



**US Army Corps  
of Engineers**®  
San Francisco District

SAN FRANCISCO DISTRICT

Regulatory Division  
450 Golden Gate Ave., 4<sup>th</sup> Floor  
San Francisco, CA 94102-3404

# PUBLIC NOTICE

PROJECT: San Lorenzo River Culvert Project

PUBLIC NOTICE NUMBER: SPN-2014-00434; 408-SPN-2021-0006

PUBLIC NOTICE DATE: June 25, 2021

COMMENTS DUE DATE: July 25, 2021

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408 PROJECT MANAGER: Jessica Vargas

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**1. INTRODUCTION:** The City of Santa Cruz (POC: Scott Ruble, 831-420-5162), 809 Center Street, Santa Cruz, California, 95060 has applied to the U.S. Army Corps of Engineers (USACE), San Francisco District, for a Department of the Army Permit to conduct work and place fill/structures into navigable waters of the United States associated with the installation of a passive, head-driven culvert (pipe drain) system and other actions to manage lagoon water levels at the mouth of the San Lorenzo River. This Department of the Army permit application is being processed pursuant to the provisions of Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*), and Section 10 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. § 403 *et seq.*). The City has also requested permission from the Corps to alter the San Lorenzo River federal flood risk management project, pursuant to Section 14 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. § 408 *et seq.*). This notice is to inform interested parties of the proposed activity and to solicit comments.

**2. PROPOSED PROJECT:**

**Project Site Location:** The project is located at the mouth of the San Lorenzo River where it flows into the Monterey Bay / Pacific Ocean (36.9636°N, -122.0125°W), adjacent to the Santa Cruz Beach and Boardwalk (Figure 1). The project site is centered around the sandstone bluff of San Lorenzo Point on the eastern banks of the San Lorenzo River, below the East Cliff Drive Vista Point in the City of Santa Cruz, Santa Cruz County, California

**Project Site Description:** The mouth of the San Lorenzo River is characterized by both natural and built features, including bluffs formed by San Lorenzo Point

along the eastern bank, Santa Cruz Beach and Boardwalk to the west, and USACE Flood Control levees immediately upstream (north) of the railroad trestle bridge at the north end of the project site. The levees, originally built in 1957, and previous urban development have channelized the area upstream of the river mouth, disconnecting the lower river from its historic floodplain. The seasonal formation of a sandbar across the mouth of the San Lorenzo River typically forms a closed lagoon during the summer and fall. Due to the constricted nature of the lower river, under closed conditions any inflow into the lagoon from river flows or wave overwash can rapidly increase water levels in the lagoon. When the lagoon water surface elevation exceeds 5.0 feet (NGVD29) as measured on the railroad trestle staff gage, subsurface seepage typically starts to flood adjacent low-lying infrastructure in surrounding developed areas including basements, streets, yards, and buried utilities. Higher lagoon water levels may also result in beach erosion undermining the Boardwalk seawall, reduced beach access, impacts to the levees upstream, and sudden breaching of the sandbar resulting in rapid lagoon outflow which can pose a public safety risk and negatively affect sensitive species which inhabit the lagoon. To more effectively manage lagoon water levels, the City developed an Interim Management Program (IMP) with input from regulatory and natural resource agencies. Initially permitted and implemented in 2015-2016, the IMP relied primarily on controlled breaches and other sandbar management actions to gradually lower the lagoon water level when necessary. The IMP also called for a temporary head-driven culvert through the sandbar to passively maintain optimum lagoon water levels, but it was never installed due to funding constraints. With extensive agency input, substantial improvements have been made to the previously permitted culvert design and other IMP components.

**Project Description:** The current IMP proposal is based around an improved, semi-permanent culvert design along the east bank of the rivermouth. As shown in the attached drawings (figure 1), the applicant proposes to install a passive, head-driven culvert (pipe drain) system designed to maintain lagoon water levels at 5.0 feet (NGVD29), as measured on the railroad trestle staff gauge. The culvert system would consist of an approximately 700-foot long pipe installed along the base of the east bank bluff, with an infiltration gallery and intake weir/junction box at the north (upstream) end and an outfall to the ocean at the southern end. The culvert system would maintain optimum lagoon water levels by draining surface water overtopping the weir and would also collect and discharge saline bottom water through the infiltration gallery in order to maximize freshwater conversion of the lagoon. Outflows through the culvert would be driven by head difference between higher water levels in the closed lagoon and lower water levels in the ocean.

Prior to installation of the culvert, the City would continue to manage the lagoon with the IMP. Actions would consist of various methods of controlled breaching to slowly reduce lagoon water levels, and/or constructed sand berms to prevent the lagoon from spreading laterally along the main beach (figure 2). Each sandbar management action would depend on ocean conditions, sandbar configuration, and river inflow, and would be conducted using heavy equipment (bulldozer, excavator, and/or front loader) following pre-established agency notification and coordination procedures. Once installed the culvert would become the primary means to manage lagoon water levels and would reduce the need for sandbar management actions.

**Basic Project Purpose:** The basic project purpose comprises the fundamental, essential, or irreducible purpose of the project, and is used by USACE to determine whether the project is water dependent. The basic project purpose is flood risk management.

**Overall Project Purpose:** The overall project purpose serves as the basis for the Section 404(b)(1) alternatives analysis and is determined by further defining the basic project purpose in a manner that more specifically describes the applicant's goals for the project while allowing a reasonable range of alternatives to be analyzed. The overall project purpose is to reduce localized flooding to private and public infrastructure adjacent to the San Lorenzo River lagoon while protecting water quality and sensitive biological resources.

**Project Impacts:** The proposed project would result in permanent impacts to approximately 0.063-acre and temporary impacts to approximately 0.27-acre of waters of the United States. Construction of the infiltration gallery would result in placement of approximately 36 cubic yards (cy) of fill in the San Lorenzo River. Additionally, construction of the steel junction box and placement of the outlet pipes would result in the placement of 291 cy of material and 710 linear feet of permanent impact along the eastern bank of the San Lorenzo River. Sandbar management could include excavation, grading, and/or stockpiling up to 1,000 cubic yards of beach sand over 0.5 acre of the beach/sandbar with each implementation, although it is expected the majority of these impacts would be outside Corps jurisdiction.

**Proposed Mitigation:** The applicant proposes several construction and operational best management practices (BMPs) in order to minimize and avoid impacts to aquatic resources. No compensatory mitigation is proposed.

**Project Alternatives:** An analysis of alternatives will be required, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines (40 C.F.R. § 230.10).

### 3. SECTION 408 PERMISSION

**Authority:** the project is being reviewed under the authority to grant permission for temporary or permanent use, occupation or alteration of any Corps civil works project as contained in Section 14 of the Rivers and Harbors Act of 1899, as amended, codified at 33 U.S.C. 408 ("Section 408"). Section 408 authorizes the Secretary of the Army, on the recommendation of the Chief of Engineers, to grant permission for the alteration or occupation or use of a Corps project if the Secretary determines that the activity will not be injurious to the public interest and will not impair the usefulness of the project. The Secretary of Army's authority under Section 408 has been delegated to the Corps, Chief of Engineers. The Corps Chief of Engineers has further delegated the authority to the Corps, Directorate of Civil Works and Division and District Engineers, depending upon the nature of the activity. A requester or applicant has the responsibility to acquire all other permissions or authorizations required by federal, state, and local laws or regulations, including any other required permits. In addition, an approval from the Corps does not grant any property rights or exclusive privileges

nor does it authorize any injury to the property or rights of others.

**Evaluation Factors for 408:** The decision whether to grant the requested permission for project alteration under Section 408 will be based on several factors. That decision will reflect the national concern for both protection and utilization of important resources. Review of requests for alteration will be reviewed by a Corps technical review team considering the following factors:

1) Impair the Usefulness of the Project Determination. The review team will determine if the proposed alteration would limit the ability of the Corps project to function as authorized, or would compromise or change any authorized project conditions, purposes or outputs. In order for an alteration to be approved, the requester must demonstrate that the alteration does not impair the usefulness of the federally authorized project.

2) Injurious to the Public Interest Determination. Proposed alterations will be reviewed to determine the probable impacts, including cumulative impacts, on the public interest. Factors that may be relevant to the public interest evaluation depend upon the type of Corps project being altered and the nature of the proposed alteration and may include, but are not limited to, such things as conservation, economic development, historic properties, cultural resources, environmental impacts, water supply, water quality, flood hazards, floodplains, residual risk, induced damages, navigation, shore erosion or accretion, and recreation. This evaluation will consider information received from the interested parties, including tribes, agencies, and the public. The benefits that reasonably may be expected to accrue from the proposal must be compared against its reasonably foreseeable detriments. The decision whether to approve an alteration will be determined by the consideration of whether benefits are commensurate with risks and by the net impact of the alteration on the public interest using the public interest factors.

3) Environmental Compliance. A decision on a Section 408 request is a federal action, and therefore subject to the National Environmental Policy Act (NEPA) and other environmental compliance requirements. While the Corps is responsible for ensuring environmental compliance, the requester is responsible for providing all information that the district identifies as necessary to satisfy all applicable federal laws, executive orders, regulations, policies, and procedures. NEPA and other analysis completed to comply

with other environmental statutes (e.g., Endangered Species Act) should be commensurate with the scale and potential effects of the activity that would alter the Corps project. The San Francisco District will work with the requester to determine the requirements, which will be scaled to the likely impacts of the proposed alteration and should convey the relevant considerations and impacts in a concise and effective manner.

#### 4. STATE AND LOCAL APPROVALS:

**Water Quality Certification:** State water quality certification or a waiver thereof is a prerequisite for the issuance of a Department of the Army Permit to conduct any activity which may result in a fill or pollutant discharge into waters of the United States, pursuant to Section 401 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1341 *et seq.*). The applicant has recently submitted an application to the California Regional Water Quality Control Board (RWQCB) to obtain water quality certification for the project. No Department of the Army Permit will be issued until the applicant obtains the required certification or a waiver of certification. A waiver can be explicit, or it may be presumed if the RWQCB fails or refuses to act on a complete application for water quality certification within 90 days of receipt, unless the District Engineer determines a shorter or longer period is a reasonable time for the RWQCB to act.

Water quality issues should be directed to the Executive Officer, California Regional Water Quality Control Board, Central Coast Region, 895 Aerovista Place, Suite 101, San Luis Obispo, California 93401, by the close of the comment period.

**Coastal Zone Management:** Section 307(c) of the Coastal Zone Management Act of 1972, as amended (16 U.S.C. § 1456(c) *et seq.*), requires a non-Federal applicant seeking a federal license or permit to conduct any activity occurring in or affecting the coastal zone to obtain a Consistency Certification that indicates the activity conforms with the state's coastal zone management program. Generally, no federal license or permit will be granted until the appropriate state agency has issued a Consistency Certification or has waived its right to do so. Since the project occurs in the coastal zone or may affect coastal zone resources, the applicant has applied for a Coastal Development Permit from the California Coastal Commission to comply with this requirement.

Coastal zone management issues should be directed to the District Manager, California Coastal Commission, Central Coast District Office, 725 Front Street, Suite 300, Santa Cruz, California 95060-4508, by the close of the comment period.

**Other Local Approvals:** The applicant has applied for a Streambed Alteration Agreement from the California Department of Fish and Wildlife.

## 5. COMPLIANCE WITH VARIOUS FEDERAL LAWS:

**National Environmental Policy Act (NEPA):** Upon review of the Department of the Army permit application and other supporting documentation, USACE has made a *preliminary* determination that the project neither qualifies for a Categorical Exclusion nor requires the preparation of an Environmental Impact Statement for the purposes of NEPA. At the conclusion of the public comment period, USACE will assess the environmental impacts of the project in accordance with the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321-4347), the Council on Environmental Quality's regulations at 40 C.F.R. § 1500-1508, and USACE regulations at 33 C.F.R. § 325. The final NEPA analysis will normally address the direct, indirect, and cumulative impacts that result from regulated activities within the jurisdiction of USACE and other non-regulated activities USACE determines to be within its purview of Federal control and responsibility to justify an expanded scope of analysis for NEPA purposes. The final NEPA analysis will be incorporated in the decision documentation that provides the rationale for issuing or denying a Department of the Army Permit and/or a Department of the Army 408 Permission for the project. The final NEPA analysis and supporting documentation will be on file with the San Francisco District, Regulatory Division.

**Endangered Species Act (ESA):** Section 7(a)(2) of the ESA of 1973, as amended (16 U.S.C. § 1531 *et seq.*), requires Federal agencies to consult with either the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) to ensure actions authorized, funded, or undertaken by the agency are not likely to jeopardize the continued existence of any Federally-listed species or result in the adverse modification of designated critical habitat. As the Federal lead agency for this project, USACE has conducted a review of the California Natural Diversity Data Base, digital maps prepared by USFWS and

NMFS depicting critical habitat, and other information provided by the applicant to determine the presence or absence of such species and critical habitat in the project area. Based on this review, USACE has made a preliminary determination that the following Federally-listed species and designated critical habitat are present at the project location or in its vicinity and may be affected by project implementation: tidewater goby (*Eucyclogobius newberryi*), Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*), CCC coho salmon (*Oncorhynchus kisutch*).

**Tidewater goby** are currently listed as endangered under the Federal ESA (59 FR 5494) but have been proposed for reclassification as threatened (79 FR 14340). Tidewater goby occur in the San Lorenzo River and are expected to be in the action area during project implementation. The San Lorenzo River, including the project area, is not within the designated critical habitat for tidewater goby (78 FR 8745).

**CCC steelhead** are listed as threatened under the Federal Endangered Species Act (ESA) (71 FR 834). The CCC steelhead DPS 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 are expected to be in the action area during plan implementation. The San Lorenzo River, including the project area, is designated as critical habitat for CCC steelhead (70 FR 52488).

**CCC coho salmon** are listed as endangered under the ESA (70 FR 37160) and as endangered under the California Endangered Species Act. 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 and may be present in the action area during plan implementation. The San Lorenzo River, including the project area, is designated as critical habitat for CCC coho salmon (64 FR 24049).

To address project related impacts to these species and designated critical habitat, USACE has initiated formal consultation with USFWS and NMFS, pursuant to Section 7(a) of the ESA. Any required consultation must be concluded prior to the issuance of a Department of the Army Permit for the project.

**Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA):** Section 305(b)(2) of the MSFCMA of 1966, as amended (16 U.S.C. § 1801 *et seq.*), requires Federal agencies to consult with the NMFS on all proposed actions authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. EFH is designated only for those species managed under a Federal Fisheries Management Plan (FMP), such as the *Pacific Groundfish FMP*, the *Coastal Pelagics FMP*, or the *Pacific Coast Salmon FMP*. As the Federal lead agency for this project, USACE has conducted a review of digital maps prepared by NMFS depicting EFH to determine the presence or absence of EFH in the project area. Based on this review, USACE has made a *preliminary* determination that EFH is present at the project location or in its vicinity, and that the critical elements of EFH may be adversely affected by project implementation. To address project related impacts to EFH, USACE has initiated consultation with NMFS, pursuant to Section 305(5)(b)(2) of the Act. Any required consultation must be concluded prior to the issuance of a Department of the Army Permit for the project.

**Marine Protection, Research, and Sanctuaries Act (MPRSA):** Section 302 of the MPRSA of 1972, as amended (16 U.S.C. § 1432 *et seq.*), authorizes the Secretary of Commerce, in part, to designate areas of ocean waters, such as the Cordell Bank, Gulf of the Farallones, and Monterey Bay, as National Marine Sanctuaries for the purpose of preserving or restoring such areas for their conservation, recreational, ecological, or aesthetic values. After such designation, activities in sanctuary waters authorized under other authorities are valid only if the Secretary of Commerce certifies that the activities are consistent with Title III of the Act. No Department of the Army Permit will be issued until the applicant obtains any required certification or permit. Since the project partially occurs in sanctuary waters or may affect sanctuary resources, the applicant is hereby advised to apply for certification or a permit from the Secretary of Commerce, or their designee, to comply with this requirement.

**National Historic Preservation Act (NHPA):** Section 106 of the NHPA of 1966, as amended (16 U.S.C. § 470 *et seq.*), requires Federal agencies to consult with the appropriate State Historic Preservation Officer to take into account the effects of their undertakings on historic

properties listed in or eligible for listing in the *National Register of Historic Places*. Section 106 of the Act further requires Federal agencies to consult with the appropriate Tribal Historic Preservation Officer or any Indian tribe to take into account the effects of their undertakings on historic properties, including traditional cultural properties, trust resources, and sacred sites, to which Indian tribes attach historic, religious, and cultural significance. As the Federal lead agency for this undertaking, USACE has conducted a review of the latest published version of the *National Register of Historic Places*, survey information on file with various city and county municipalities, and other information provided by the applicant to determine the presence or absence of historic and archaeological resources within the permit area. Based on this review, USACE has made a *preliminary* determination that historic or archaeological resources are not likely to be present in the permit area and that the project either has no potential to cause effects to these resources or has no effect to these resources. USACE will render a final determination on the need for consultation at the close of the comment period, taking into account any comments provided by the State Historic Preservation Officer, the Tribal Historic Preservation Officer, the Advisory Council on Historic Preservation, and Native American Nations or other tribal governments. If unrecorded archaeological resources are discovered during project implementation, those operations affecting such resources will be temporarily suspended until USACE concludes Section 106 consultation with the State Historic Preservation Officer or the Tribal Historic Preservation Officer to take into account any project related impacts to those resources.

**6. COMPLIANCE WITH THE SECTION 404(b)(1) GUIDELINES:** Projects resulting in discharges of dredged or fill material into waters of the United States must comply with the Guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b) of the Clean Water Act (33 U.S.C. § 1344(b)). An evaluation pursuant to the Guidelines indicates the project is dependent on location in or proximity to waters of the United States to achieve the basic project purpose. This conclusion raises the (rebuttable) presumption of the availability of a practicable alternative to the project that would result in less adverse impacts to the aquatic ecosystem while not causing other major adverse environmental consequences. The applicant has been informed to submit an analysis of project alternatives to be reviewed for compliance with the Guidelines.

**7. PUBLIC INTEREST EVALUATION:** The decision on whether to issue a Department of the Army Permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the project and its intended use on the public interest. Evaluation of the probable impacts requires a careful weighing of the public interest factors relevant in each particular case. The benefits that may accrue from the project must be balanced against any reasonably foreseeable detriments of project implementation. The decision on permit issuance will, therefore, reflect the national concern for both protection and utilization of important resources. Public interest factors which may be relevant to the decision process include conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people.

**8. CONSIDERATION OF COMMENTS:** USACE is soliciting comments from the public; Federal, State, and local agencies and officials; Native American Nations or other tribal governments; and other interested parties in order to consider and evaluate the impacts of the project. All comments received by USACE will be considered in the decision on whether to issue, modify, condition, or deny a Department of the Army Permit and/or a 408 Permission for the project. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, and other environmental or public interest factors addressed in a final environmental assessment or environmental impact statement. Comments are also used to determine the need for a public hearing and to determine the overall public interest in the project.

**9. SUBMITTING COMMENTS:** During the specified comment period, interested parties may submit written comments to Gregory Brown or Jessica Vargas, San Francisco District, Regulatory Division, 450 Golden Gate Avenue, 4<sup>th</sup> Floor, San Francisco, California 94102-3404; comment letters should cite the project name, applicant name, and public notice number to facilitate review by the Regulatory Permit Manager. Comments may include a request for a public hearing on the project prior to a determination on the Department of the Army permit application; such requests shall state, with particularity, the reasons for holding a public hearing. All substantive

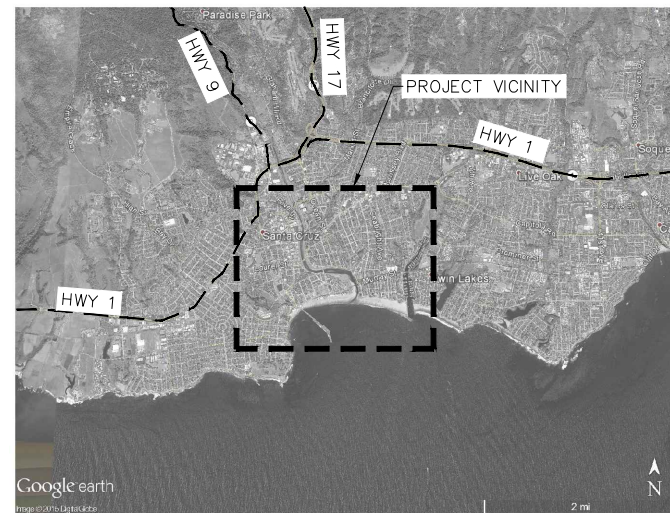
comments will be forwarded to the applicant for resolution or rebuttal. Additional project information or details on any subsequent project modifications of a minor nature may be obtained from the applicant and/or agent or by contacting the Regulatory Permit Manager by telephone or e-mail (cited in the public notice letterhead). An electronic version of this public notice may be viewed under the *Public Notices* tab on the San Francisco District website: <https://www.spn.usace.army.mil/Missions/Regulatory>.

FIGURE 1

# SAN LORENZO RIVER CULVERT

## JANUARY 2021

### CITY OF SANTA CRUZ, SANTA CRUZ COUNTY, CALIFORNIA



SOURCE: GOOGLE

LOCATION MAP  
SCALE: 1"=1 MILE



SOURCE: GOOGLE

VICINITY MAP  
SCALE: 1"=1,500'

SHEET INDEX

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DEFINITIONS

PROJECT OWNER: CITY OF SANTA CRUZ  
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PH: (831) 420-5428  
CONTACT: SCOTT RUBLE  
PH: (831) 420-5162

APPROVED BY: CHRISTOPHE J. SCHNEITER  
ASSISTANT DIRECTOR, CITY ENGINEER, CITY OF SANTA CRUZ

DATE \_\_\_\_\_

PROJECT ENGINEER: ENVIRONMENTAL SCIENCE ASSOCIATES  
CONTACT: JEAN O. TOILLIEZ, PE  
PH: (510) 267-7158

PREPARED BY:  
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TITLE SHEET  
PROJECT  
SAN LORENZO RIVER  
CULVERT

PREPARED FOR:  
CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060



APPROVED B. BATTALIO

DESIGNED ESA

DRAWN H. SNOW, S. SMITH

INCHARGE J. TOILLIEZ

SCALE AS NOTED

REVISION

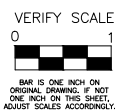
DATE JANUARY 2021

SHEET

G-1













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VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

**LEGEND**









-  PROPERTY LINE
-  EXISTING GRADE (PROFILE & SECTION)
-  DESIGN GRADE (PROFILE & SECTION)
-  SAFETY FLAG/FENCE
-  ACCESS ROUTE
-  BLUFF TOE
-  (E) VEGETATION
-  (E) MAJOR CONTOUR LINE
-  (E) MINOR CONTOUR LINE
-  (N) MAJOR CONTOUR LINE
-  (N) MINOR CONTOUR LINE
-  MHW LINE = 4.85' NAVD88

**LEGEND (CONT.)**

-  24" STEEL PIPE
-  8" STEEL PIPE
-  VALVES, CLEANOUT AND PIPELINE APPURTANCES
-  (E) GRADE, SURVEYED BY IFLAND (2018) AND ESA (2018)\*
-  (E) GRADE, SURVEYED BY ESA (2020)
-  (E) GRADE, EAST (BLUFF SIDE) TOP OF TRENCH (2018,2020)
-  (E) GRADE, WEST (WATER SIDE) TOP OF TRENCH (2018,2020)
-  HARD BASEMENT LAYER, SURVEYED BY FOTH/CLE (2018)
-  HARD BASEMENT LAYER (NOT SURVEYED)

\*IN 2018, AN ELEVATED SAND BERM (12+' NAVD88) COMPLETELY COVERED THE EXISTING TRENCH AFTER STA 6+50. THE 2016 LIDAR DATASET IS PROVIDED TO ESTIMATE TRENCH GEOMETRY AND ELEVATIONS DURING A LOW BERM PERIOD.

**LEGEND (CONT.)**

-  CUT OR FILL SLOPE
-  INDICATES SECTION NUMBER
-  VIEW DIRECTION
-  SHEET NUMBER ON WHICH SECTION APPEARS
-  INDICATES DETAIL NUMBER
-  SHEET NUMBER ON WHICH DETAIL APPEARS
-  SURVEY CONTROL POINT
-  CORING AND BULK SAMPLE LOCATION

**ABBREVIATIONS**

- |        |  |
|--------|--|
| APPROX | - APPROXIMATE                              |
| DG     | - DESIGN GRADE                             |
| DIA    | - DIAMETER                                 |
| (E)    | - EXISTING                                 |
| EG     | - EXISTING GRADE                           |
| EL     | - ELEVATION                                |
| EOR    | - ENGINEER OF RECORD                       |
| FOS    | - FACTOR OF SAFETY                         |
| FT     | - FEET                                     |
| LF     | - LINEAR FEET                              |
| MAX    | - MAXIMUM                                  |
| MIN    | - MINIMUM                                  |
| MISC   | - MISCELLANEOUS                            |
| MSL    | - MEAN SEA LEVEL                           |
| MHW    | - MEAN HIGH WATER                          |
| MHHW   | - MEAN HIGHER HIGH WATER                   |
| MLW    | - MEAN LOW WATER                           |
| MLLW   | - MEAN LOWER LOW WATER                     |
| (N)    | - NEW                                      |
| NAD83  | - NORTH AMERICAN DATUM OF 1983             |
| NAVD88 | - NORTH AMERICAN VERTICAL DATUM OF 1988    |
| NGVD29 | - NATIONAL GEODETIC VERTICAL DATUM OF 1929 |
| PIP    | - PROTECT IN PLACE                         |
| RCP    | - REINFORCED CONCRETE PIPE                 |
| SWL    | - SAFE WORKING LOAD                        |
| TBC    | - TO BE CONFIRMED                          |
| TYP    | - TYPICAL                                  |
| VIF    | - VERIFY IN FIELD                          |

**TIDAL DATUMS**

DATUM	ELEVATION (FT NAVD88)	ELEV. (FT CITY NGVD)
MHHW*	5.54	2.82
MHW	4.85	2.13
MSL*	2.99	0.27
MLW*	1.20	-1.52
MLLW*	0.10	-2.62

\*WITH THE EXCEPTION OF MHW, WHICH WAS CALCULATED BY IFLAND SURVEY, ALL TIDAL DATUMS WERE INTERPOLATED USING AN INVERSE DISTANCE-WEIGHTED AVERAGE BETWEEN THE TIDAL DATUMS REPORTED AT PILLAR POINT, CA AND MONTEREY, CA TIDAL STATIONS.

**NOTES**

GENERAL

- THESE NOTES HIGHLIGHT KEY REQUIREMENTS OF THE SPECIFICATIONS AND PROVIDE ADDITIONAL PROJECT INFORMATION. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS CONTAINED IN THE PLANS, SPECIFICATIONS, AND OTHER CONTRACT DOCUMENTS.

UTILITIES

- IDENTIFY, LOCATE, AND PROTECT ALL EXISTING UTILITIES WITHIN THE LIMITS OF WORK AND ALONG ONSITE AND OFFSITE ACCESS ROUTES.
- USE EXTREME CAUTION WHEN PERFORMING WORK IN THE VICINITY OF OVERHEAD POWERLINES. COMPLY WITH ALL SAFETY REGULATIONS AND REQUIREMENTS.
- PROTECT ALL EXISTING UTILITIES WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.
- OBTAIN BEST AVAILABLE CURRENT INFORMATION ON LOCATION, IDENTIFICATION AND MARKING OF EXISTING UTILITIES, PIPING AND CONDUITS AND OTHER UNDERGROUND FACILITIES BEFORE BEGINNING ANY EXCAVATION.
- NOTIFY UNDERGROUND SERVICE ALERT AND COORDINATE WITH UTILITIES AND PRIVATE LANDOWNERS IN ADVANCE OF BEGINNING WORK.

SITE ACCESS AND WATER MANAGEMENT

- THE CONTRACTOR IS ADVISED OF THE PUBLIC USE OF THE BEACH AND OTHER NEARBY AREAS WHICH AFFECT CONSTRUCTION ACCESS AND CONSTRUCTION, AND SHALL COMPLY WITH PROJECT PERMITS AND COORDINATE WITH THE CITY OF SANTA CRUZ AND ENDEAVOR TO LIMIT RESTRICTIONS ON PUBLIC ACCESS OUTSIDE THE LIMITS OF CONSTRUCTION.
- THE PROJECT SITE IS WITHIN THE SAN LORENZO RIVER ESTUARY LAGOON, WHICH EXPERIENCES THE EFFECT OF BOTH OCEAN TIDES AND RIVER FLOWS. CONSTRUCTION ACCESS WILL REQUIRE FLOATING EQUIPMENT AND WORKING AROUND HIGH WATER LEVELS, INCLUDING WORK BELOW WATER. THE WATER LEVELS IN THE LAGOON VARY FROM OCEAN TIDES - SEE SPECIFICATIONS APPENDIX C LAGOON WATER LEVELS. THE CITY OF SANTA CRUZ WILL PROVIDE LIMITED MANIPULATION OF LAGOON WATER LEVELS VIA GRADING OF THE SAND BEACH BERM IN ORDER TO FACILITATE CONSTRUCTION. SEE ENVIRONMENTAL PROTECTION SPECIFICATION.

TOPOGRAPHIC DATA

- ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88). HORIZONTAL CONTROL IS CALIFORNIA STATE PLANE COORDINATE SYSTEM, ZONE 3, NORTH AMERICAN DATUM (NAD 83, 1992).
- ALL ELEVATIONS AND HORIZONTAL COORDINATES ARE IN FEET.
- ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
- SEE DRAWING G-2 FOR TABLE OF TIDAL DATUMS AND CROSS-REFERENCE WITH CITY OF SANTA CRUZ NGVD ELEVATIONS. THE FOLLOWING ARE TARGETED ELEVATIONS:
  - CITY NGVD = + 2.72 FEET NAVD.
  - REQUIRED WEIR CREST ELEVATION RANGE IS 5.72 TO 8.22 FEET NAVD (3.0 TO 5.5 FEET CITY NGVD)
  - REQUIRED PIPELINE UPSTREAM INVERT (BOTH 24" AND 8" DIAMETER STEEL PIPE) = 5.72 FEET NAVD (3.0 FEET CITY NGVD)
  - REQUIRED PIPELINE DOWNSTREAM INVERT = 4.72 FEET NAVD (2.0 FEET CITY NGVD)
  - INFILTRATION GALLERY EMBEDDED 1.5 FEET BELOW EXISTING LAGOON BED, ESTIMATED ELEVATION -1.0 TO -2.0 FEET NAVD (-3.72 TO - 4.72 FEET CITY NGVD): VERIFY IN FIELD ELEVATIONS AND LOCATIONS PRIOR TO CONSTRUCTION.
- SURVEY CONTROL IS PROVIDED ON DRAWING G-3.
- EXISTING TOPOGRAPHY AND SURVEY CONTROL PROVIDED BY IFLAND SURVEY, 5300 SOQUEL AVENUE, #101, SANTA CRUZ, CA 95062, TEL 831.426.7941. BOUNDARY AND TOPOGRAPHIC SURVEY FOR SLR HEAD DRIVEN CULVERT, 06/27/2018, G17058
- SUPPLEMENTAL TOPOGRAPHIC DATA PROVIDED BY:
  - ADDITIONAL SURVEY AND SUBSURFACE EXPLORATION BY FOTH -CLE FOTH INFRASTRUCTURE & ENVIRONMENT, LLC 384 BEL MARIN KEYS BOULEVARD SUITE 140 NOVATO CA 94949 PHONE: (415) 884-8011. SAN LORENZO RIVER BATHYMETRIC AND DEPTH-TO-BASEMENT SONAR SURVEYS METHODS, PROCEDURES AND RESULTS AUGUST 25, 2018
  - ESA, 2020 - EXISTING CULVERT DOWNSTREAM OF SEABRIGHT CAVE

- ELEVATION CONTOURS ARE APPROXIMATE AND PROVIDED FOR GENERAL REFERENCE ONLY. THE ACCURACY OF THE ELEVATION CONTOURS IS LIMITED STANDING WATER, INSTRUMENT ACCURACY, NATURAL VARIABILITY AND CHANGES SINCE SURVEYS. THE CONTRACTOR SHALL PERFORM SITE INVESTIGATIONS, ESTIMATE QUANTITIES AND INCLUDE SUFFICIENT CONTINGENCY IN ITS BID TO COVER TOPOGRAPHIC AND BATHYMETRIC VARIABILITY.

GEOTECHNICAL

- GEOTECHNICAL ENGINEERING PROVIDED HARO KASUNICH AND ASSOCIATES INC. 116 EAST LAKE AVENUE □ WATSONVILLE, CALIFORNIA 95076 (831) 722-4175. GEOTECHNICAL INVESTIGATION SAN LORENZO RIVER LAGOON MANAGEMENT PROGRAM - PHASE 2, 30 APRIL 2019, PROJECT NO. SC11525

ENVIRONMENTAL PROTECTION

- CONSTRUCTION IS RESTRICTED TO WINDOWS OF TIME IDENTIFIED BY THE PROJECT PERMITS - SEE SPECIFICATIONS.
- THE CONTRACTOR IS ADVISED OF SENSITIVE HABITAT AND ENVIRONMENTAL RESTRICTIONS AFFECTING CONSTRUCTION, AND SHALL COMPLY WITH PROJECT PERMITS AND COORDINATE WITH THE CITY OF SANTA CRUZ AND ENDEAVOR TO PROTECT COASTAL RESOURCES FROM ADVERSE EFFECTS CAUSED BY CONSTRUCTION.
- THE CITY OF SANTA CRUZ IS OBTAINING PERMITS FOR THE PROJECT.
- THE CONTRACTOR SHALL PREPARE AND IMPLEMENT A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AS REQUIRED BY THE REGIONAL WATER RESOURCES CONTROL BOARD. INCORPORATE SEDIMENT CONTROL AND EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT AND HAZARDOUS MATERIALS RUNOFF FROM THE CONSTRUCTION SITE.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY EROSION AND SEDIMENT CONTROL THROUGHOUT CONSTRUCTION. LAGOON WATER MANAGEMENT WILL BE ACCOMPLISHED BY THE CITY OF SANTA CRUZ AS DESCRIBED IN SPECIFICATIONS.


EARTHWORK

- CONSTRUCTION WILL REQUIRE EXCAVATION OF SEDIMENTARY ROCK ALONG SAN LORENZO POINT. THE CONTRACTOR SHALL ENDEAVOR TO MINIMIZE EXCAVATION BY CONSTRUCTION METHODS AND FABRICATION OF PIPE SEGMENTS THAT CONFORM TO AN EXISTING TRENCH TO THE EXTENT PRACTICABLE AS INDICATED IN THESE DRAWINGS. THE CONTRACTOR SHALL VERIFY IN FIELD THE EXISTING GEOMETRY, AND SUBMIT THE PROPOSED PIPE LINE ALIGNMENT, EXCAVATION LIMITS AND COMPUTED VOLUMES TO THE CITY FOR APPROVAL PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR LEGAL DISPOSAL OR BENEFICIAL REUSE OF ALL EXCAVATED SEDIMENT INCLUDING ANY SAMPLING, TESTING, DUMP FEES, TRANSPORT AND STAGING, EROSION CONTROL AND APPROVALS ASSOCIATED WITH OFF-SITE PLACEMENTS.
- THE CONTRACTOR SHALL RESTRICT CONSTRUCTION MEANS AND METHODS TO AVOID DESTABILIZING THE SAN LORENZO POINT, PRIVATE PROPERTY AND RESIDENCES: SEE GEOTECHNICAL REPORT AND PROJECT PERMITS, AND MAINTAIN WORK WITHIN AND IN ACCORDANCE WITH EASEMENTS SECURED BY THE CITY OF SANTA CRUZ.

U:\Projects\SEA\1800183\_01 - San Lorenzo Culvert Design\08 CAD\Drawings\2 GENERAL NOTES.dwg 1-22-21 04:46:57 PM adshh



PREPARED BY:



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SHEET TITLE

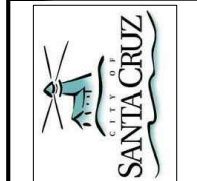
LEGEND, ABBREVIATIONS, AND NOTES

PROJECT

SAN LORENZO RIVER CULVERT

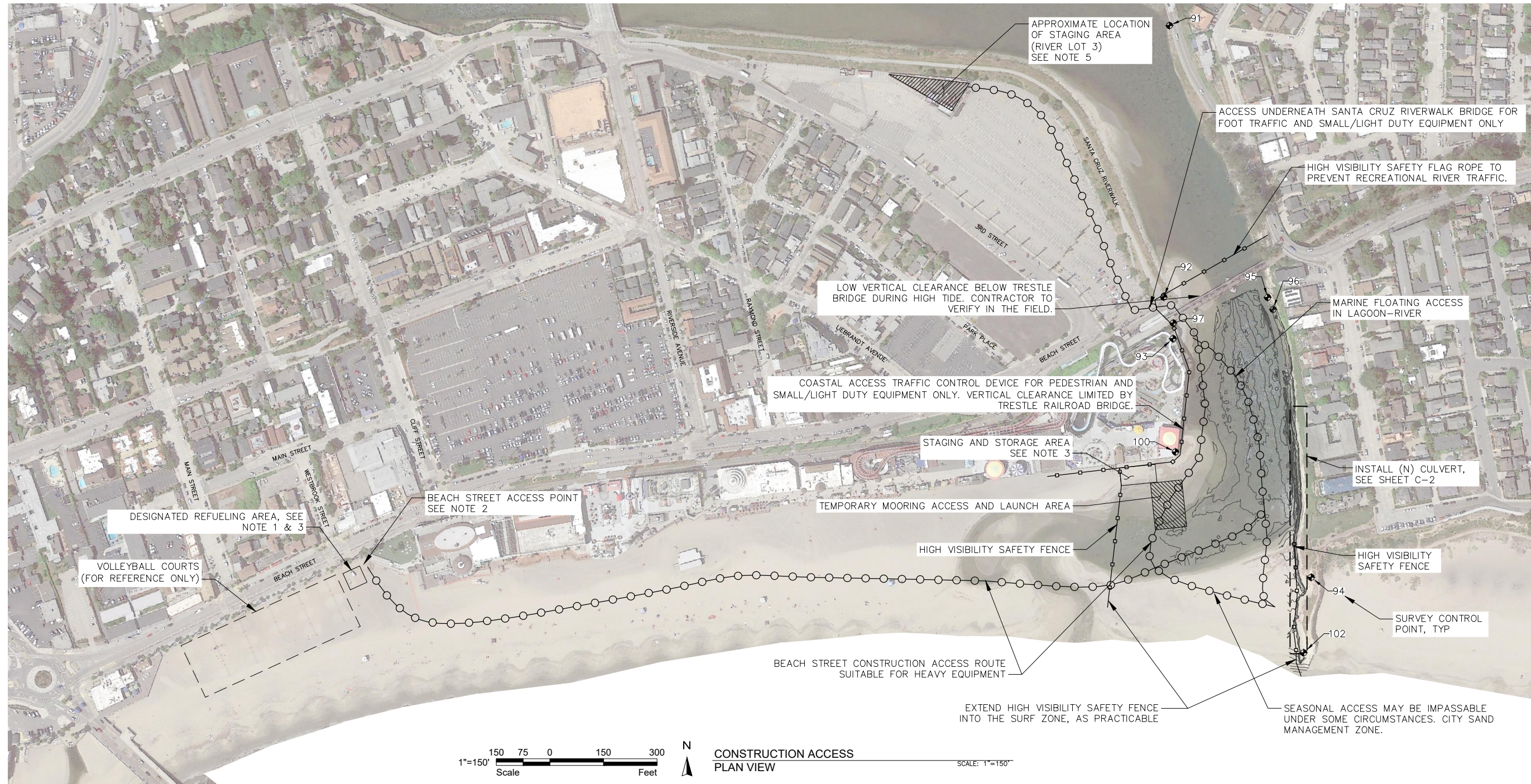
PREPARED FOR:

CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060



APPROVED	B. BATTALIO
DESIGNED	ESA
DRAWN	H. SNOW
INCHARGE	J. TOILLIEZ
SCALE	AS NOTED
REVISION	
DATE	JANUARY 2021
SHEET	





**NOTES:**

1. DAYTIME REFUELING SHALL BE COORDINATED WITH THE CITY AND CITY LIFEGUARD.
2. BEACH STREET ACCESS IS LIMITED TO 06:00 AM TO 08:00 AM WEEKDAYS. SEE GENERAL NOTES.
3. CONTRACTOR SHALL WORK WITH THE CITY TO CONFIRM EXTENT, LOCATION, HOUR RESTRICTIONS, AND ACCESS TO REFUELING AND TEMPORARY NIGHT TIME STAGING AREAS.
4. NIGHT TIME STORAGE OF EQUIPMENT SHALL BE RESTRICTED TO EQUIPMENT REQUIRED TO INSTALL THE CULVERT, UNLESS DIRECTED OTHERWISE BY THE CITY OR THE EOR.
5. ACTUAL STAGING AREA (APPROX. 10,000 SQUARE FEET) WILL BE LOCATED WITHIN LOT 3 AREA. EXACT LOCATION, LAYOUT, AND EXTENT TO BE PROVIDED BY THE CITY.

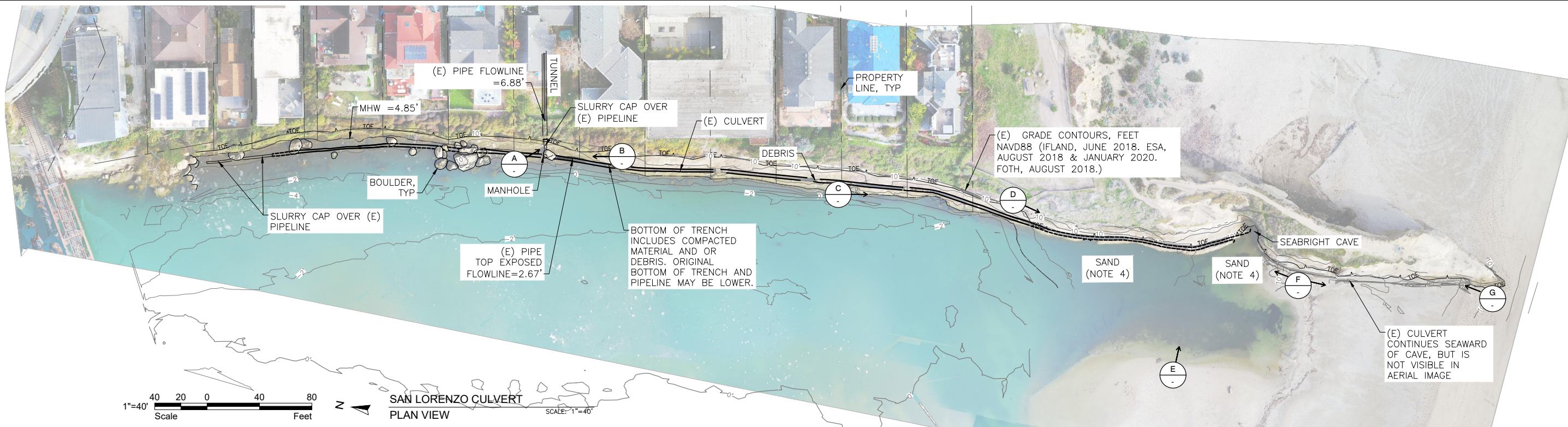
**SURVEY CONTROL POINT TABLE:**

NAD 83 / NAVD 88 POINT TABLE					
POINT #	NAME	NORTHING	EASTING	NAVD88 ELEV	DESCRIPTION
91	SLR-M1	1814371.77	6119534.38	22.187	FD DISK SLR-M1
92	3B	1813611.29	6119518.91	15.267	CUT + ON CC
93	3A	1813495.37	6119544.65	19.119	SET DISC
94	2B	1812827.16	6119931.81	38.435	FD MAG NAIL TW
95	1A	1813610.86	6119809.60	9.931	SET DISC
96	1B	1813577.19	6119824.75	4.805	SET DISC
97	S-1237	1813539.01	6119545.39	26.815	FD DISK S1237
100	4	1813177.87	6119551.87	11.456	CENTER TARGET
102	2A	1812615.83	6119910.95	23.569	SET DISC

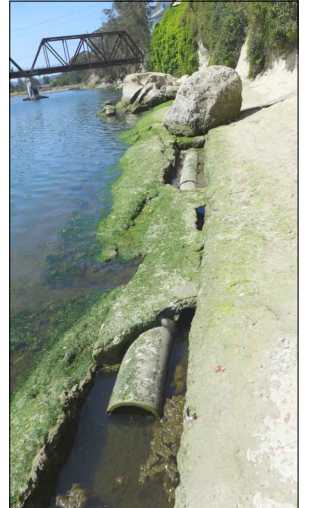


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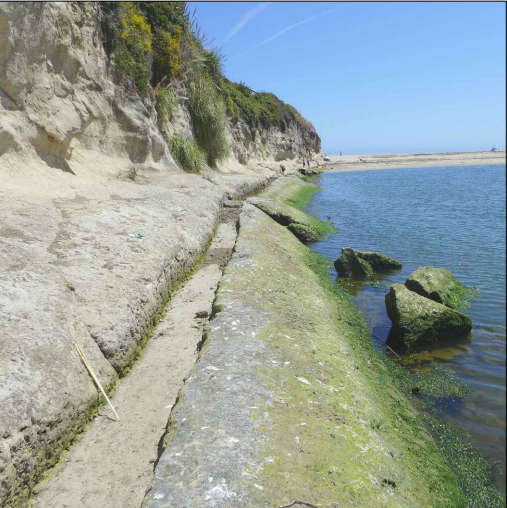
**FINAL DRAFT  
NOT FOR CONSTRUCTION**



**A** TUNNEL OPENING AND BOULDER NEAR (P) JUNCTION BOX  
PHOTO DETAIL - LOOKING SOUTH



**B** REMANT PIPE  
PHOTO DETAIL - LOOKING NORTH



**C** TYPICAL (E) TRENCH CONDITIONS  
PHOTO DETAIL - LOOKING SOUTH

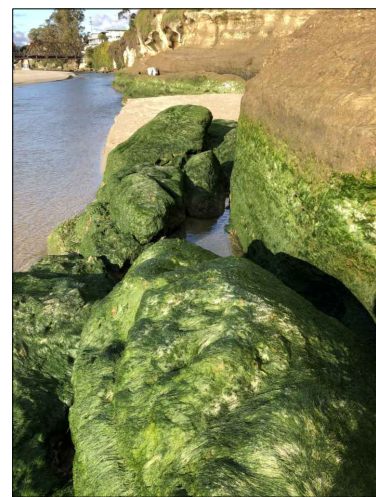


**D** TYPICAL (E) TRENCH CONDITIONS  
PHOTO DETAIL - LOOKING SOUTH



**E** SEABRIGHT CAVE AND (E) TRENCH  
PHOTO DETAIL - LOOKING EAST

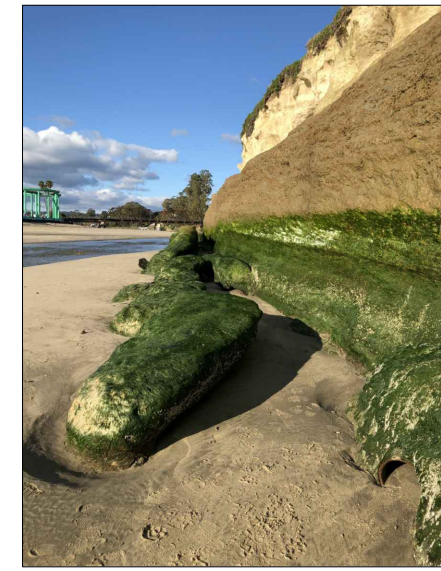
- NOTES:**
- ELEVATIONS SHOWN IN NAVD88.
  - CONTOURS SHOWN ARE CONSTRUCTED FROM A COMBINATION OF MULTIPLE FIELD SURVEYS. FIELD SURVEYS CONDUCTED BY:
    - IFLAND SURVEY, DATED JUNE 5TH, 2018.
    - ESA, DATED AUGUST 2ND, 2018 AND JANUARY 14, 2020.
    - FOTH ENGINEERS, JULY & AUGUST 2018.
  - (E) CULVERT LOCATION BASED ON AERIAL IMAGE DATED 12/10/17.
  - AERIAL IMAGE SHOWN WAS TAKEN THE WINTER PRIOR TO THE IFLAND FIELD SURVEY.
  - GROUND PHOTOS BY ESA, 2018 AND CITY OF SANTA CRUZ, 2019



**F** TYPICAL (E) TRENCH CONDITIONS  
PHOTO DETAIL - LOOKING NORTH



**F** TYPICAL (E) TRENCH CONDITIONS  
PHOTO DETAIL - LOOKING SOUTH



**G** TYPICAL (E) TRENCH CONDITIONS  
PHOTO DETAIL - LOOKING NORTH

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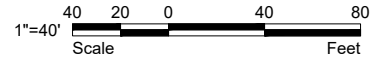
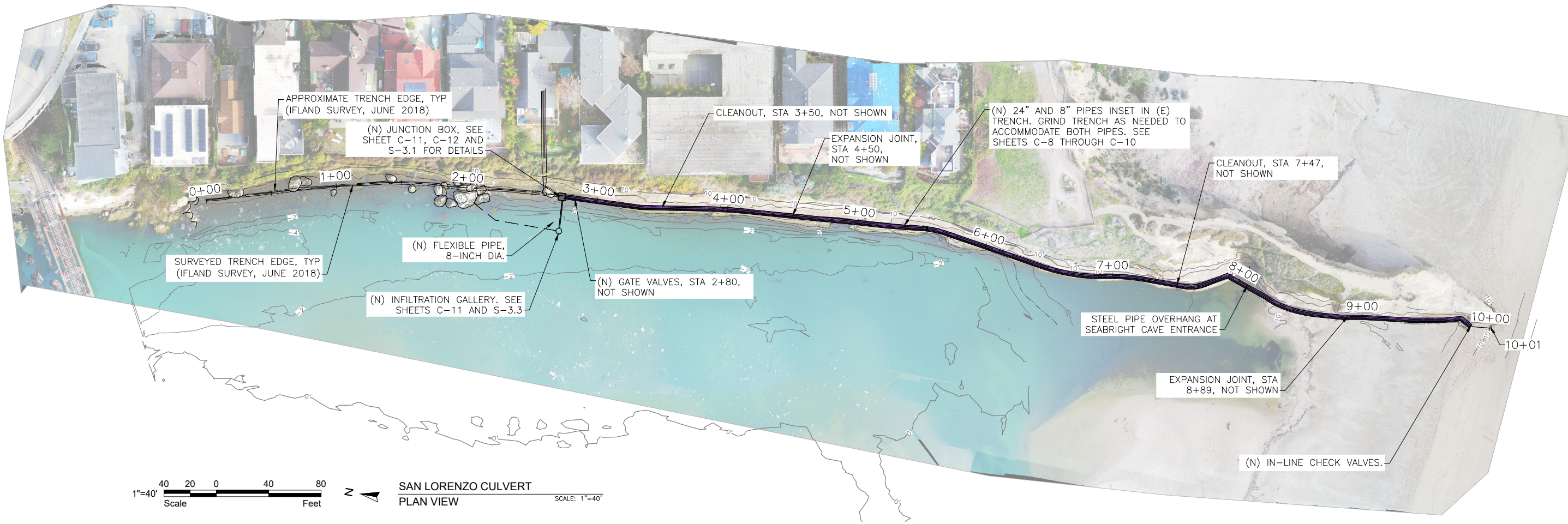
EXISTING CONDITIONS  
SAN LORENZO RIVER  
CULVERT

PREPARED FOR:  
CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060

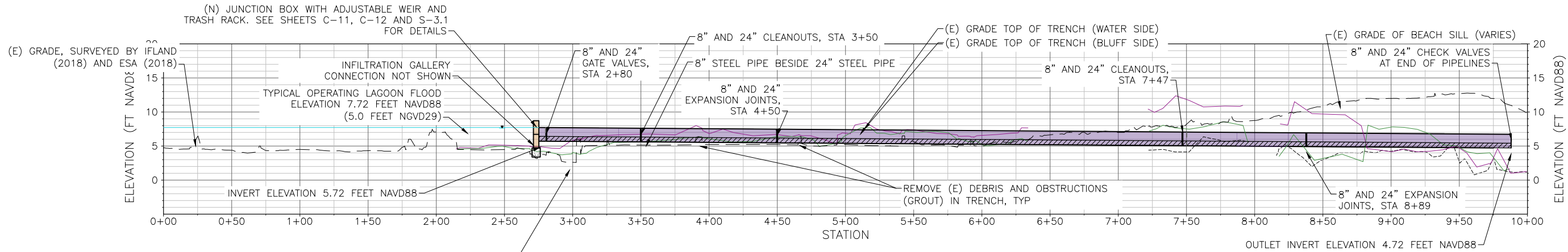


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INCHARGE	J. TOLLIEZ
SCALE	AS NOTED
REVISION	
DATE	JANUARY 2021
SHEET	

**FINAL DRAFT  
NOT FOR CONSTRUCTION**



**SAN LORENZO CULVERT  
PLAN VIEW** SCALE: 1"=40'



**(N) CULVERT ALIGNMENT  
PROFILE VIEW** SCALE: HORZ. 1"=40'; VERT. 1"=8'

- LEGEND:**
- 24" STEEL PIPE
  - 8" STEEL PIPE
  - (E) GRADE, SURVEYED BY IFLAND (2018) AND ESA (2018)\*
  - (E) GRADE, SURVEYED BY ESA (2020)
  - (E) GRADE, EAST (BLUFF SIDE) TOP OF TRENCH (2018,2020)
  - (E) GRADE, WEST (WATER SIDE) TOP OF TRENCH (2018,2020)
  - VALVES, CLEANOUT AND PIP

- NOTES:**
- ELEVATIONS SHOWN IN NAVD88
  - STEEL PIPE TO BE PAINTED TO MATCH BLUFF COLOR. SEE SPECIFICATIONS FOR DETAILS



\*IN 2018, AN ELEVATED SAND BERM (12+ NAVD88) COMPLETELY COVERED THE EXISTING TRENCH AFTER STA 6+50.

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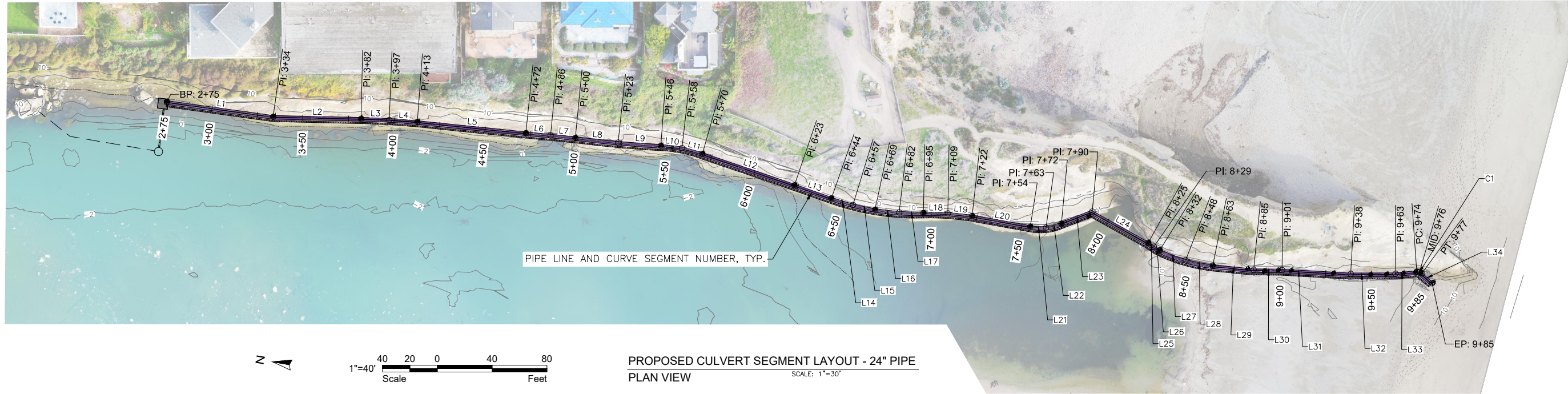
SHEET TITLE  
**SITE PLAN & PROFILE**  
PROJECT  
**SAN LORENZO RIVER  
CULVERT**

PREPARED FOR:  
**CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060**



APPROVED	B. BATTALIO
DESIGNED	ESA
DRAWN	H. SNOW
INCHARGE	J. TOILLIEZ
SCALE	AS NOTED
REVISION	
DATE	JANUARY 2021
SHEET	

**FINAL DRAFT  
NOT FOR CONSTRUCTION**



PROPOSED CULVERT SEGMENT LAYOUT - 24" PIPE  
PLAN VIEW  
SCALE: 1"=30'

(N) CULVERT LAYOUT  
CURVE AND LINE TABLE

NUMBER	BEGIN STATION	BEGIN EASTING	BEGIN NORTHING	LINE BEARING	LINE DISTANCE	CURVE DISTANCE	CURVE RADIUS	DELTA ANGLE
L1	2+75	6119873.9	1813308.5	S1° 46' 48"E	58.75			
L2	3+33.75	6119875.7	1813249.8	S8° 27' 02"E	48.10			
L3	3+81.85	6119882.8	1813202.2	S7° 26' 03"E	15.39	30.8	433.7	4° 03' 59"
L4	3+97.24	6119884.8	1813187.0	S5° 24' 03"E	15.39			
L5	4+12.63	6119886.2	1813171.7	S3° 49' 50"E	59.66			
L6	4+72.29	6119890.2	1813112.1	S4° 11' 58"E	13.61	27.2	16748.3	0° 05' 35"
L7	4+85.90	6119891.2	1813098.6	S4° 09' 11"E	13.61			
L8	4+99.51	6119892.2	1813085.0	S3° 28' 27"E	23.47	47.0	650.0	4° 08' 18"
L9	5+22.98	6119893.6	1813061.6	S5° 32' 36"E	23.47			
L10	5+46.46	6119895.9	1813038.2	S3° 10' 39"E	11.60	23.2	71.5	18° 36' 41"
L11	5+58.06	6119896.5	1813026.6	S6° 07' 41"W	11.60			
L12	5+69.65	6119895.3	1813015.1	S9° 07' 34"W	53.17			
L13	6+22.83	6119886.9	1812962.6	S9° 44' 13"W	21.43			
L14	6+44.25	6119883.2	1812941.5	S7° 17' 24"W	12.33	24.7	144.4	9° 47' 15"
L15	6+56.58	6119881.7	1812929.2	S2° 23' 47"W	12.33			
L16	6+68.91	6119881.2	1812916.9	S2° 52' 12"E	13.27	26.5	134.9	11° 16' 40"
L17	6+82.18	6119881.8	1812903.7	S8° 30' 32"E	13.27			
L18	6+95.45	6119883.8	1812890.5	S8° 41' 07"E	13.34	26.7	144.7	10° 34' 20"
L19	7+08.79	6119885.8	1812877.4	S3° 23' 57"E	13.34			
L20	7+22.13	6119886.6	1812864.0	S0° 31' 22"W	32.30			
L21	7+54.43	6119886.3	1812831.7	S5° 58' 27"E	8.65	17.4	28.1	35° 22' 59"
L22	7+63.08	6119887.2	1812823.1	S23° 39' 57"E	8.65			
L23	7+71.74	6119890.7	1812815.2	S31° 19' 25"E	18.11			
L24	7+89.85	6119900.1	1812799.7	S19° 23' 13"W	35.00			
L25	8+24.85	6119888.5	1812766.7	S25° 10' 09"W	3.76	7.5	70.7	6° 06' 09"
L26	8+28.61	6119886.9	1812763.3	S22° 07' 04"W	3.76			
L27	8+32.37	6119885.5	1812759.8	S11° 27' 41"W	15.14	30.3	89.4	19° 24' 58"
L28	8+47.51	6119882.4	1812745.0	S1° 45' 12"W	15.14			
L29	8+62.64	6119882.0	1812729.9	S4° 01' 53"E	22.43			
L30	8+85.07	6119883.6	1812707.5	S9° 11' 29"E	15.50			
L31	9+00.57	6119886.0	1812692.2	S6° 30' 36"E	37.56			
L32	9+38.13	6119890.3	1812654.9	S9° 50' 14"E	24.56			
L33	9+62.69	6119894.5	1812630.7	S14° 58' 52"E	11.60			
C1	9+74.29	6119897.5	1812619.5			2.99	4.26	40° 12' 16"
L34	9+77.28	6119897.2	1812616.6	S30° 02' 17"W	7.99			



PREPARED BY:  
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CULVERT LAYOUT  
SAN LORENZO RIVER  
CULVERT

PREPARED FOR:  
CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060



APPROVED B. BATTALIO

DESIGNED ESA

DRAWN S. SMITH

INCHARGE J. TOILLIEZ

SCALE AS NOTED

REVISION

DATE JANUARY 2021

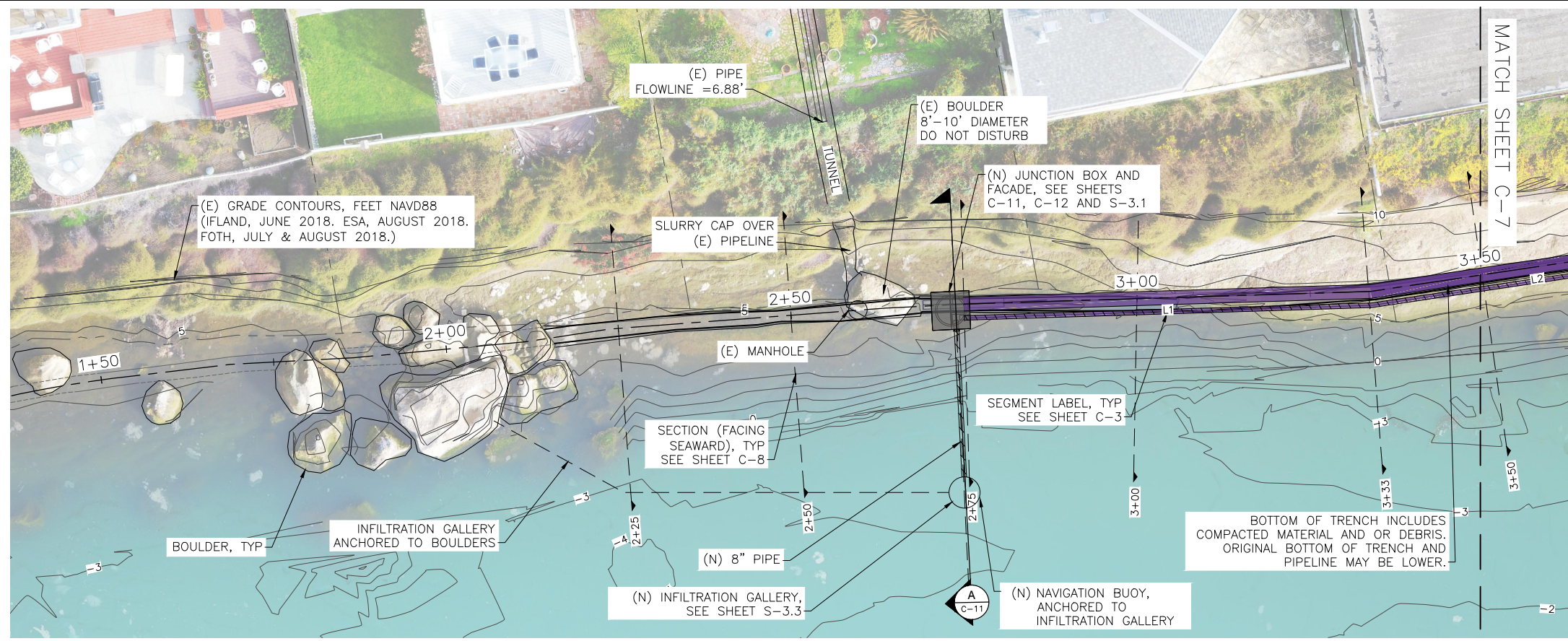
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C-3

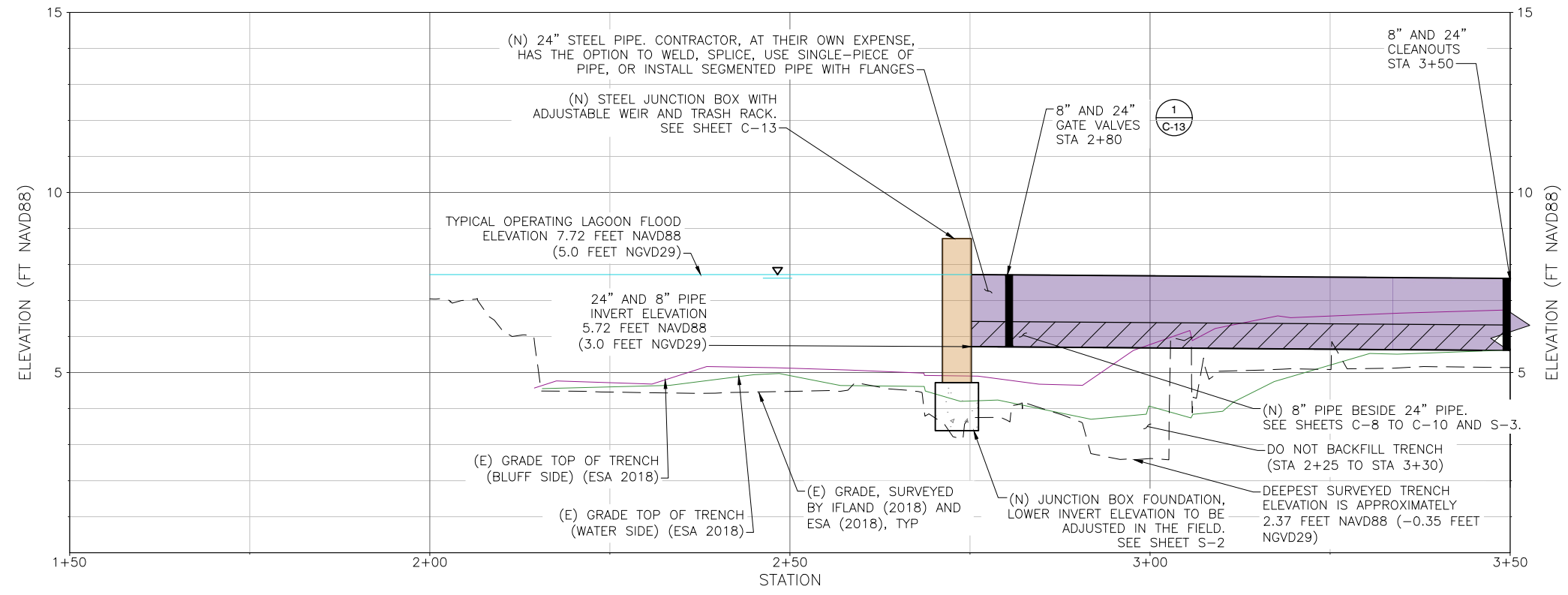
06 OF 22

U:\Projects\150\150000\150000\_01 - San Lorenzo Culvert Design\08 CAD\Drawn\3-3 PROPOSED CULVERT LAYOUT.dwg 1-22-21 04:55:34 PM esd/rae

**FINAL DRAFT  
NOT FOR CONSTRUCTION**



1"=10'  
Scale Feet  
N  
**(E) CULVERT STA 0+00 TO STA 3+50**  
PLAN VIEW SCALE: 1"=10'



**(E) CULVERT STA 0+00 TO STA 3+50**  
PROFILE VIEW  
HORIZ: 1"=10' VERT: 1"= 2'

**NOTES:**

- ELEVATIONS PROVIDED IN NAVD88.
- CONTOURS SHOWN ARE CONSTRUCTED FROM A COMBINATION OF MULTIPLE FIELD SURVEYS. FIELD SURVEYS CONDUCTED BY:
  - IFLAND SURVEY, DATED JUNE 5TH, 2018.
  - ESA, DATED AUGUST 2ND, 2018 & JANUARY 14TH, 2020
  - FOTH ENGINEERS, JULY & AUGUST 2018.
- (E) CULVERT LOCATION BASED ON AERIAL IMAGE DATED 12/10/17.
- AERIAL IMAGE SHOWN WAS TAKEN THE WINTER PRIOR TO THE 2018 IFLAND FIELD SURVEY.
- SEE SHEET S-2 FOR PIPELINE FOUNDATION PLAN.

**LEGEND:**

- 24" STEEL PIPE
- 8" STEEL PIPE
- VALVES, CLEANOUT AND PIPELINE APPURTANCES
- (E) GRADE, SURVEYED BY IFLAND (2018) AND ESA (2018)\*
- (E) GRADE, SURVEYED BY ESA (2020)
- (E) GRADE, EAST (BLUFF SIDE) TOP OF TRENCH (2018,2020)
- (E) GRADE, WEST (WATER SIDE) TOP OF TRENCH (2018,2020)

\*IN 2018, AN ELEVATED SAND BERM (12+' NAVD88) COMPLETELY COVERED THE EXISTING TRENCH AFTER STA 6+50.

I:\Projects\2020\San Lorenzo Culvert Design\08\_CAD\Drawings\Detail Plan & Profile STA 7+50 TO 9+75.dwg 1-22-21 04:51:29 PM adk/ka



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SHEET TITLE: **DETAIL PLAN & PROFILE  
STA 1+50 TO 3+50**

PROJECT: **SAN LORENZO RIVER  
CULVERT**

PREPARED FOR: **CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060**

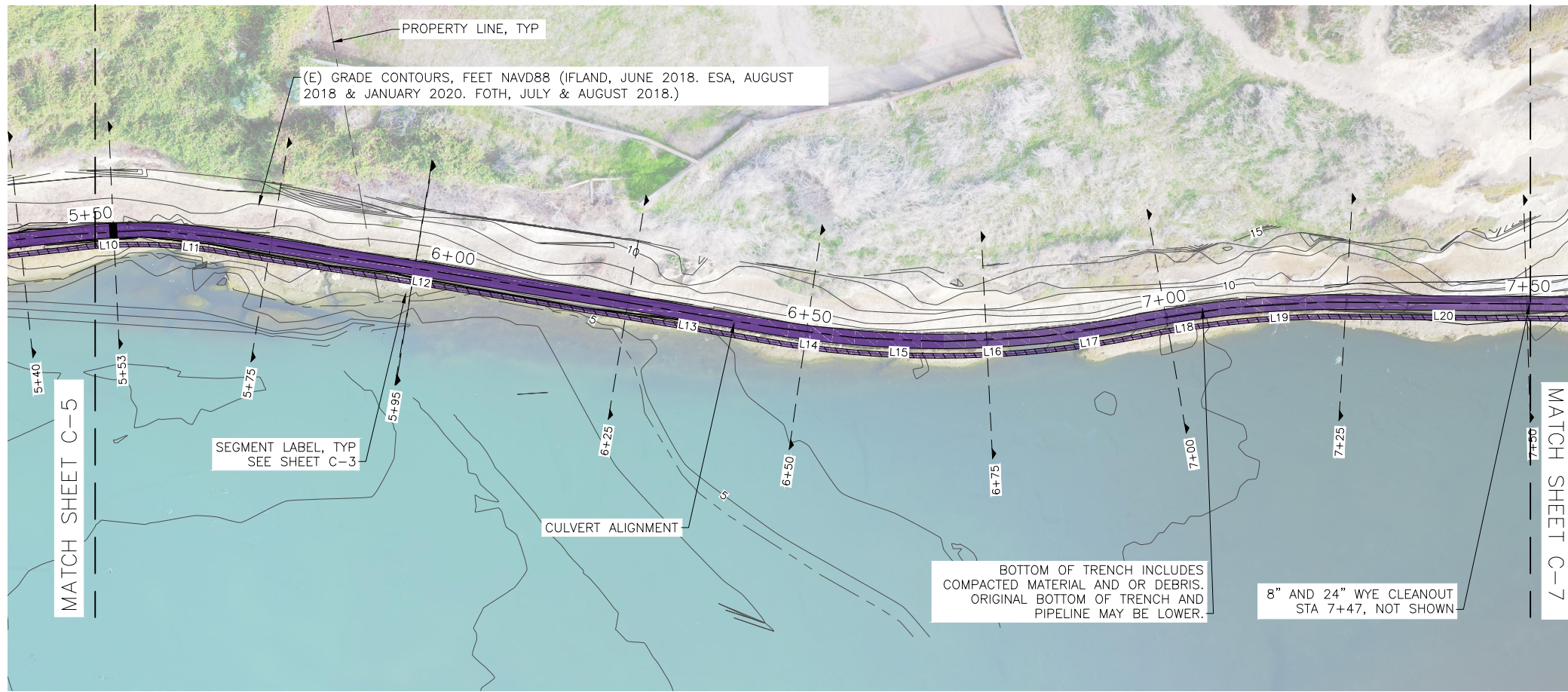
**SANTA CRUZ**  
CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER  
JEAN D. TOILLIEZ  
C 77499  
CIVIL  
STATE OF CALIFORNIA

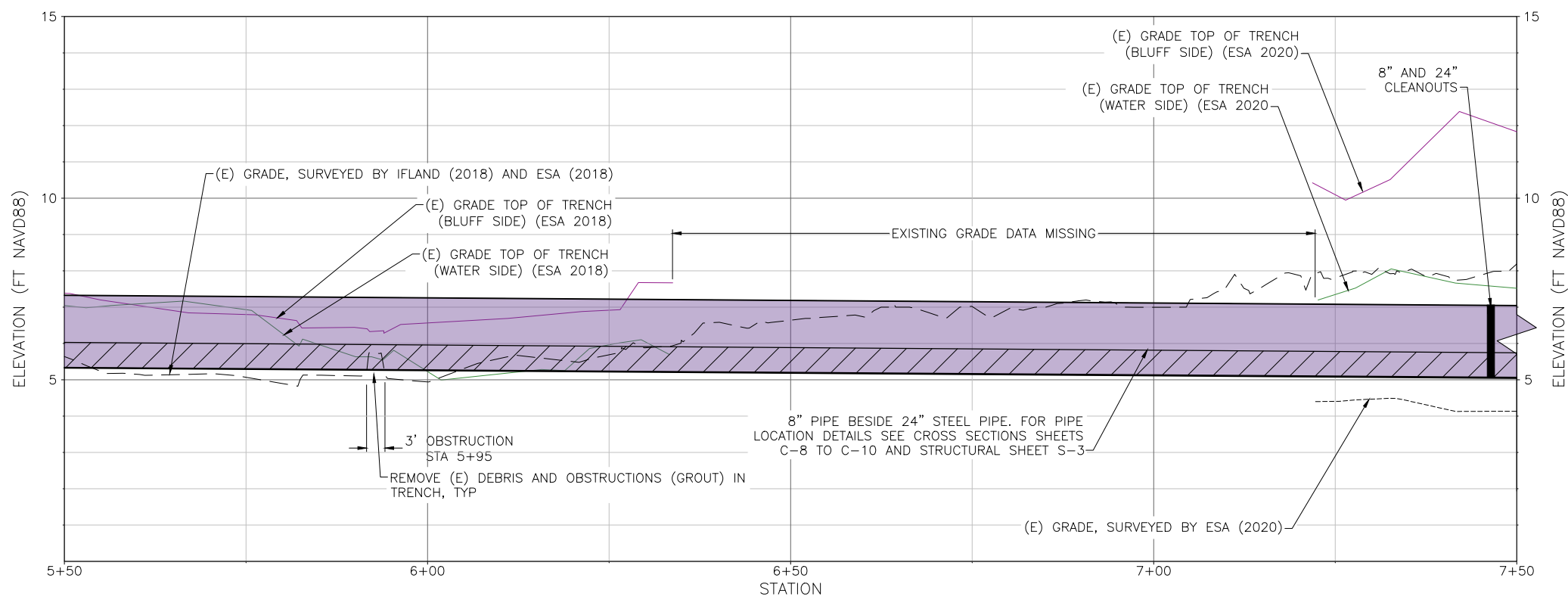
APPROVED: B. BATTALIO  
DESIGNED: ESA  
DRAWN: H. SNOW  
INCHARGE: J. TOILLIEZ  
SCALE: AS NOTED  
REVISION:  
DATE: JANUARY 2021  
SHEET: **C-4**  
07 OF 22



**FINAL DRAFT  
NOT FOR CONSTRUCTION**



1"=10'  
Scale 10 5 0 10 20 Feet  
**(N) CULVERT STA 5+50 TO STA 7+50**  
PLAN VIEW SCALE: 1"=10'



**(N) CULVERT STA 5+50 TO STA 7+50**  
PROFILE VIEW  
HORZ: 1"=10' VERT: 1"=2'

**NOTES:**

- ELEVATIONS PROVIDED IN NAVD88.
- CONTOURS SHOWN ARE CONSTRUCTED FROM A COMBINATION OF MULTIPLE FIELD SURVEYS. FIELD SURVEYS CONDUCTED BY:
  - IFLAND SURVEY, DATED JUNE 5TH, 2018.
  - ESA, DATED AUGUST 2ND, 2018 & JANUARY 14TH, 2020
  - FOTH ENGINEERS, JULY & AUGUST 2018.
- (E) CULVERT LOCATION BASED ON AERIAL IMAGE DATED 12/10/17.
- AERIAL IMAGE SHOWN WAS TAKEN THE WINTER PRIOR TO THE 2018 IFLAND FIELD SURVEY.
- SEE SHEET S-2 FOR PIPELINE FOUNDATION PLAN.

**LEGEND:**

- 24" STEEL PIPE
- 8" STEEL PIPE
- VALVES, CLEANOUT AND PIPELINE APPURTANCES
- (E) GRADE, SURVEYED BY IFLAND (2018) AND ESA (2018)\*
- (E) GRADE, SURVEYED BY ESA (2020)
- (E) GRADE, EAST (BLUFF SIDE) TOP OF TRENCH (2018,2020)
- (E) GRADE, WEST (WATER SIDE) TOP OF TRENCH (2018,2020)

\*IN 2018, AN ELEVATED SAND BERM (12+' NAVD88) COMPLETELY COVERED THE EXISTING TRENCH AFTER STA 6+50.

I:\Projects\2021\San Lorenzo Culvert Design\08\_CAD\Drawings\C-6 DETAIL PLAN & PROFILE STA 5+50 TO 7+50.dwg 1-22-21 04:52:01 PM adskrk



PREPARED BY:

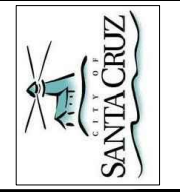
500 Henry Street  
Suite 800  
San Francisco, CA 94108  
415.774.2300 phone

SHEET TITLE  
**DETAIL PLAN & PROFILE  
STA 5+50 TO 7+50**

PROJECT  
**SAN LORENZO RIVER  
CULVERT**

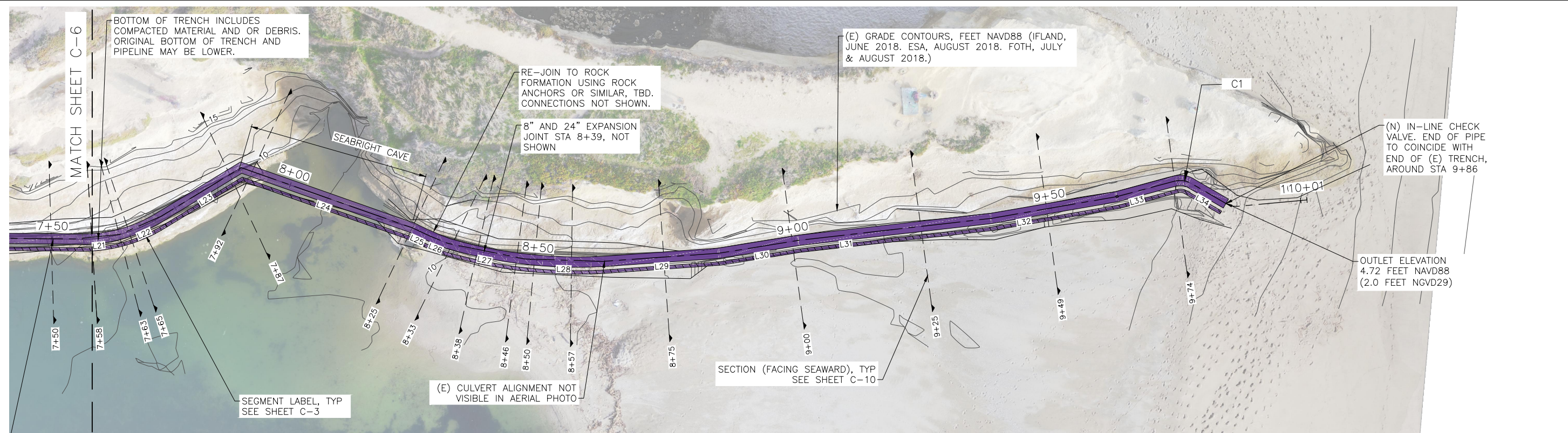
PREPARED FOR:

**CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060**

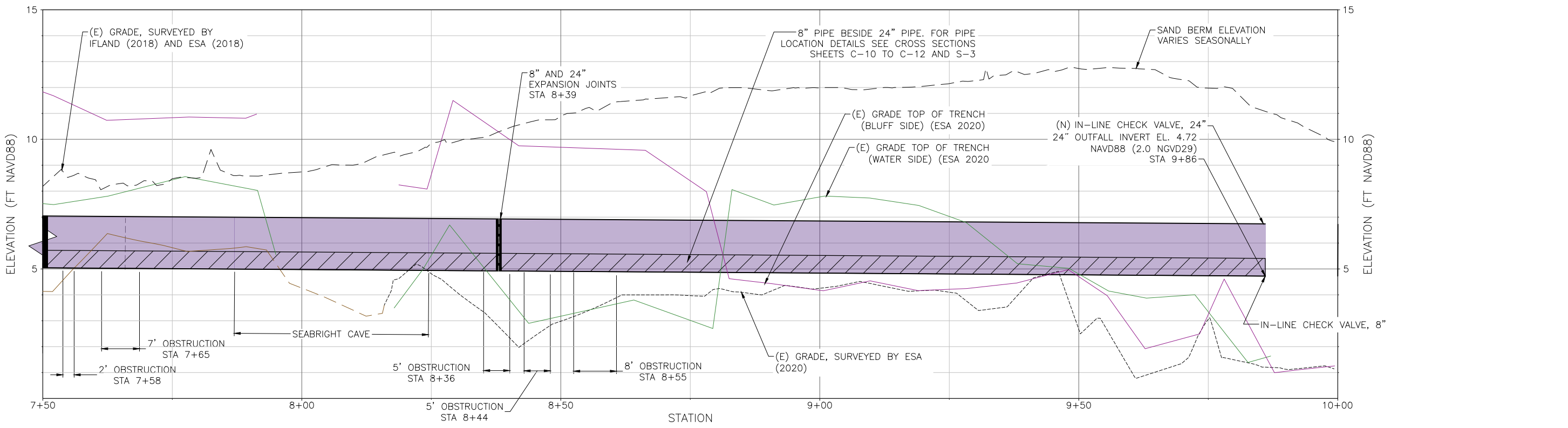


APPROVED	B. BATTALIO
DESIGNED	ESA
DRAWN	H. SNOW
INCHARGE	J. TOLLIEZ
SCALE	AS NOTED
REVISION	
DATE	JANUARY 2021
SHEET	

**FINAL DRAFT  
NOT FOR CONSTRUCTION**



1"=10'  
Scale Feet  
**(N) CULVERT STA 7+50 TO STA 9+75  
PLAN VIEW**  
SCALE: 1"=10'



**(N) CULVERT STA 7+50 TO STA 10+00  
PROFILE VIEW**  
HORZ: 1"=10' VERT: 1"=2'

**NOTES:**

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**LEGEND:**

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  - 8" STEEL PIPE
  - (E) GRADE, SURVEYED BY IFLAND (2018) AND ESA (2018)\*
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  - (E) GRADE, EAST (BLUFF SIDE) TOP OF TRENCH (2018,2020)
  - (E) GRADE, WEST (WATER SIDE) TOP OF TRENCH (2018,2020)
  - VALVES, CLEANOUT AND PIPELINE APPURTANCES
- \*IN 2018, AN ELEVATED SAND BERM (12+ NAVD88) COMPLETELY COVERED THE EXISTING TRENCH AFTER STA 6+50.



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SHEET TITLE  
**DETAIL PLAN & PROFILE  
STA 7+50 TO 10+00**  
PROJECT  
**SAN LORENZO RIVER  
CULVERT**

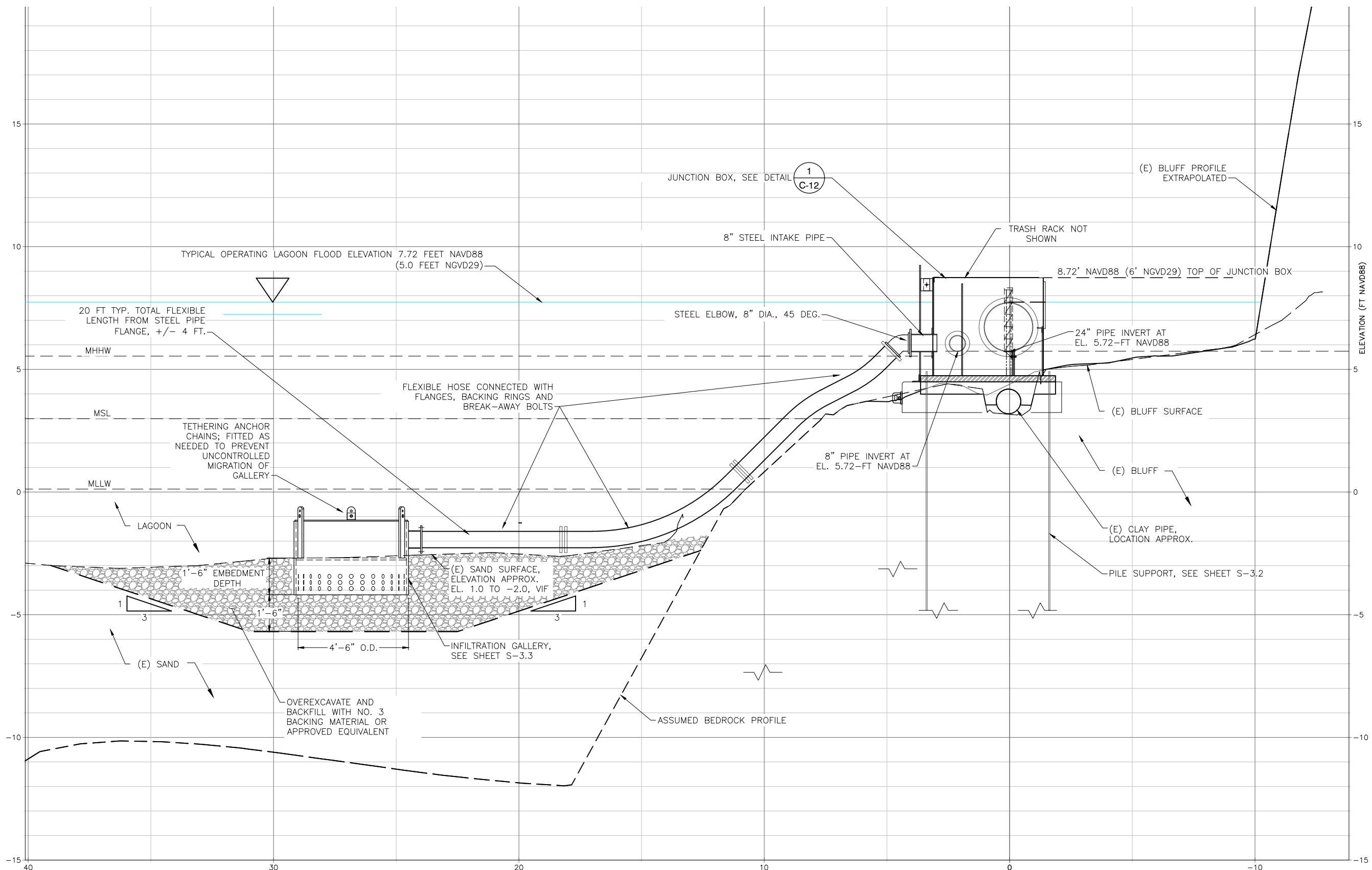
PREPARED FOR:  
**CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060**



APPROVED B. BATTALIO  
DESIGNED ESA  
DRAWN H. SNOW  
INCHARGE J. TOLLIEZ  
SCALE AS NOTED  
REVISION  
DATE JANUARY 2021  
SHEET



**FINAL DRAFT  
NOT FOR CONSTRUCTION**



(N) INFILTRATION GALLERY AND PIPE ASSEMBLY STA 2+45  
PROFILE VIEW  
HORZ: 1"=2'-0" VERT: 1"=2'-0"



- NOTES:**
1. ALL PIPE SIZES ARE OUTER DIAMETER UNLESS SPECIFICALLY INDICATED OTHERWISE. FOR PIPE THICKNESS AND OTHER CHARACTERISTICS, SEE TECHNICAL SPECIFICATIONS.
  2. SEE S-SHEETS FOR STRUCTURAL DETAILS FOR INFILTRATION GALLERY, JUNCTION BOX, AND PILES.
  3. FOR ROCK ANCHOR PERFORMANCE SPECIFICATIONS, SEE CONSTRUCTION DOCUMENTS.

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SHEET TITLE  
**INFILTRATION GALLERY AND  
JUNCTION BOX PROFILE VIEW**  
PROJECT  
**SAN LORENZO RIVER  
CULVERT**

PREPARED FOR:  
**CITY OF SANTA CRUZ  
809 CENTER STREET  
SANTA CRUZ, CA 95060**



APPROVED	B. BATTALIO
DESIGNED	ESA
DRAWN	H. SNOW
INCHARGE	J. TOLLIEZ
SCALE	AS NOTED
REVISION	
DATE	JANUARY 2021
SHEET	



San Lorenzo River Culvert Project (Corps File No. SPN-2014-00434)

FIGURE 2