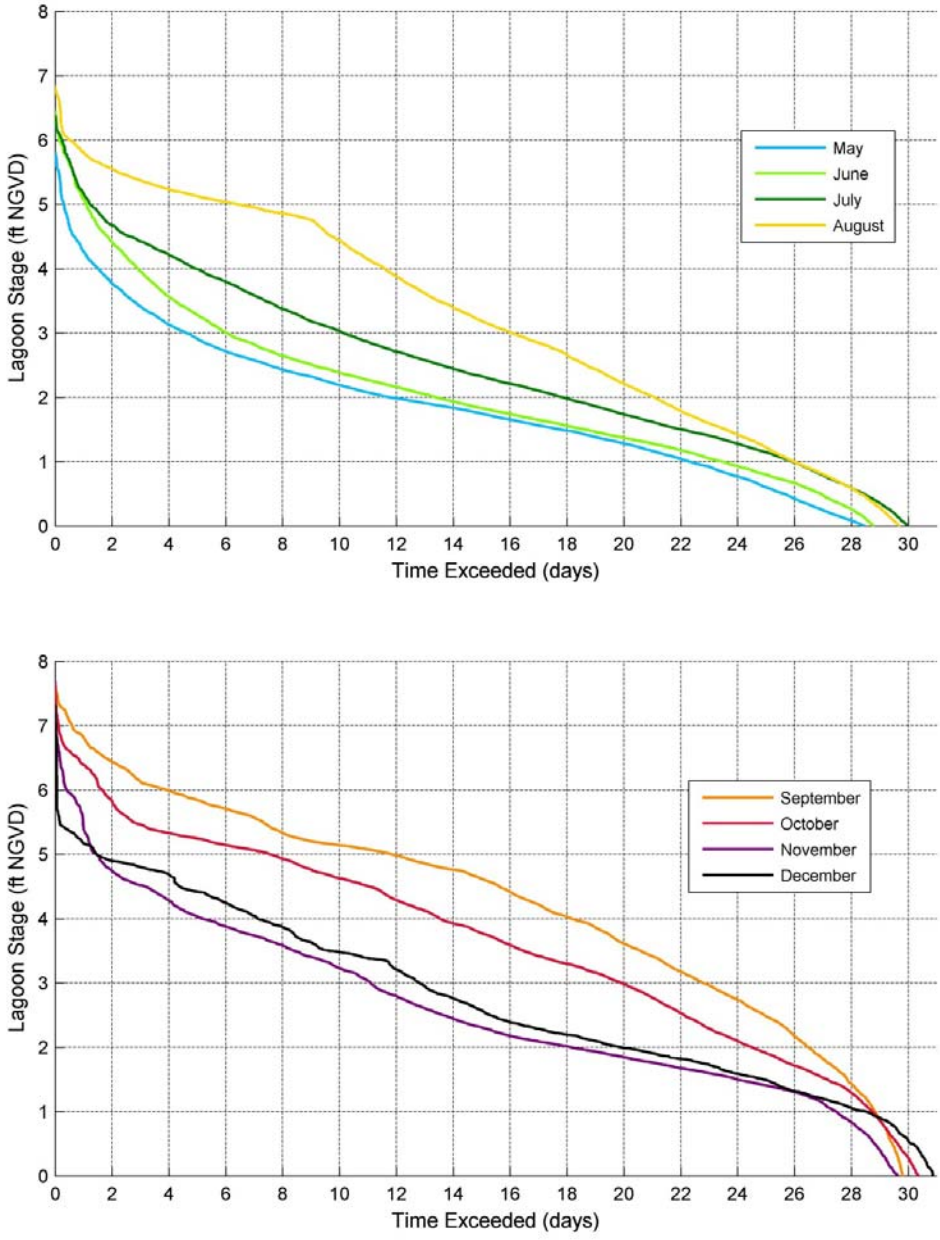
Outlet

SOURCE: ESA

FIGURE 7: Examples of Culvert Outlets

Examples of duckbill valves at several northern California beaches,

FIGURE 8: San Lorenzo Stage Exceedances



For Years 2002-2013. Data were provided by the City of Santa Cruz.

SOURCE: ESA