DRAFT

ENVIRONMENTAL ASSESSMENT

FOR

CULVERT 10 REPAIRS
AT VANDENBERG SPACE FORCE BASE, CALIFORNIA

Space Launch Delta 30, Installation Management Flight
1028 Iceland Avenue
Vandenberg Space Force Base, California 93437

CEQ Unique Identification Number: EAXX-007-57-USF-1736956602

February 2025

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality NEPA Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on Department of the Air Force (DAF) decision making, allows the public to offer input on alternative ways for the DAF to accomplish what it is proposing, and solicits comments on the DAF's analysis of environmental effects.

Public commenting allows the DAF to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

Compliance with Section 508 of the Rehabilitation Act

To the extent possible, this document is compliant with Section 508 of the Rehabilitation Act. This allows assistive technology to be used to obtain the available information from the document. Due to the nature of graphics, figures, tables, and images occurring in the document, accessibility is limited to a descriptive title for each item.

Compliance with Revised CEQ Regulations

This document has been verified that it does not exceed the 75 pages, not including appendices, as defined in 40 CFR § 1501.5(f). As defined in 40 CFR § 1508.1(v) a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitation or geospatial information.

DRAFT FINDING OF NO SIGNIFICANT IMPACT

CULVERT 10 REPAIRS AT
VANDENBERG SPACE FORCE BASE, CALIFORNIA

CEQ UNIQUE IDENTIFICATION NUMBER: EAXX-007-57-USF-1736956602

This Draft Finding of No Significant Impact (FONSI) hereby incorporates by reference and attaches hereto the Draft Environmental Assessment (EA), Culvert 10 Repair at Vandenberg Space Force Base (VSFB), California. The Draft EA considered all potential environmental impacts of the Proposed Action and the No Action Alternative, in addition to cumulative impacts, and identified measures to avoid and/or minimize environmental impacts. Coast Road crosses multiple named and unnamed drainage features, including an unnamed erosional channel that drains stormwater discharges through Culvert 10. Severe stormwater flows have damaged Culvert 10, which could lead to the collapse of Coast Road.

The purpose of the Proposed Action is to maintain stormwater drainage to critical mission support routes that enable the transportation of billion-dollar launch assets to launch sites. The Proposed Action is needed to repair Culvert 10 where it crosses Coast Road to eliminate the risk of Coast Road collapse.

PROPOSED ACTION

The Proposed Action consists of the necessary repairs to Culvert 10 to ensure it functions adequately to move stormwater discharges beneath Coast Road. Culvert 10 provides proper stormwater drainage beneath Coast Road. Coast Road provides the only access to critical infrastructure on South VSFB that supports space and missile launch activities as an access route for the delivery of assets to mission critical launch sites. Interruption to the use of Coast Road would impede logistics and could delay mission objectives.

Culvert 10 is a 276-foot-long, 36-inch-diameter corrugated metal pipe (CMP) that is corroded, degraded, and at risk of collapse. Further, there is substantial channel erosion and downcutting downstream of the Culvert 10 outfall between Culvert 10 and the western end of the marine terrace. Space Launch Delta (SLD) 30 would repair Culvert 10 in its current alignment beneath Coast Road. Additionally, SLD 30 would install stormwater flow dissipation at the outfall of Culvert 10 to decrease water flow velocities and associated downstream erosion. SLD 30 would construct a temporary access road to Culvert 10 for all repair activities. This would involve the use of a combination of temporary and existing staging, equipment parking, and laydown yards for the Culvert 10 repairs. It is anticipated that 10 feet from the centerline of the culvert and 50 feet from the end of the culvert would be impacted by the culvert repair efforts. Following the completion of Culvert 10 repair activities, SLD 30 would restore all temporarily disturbed areas.

The Proposed Action includes all mitigation for potential impacts on an archaeological site that is potentially eligible for National Historic Preservation Act.

ALTERNATIVES TO THE PROPOSED ACTION

Alternatives that adequately implement repairs to Culvert 10 as well as meet the project's purpose and need and selection standards were carried forward for detailed analysis. Given the nature of the Proposed Action, the Culvert 10 repair is not implementable at any location except at Culvert 10. Therefore, alternatives that would implement culvert repairs at other locations would not meet the project's purpose and need and were not considered. Further, Culvert 10 is at risk of failure

with the stability of Coast Road in jeopardy. Therefore, alternatives that include various extended timelines for implementation of Culvert 10 repairs were not considered further. Four alternatives that included various methods for implementing Culvert 10 repairs were considered. Of those four alternatives, only Alternative 1 - Install Slip Liner and Riprap Flow Dissipation met the purpose of and need for the action, the selection standards, and was carried forward for further evaluation. Under Alternative 1, SLD 30 would install a high-density polyethylene (HDPE) slip liner within Culvert 10 and place riprap for approximately 50 linear feet downstream of the outfall of Culvert 10 for stormwater flow energy dissipation. SLD 30 determined this to be the Preferred Alternative for implementation of the Proposed Action.

PREFERRED ALTERNATIVE: INSTALL SLIP LINER AND RIPRAP FLOW DISSIPATION

Culvert 10 Repair. SLD 30 would install a lining inside the CMP to prevent further corrosion and collapse. SLD 30 would grout a smooth-walled HDPE liner in place inside Culvert 10. The Proposed Action would eliminate Coast Road's collapse risk and maintain stormwater discharge beneath Coast Road. SLD 30 would use existing roads and staging/parking areas and construct a temporary access road and temporary laydown area for Culvert 10 repairs.

SLD 30 would not require dewatering the drainage channel and culvert to install the slip lining inside the Culvert 10 CMP. Because Culvert 10 receives stormwater runoff, SLD 30 could install the slip lining in the CMP during the dry season (approximately 15 April to 1 October) when there would be no water flow in Culvert 10. Alternatively, if SLD 30 elected to install the slip lining during the rainy season, the slip lining could be installed during low-flow events without the need for dewatering.

SLD 30 would construct a culvert section at the downstream end of Culvert 10 to meet the existing channel grade. SLD 30 would construct an outfall structure at the outlet of Culvert 10 to assist water flow transition from the end of the culvert into the channel that carries stormwater from Culvert 10 to the Pacific Ocean. The outfall structure would consist of riprap placed at the base of the outlet of Culvert 10 and extending approximately 50 linear feet downstream from the Culvert 10 outlet.

If slopes along the channel banks at the culvert outfall area that are not rock lined exceed 1:2 (vertical:horizontal), SLD 30 would include channel bank stabilization with vegetation such as hydroseeding, biodegradable erosion control blankets, a 12-month longevity biodegradable bonded fiber matrix, or rock slope protection to reduce the potential for erosion.

SLD 30 would use a rough terrain crane and rough terrain forklift to manipulate the new HDPE pipe sections at the Culvert 10 outlet. Prior to use of the rough terrain equipment, a dozer, track hoe, wheel loader, skid steer loader, and trucks would be used to clear and grub the access road and laydown yard. SLD 30 would loosen and load trapped debris and sediment from the outlet end of Culvert 10 and place it into a dump truck waiting in the laydown yard. SLD would loosen and remove sediment and smaller debris from within the existing culvert. This process would continue until all trapped debris and sediment within the culvert or at the culver inlet is removed. Any culvert washout water would be contained for evaporation in a temporary pit in the laydown yard area or in trucks that would be washed out off base. All debris (silt, dirt, sand, etc.) removed from Culvert 10 would then be disposed of at an off base, approved landfill.

Approximately 7,500 cubic yards of riprap would be placed at the end of Culvert 10 using a Bobcat and grader. Riprap would be placed in the channel downstream of the Culvert 10 outlet, then contoured to ensure that stormwater flows would be directed from the Culvert 10 outlet, across placed riprap prior to flows entering the natural channel bottom.

Access. SLD 30 would construct a temporary access route extending from Honda Point Road, just west of its intersection with Coast Road, to the west side of Culvert 10. The new temporary access road would be approximately 45 feet wide and 1,500 feet long. SLD 30 would construct the temporary access road through a combination of grading and using clean, compacted fill soil to create a ramp to transition from the existing Honda Point Road elevation to the marine terrace elevation. The total area of temporary disturbance from temporary access road construction would be approximately 1.50 acres.

Vehicle and Material Staging. SLD 30 would construct one temporary laydown and vehicle turnaround area at the southern end of the access road adjacent to the Culvert 10 outfall. The approximately 0.30-acre laydown area would be used to store equipment and materials needed to place the slip lining in Culvert 10 and riprap to construct the flow dissipation structure. The temporary laydown area may require the use of swamp or timber matting to minimize damage to the lands adjacent to the channel on the outfall side of Culvert 10. SLD 30 would also use an approximately 0.74-acre previously disturbed area (parking lot) proximate to Coast Road as a vehicle staging area.

Site Restoration. Following the final stages of the Culvert 10 repair, as machinery and materials are removed, SLD 30 would begin site restoration of areas subject to temporary disturbance. SLD 30 would remove all surplus and waste materials from the Proposed Action Area unless also required for the restoration of the Proposed Action Area. To the extent practicable, SLD 30 would restore site contours and habitat types of temporarily impacted areas to preconstruction conditions. SLD 30 would also replant native herbaceous vegetation to restore all temporarily disturbed areas.

Culvert 10 is a human-made erosional drainage channel with seasonal stormwater flows; therefore, there are no waters of the US nor waters of the state present within the Proposed Action Area.

Mitigation. An archaeological site (CA-SBA-666) located proximate to the drainage channel west of Culvert 10 and Coast Road has been impacted due to channel erosion from high-velocity flows exiting Culvert 10 and flowing through the marine terrace to the west of Culvert 10 onto the Pacific Ocean. To resolve adverse effects on the CA-SBA-666 site from continued usage of Culvert 10, data recovery excavations will be completed at the site in accordance with the Advisory Council on Historic Preservation's standard treatment for recovering significant information. More specifically, adverse effects will be resolved by data recovery excavations of up to 5 cubic feet of archaeological material at CA-SBA-666. The excavation unit(s) will be terminated after two successive culturally sterile levels are excavated or the maximum depth of the archaeological deposit is reached. All excavated soils will be screened through 1/8-inch mesh. A portion of the unit, up to 8 inches by 8 inches in size, will be screened through 1/16-inch mesh to capture a sample of smaller cultural remains such as shell beads, lithic drills, and botanical material. Due to the clay soil at the site, it will be necessary to water-screen excavated sediment to identify archaeological material. A water-screening station will be set up in the proposed Culvert 10 project's equipment staging area.

Following data recovery excavations, archaeological remains and all associated forms will be sent to a local laboratory for processing and data entry. Screen residues will be size sorted through the field mesh size grade, separated by material/artifact class, counted and weighed, and cataloged. When the catalog is complete, materials will be given to specialists for technical analysis. Results of technical analyses and data recovery activities will be included in a technical report.

Project Equipment Needs. Typical construction equipment such as a compact track loader, skid steer loader, compactor, concrete truck, dump truck, flatbed truck, and grader would be used during construction, depending on contractor capabilities. Additionally, three half-ton or three quarter-ton pickup trucks would be used daily for a duration of approximately three months, for a total of 1,440 hours, for the Culvert 10 repairs. For the data recovery excavations, SLD 30 would use two half-ton pickup trucks for approximately 50 hours and a water trailer for water screening. The water trailer would have a 500-gallon tank and a 5.8-horsepower engine. Approximately 750 gallons of water would be used per day for up to five days. The water trailer would be filled from fire hydrants along Coast Road and a backflow prevention device as approved by the Vandenberg Cross Connection Control and Backflow Prevention Program Manager would be used.

Anticipated Schedule. The implementation of the Culvert 10 repairs, including downstream erosion protection, and the restoration of temporarily impacted areas such as the access road and laydown yard, is anticipated to be completed in approximately three months and begin in June 2025. Mitigation of the CA-SBA-666 site would require approximately six months and would also begin in June 2025.

NO ACTION

No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. Under the No Action Alternative, Culvert 10 would not be repaired, and SLD 30 would not install downstream erosion protection at the outfall of Culvert 10. Mitigation would not be implemented for the CA-SBA-666 site. Culvert 10 would continue to degrade and eventually collapse, damaging Coast Road and potentially making the road impassible. Further, the channel downstream of Culvert 10 would continue to erode during high-velocity storm events, as uncontrolled discharge from Culvert 10, or from across Coast Road following Culvert 10's collapse, would degrade the channel. The No Action Alternative would not meet the Proposed Action's purpose and need.

SUMMARY OF FINDINGS

Potentially affected environmental resources were identified through communications with federal, state, and local agencies, field surveys, and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include air quality, biological resources, cultural resources, earth resources, hazardous materials and waste management, human health and safety, noise, coastal zone management, solid waste management, transportation, and water resources. Some aspects of the Preferred Alternative were noted as potentially beneficial to biological resources and water resources. If Culvert 10 caused failure of Coast Road, adverse impacts from the No Action Alternative could be greater than the Proposed Action. Otherwise, the Preferred Alternative would result in impacts less than the No Action Alternative. Environmental protection measures that are incorporated into the Proposed Action (identified as required in the EA) would be implemented to avoid and/or minimize the potential adverse impacts. Discretionary environmental protection measures may further reduce potential impacts of the Preferred Alternative.

PUBLIC REVIEW AND COMMENT

The Draft EA and Draft FONSI were made available for public review and comment for 30 days (15 February 2025 through 17 March 2025) following the publication of the Notice of Availability (NOA) in the *Lompoc Record* and *Santa Maria Times*. The Draft EA and Draft FONSI were also distributed per the current VSFB NEPA Distribution List, including the State Clearinghouse. Appendix H contains a copy of the NOA and VSFB's NEPA distribution list. Public comments

received on the Draft EA and Draft FONSI and SLD 30's responses will be included in Appendix H of the Final EA.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA conducted in accordance with the NEPA, 42 US Code 4321 et seq., implementing CEQ Regulations, 40 CFR 1500-1508, and 32 CFR Part 989, *Environmental Impact Analysis Process*, I conclude that implementing the Preferred Alternative will not have a significant effect on the human environment. Therefore, further analysis in the form of an Environmental Impact Statement is not required and a FONSI is appropriate. This decision has been made after considering all submitted information, including a review of public and agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the Department of the Air Force.

_____ _____

MARK A. SHOEMAKER, Colonel, USSF Date
Chief, Space Force Mission Sustainment
(Engineering, Logistics, & Force Protection)

Attachment: Draft Environmental Assessment for Culvert 10 Repairs at Vandenberg Space Force Base, California

FORMAT PAGE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

FORMAT PAGE

LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
ACAM	Air Conformity Applicability Model
ADT	Average Daily Traffic
AFB	Air Force Base
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AOC	Area of Concern
AOI	Area of Interest
APE	Area of Potential Effect
APZ	Accident Potential Zone
ATV	all-terrain vehicle
BCC	federal bird of conservation concern
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CCA	California Coastal Act of 1976
CCC	California Coastal Commission
CCMP	California Coastal Management Program
CCR	California Code of Regulations
CCRWQCB	Central Coast Regional Water Quality Control Board
CDFW	California Department of Fish and Wildlife
CEIEA	Installation Management Flight, Environmental Conservation

CEIEC	Installation Management Flight, Environmental Compliance
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineer Squadron
CFR	Code of Federal Regulations
CH_4	methane
CMP	corrugated metal pipe
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CRLF	California red-legged frog
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAF	Department of the Air Force
dB	decibel(s)
dBA	A-weighted decibel
DoD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EMS	Environmental Management System
EO	Executive Order
EPM	environmental protection measure
ESA	Endangered Species Act
°F	degrees Fahrenheit
FE	federal endangered species
FONPA	Finding of No Practicable Alternative

FONSI	Finding of No Significant Impact
FR	Federal Register
FT	federal threatened species
GHG	greenhouse gas
GIS	geographic information system
GWP	global warming potential
HazMart	Hazardous Materials Pharmacy
HDPE	high-density polyethylene
HFC	hydrofluorocarbon
HS	hydrogen sulfide
HTL	high tide line
IRP	Installation Restoration Program
LCZ	Lateral Clear Zone
L_{eq1H}	one-hour average sound level
LOS	Level of Service
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
ND	Negative Determination
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability

NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NWPR	2020 Navigable Waters Protection Rule
O_3	ozone
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
P2	pollution prevention
Pb	lead
PBO	Programmatic Biological Opinion
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
POL	petroleum, oil, and lubricant
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
ppt	parts per thousand
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gas
ROI	region of influence
RWQCB	Regional Water Quality Control Board
SBCAPCD	Santa Barbara County Air Pollution Control District
SCCAB	South Central Coast Air Basin
SCE	state candidate endangered species
SE	state endangered species
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SLC	Space Launch Complex
SLD	Space Launch Delta
SO_2	sulfur dioxide
SO_4	sulfate
SO_X	sulfur oxides
SR	State Route
SSC	state candidate species
SSPP	Strategic Sustainability and Performance Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SYBCI	Santa Ynez Band of the Chumash Indians
US	United States
US 101	United States Highway 101
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
VSFB	Vandenberg Space Force Base
V/C	volume to capacity
WOTS	waters of the State
WOTUS	waters of the United States

FORMAT PAGE

1.0 INTRODUCTION

Space Launch Delta 30 (SLD 30), 30th Civil Engineer Squadron, Installation Management Flight, Environmental Conservation (30 CES/CEIEA) prepared this Environmental Assessment (EA) to evaluate the potential impacts from proposed repairs of Culvert 10, which is located beneath Coast Road on Vandenberg Space Force Base (VSFB). Culvert 10 is damaged and severely eroded, risking eventual slumping and collapse of Coast Road.

SLD 30 prepared this EA per the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] § 4321 et seq.), the Council on Environmental Quality's (CEQ's) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and the Department of the Air Force's (DAF's) Environmental Impact Analysis Process (32 CFR Part 989). This EA follows the updated 1 May 2024 CEQ NEPA rules (89 Federal Register [FR] 35554 through 23470; pending congressional review). The DAF is aware of the 12 November 2024 decision in Marin Audubon Society v. Federal Aviation Administration, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the CEQ regulations implementing NEPA are not judicially enforceable or binding on this agency action, the DAF has nonetheless elected to follow those regulations at 40 CFR Parts 1500–1508, in addition to the DAF's procedures/regulations implementing NEPA at 32 CFR Part 989, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

VSFB is located in central Santa Barbara County, California, near the city of Lompoc (**Figure 1-1**), and occupies approximately 99,572 acres (Vandenberg Air Force Base [AFB] 2019). Culvert 10 is located in South VSFB, running east-west beneath Coast Road, near the South Base gaseous nitrogen power plant (**Figure 1-2**).

SLD 30 at VSFB is the United States (US) Space Force organization responsible for supporting Department of Defense (DoD) space and missile launch activities on the west coast of the US. SLD 30 supports satellite launches destined for polar or near-polar orbit and ballistic missile testing from VSFB for the DAF, DoD, Missile Defense Agency, National Aeronautics and Space Administration, foreign nations, and various private contractors.

Culvert 10 provides proper stormwater drainage beneath Coast Road. Coast Road provides the only access to critical infrastructure on South VSFB that supports space and missile launch activities as an access route for the delivery of assets to mission critical launch sites. An interruption to the use of Coast Road would impede logistics and could delay mission objectives.

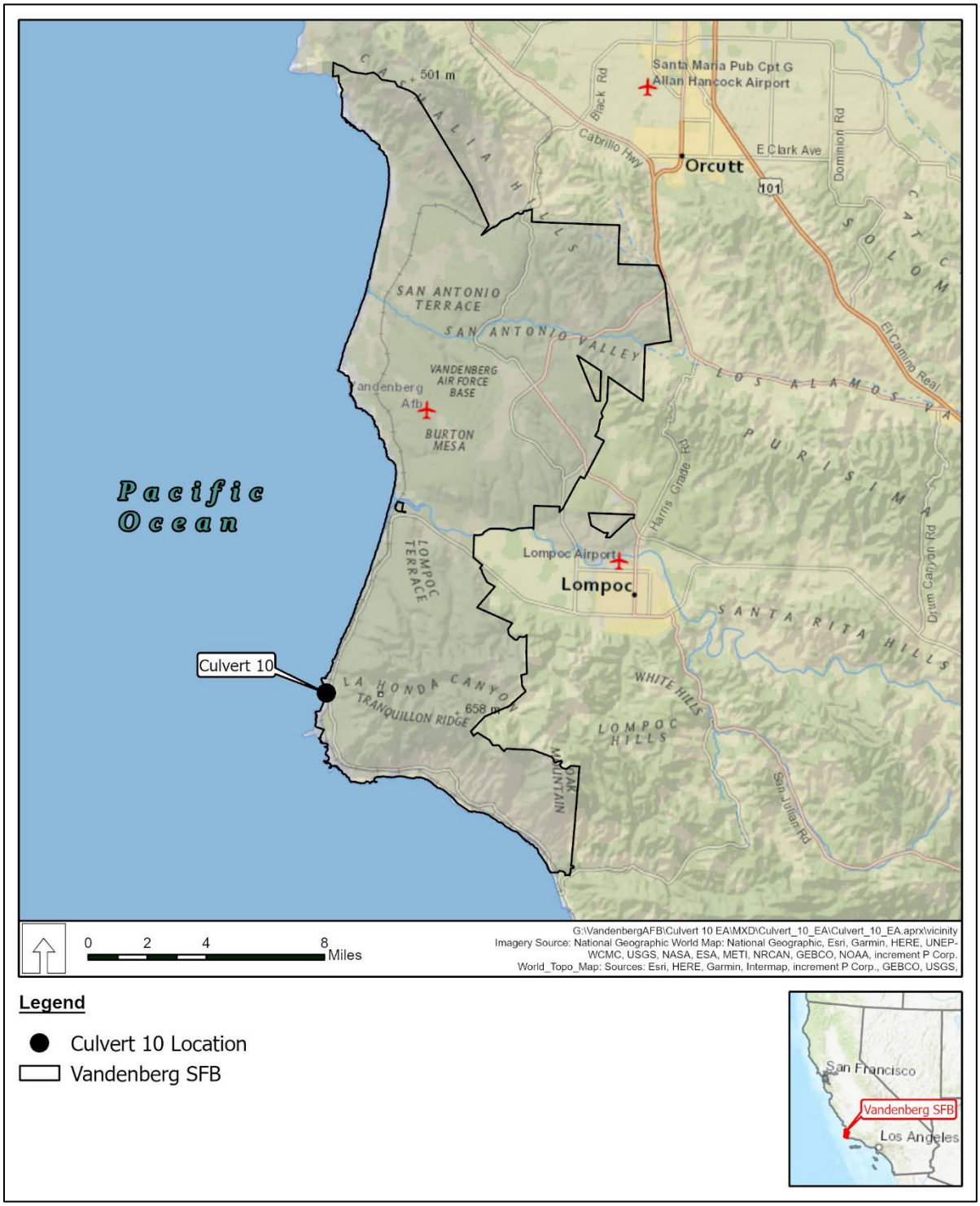


Figure 1-1. Location of Vandenberg Space Force Base

Figure 1-2. Location of Culvert 10 and Coast Road

1.1 Purpose of and Need for the Proposed Action

A reliable transportation network is critical to the SLD 30 missions. A transportation network of paved and unpaved roads connects VSFB, and continuous maintenance of this network is required. Roads that cross drainage features via culverts may require repair or periodic cleaning to maintain flow and prevent erosion of the overlying roadbed. Coast Road is a major, paved artery connecting launch sites along the western edge of South VSFB and delivery of launch components to and from the VSFB Harbor. Coast Road crosses multiple named and unnamed drainage features, including a human-made erosional feature that drains stormwater discharges through Culvert 10. The concrete channel conveying flows to Culvert 10 and Culvert 10 itself were created as a facility with the purpose of supporting stormwater runoff. However, severe stormwater flows have damaged Culvert 10, which could lead to the collapse of Coast Road.

The purpose of the Proposed Action is to maintain stormwater drainage to critical mission support routes that enable the transportation of billion-dollar launch assets to launch sites.

The Proposed Action is needed to repair Culvert 10 where it crosses Coast Road to eliminate the risk of Coast Road collapse. Further degradation of Culvert 10 could result in the failure of Coast Road, which is a critical roadway for launch mission access. If Coast Road fails, no overland loads would be able to access Space Launch Complex (SLC) 6 or SLC-8 with transportation only possible via harbor delivery. Further, all first stage and fairings are delivered by barge to SLC-4 after boostback, and a collapse of Coast Road at Culvert 10 would cut off access between the VSFB Harbor and SLC-4. This would suspend all launches from SLC-4, SLC-6, and SLC-8. Therefore, if Culvert 10 is not repaired, space launch missions would continue to operate under the risk of potential road collapse, resulting in a substantial reduction of transportation access on South VSFB, loss of space launch missions, and constraints on SLD 30 to provide the necessary safety and security support.

1.2 Scope of the Environmental Assessment

The scope of the Proposed Action comprises the necessary repairs to Culvert 10 to ensure it functions adequately to move stormwater discharges beneath Coast Road. This EA evaluates the potential environmental consequences of implementing the Proposed Action and alternatives for Culvert 10 repairs at VSFB. The EA also identifies environmental permits relevant to the Proposed Action. The Proposed Action incorporates standard procedures that will avoid, prevent, or minimize environmental impacts.

1.3 Coordination and Consultation

In accordance with 32 CFR § 989.14(l), SLD 30 will involve other federal agencies, state, tribal, and local governments, and the public in EA preparation. In meeting this requirement, as well as meeting the requirements of Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, SLD 30 notified and consulted with relevant federal and state agencies on the Proposed Action and alternatives to identify potential environmental issues and regulatory

requirements associated with project implementation. The following discussion summarizes the completed agency coordination and consultation.

Under the Coastal Zone Management Act (CZMA) of 1972 (16 USC § 1451-1465), a federal action that may affect the coastal zone must be carried out in a manner that is consistent with state coastal zone management programs. The DAF prepared a Negative Determination (ND), and the California Coastal Commission (CCC) concurred with that ND on 18 October 2024 (**Appendix A**).

The Proposed Action is a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 as amended (54 USC § 300101 et seq.). SLD 30 initiated consultation with the State Historic Preservation Officer (SHPO) under 36 CFR Part 800. SLD 30 determined that the Proposed Action could have adverse effects on any properties listed in or potentially listed in the National Register of Historic Places. The SHPO concurred with SLD 30's delineation of the Area of Potential Effects (**Appendix B**). SLD 30 prepared a Memorandum of Agreement (MOA) stipulating how the adverse effects of the Culvert 10 repairs on historic properties will be resolved. The SHPO reviewed the MOA and has concurred with SLD 30's mitigation measures, the responsibilities of SLD 30 to implement those mitigation measures, and SLD 30's compliance with Section 106 of the NHPA (**Appendix B**).

Native American traditional cultural properties are also protected by the NHPA of 1966, as amended (54 USC § 300101, et seq.). Per NHPA implementing regulations at 36 CFR Part 800, consultation was initiated with the Santa Ynez Band of the Chumash Indians (SYBCI). The SLD 30 Commander appointed Josh Smallwood (30 CES/CEIEA) as the Installation Tribal Liaison Officer. As the SYBCI is a federally recognized Chumash Tribe with ancestral ties to VSFB, SLD 30 regularly consults with the tribe on a government-to-government basis. On 10 October 2023, Mr. Smallwood notified the SYBCI of the Proposed Action and requested tribal comments to initiate government-to-government consultation (**Appendix C**). The SYBCI responded on 23 October 2023 (**Appendix C**). The SYBCI has also reviewed the SLD 30's mitigation measures as described in the MOA and has concurred with those measures.

Under Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 USC § 1531 et seq.), federal agencies are required to assess the effect of any action(s) authorized, funded by, or carried out by federal agencies on federally listed threatened or endangered species. Section 7 consultations with the US Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration's National Marine Fisheries Service are required for federal projects if such actions have the potential to directly or indirectly affect listed species or destroy or adversely modify critical habitat. The DAF initiated Section 7 consultation with the USFWS via a prenotification under the Programmatic Biological Opinion (PBO; 8-8-13-F-49R) for potential federally listed species impacts due to the Proposed Action. The completed prenotification was approved by the USFWS on 10 September 2021 (**Appendix D**). No designated critical habitat would be impacted by this proposed project.

1.4 Public Notification and Review

Following the publication of a Notice of Availability (NOA) in the *Lompoc Record* and *Santa Maria Times*, the DAF made the Draft EA and Draft Finding of No Significant Impact (FONSI) available for public review and comment for 30 days. The DAF also distributed the Draft EA and Draft FONSI per the current SLD 30 NEPA Distribution List, including the California State Clearinghouse. The public distribution list, newspaper publications of the NOA, and correspondence submitted by the public in response to the notification process is included in **Appendix E**. The Final EA will include a copy of the NOA, proofs of publication, proof of library deliveries, public correspondence, and responses to substantive public comments.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter provides detailed descriptions of the Proposed Action and alternatives to implement the Proposed Action, as well as the No Action Alternative.

2.1 Proposed Action

2.1.1 Culvert 10 Repair

Culvert 10 is a 276-foot-long, 36-inch-diameter corrugated metal pipe (CMP) that is corroded, degraded, and at risk of collapse. Further, there is substantial channel erosion and downcutting downstream of the Culvert 10 outfall between Culvert 10 and the western end of the marine terrace (**Figure 2-1**). The repair of Culvert 10 would occur in its current alignment beneath Coast Road. Additionally, SLD 30 would install stormwater flow dissipation at the outfall of Culvert 10 to decrease water flow velocities and associated downstream erosion.

Figure 2-1. Culvert 10 and Channel Degradation at the Culvert 10 Outfall

SLD 30 would construct a temporary access road to Culvert 10 for all repair activities. This would involve the use of a combination of temporary and existing staging, equipment parking, and laydown yards for the Culvert 10 repairs. It is anticipated that 10 feet from the centerline of the culvert and 50 feet from the end of the culvert would be impacted by the culvert repair efforts. Following the completion of Culvert 10 repair activities, SLD 30 would restore all temporarily disturbed areas.

The Proposed Action includes mitigation for potential impacts on an archaeological site that is potentially eligible for NHPA.

2.1.2 Environmental Protection Measures

Mandatory environmental protection measures (EPMs) (denoted by “shall” or “would”) are part of the project design. SLD 30 would implement EPMs as part of the Proposed Action to avoid, minimize, reduce, or compensate for the anticipated environmental impacts. SLD 30 may or may not implement discretionary measures (denoted by “may” or “could”) to further reduce environmental impacts. SLD 30 would implement measures necessary to avoid significant environmental impacts.

2.1.2.1 Air Quality

The Santa Barbara County Air Pollution Control District (SBCAPCD) and California Air Resources Board (CARB) require the following measures to decrease emissions, as applicable to the Proposed Action:

- On-site vehicle speeds shall be limited to 15 miles per hour.
- Ground disturbance shall be limited to the smallest practical area and to the least amount of time.
- The Proposed Action shall comply with Storm Water Management Plans, including best management practices (BMPs) to reduce dust emissions.
- Any portable equipment powered by an internal combustion engine with a rated horsepower of 50 brake horsepower or greater used for this project shall be registered in the California State-Wide Portable Equipment Registration Program or have a valid SBCAPCD permit to operate if the equipment does not qualify as portable under the regulations. Examples of such equipment are portable generators, compressors, and light-carts.
- Maintenance activities shall comply with SBCAPCD Rule 345, *Control of Fugitive Dust from Construction and Demolition Activities.* Under Rule 345, construction, demolition, or earthmoving activities are prohibited from causing discharge of visible dust outside the property line and must utilize standard BMPs to minimize dust from truck hauling, track-out/carry-out from active construction sites, and demolition activities.

- Off-road construction equipment shall comply with all applicable federal, state, and local regulations.

2.1.2.2 Biological Resources

Although the measures listed below are proposed to meet the requirements of the ESA and Migratory Bird Treaty Act (MBTA), any additional specific requirements of the final regulatory documents such as the PBO will generate required measures.

General Protection and Monitoring Measures

SLD 30 would apply the following protection and monitoring measures to all aspects of the Proposed Action to protect and minimize effects on biological resources.

- Qualified biologists will brief all project personnel prior to participating in construction activities. At a minimum, the briefing will include a summary of the Proposed Action, a description of the federally listed species that may occur in the project area, and a summary of the measures that will be implemented to avoid or minimize the adverse effects on federally listed species within a projects' footprint.

- Qualified biologists will conduct preactivity surveys at each project site for all project activities that may affect the federally listed species analyzed within the VSFB PBO.

- Prior to conducting any project activities, a qualified biologist will clearly mark sensitive species habitats within the project site and the immediate area to prevent workers or equipment from adversely affecting species or habitats that are not expected to be damaged during the project.

- When it is not practical to stage or operate project vehicles or equipment on paved or existing roadways and trails, vehicles and equipment will be staged and operated on nonnative vegetation to the maximum extent practicable.

- Construction contractors will utilize the most suitable vehicle to minimize erosion potential and will adhere to delineated access routes.

- Construction contractors will implement BMPs that are appropriate to the site and situation to reduce soil erosion, sedimentation, and adverse effects on water quality.

- All trenches, holes, and pipeline routes will be covered at the conclusion of project activities to avoid the entrapment of animals. If a project lasts for more than one day, these areas will be covered or an escape route provided.

- To the maximum extent feasible, the Proposed Action will be scheduled to avoid sensitive breeding/blooming seasons in habitat occupied by federally listed species.

- All erosion control materials used (e.g., gravel, sand, fill material, wattles) will be from weed-free sources. Only nonplastic, 100 percent biodegradable erosion control materials (e.g., erosion blankets, wattles) will be left in place following project completion.

- Portable toilets would be placed only on paved surfaces or within designated staging areas.

- All human-generated trash at the project site shall be disposed of properly at the end of each workday, placed in proper containers, and removed from the work site. All debris and trash shall be removed from the work area upon completion of the project.

- Equipment and vehicles shall be cleaned of weed seeds prior to use in the project area to prevent the introduction of weeds. Prior to site transport, any skid plates shall be removed and cleaned. Equipment should be cleaned of weed seeds daily, especially wheels, undercarriages, and bumpers. Prior to leaving the project area, any vehicles that have caked-on dirt or mud shall be cleaned with hand tools such as bristle brushes and brooms at a designated exit area. For vehicles with dry, dusted dirt (and no caked-on dirt or mud), prior to leaving a site at a designated exit area, equipment vehicles shall be thoroughly brushed; vehicles may alternatively be air blasted on site. Prior to use, all equipment will be inspected for weed seeds and debris by a qualified biological monitor who may refuse use of equipment that does not pass inspection.

- Fueling of equipment will be conducted in a predesignated location within the designated laydown areas at least 100 feet from coastal boundaries, and spill containment materials will be placed around the equipment before refueling. Stationary equipment will be outfitted with drip pans and hydrocarbon absorbent pads.

- Personnel will use established roads, both paved and unpaved, to the maximum extent practicable to stage and operate vehicles and equipment. In areas where this is not possible, personnel will use preexisting disturbed areas or areas occupied by nonnative vegetation to the maximum extent practicable.

Landscape Requirements

SLD 30 would apply the following landscape requirements during and following construction activities.

- The post-construction plantings, seed mix, and planting strategy will be approved prior to the start of construction.
- Native seed available on site and in adjacent areas will be collected for post-construction seeding; this will be complemented with an outside seed source if needed. An outside seed source should be from the California coast proximate to the project region.
- Iceplant will be removed from the project area and properly disposed of prior to work in the area.
- Any native vegetation designated for removal or disturbance will be mulched and salvaged for use in restoration as mulch material where appropriate.

- Where native vegetation is present, the top 4 inches of soil will be salvaged for use as topsoil in the project area.
- Any topsoil imported shall be weed-free and clean as specified.
- Topsoil shall be properly prepared soil for native seed germination.
- Weeds shall be controlled for one year post-construction to achieve at least the same amount of or more than the preconstruction native plant cover. Provide a report to CEIEA of initial, preconstruction component plant list with percent of native plant cover. After one year, provide report with plant list and cover, then coordinate site inspection with CEIEA for approval. Approval is dependent upon amount of native plant cover achieved.
- Plants installed following construction shall be watered as necessary without overwatering.

Nesting Birds

A variety of bird species protected under the MBTA also nest at the property. Minimization of effects on these animals will primarily consist of temporal and spatial avoidance. SLD 30 will employ the following minimization measures to ensure nesting birds are not disturbed:

- Personnel will not conduct any work on the beaches or marine terrace bluffs located to the west of Culvert 10.

- During nesting season (15 February through 15 August), work areas will be surveyed by a qualified biologist for nesting birds protected under the MBTA, prior to initiating activities. If nesting birds are detected, an appropriate buffer around the nest(s) would be determined by the biologist and would be avoided until the biologist determines the nestlings have fledged.

- When and where practicable, nonnative vegetation that attracts bird species within the Proposed Action Area may be removed in advance of the nesting season during project-related activities under the direction of the biological monitor. The removal of nonnative vegetation in advance of project activities would discourage nesting of migratory birds in the Proposed Action Area.

California Red-Legged Frog

- Construction would only occur outside the breeding season for the California red-legged frog (CRLF; *Rana draytonii*) (typically January 15 to April 15) and only during daylight hours.
- No work would occur during active rain events.
- A biological monitor would be present to observe construction activities in all areas, but primarily at the start of the project, at least one day per week during construction and the last two to three days of construction. The biological monitor would be present for all phases that include vegetation removal.
- Before construction activities begin on a project, a USFWS-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a

description of the CRLF and its habitat, the specific measures that are being implemented to conserve the CRLF for the current project, and the boundaries within which the project may be accomplished.

- Construction activities will not occur until 24 hours after a precipitation event greater than 0.2 inch accumulating within a 24-hour period.

2.1.2.3 Cultural Resources

To comply with Section 106 of the NHPA, archaeological surveys have been completed, and have found that routing stormwater through the repaired Culvert 10 would cause adverse effects on site CA-SBA-666. These adverse effects would be resolved through the MOA approved by the SHPO. The following minimization measures for archaeological resources will be implemented to avoid adverse effects:

- Any artifacts found during the Culvert 10 repairs will be documented and reported to VSFB archaeologists and treated in accordance with the VSFB Integrated Cultural Resource Management Plan.

- There will be no vehicle use off existing roads or temporary roads, turnaround, staging areas, or laydown yards developed specifically for the Culvert 10 repairs.

2.1.2.4 Earth Resources

No EPMs specific to the protection of earth resources, geology and soils, will be required for the Proposed Action because project activities would be limited to temporary soil disturbance only, and EPMs to protect surface waters from soil disturbance are described in **Section 2.1.2.8**.

2.1.2.5 Hazardous Materials and Waste Management

EPMs to better manage hazardous materials use and hazardous waste management as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation Recovery Act (RCRA) would include the following.

- Hazardous materials would be procured through or approved for use by the VSFB Hazardous Materials Pharmacy (HazMart). Monthly usage of hazardous materials will be reported to HazMart to meet legal reporting requirements.

- Hazardous materials would be properly stored and would only be at the site temporarily while workers are present. While on the site, hazardous materials would be stored in proper containers secured within vehicles or vehicle beds with enclosed bed canopies.

- Standard procedures would be used to ensure that all equipment is maintained properly and free of leaks during operation, and all necessary repairs are carried out with proper spill containment. All equipment operating within the Proposed Action Area would be

inspected regularly for fluid leaks. A Spill Prevention Plan would be approved by SLD 30 Installation Management Flight, Environmental Compliance (CEIEC) and implemented.

- Fueling of equipment would be conducted in a predesignated location at least 100 feet from the shoreline, and spill containment materials would be placed around the equipment before refueling. Stationary equipment would be outfitted with drip pans and hydrocarbon absorbent pads. Additionally, 40 CFR Part 112, *Spill Prevention, Control, and Countermeasure Plan*, requires that tanks and containers have secondary containment or that the tanks be double walled.

- All hazardous materials would be properly identified and used in accordance with manufacturer specifications to avoid accidental exposure to or release of hazardous materials required to operate and maintain construction equipment.

- Hazardous waste shall be managed in accordance with the Hazardous Waste Management Plan, SLD 30 Plan 32-7043-A. A Community Awareness Emergency Response form would be completed and submitted to SLD 30 CEIEC within 24 hours of a hazardous materials spill or release.

2.1.2.6 Solid Waste

Solid waste would be minimized by strict compliance with SLD 30's Integrated Solid Waste Management Plan (DAF 2015) and implementation of the following measures.

- Solid waste generated as part of the Culvert 10 repairs would be hauled to a municipal landfill. Other possible waste, such as empty containers, would be recycled if possible.

- Debris shall be segregated to facilitate subsequent pollution prevention (P2) options. P2 options would be exercised in the following order: reuse of materials, recycling of materials, and then regulatory compliant disposal.

- All solid waste disposal and recycling tonnages would be tracked and reported to SLD 30 CEIEC on a quarterly basis during the project.

2.1.2.7 Transportation

The following measures would be implemented to reduce traffic congestion on regional roads, VSFB roads, and at VSFB gates during peak traffic hours.

- Employees may be encouraged to carpool and eat lunch on the site.

- Vehicle trips should be scheduled during nonpeak traffic hours to the greatest extent practicable.

2.1.2.8 Water Resources

To ensure compliance with the Clean Water Act and avoidance of pollutants entering stormwater from construction activities, the following measures would be implemented.

- In preexisting vegetated areas and slopes, exposed soils will be stabilized to prevent erosion.
- Vegetation disturbance activities shall start and be complete during the dry season and prior to the start of the first winter rains.
- If any significant rain event is predicted to occur during construction activities in the dry season, all erosion control measures shall be put in place to reduce sediment runoff and flood risk; work shall pause for the duration of the rain event.
- Minimize vegetation removal for access roads where safety permits. Create temporary access roads by crushing vegetation, rather than clearing and grubbing or grading.
- Minimize vegetation removal along the banks of the drainage channel where feasible.
- Erosion control blankets will be of 100 percent biodegradable materials, including netting. Erosion control blankets will be selected based on the slope. Only nonplastic, 100 percent biodegradable erosion control materials would be left in place following project completion.
- BMPs to prevent discharge of waste (construction materials, contaminants, washings, fuels, and oils) shall include the following measures:
    - All equipment shall be properly maintained and free of leaks during operation, and all necessary repairs shall be carried out with proper spill containment.
    - Fueling of equipment would be conducted in a predesignated location outside of the drainage; spill containment materials would be placed around the equipment before refueling. Drip pans or other containment would be used during fueling.
    - Hazardous materials would only be present at the site temporarily while workers are present. While on site, hazardous materials would be stored in proper containers secured within vehicles or vehicle beds with enclosed bed canopies.
    - Trash will be contained and regularly disposed of daily. Any trash that escapes from containers shall be collected immediately.
    - Portable toilets shall have secondary containment and be secured to prevent falling.
    - The grout used around the pipe liner would be properly managed to prevent accidental discharge. Any grout washout water would be contained for evaporation in a temporary pit in the staging area or trucks would be washed out off base.

2.1.2.9 Human Health and Safety

The following measures would be implemented to ensure construction activities are compliant with Federal Occupational Safety and Health Administration (OSHA), Air Force Occupational Safety and Health (AFOSH), and California OSHA regulations and procedures requirements.

- The construction contractor(s) would comply with OSHA) U.S. Department of Labor, and AFOSH regulations and other recognized standards, as well as applicable DAF regulations or instructions.
- The construction contractor(s) must also provide for the health and safety of workers and all subcontractors who may be exposed to their operations or services.
- During performance of work, the contractor(s) must comply with all provisions and procedures prescribed for the control and safety of personnel and visitors to the job site.

2.2 Alternatives to the Proposed Action

An alternative must be considered reasonable to warrant detailed evaluation in the EA. Reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and use common sense, rather than simply being desirable from the standpoint of SLD 30. To be considered reasonable, an alternative must meet the purpose of and need for the action, be feasible and able to be implemented, and be suitable for consideration by decision makers. Guidance for complying with NEPA requires an assessment of potentially effective and reasonable alternatives for implementing the Proposed Action. An organized approach to evaluating alternatives can identify reasonable ways to achieve the Proposed Action's purpose and avoid unnecessary impacts.

The use of selection standards is an effective tool for identifying, comparing, and evaluating reasonable and feasible alternatives in NEPA documents (32 CFR § 989.8(c)). As such, SLD 30 developed the following selection standards to evaluate potential Culvert 10 repair alternatives:

1. **Alternatives must be effective and achieve full repair of Culvert 10 and stabilization of Coast Road.** Following the completion of the Culvert 10 repairs, Culvert 10 must continue to be operable for transporting stormwater beneath Coast Road and properly discharging stormwater into the drainage channel and the Pacific Ocean. These repairs must ensure that Coast Road remains stable to provide critical access for VSFB's mission activities.
2. **Alternatives must dissipate the energy from water discharge at the Culvert 10 outflow to reduce downstream channel erosion.** High-energy surface water discharge from the outfall of Culvert 10 is downcutting and degrading the channel between the outflow and the western edge of the marine terrace, prior to stormwater discharge into the Pacific Ocean. Energy dissipation to reduce erosion, sediment transport in surface waters, and potential damage to cultural resources must be included in any alternative.

3. **Alternatives must not cause construction-related temporary closures of Coast Road.** Coast Road is a critical component of the VSFB transportation network. It serves to provide the only access to some launch sites. Transportation from the VSFB Harbor to SLC-4 is critical for mission support. Therefore, it is imperative that Coast Road remains open and usable during Culvert 10 repairs to maintain access to the South VSFB launch sites.

The scope of this EA includes the implementation of repairs to Culvert 10. Alternatives that adequately implement repairs to Culvert 10 as well as meet the project's purpose and need and selection standards are carried forward for detailed analysis.

Given the nature of the Proposed Action, the Culvert 10 repair is not implementable at any location other than Culvert 10. Therefore, alternatives that would implement culvert repairs at other locations would not meet the project's purpose and need and were not considered. Further, Culvert 10 is at risk of failure with the stability of Coast Road in jeopardy. Therefore, alternatives that include various extended timelines for implementation of Culvert 10 repairs were not considered further. However, alternatives that included various methods for implementing Culvert 10 repairs were considered:

- **Alternative 1: Install Slip Liner and Riprap Flow Dissipation.** Under Alternative 1, SLD 30 would install a high-density polyethylene (HDPE) slip liner within Culvert 10 and place riprap for approximately 50 linear feet downstream of the outfall of Culvert 10 for stormwater flow energy dissipation.

- **Alternative 2: Install Slip Liner and Concrete Flow Dissipation.** Under Alternative 2, SLD 30 would install a HDPE slip liner within Culvert 10 and place concrete for approximately 50 linear feet downstream of the outfall of Culvert 10 for stormwater flow energy dissipation.

- **Alternative 3: Replace Culvert 10 and Install Riprap Flow Dissipation.** Under Alternative 3, SLD 30 would remove the entirety of Culvert 10 by excavation, located approximately 10.5 feet below Coast Road, and replace Culvert 10 with a new CMP of the same size, at the same depth, and in the same alignment. SLD 30 would place riprap for approximately 50 linear feet downstream of the outfall of Culvert 10 for stormwater flow energy dissipation.

- **Alternative 4: Replace Culvert 10 and Install Concrete Flow Dissipation**. Under Alternative 4, SLD 30 would remove the entirety of Culvert 10 by excavation, located approximately 10.5 feet below Coast Road, and replace Culvert 10 with a new CMP of the same size, at the same depth, and in the same alignment. SLD 30 would place concrete for approximately 50 linear feet downstream of the outfall of Culvert 10 for stormwater flow energy dissipation.

2.2.1 No Action Alternative

Under the No Action Alternative, Culvert 10 would not be repaired, and SLD 30 would not install downstream erosion protection at the outfall of Culvert 10. Mitigation would not be implemented for the CA-SBA-666 site. Culvert 10 would continue to degrade and eventually collapse, damaging Coast Road and potentially making the road impassible. Further, the channel downstream of Culvert 10 would continue to erode during high-velocity storm events, as uncontrolled discharge from Culvert 10, or from across Coast Road following Culvert 10's collapse.

The No Action Alternative would not meet the project's purpose and need but is being carried forward as the analysis of the No Action Alternative provides a benchmark, enabling decision makers to compare the magnitude of the potential environmental effects of the Proposed Action. Further, NEPA requires an EA to analyze the No Action Alternative

2.3 Alternative Actions Eliminated from Further Consideration

Alternatives 2, 3, and 4 were considered and eliminated from detailed consideration in this EA because they would not meet the purpose of and need for the action, the selection standards, or were not sufficiently different from Alternative 1 to be evaluated further.

Alternative 2 would use concrete in place of riprap at the outfall of Culvert 10 to reduce the energy of stormwater flows. However, concrete lacks the roughness of engineered rock such as riprap and does a poorer job of dissipating energy at the outfall of culverts. This does not meet Selection Standard 2 (**Section 2.2**). Further, riprap is easier to transport and place, and if the engineered rock used for the riprap is sized properly for the maximum anticipated flows, it would also not be moved or displaced by stormwater during the highest flow events.

Alternatives 3 and 4 would require temporary closure of Coast Road during the excavation, removal, and replacement of Culvert 10. The required temporary closure of Coast Road to replace Culvert 10 does not meet Selection Standard 3 (**Section 2.2**) and would cause interruptions in access to launch sites and delivery of launch components at the harbor, negatively impacting the national security mission at VSFB.

2.4 Description of the Alternatives Considered for Detailed Analysis

NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Action. "Reasonable alternatives" are those that meet the purpose of and need for the Proposed Action. One action alternative met the purpose and need for the Proposed Action, satisfied the selection standards, and is carried forward for detailed analysis in this EA. The No Action Alternative provides a benchmark with which to compare potential impacts of the Proposed Action.

2.4.1 Alternative 1. Install Slip Liner and Riprap Flow Dissipation

Culvert 10 Repair

SLD 30 would install a lining inside the CMP to prevent further corrosion and collapse. SLD 30 would grout a smooth-walled HDPE liner in place inside Culvert 10. The Proposed Action would eliminate Coast Road's collapse risk and maintain stormwater discharge beneath Coast Road. SLD 30 would use existing roads and staging/parking areas and construct a temporary access road and temporary laydown area (**Figure 2-2**) for Culvert 10 repairs.

SLD 30 would not require dewatering the drainage channel and culvert to install the slip lining inside the Culvert 10 CMP. Because Culvert 10 receives stormwater runoff, SLD 30 could install the slip lining in the CMP during the dry season (approximately 15 April to 1 October) when there would be no water flow in Culvert 10. Alternatively, if SLD 30 elected to install the slip lining during the rainy season, the slip lining could be installed during low-flow events without the need for dewatering.

SLD 30 would construct a culvert section at the downstream end of Culvert 10 to meet the existing channel grade. SLD 30 would construct an outfall structure at the outlet of Culvert 10 to assist water flow transition from the end of the culvert into the channel that carries stormwater from Culvert 10 to the Pacific Ocean. The outfall structure would consist of riprap placed at the base of the outlet of Culvert 10 and extending approximately 50 linear feet downstream from the Culvert 10 outlet.

If slopes along the channel banks at the culvert outfall area that are not rock lined exceed 1:2 (vertical:horizontal), SLD 30 would include channel bank stabilization with vegetation such as hydroseeding, biodegradable erosion control blankets, a 12-month longevity biodegradable bonded fiber matrix, or rock slope protection to reduce the potential for erosion.

SLD 30 would use a rough terrain crane and rough terrain forklift to manipulate the new HDPE pipe sections at the Culvert 10 outlet. Prior to use of the rough terrain equipment, a dozer, track hoe, wheel loader, skid steer loader, and trucks would be used to clear and grub the access road and laydown yard. SLD 30 would loosen and load trapped debris and sediment from the outlet end of Culvert 10 and place it into a dump truck waiting in the laydown yard. SLD would loosen and remove sediment and smaller debris from within the existing culvert. This process would continue until all trapped debris and sediment within the culvert or at the culver inlet is removed. Any culvert washout water would be contained for evaporation in a temporary pit in the laydown yard area or in trucks that would be washed out off base. All debris (silt, dirt, sand, etc.) removed from Culvert 10 would then be disposed of at an off base, approved landfill.

Figure 2-2. Alternative 1 Proposed Action Area

Approximately 7,500 cubic yards of riprap would be placed at the end of Culvert 10 using a compact track loader and grader. Riprap would be placed in the channel downstream of the Culvert 10 outlet, then contoured to ensure that stormwater flows would be directed from the Culvert 10 outlet, across placed riprap prior to flows entering the natural channel bottom.

Access

SLD 30 would construct a temporary access route extending from Honda Point Road, just west of its intersection with Coast Road, to the west side of Culvert 10 (see **Figure 2-2**). The new temporary access road would be approximately 45 feet wide and 1,500 feet long. SLD 30 would construct the temporary access road through a combination of grading and using clean, compacted fill soil to create a ramp to transition from the existing Honda Point Road elevation to the marine terrace elevation (see **Figure 2-2**). The total area of temporary disturbance from temporary access road construction would be approximately 1.50 acres.

Vehicle and Material Staging

SLD 30 would construct one temporary laydown and vehicle turnaround area at the southern end of the access road adjacent to the Culvert 10 outfall (see **Figure 2-2**). The approximately 0.30-acre laydown area would be used to store equipment and materials needed to place the slip lining in Culvert 10 and riprap to construct the flow dissipation structure. The temporary laydown area may require the use of swamp or timber matting to minimize damage to the lands adjacent to the channel on the outfall side of Culvert 10. SLD 30 would also use an approximately 0.74-acre (32,200-square-foot) previously disturbed area (parking lot) proximate to Coast Road as a vehicle staging area (see **Figure 2-2**).

Site Restoration

Following the final stages of the Culvert 10 repair, as machinery and materials are removed, SLD 30 would begin site restoration of areas subject to temporary disturbance. SLD 30 would remove all surplus and waste materials from the Proposed Action area unless also required for the restoration of the Proposed Action area. To the extent practicable, SLD 30 would restore site contours and habitat types of temporarily impacted areas to preconstruction conditions. SLD 30 would also replant native herbaceous vegetation to restore all temporarily disturbed areas.

An assessment of potential jurisdictional waters associated with Culvert 10 was completed in May 2024 (ManTech SRS Technologies Inc. 2024). Within the Culvert 10 Proposed Action area, there are no waters of the US and no waters of the State because the drainage channel is an erosional feature associated with stormwater discharge from Culvert 10. The culvert receives stormwater runoff from the developed areas associated with Building 542 and is not a natural feature. Over time the outfall at Culvert 10 has eroded into a deeply incised channel.

Mitigation

An archaeological site (CA-SBA-666) located proximate to the drainage channel west of Culvert 10 and Coast Road has been impacted due to channel erosion from high-velocity flows exiting

Culvert 10 and flowing through the marine terrace to the west of Culvert 10 then to the Pacific Ocean. To resolve adverse effects on the CA-SBA-666 site from continued usage of Culvert 10, data recovery excavations will be completed at the site in accordance with the Advisory Council on Historic Preservation's standard treatment for recovering significant information. More specifically, adverse effects will be resolved by data recovery excavations of up to 5 cubic feet of archaeological material at CA-SBA-666. The excavation unit(s) will be terminated after two successive culturally sterile levels are excavated or the maximum depth of the archaeological deposit is reached. All excavated soils will be screened through 1/8-inch mesh. A portion of the unit, up to 8 inches by 8 inches in size, will be screened through 1/16-inch mesh to capture a sample of smaller cultural remains such as shell beads, lithic drills, and botanical material. Due to the clay soil at the site, it will be necessary to water-screen excavated sediment to identify archaeological material. A water-screening station will be set up in the proposed Culvert 10 project's equipment-staging area (see **Figure 2-2**). Following data recovery excavations, archaeological remains and all associated forms will be sent to a local laboratory for processing and data entry. Screen residues will be size sorted through the field mesh size grade, separated by material/artifact class, counted and weighed, and cataloged. When the catalog is complete, materials will be given to specialists for technical analysis. Results of technical analyses and data recovery activities will be included in a technical report. In addition, outreach materials such as a brochure, pamphlet, or poster will be produced that interprets the results of excavations in a manner appropriate for a public audience and conveys the broader significance of the archaeological study. The interpretive material will be designed in coordination with the Santa Ynez Band of Chumash Indians and SLD 30 cultural resources staff.

Project Equipment Needs

The exact equipment used during construction could vary slightly from the projections presented in **Table 2-1**, depending on contractor capabilities. However, these estimates provide a basis for analyzing related issue areas such as air quality, noise, and traffic. In addition to the equipment presented in **Table 2-1**, three half-ton or three quarter-ton pickup trucks would be used daily for a duration of approximately three months, for a total of 1,440 hours, for the Culvert 10 repairs. For the data recovery excavations, SLD 30 would use two half-ton pickup trucks for approximately 50 hours and a water trailer for water screening. The water trailer would have a 500-gallon tank and a 5.8-horsepower engine. Approximately 750 gallons of water would be used per day for up to five days. The water trailer would be filled from fire hydrants along Coast Road and a backflow prevention device as approved by the Vandenberg Cross Connection Control and Backflow Prevention Program Manager would be used.

Table 2-1. Construction Equipment Assumptions Associated with the Proposed Action

Equipment Type	Equipment Assumption	Horsepower	Assumed Year	Quantity	Total Hours
Compact Track Loader	Bobcat CT2535	35	2019	2	320

Equipment Type	Equipment Assumption	Horsepower	Assumed Year	Quantity	Total Hours
Compactor	Wacker Neuson WP1540AW - 16.9-inch width, 3372 LB CF, Honda Engine, Water Tank	5	2020	2	320
Concrete Truck	Peterbilt 567	335	2015	2	160
Dump Truck	2015 Kenworth T400	380	2015	2	320
Flatbed	2013 Freightliner Cascadia Flatbed Truck	410	2013	2	320
Grader	CAT 140 / 140 AWD - LVR	250	2020	2	320

Anticipated Schedule

The implementation of the Culvert 10 repairs, including downstream erosion protection, and the restoration of temporarily impacted areas such as the access road and laydown yard, is anticipated to be completed in approximately three months and begin in June 2025. Mitigation of the CA-SBA-666 site would require approximately six months and would also begin in June 2025.

2.5 Identification of the Preferred Alternative

DAF has identified Alternative 1 as the Preferred Alternative. Alternative 1 repairs Culvert 10, reduces downstream channel erosion, mitigates the CA-SBA-666 site, restores all disturbed habitat following construction activities, and meets the project's purpose and need.

2.6 Summary of Potential Environmental Consequences

Table 2-2 summarizes the impact characterizations from the Preferred Alternative and the No Action Alternative. The information is based on Chapter 3 of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-2. Comparison of Potential Environmental Consequences of the Proposed Action

Resource	Preferred Alternative	No Action Alternative
Air Quality	Impacts on air quality would be temporary and would cease upon completion of the Culvert 10 repairs.	Culvert 10 could potentially fail causing the collapse of Coast Road, increasing the materials, equipment, and time necessary for repairs. Therefore, there is the potential for increased temporary air quality impacts from the No Action Alternative.
Biological Resources	Repairs to Culvert 10 would temporarily impact approximately 1.80 acres of vegetation communities, most of which are nonnative-dominated plant communities. Temporarily impacted areas would be restored with native	Culvert 10 could potentially fail causing the collapse of Coast Road, leading to a greater area of temporary impacts to repair both Culvert 10 and Coast Road. The larger staging, access, and

Resource	Preferred Alternative	No Action Alternative
	species following the completion of Culvert 10 repair activities. Approximately 0.06 acre of the drainage channel would be permanently impacted by placement of riprap for energy dissipation at the outfall of Culvert 10.	construction areas would impact a larger area of native vegetation communities than under the Preferred Alternative.
Cultural Resources	The continued use of Culvert 10 would result in stormwater being directed through the erosional channel to prehistoric archaeological site CA-SBA-666. Repairing Culvert 10 and installing stormwater dissipation at the outfall of Culvert 10 would continue to impact the site. Although the flow of water would be minimized by the stormwater dissipation, no prudent and feasible historic property protection measure could be developed to completely stop channel erosion from affecting archaeological deposits downstream from Culvert 10. As a result, SLD 30 will conduct archaeological data recovery excavations in advance of project activities to recover information that would otherwise be lost due to damage and/or destruction to the site.	By not installing water dissipation at the outfall of Culvert 10, continued erosion of the channel downstream of the culvert would cause larger impacts to CA-SBA-666 than the Preferred Alternative. In addition, Culvert 10 could fail, causing the collapse of Coast Road, leading to a greater area of temporary impacts than the Preferred Alternative; this may extend to other nearby, significant archaeological sites.
Earth Resources	Repairs to Culvert 10 would temporarily impact approximately 1.80 acres of soils from the construction and use of a temporary access road and laydown area. The soil disturbance in these temporarily impacted areas would be permanently stabilized through habitat restoration after repair activities would be completed. The placement of riprap downstream of the outfall of Culvert 10 would reduce erosion in the drainage channel and provide a beneficial impact on soils.	Continued erosion of the drainage channel downstream of the Culvert 10 outfall would have long-term minor adverse impacts on soils within and along the banks of the drainage channel. Culvert 10 could potentially fail, causing the collapse of Coast Road. The failure of Coast Road and loss of Culvert 10 would have a short-term moderate adverse impact on soils as severe erosion would occur at and downstream of Culvert 10 until repairs could be completed.
Hazardous Materials and Waste Management	Activities under the Preferred Alternative would only last up to 3 months and the construction team would be relatively small (approximately 10 workers), there would not be a significant increase in the amounts of hazardous materials present on VSFB. All hazardous materials used and hazardous waste generated would be managed according to federal, state, and local laws and regulations. Therefore, the Preferred Alternative would not have a significant impact from the use and generation of hazardous materials and hazardous wastes.	The No Action Alternative would not create additional hazardous materials or waste on VSFB than exist in current baseline conditions. However, if Culvert 10 was to cause Coast Road to fail, hazardous materials that are part of the existing structure may be released unabated into the drainage channel downstream, and into the Pacific Ocean, potentially causing a significant impact on biological resources and human health and safety.
Solid Waste Management	To the extent practicable, construction and demolition debris would be reused or	Proposed Culvert 10 repairs would not be conducted and no solid waste would

Resource	Preferred Alternative	No Action Alternative
	transported to a recycler. Soils that are not reused at the Proposed Action Area would be transported to an on-base borrow pit for storage and use on future VSFB projects. Debris would be segregated to facilitate subsequent pollution prevention options. Pollution prevention options would be exercised in the following order: reuse of materials, recycling of materials, and then regulatory compliant disposal. Compliance with all applicable federal, state, and local regulations, rules and requirements, and applicable VSFB plans would govern all Culvert 10 repairs and cultural resources mitigation. Therefore, no significant effects on solid waste management are anticipated.	be generated. There would be no impacts on solid waste management. However, if Culvert 10 were to cause Coast Road to fail, concrete, asphalt, and other materials would likely be released into the drainage channel and the Pacific Ocean, requiring emergency retrieval and proper disposal as well as a large influx of waste onto VSFB infrastructure without the benefits of planning. Additionally, retrieval of all materials would be unlikely. Therefore, if Coast Road were to collapse, it would likely result in significant impacts on solid waste management on VSFB.
Human Health and Safety	The Culvert 10 repair contractor would comply with federal OSHA and AFOSH regulations, as required and appropriate, to provide for the health and safety of the public who may be exposed to the operations, hazardous materials in use, and hazardous wastes generated and transported. Therefore, human health and safety would not be adversely impacted by general construction hazards.	The proposed repairs would not be conducted and there would be no human health and safety impacts. However, if Culvert 10 was to cause failure of Coast Road, access would be impeded. This would result in a significant impact on health and safety of personnel at VSFB as emergency vehicle access would be impeded from quickly accessing some portions of VSFB.
Noise	The Preferred Alternative would temporarily increase the ambient noise levels within the Proposed Action Area and in neighboring areas during project implementation activities. Relatively continuous noise would be generated during project activities. At a distance of 1,093 feet from the construction activities, the predicted maximum noise levels would drop below 65 decibels (dB), a noise level that is equivalent to normal conversation or background music. Noise generated during construction activities would not travel off-base. Adverse impacts because of noise would be short-term and minor and cease at the completion of Culvert 10 repair activities.	The proposed Culvert 10 repairs would not be conducted. Therefore, there would be no noise impacts that would expose people to unsafe or undesirable noise levels resulting from project activities. However, if Culvert 10 was to cause Coast Road to fail, there would likely be short-term increases in noise at the site associated with emergency road repairs or replacement and the noise would be longer in duration than under the Preferred Alternative as more extensive repairs would be required.
Coastal Zone Management	SLD 30 prepared a Negative Determination, and the CCC concurred with a Negative Determination on 18 October 2024.	There would be no activities potentially affecting the coastal zone and review of proposed federal activities by the CCC would not be required.
Transportation	Given the short-duration, low average daily traffic volumes and good level of service currently experienced on the roadways that would be affected by Culvert 10 repair	There would be no effect on existing transportation beyond baseline conditions. However, if the failure of Culvert 10 was to cause Coast Road to

Resource	Preferred Alternative	No Action Alternative
	activities on VSFB and its vicinity, and the relatively small increase in daily truck traffic that would be generated by the Proposed Action, no adverse effects on capacity would occur in the Proposed Action Area roadways. The Proposed Action is not anticipated to create any significant impacts on transportation.	collapse, traffic would be forcibly diverted to other roads, and this would result in an interruption of mission-essential transportation on VSFB. In addition, such a situation would result in emergency repair involving intensive construction activities. Such an action could affect local traffic conditions and cause significant impacts on local transportation routes.
Water Resources	The total area that may be disturbed by the Proposed Action is up to 2.60 acres (including the previously developed proposed staging area). Therefore, the Proposed Action may require Construction General Permit coverage. Potential short-term increases in erosion and sedimentation could occur but would be minimized through environmental protection measures. There would be no dredge or fill activities in WOTUS or WOTS. Stabilization of the drainage channel downstream of the Culvert 10 outfall would provide a long-term beneficial impact on water quality as stormwater erosion would be reduced and there would be less sediment transport to the Pacific Ocean during storm events. Grout pumped from a concrete truck on Coast Road would be used to grout the HDPE liner in place inside the culvert. The grout used around the pipe liner would be properly managed to prevent accidental discharge. Any grout washout water would be contained for evaporation in a temporary pit in the staging area or trucks, and would be washed out off-base. All refuse and construction debris would be properly handled, stored, and removed from the site as soon as possible. Implementation of the Proposed Action under the Preferred Alternative is not anticipated to have a significant effect on surface water quality. There would be no impacts on groundwater.	The proposed repair of Culvert 10 would not be conducted. Therefore, no impacts on water resources would occur. However, if Culvert 10 was to fail, the water quality of the drainage channel downstream of Coast Road and the Pacific Ocean would be adversely affected by debris, bank erosion, and emergency road and culvert repairs. In addition, culvert failure is likely to cause scour and erosion that would alter the hydrology of the culvert's drainage area.

VSFB – Vandenberg Space Force Base; **OSHA** – Occupational Safety and Health Administration; **AFOSH** – Air Force Occupational Safety and Health; **HDPE** – high-density polyethylene; **CCC** – California Coastal Commission; **WOTUS** -waters of the US; **WOTS** - waters of the State

FORMAT PAGE

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing environment near and within the Proposed Action Area for the Preferred Alternative and No Action Alternative. The Region of Influence (ROI) considered for most resources was confined to the immediate Proposed Action Area (which includes Culvert 10, riprap for flow dissipation downstream of Culvert 10, work areas at the inlet and outlet of Culvert 10, the equipment staging area, water-screening station, temporary access road, and temporary laydown area; see Figure 2-2). However, for some environmental resources, a wider regional area was used (such as county-level data), as appropriate.

The resources identified for analysis in this EA include air quality, biological resources, cultural resources, earth resources, hazardous materials and hazardous waste management, solid waste management, human health and safety, noise, coastal zone management, transportation, and water resources.

The following resources were considered but not analyzed further in this EA:

- **Socioeconomics.** Implementing the Preferred Alternative could result in the creation of some temporary new jobs and the purchase of materials. However, these potential new jobs and material purchases would have no effect on the socioeconomic environment of the region (i.e., Lompoc Valley and Santa Maria Valley). Implementing the No Action Alternative would neither create nor eliminate jobs from the regional area.
- **Land Use and Aesthetics.** The Preferred Alternative does not include any change in the land use or aesthetics of the project area; it only proposes to repair existing structures and would not add to them or replace them. Therefore, the Proposed Action does not include any component that would impact land use and aesthetics, and this resource component is not carried forward for analysis in this EA.

VSFB is located in northwestern Santa Barbara County, where agriculture is the main economic industry and land use. VSFB encompasses approximately 99,604 acres and is physically divided into North VSFB and South VSFB by the Santa Ynez River. Much of VSFB is open space set aside as security or safety buffer zones for space launch activities. The Proposed Action Area is located along Coast Road, a major, paved artery connecting sites along the western edge of VSFB on South Base (see Figure 1-2). This area lies within the Santa Maria Basin-San Luis Range domain of central California, a geologic transition zone between the Transverse Ranges Geomorphic Province to the south and the Coast Ranges Geomorphic Province to the north.

3.1 Air Quality

3.1.1 Definition of Resource

Air quality is defined by ambient air concentrations of specific pollutants determined by the US Environmental Protection Agency (USEPA) to be of concern with respect to the health and welfare of the general public, vegetation, and property. Six major pollutants of concern, called “criteria pollutants,” are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3),

suspended and fine particulate matter (particulate matter less than 10 micrometers [PM_{10}] and particulate matter less than 2.5 micrometers [$PM_{2.5}$]), and lead (Pb). The USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants (**Table 3-1**). Areas that exceed a federal air quality standard are designated as nonattainment areas. Nonattainment areas for some criteria pollutants are further classified, depending upon the severity of their air quality problem, to facilitate their management:

- O_3 – marginal, moderate, serious, severe, and extreme
- CO – moderate and serious
- Particulate matter – moderate and serious

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume [ppmv]).

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as CO, SO_2, Pb, and some particulates, are emitted directly into the atmosphere from emission sources. Secondary pollutants, such as O_3, NO_2, and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ can also be formed as secondary pollutants through chemical reactions or by gaseous pollutants condensing into fine aerosols. In general, emissions that are considered “precursors” to secondary pollutants in the atmosphere (such as reactive organic gases and oxides of nitrogen (NO_x), which are considered precursors for O_3), are the pollutants for which emissions are evaluated to control the level of O_3 in the ambient air.

The State of California has identified four additional pollutants for ambient air quality standards: visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The CARB has also established the more stringent California Ambient Air Quality Standards (CAAQS). Areas within California in which ambient air concentrations of a pollutant are higher than the state or federal standard are considered to be nonattainment for that pollutant. **Table 3-1** shows both the federal and state ambient air quality standards. Toxic air pollutants, also called hazardous air pollutants, are a class of pollutants that do not have ambient air quality standards but are examined on an

individual basis when there is a source of these pollutants. The State of California has identified particulate emissions from diesel engines as a toxic air pollutant.

Table 3-1. Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3]	Secondary[4]	Concentration[5]
O_3	1 hour	-	-	0.09 ppm
	8 hours	0.070 ppm	Same as primary	0.070 ppm
Respirable Particulate Matter (PM_{10})	24 hours	150 µg/m^3	Same as primary	50 µg/m^3
	Annual arithmetic mean	-	-	20 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24 hours	35 µg/m^3	Same as primary	-
	Annual arithmetic average	12 µg/m^3	15 µg/m^3	12 µg/m^3
CO	1 hour	35 ppm	-	20 ppm
	8 hours	9 ppm	-	9 ppm
NO_2	1 hour	100 ppb	-	0.18 ppm
	Annual arithmetic average	0.053 ppb	Same as primary	0.030 ppm
SO_2	1 hour	75 ppb	-	0.25 ppm
	24 hours	-		0.04 ppm
Pb	30-day average	-	-	1.5 µg/m^3
	Rolling 3-month average	0.15 µg/m^3	Same as primary	-
Hydrogen Sulfide (HS)	1-hour	No federal standards		0.03 ppm (42 µg/m^3)
Sulfates (SO_4)	24-hour			25 µg/m^3
Visibility Reducing Particles	8-hour (10 am to 6 pm, Pacific Standard Time)			Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.
Vinyl chloride[6]	24 Hour			0.01 ppm (26 µg/m^3)

Source: CARB 2015

µg/m^3 - micrograms per cubic meter; **CAAQS** = California Ambient Air Quality Standards; **CO** - carbon monoxide; **HS** - hydrogen sulfide; **NAAQS** - National Ambient Air Quality Standards; **NO_2** - nitrogen dioxide; **O_3** – ozone; **Pb** – lead; **$PM_{2.5}$** - fine particulate matter less than or equal to 2.5 micrometers in diameter; **PM_{10}** - suspended particulate matter less than or equal to 10 micrometers in diameter; **ppb** - parts per billion; **ppm** - parts per million; **SO_2** - sulfur dioxide; **SO_4** – sulfate; **CARB** - California Air Resources Board

[1] NAAQS (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration

in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.

[2] California Ambient Air Quality Standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM_{10}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded.

[3] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[4] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[5] Concentration expressed first in units in which it was promulgated. Ppm in this table refers to ppm by volume or micromoles of pollutant per mole of gas.

[6] The CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), which are known as greenhouse gases (GHGs). These gases allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere. Gases that trap heat in the atmosphere are often called GHGs, analogous to a greenhouse. GHGs are emitted by both natural processes and human activities. State law defines GHGs as any of the following compounds: CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride (California Health and Safety Code § 38505(g)). GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide" (USEPA 2016). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main GHGs that have been attributed to human activity include CH_4, which has a GWP of 21, and N_2O, which has a GWP of 298. CO_2, followed by CH_4 and N_2O, are the most common GHGs that result from human activity. CO_2, and to a lesser extent, CH_4 and N_2O, are products of combustion and are generated from stationary combustion sources as well as vehicles. High GWP gases include GHGs that are used in refrigeration/cooling systems such as chlorofluorocarbons and HFCs.

To calculate carbon dioxide equivalent (CO_2e), the weighted amount of CO_2, CH_4, and N_2O released in terms of a single value based on their GWP, the following formula is used:

$$CO_2e = (CO_2 \times 1) + (CH_4 \times 25) + (N_2O \times 298)$$

3.1.2 Regional Setting

VSFB is within Santa Barbara County and under the jurisdiction of the SBCAPCD. The SBCAPCD is the agency responsible for the administration of federal and state air quality laws, regulations, and policies in Santa Barbara County, which is within the South-Central Coast Air Basin (SCCAB). The SCCAB includes San Luis Obispo, Santa Barbara, and Ventura counties.

The SCCAB, and all of Southern California, lies in a semipermanent high-pressure zone of the Eastern Pacific Region. The coast is characterized by sparse rainfall, most of which occurs in the

winter season and hot, dry summers, tempered by cooling sea breezes. In Santa Barbara County, the months of heaviest precipitation are November through April, averaging 14.7 inches annually. The mean temperature in the VSFB area, as reported by monitors in Lompoc, is 58.3 degrees Fahrenheit (°F) and the mean maximum and mean minimum temperatures are 69.6°F and 47.0°F, respectively (Western Regional Climatic Center 2020).

Santa Barbara County is classified as an attainment/unclassified area for the NAAQS for all criteria pollutants. Santa Barbara County is considered a nonattainment area for the CAAQS for ozone and PM_{10} by the SBCAPCD although the CARB has not made a final designation on this attainment status. CARB met on 25 February 2021 to consider proposed amendments to area designations for state ambient air quality standards. One of the proposed amendments would redesignate Santa Barbara County as nonattainment for O_3. Santa Barbara County is currently considered in attainment for all other criteria pollutants.

The CARB and SBCAPCD operate a network of ambient air monitoring stations throughout Santa Barbara County. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The nearest active ambient monitoring station to the project site is the Lompoc South H Street monitoring station. The Lompoc South H Street monitoring station measures all criteria pollutants. The VSFB monitoring station at the STS Power site was closed in 2019; however, it provides historical data for O_3, PM_{10}, CO, NO_2, and SO_2.

For the period from 2015 through 2019, the 1-hour CAAQS for ozone was not exceeded at either the VSFB or Lompoc H Street monitoring stations. The 8-hour NAAQS and CAAQS for ozone was exceeded once in 2015 at the VSFB monitoring station. At the Lompoc H Street monitoring station, the 24-hour PM_{10} CAAQS was exceeded 16 times in 2017, 2 times in 2018, and 3 times in 2019. At the VSFB monitoring station, the 24-hour PM_{10} CAAQS was exceeded 14 times in 2016, 35 times in 2017, and 4 times in 2018. The 24-hour PM_{10} NAAQS was exceeded twice in 2017 and four times in 2016 at the VSFB monitoring station, and once in 2015 at both monitoring stations. The 24-hour $PM_{2.5}$ NAAQS was exceeded twice in 2018 and four times in 2017 at the Lompoc H Street monitoring station. In 2020, at the time this was written, there have been two exceedances of state 24-hour PM_{10} and one exceedance of federal 24-hour $PM_{2.5}$ at the Lompoc H Street monitoring station. The data from the monitoring stations indicate that air quality is in attainment for all other state and federal standards (CARB 2020).

3.1.3 Region of Influence

Specifically identifying the ROI for air quality requires knowledge of the type of pollutant, emission rates of the pollutant source, proximity to other emission sources, and local and regional meteorology. For inert pollutants (all pollutants other than O_3 and its precursors), the ROI is generally limited to a few miles downwind from the source. However, for photochemical pollutant such as O_3, the ROI may extend much farther downwind. O_3 is a secondary pollutant that is formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors (ROG and NO_x). The maximum effect of precursors on O_3 levels tends to occur several hours after the time of emission during periods of high solar load and may occur many miles from

the source. O_3 and O_3 precursors transported from other regions can also combine with local emissions to produce high local O_3 concentrations. The ROI for the Proposed Action includes the SCCAB.

3.1.4 Federal Requirements

Clean Air Act, General Conformity, and NEPA

The USEPA is the agency responsible for enforcing the Clean Air Act (CAA) of 1970 and its 1977 and 1990 amendments. The purpose of the CAA is to establish NAAQS, to classify areas as to their attainment status relative to the NAAQS, to develop schedules and strategies to meet the NAAQS, and to regulate emissions of criteria pollutants and air toxics to protect public health and welfare. Under the CAA, individual states are allowed to adopt ambient air quality standards and other regulations, provided they are at least as stringent as federal standards. The CAA Amendments (CAAA) (1990) established new deadlines for achievement of the NAAQS, dependent upon the severity of nonattainment.

The USEPA requires each state to prepare a State Implementation Plan (SIP), which describes how that state will achieve compliance with the NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all federal air quality standards.

The CAAA also requires that states develop an operating permit program that would require permits for all major sources of pollutants. The operating permit program requires permits for all major sources of pollutants.

- **New Source Review.** A New Source Review is required when a source has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specified major source thresholds (100 or 250 tons per year) which are predicated on a source's industrial category. Through the SBCAPCD's permitting processes, all stationary sources are reviewed and are subject to a New Source Review process.

- **General Conformity.** Under 40 CFR Part 93, Subpart B and 40 CFR Part 51, Subpart W, federal agencies are required to demonstrate that federal actions conform to the applicable SIP. The USEPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas. Santa Barbara is an unclassified/attainment area for all NAAQS. The general conformity rule does not apply to the Proposed Action at VSFB.

Local Requirements

As indicated previously, in Santa Barbara County the SBCAPCD is the agency responsible for administering the federal and state air quality laws, regulations, and policies. Included in the local air districts' tasks are monitoring air pollution, maintenance of air quality standards through programs to control air pollutant emissions and promulgating rules and regulations. SBCAPCD regulations require that facilities building, altering, or replacing stationary equipment that may emit

air pollutants obtain an authority to construct permit. Further, SBCAPCD regulations require stationary sources of air pollutants to obtain a permit to operate. The local air districts are responsible for the review of applications and for the approval and issuance of these permits. It is not anticipated that the Culvert 10 installation project would require any permits because emissions from construction activities would be temporary and air pollutant emissions would be below *de minimus* levels (see **Section 4.1.1**). In addition, the SBCAPCD regulations require a stationary source that would emit 25 tons per year or more of any pollutant except CO in any calendar year during construction to obtain emission offsets.

3.2 Biological Resources

3.2.1 Region of Influence

The existing biological setting includes the regional setting of VSFB, the specific Proposed Action Area, and past and present disturbances in and near the Culvert 10 repair project site. Biological resources on VSFB are abundant and diverse compared to other areas of California because VSFB is within an ecological transition zone where the northern and southern ranges of many species overlap, and because the majority of the land within the base's boundaries has remained undeveloped. The ROI considered in this EA for biological resources encompasses the Proposed Action Area (see **Figure 2-2**), including the culvert, unnamed drainage, temporary access roads, staging areas, and the Honda Borrow Pit.

3.2.2 Methodology

Biological resources in the vicinity of the Proposed Action Area were characterized based on a review of VSFB geographic information system (GIS) data, available documents for the Proposed Action, and field assessments (i.e., survey area) conducted by ManTech SRS Technologies Inc. in support of the Proposed Action (ManTech SRS Technologies Inc. 2024). Complete lists of plant and wildlife species documented within the Proposed Action Area can be found in **Appendix F.** Potential occurrence of special-status and sensitive species was determined based on the presence of suitable habitat or records of occurrence of the species. Sources accessed and reviewed to determine the potential for occurrence included the California Natural Diversity Database (California Department of Fish and Wildlife 2023) and existing local and regional references.

3.2.3 Vegetation

Most of the vegetation in the surveyed area, including the Proposed Action Area, consists of nonnative iceplant (*Carpobrotus* spp.) mats, in which nonnative iceplant is the dominant species. California sagebrush (*Artemisia californica*) scrub, with codominant mock heather (*Ericameria ericoides*) was also found over a large portion of the survey area. Veldt grass (*Ehrharta calycina*) grassland was also found in the survey areas (**Table 3-2; Figure 3-1**).

Vegetation associated with the Culvert 10 drainage west of Coast Road was not hydric. The drainage associated with the Culvert 10 outflow was largely scoured to bare soil. Vegetation that had successfully colonized the drainage was exclusively dominated by upland species with the

exception of California blackberry (*Rubus ursinus*). Blackberry was a common component of adjacent upland central coast scrub vegetation and its intrusion into the drainage did not appear to be tied to any enhanced moisture availability. Instead, its ability to grow via runners from upland rooted plants, has enabled it to rapidly recolonize the drainage in the temporal gap between storm flow events. East of Coast Road, flow was confined to open unvegetated engineered concrete channels and a metal culvert.

Table 3-2. Vegetation Types within the Survey Area

Alliance Name	Common Name	Percent Cover of Dominant Species	Acres in Survey Area	Alliance Acres in Survey Area
Anthropogenic - Developed	Anthropogenic - Developed	Unvegetated	5.63	5.63
Coastal Strand - Coastal Bluff	Coastal Strand - Coastal Bluff	Unvegetated	6.05	6.05
Artemisia californica - (*Salvia leucophylla*) Alliance	California Sagebrush - (Purple Sage) Scrub	75% *Solanum douglasii*; 15% *Artemisia californica*; 10% *Baccharis pilularis*	0.14	7.89
		85% *Artemisia californica*; 15% *Ericameria ericoides*	2.13	
		95% *Artemisia californica*	4.63	
		85% *Artemisia californica*	0.99	
Brassica nigra - *Centaurea* (solstitialis, *melitensis*) Alliance	Upland Mustards or Star-Thistle Fields	35% *Hirschfeldia incana*; 25% *Artemisia californica*; 25% *Carpobrotus* spp.	0.47	0.47
Ehrharta spp. Alliance	Perennial Veldt Grass Grassland	97% *Ehrharta calycina*	2.33	3.09
		35% *Ehrharta calycina*; 10% *Ericameria ericoides*; 10% *Carpobrotus* spp.	0.32	
		85% *Ehrharta calycina*; 10% *Artemisia californica*	0.44	
Eriophyllum staechadifolium - *Erigeron glaucus* - *Eriogonum latifolium* Alliance	Seaside Woolly-Sunflower - Seaside Daisy - Buckwheat Patches	65% *Eriophylum staechadifolium*; 20% *Isocoma menziesii*; 10% *Eriogonum parvifolium*	0.59	0.59
Eucalyptus spp. - *Ailanthus altissima* - *Robinia pseudoacacia* Alliance	Eucalyptus - Tree of Heaven - Black Locust Groves	100% *Eucalyptus globulus*	0.17	0.17
Mesembryanthemum spp. - *Carpobrotus* spp. Alliance	Ice Plant Mats	10% *Carpobrotus* spp.; 10% *Eriogonum parvifolium*; 10% *Isocoma menziesii*	1.53	8.68

Alliance Name	Common Name	Percent Cover of Dominant Species	Acres in Survey Area	Alliance Acres in Survey Area
		15% *Carpobrotus* spp.	0.32	
		20% *Carpobrotus* spp.	0.36	
		25% *Carpobrotus* spp.	1.10	
		50% *Mesembryanthemum crystallinum*; 30% *Artemisia californica*; 15% *Leptosyne gigantea*	0.76	
		65% *Carpobrotus* spp.; 30% *Artemisa californica*	5.36	
		70% *Carpobrotus* spp.; 15% *Artemisia californica*; 15% *Ericameria ericoides*	1.46	
		70% *Carpobrotus* spp.; 25% *Artemisia californica*	7.81	
mixed *Carpobrotus* spp. and *Artemisia californica* Alliance	mixed California Sagebrush Scrub and Ice Plant Mats	30% *Carpobrotus* spp.; 25% *Baccharis pilularis*; 25% *Artemisia californica*; 10% *Acmispon glaber*; 10% *Rhus integrifloia*	0.27	1.86
		45% *Carpobrotus* spp.; 35% *Artemisa californica*; 25% *Baccharis pilularis*	1.59	
mixed *Carpobrotus* spp. and *Ehrharta* spp. Alliance	mixed Ice Plant Mats and Veldt Grass Grassland	35% *Carpobrotus* spp.; 25% *Ehrharta calycina*; 10% *Artemisia californica*; 10% *Eriophylum staechadifolium*	0.18	0.18
Rhus integrifolia Alliance	Lemonade Berry Scrub	95% *Rhus integrifolia*	0.16	0.16

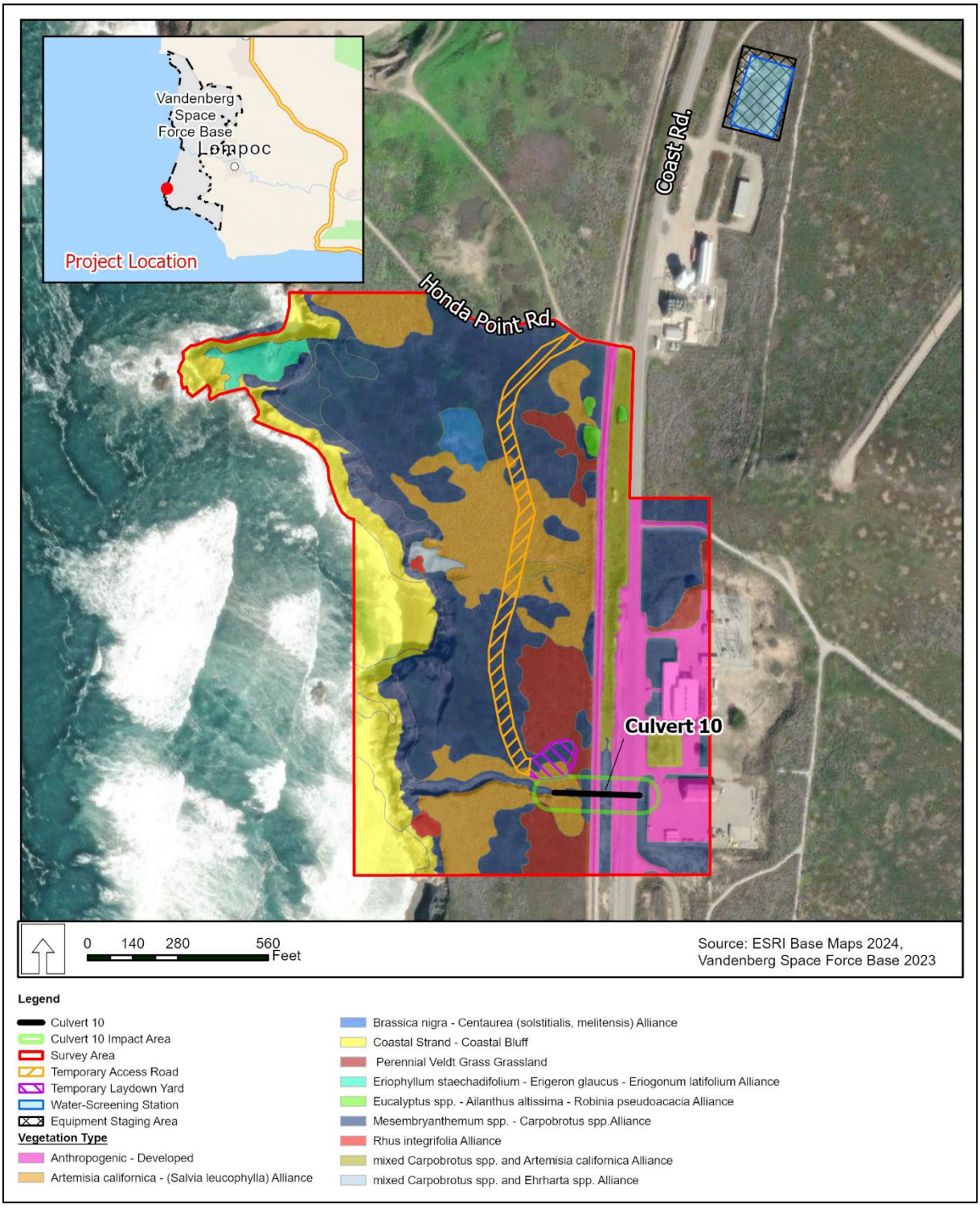


Figure 3-1. Vegetation Alliances within the Survey Area at Vandenberg Space Force Base

3.2.4 General Wildlife Resources

A variety of common bird species are associated with the Proposed Action Area and adjacent habitats including birds associated with scrub and nearby beach habitat. During site surveys, Anna's hummingbird (*Calypte anna*), wrentit (*Chamaea fasciata*), common yellowthroat (*Geothlypis trichas*), and California thrasher (*Taxostoma redivivum)*, among others, were documented within the Proposed Action Area. Amphibians that may occur at the site include lungless salamanders such as the arboreal salamanders (*Aneides lugubris*), the Arguello slender salamander (*Batrachoseps wakei*) known only from Destroyer Rock to Point Arguello on VSFB (ManTech SRS Technologies Inc. 2023), as well as the Baja California treefrog (*Pseudacris hypochondriaca*). Reptile species expected to occur or observed within the Proposed Action Area include western fence lizard (*Sceloporus occidentalis*), western skink (*Plestiodon skiltonianus*), southern alligator lizard (*Elgaria multicarinata*), San Diego gopher snake (*Pituophis catenifer annectens*), and southern pacific rattlesnake (*Crotalus oreganus helleri*).Various mammal species are also expected to occur within the project area, including brush rabbit (*Sylvilagus bachmani*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus hemionus*). Small mammals include various species of mice and pocket gopher (*Thomomys bottae*). A full list of species observed during surveys of the Action Area is included in *Preliminary Assessment of Potential Jurisdictional Waters Associated with Culverts 9 and 10 on Vandenberg Space Force Base, California* (**Appendix F**; ManTech SRS Technologies Inc. 2024).

3.2.5 Special-Status Species

Table 3-3 lists federal and state special-status species that occur or have the potential to occur within the Proposed Action Area and its vicinity. Potential occurrence was determined based on past documentation within the vicinity of the Proposed Action Area and on suitability of habitat and occurrence within the region of a particular species. Several species were excluded from potential occurrence because they either do not occur at the site when project activities would occur, they do not breed within the Proposed Action Area and their special status affords them protection only during their breeding period, or they do not occur in a manner (rookeries or nesting colonies) that affords them special-status protection.

Table 3-3. Federal and State Special Status Terrestrial Species with the Potential to Occur within the Proposed Action Area

Species	Status		Potential Occurrence within the Proposed Action Area
	USFWS	CDFW	
Invertebrates			
Crotch Bumble Bee (*Bombus crotchii*)	-	SCE	Potential: may nest and visit flowering plants in the Proposed Action Area
Amphibians			
California Red-Legged Frog (*Rana draytonii*)	FT	SSC	Unlikely: Proposed Action Area may be used as transient upland habitat
Reptiles			
Northern California Legless Lizard (*Anniella pulchra pulchra*)	-	SSC	Potential: may occur in areas of loose sandy soil

Species	Status		Potential Occurrence within the Proposed Action Area
	USFWS	CDFW	
Two-Striped Gartersnake (*Thamnophis hammondii*)		SSC	Potential: documented nearby in Honda Creek
Birds			
Allen's Hummingbird (*Selasphorus sasin*)	BCC	-	Likely: may occur and nest in riparian vegetation
Bald Eagle (*Haliaeetus leucocephalus*)	BGEPA	Fully protected	Rare: may over fly the Proposed Action Area
Black Oystercatcher (*Haematopus bachmani*)	BCC	-	Potential: may fly over the Proposed Action Area
California Condor (*Gymnogyps californianus*)	FE	SE	Very Rare: may over fly the Proposed Action Area
Loggerhead Shrike (*Lanius ludovicianus*)	BCC	SSC	Likely: may occur and nest in scrub vegetation
Peregrine Falcon (*Falco peregrinus anatum*)	BCC	Fully protected	Likely: may hunt within coastal strand and fly over Proposed Action Area
Mammals			
American badger (*Taxidea taxus*)	-	SSC	Likely: suitable habitat within and adjacent to the Proposed Action Area

BCC - federal bird of conservation concern; **BGEPA** - Bald and Golden Eagle Protection Act; **CDFW** - California Department of Fish and Wildlife; **FE** - federal endangered species; **FT** - federal threatened species; **SCE** - state candidate endangered species; **SE** - state endangered species; **SSC** - state candidate species; **USFWS** - US Fish and Wildlife Service

California Red-Legged Frog (*Rana draytonii*)

Status

CRLF were listed as federally threatened by the USFWS on 23 May 1996 (61 FR 25813-25833). In 2002, the USFWS issued a Recovery Plan to stabilize and restore CRLF populations (USFWS 2002).

Critical Habitat

Critical habitat was designated on 17 March 2010 (50 FR 12816-12959). Critical habitat does not include VSFB, since it was excluded under Section 4(b)(2) of the ESA, for reasons including impacts on national security.

Life History

The CRLF is a member of the family Ranidae and is California's largest native frog. In order to breed, CRLF require water bodies with sufficient hydroperiods and compatible salinity levels to accommodate larval and egg development. Breeding typically takes place from November through April with most egg deposition occurring in March. Eggs require 6 to 14 days, depending on water temperature, to develop into tadpoles. Tadpoles typically require 11 to 20 weeks to develop into terrestrial frogs (USFWS 2002a), although some individuals may overwinter in the tadpole stage (Fellers et al. 2001). Although CRLF have been documented depositing eggs in areas of higher salinity, levels of 4.5 parts per thousand (ppt) resulted in significant mortality and

deformities in developing embryos (Jennings and Hayes 1990). Adult CRLF vacated areas with salinity greater than 6.5 ppt (Jennings and Hayes 1990).

In California, adult CRLF have been documented traveling distances of over 1 mile during the wet season and spending considerable time in terrestrial riparian vegetation (USFWS 2002a). It is thought that riparian vegetation provides good foraging habitat, as well as good dispersal corridors, due to canopy cover, and presence of moisture (USFWS 2002a). A study aimed at quantifying CRLF movements within a wetland management area on VSFB documented a maximum travel distance of 0.13 mile (Christopher 2018). In 2017, ManTech SRS Technologies Inc. biologists found an adult CRLF in a roadside puddle 0.69 mile from the nearest aquatic habitat following a rain event (ManTech SRS Technologies Inc. 2019), indicating that CRLF on VSFB may be capable of longer distance movements under conditions of enhanced moisture. In addition to riparian and wetland habitat (38 percent of terrestrial observations), CRLF on VSFB have been found using terrestrial forb (60 percent of terrestrial observations) and shrub (3 percent of terrestrial observations) dominated habitats (Christopher 2018). This demonstrates use of upland habitat on VSFB, as long as sufficient cover is present.

Habitat loss and degradation, combined with overexploitation and introduction of exotic predators, were important factors in the decline of CRLF in the early to mid-1900s. Continuing threats to CRLF include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, and competition or predation from nonnative species including the bullfrog, catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish, and crayfish. Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations and is considered a threat to CRLF populations.

Occurrence within the Proposed Action Area

CRLF have been documented in fairly regular surveys across VSFB since the early 1990s (Christopher 1996). Surveys have shown that CRLF have the potential to occur in virtually all known wetlands and bodies of water on VSFB. The closest consistently occupied CRLF habitat is present in Honda Creek, 0.77 mile to the north. Historically occupied sites 1.55 miles south in the SLC-6 area no longer pool consistently, with the most recent instances of CRLF occupancy recorded in 2001. Water conveyed through Culvert 10 has been entirely comprised of stormwater discharges (ManTech SRS Technologies Inc. 2024); therefore, it does not provide aquatic habitat for CRLF. There is no persistence of enhanced moisture conditions. Flows through the drainage associated with Culvert 10 are high velocity and transitory. There are no areas of sustained pooling within the base of the drainage and vegetation cover is limited and dominated by sparse upland species. Given the distances involved and the lack of suitable aquatic habitat afforded by the Culvert 10 outflow, the potential for CRLF transiting through the site is extremely unlikely, but its occurrence cannot be entirely excluded within the Proposed Action Area.

3.3 Cultural Resources

This section discusses cultural resources within the affected environment. It describes the cultural setting, known cultural resource sites and studies within the affected environment, and the

environmental consequences to cultural resources. The ROI is the Area of Potential Effect (APE), which is described in **Section 3.3.2**.

3.3.1 Cultural Setting

The prehistory of California's central coast spans the entire Holocene and may extend back to late Pleistocene times. Excavations on VSFB reveal occupations dating to the Pleistocene/Holocene transition, around 11,000 years ago (Lebow et al. 2014; Lebow et al. 2015). Occupations during earliest part of the Holocene (9,000 to 10,000 years) have been identified at several sites on the base (Glassow 1990, 1996; Lebow et al. 2001, 2006, 2007; Stevens 2011). These early occupants are thought to have lived in small groups that had a relatively egalitarian social organization and a forager-type land-use strategy (Erlandson 1994; Glassow 1996; Greenwood 1972; Moratto 1984). Human population density remained low throughout the early and middle Holocene (Lebow et al. 2007). Cultural complexity appears to have increased around 3,000 to 2,500 years ago (King 1981, 1990). At VSFB, that interval also marks the beginning of increasing human population densities and appears to mark the shift from a foraging to a collecting land-use strategy (Lebow et al. 2006, 2007). Population densities reached their peak around 600 to 800 years ago, corresponding to the full emergence of Chumash cultural complexity (Arnold 1992).

People living in the VSFB area prior to historic contact are grouped with the Purisimeño Chumash (Greenwood 1978; King 1984; Landberg 1965), one of several linguistically related members of the Chumash culture. In the Santa Barbara Channel area, the Chumash people lived in large, densely populated villages and had a culture that "was as elaborate as that of any hunter-gatherer society on earth" (Moratto 1984:118). Relatively little is known about the Chumash in the VSFB region. Explorers noted that villages were smaller and lacked the formal structure found in the channel area (Greenwood 1978: 520). About five ethnohistoric villages are identified by King (1984: Figure 1) on VSFB, along with another five villages in the general vicinity. Diseases introduced by early Euroamerican explorers, beginning with the maritime voyages of Cabrillo in A.D. 1542–1543, substantially impacted Chumash populations more than 200 years before Spanish occupation began (Erlandson and Bartoy 1995, 1996; Preston 1996). Drastic changes to Chumash lifeways resulted from the Spanish occupation that began with the Portolá expedition in A.D. 1769.

VSFB history is divided into the Mission, Rancho, Anglo-Mexican, Americanization, Regional Culture, and Suburban periods. The Mission Period began with the early Spanish explorers and continued until 1820. Mission La Purísima encompassed the VSFB area. Farming and ranching were the primary economic activities at the Mission. The Rancho Period began in 1820 and continued until 1845. Following secularization in 1834, the Alta California government granted former mission lands to Mexican citizens as ranchos. Cattle ranching was the primary economic activity during this period. The Bear Flag Revolt and the Mexican War marked the beginning of the Anglo-Mexican Period (1845 to 1880). Cattle ranching continued to flourish during the early part of this period, but severe droughts during the 1860s decimated cattle herds. The combination of drought and change in government from Mexican to the United States caused substantial

changes in land ownership. Sheep ranching and grain farming replaced the old rancho system. Increased population densities characterized the Americanization Period (1880 to 1915). Beginning in the late 1890s, the railroad provided a more efficient means of shipping and receiving goods and supplies, which in turn increased economic activity. Ranching and farming continued during the early part of the period of Regional Culture (1915 to 1945), until property was condemned for Camp Cooke. The Suburban Period (1945 to 1965) began with the end of World War II. In 1956, the Army transferred 64,000 acres of North Camp Cooke to the Air Force, and it was renamed the Cooke AFB. In 1958 the base had its first missile launch, the Thor, and was renamed Vandenberg AFB (Palmer 1999). Vandenberg AFB was officially renamed VSFB during a US Space Force ceremony held at the VSFB parade grounds on 14 May 2021.

3.3.2 Area of Potential Effect

As identified by the VSFB Cultural Resources Lead, the APE includes an Archaeological Study Area, which is composed of the proposed Culvert 10 project elements and a 20-foot buffer around the access road and laydown area as well as a 50-foot buffer around the culvert.

3.3.3 Cultural Resources Studies

An archaeological site record and literature search was completed at the 30 CES/CEIEA at VSFB and included a review of site records, reports, and site condition assessments, and examination of Base GIS and US Geological Survey topographic maps. Background research identified five archaeological sites (CA-SBA-212, -212H, -666, -1145, and -1145H) within a 328-foot buffer area.

3.3.4 Archaeological Survey Results

Applied EarthWorks, Inc. conducted an archaeological study for the Proposed Action on 21 and 22 February 2023 (Applied EarthWorks, Inc. 2023). The study included a surface survey and excavation of 21 shovel test pits to determine whether archaeological deposits are present. Archaeological materials were observed in one shovel test pit, and a small low-density marine shell surface scatter was identified next to the unit. The site boundary of CA-SBA-212 has been extended to encompass the archaeological material. CA-SBA-212 was determined NRHP eligible in November 1985 (USAF850807A). Applied Earthworks, Inc. recommended adjusting the route of the temporary access road to avoid the CA-SBA-212 deposit. The temporary access road alignment under the Preferred Alternative was adjusted accordingly.

3.4 Earth Resources

Earth resources include geology and soils, as well as geologic hazards and seismicity. The ROI for Earth Resources is Santa Barbara County.

3.4.1 Geology and Soils

VSFB is a geologically complex area that includes the transition zone between the Southern Coast Range and Western Transverse Range geomorphic provinces of California. The geologic features of VSFB have been an important factor in the development of the diverse natural habitats

found in this primarily undeveloped stretch of California coastline. VSFB is underlain predominantly by marine sedimentary rocks of Late Mesozoic age (140 to 70 million years before the present) and Cenozoic age (70 million years to the present). The basal unit underlying the entire base is the Franciscan Formation of upper Jurassic age (Dibblee 1950). The Franciscan Formation consists of a series of sedimentary and volcanic rocks with numerous serpentine intrusions. Extensive folding and faulting throughout the VSFB area has created four structural regions: the Santa Ynez range, the Lompoc lowland, the Los Alamos syncline, and the San Rafael Mountain uplift (Reynolds, Smith, and Hill Inc. 1985). The Santa Ynez range consists of a very thick Cretaceous-Tertiary sedimentary section uplifted along the Santa Ynez fault; it was subsequently folded. The Lompoc lowland is an area of low relief that is structurally synclinal but has Franciscan basement relatively close to the surface. The Los Alamos syncline is a deep structural down warp traversing the Los Alamos and upper Santa Ynez valleys. Faulting along the southwestern margin of the mountain range uplifted the San Rafael Mountains. Most of the folds in these structural regions are oriented to the northwest.

The Proposed Action Area is located along the western edge of VSFB on South Base and lies within the Santa Maria Basin-San Luis Range domain of central California, a geologic transition zone between the Transverse Ranges Geomorphic Province to the south and the Coast Ranges Geomorphic Province to the north.

Soils proximate and at Culvert 10 consist of loam sands and clay loams (**Figure 3-2**). Botella clay loam and Baywood loamy sand are the soil types within the Culvert 10 Proposed Action Area. Botella clay loam tends to occur in small valleys and on fans that are subject to overflow from higher areas. The soil is moderately well drained. Baywood series soils are deep, somewhat excessively drained soils that formed in historic coastal sand dunes (US Department of Agriculture 1972).

3.4.2 Seismology

The Santa Barbara County region is seismically active with a major earthquake occurring in the region about every 15 to 20 years (US Air Force 1987; Alterman et al. 1994). The Santa Ynez-Pacifico Fault Zone, the Lompoc-Solvang (Santa Ynez River)-Honda Fault Zone, the Lions Head-Los Alamos-Baseline Fault Zones, and their potential offshore extensions, are three of the primary fault zones that project through VSFB (Alterman et al. 1994).

These fault systems within the Transverse Ranges are considered active (Jennings 1994) and capable of generating damaging earthquakes. Moderate or major earthquakes along these systems could generate strong or intense ground motions in the area, and possibly result in surface ruptures of unmapped faults along the northern and southern boundaries, as well as the central part of VSFB.

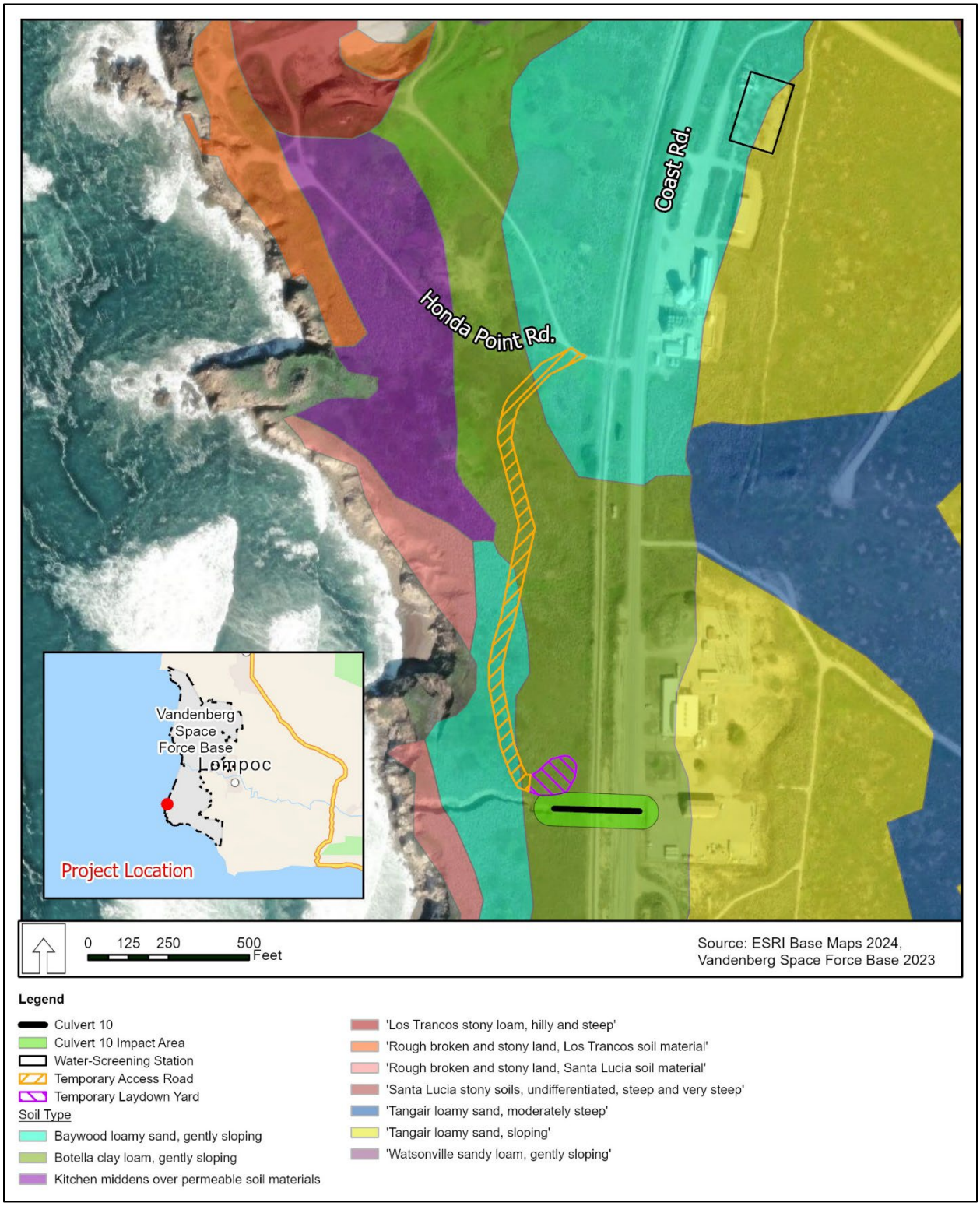


Figure 3-2. Soils Mapped in and near the Proposed Action Area at Vandenberg Space Force Base

3.4.3 Geological Hazards

The Proposed Action Area at Culvert 10 beneath Coast Road is in a seismically active portion of Central California. Potential hazards that could affect the site and result in structural damage include faulting, ground shaking, liquefaction, lateral spreading, and flooding. The hazards consist of seismically induced settlement, collapse (hydroconsolidation), and tsunami potential.

The potential for surface fault rupture on VSFB is generally considered to be low (US Air Force 1987). At the present, there are no known areas where liquefaction has occurred. Areas most prone to liquefaction are those where there is sandy to silty soil, the water table is within 50 feet of the surface, and earthquake loading exceeds 20 percent of gravity. The areas that are most prone to liquefaction on VSFB are near San Antonio Creek and the Santa Ynez River. The potential for liquefaction on VSFB, despite these areas, is still considered low (US Air Force 1987).

Tsunamis, sea waves associated with offshore earthquakes, along the Central and Southern California coast have not been well recorded and documented until recently. Since 1946, only five significant tsunamis have been recorded, and each was associated with distant earthquakes. Tsunami flooding of the VSFB coastline could occur in low-lying areas such as the mouth of the Santa Ynez River and Honda Creek. The recurrence intervals for tsunamis have not been predicted for the VSFB coastline (US Air Force 1987).

3.5 Hazardous Materials and Waste Management

Hazardous materials and wastes are those substances defined as hazardous by the CERCLA (42 USC 9675), the Toxic Substances Control Act (15 USC 2601-2671), the Solid Waste Disposal Act as amended by the RCRA (42 USC 6901-6992), and Title 22 of the California Code of Regulations (CCR). In addition, federal and state OSHA regulations govern protection of personnel in the workplace. In general, the definitions within these citations include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health (to workers), welfare, or the environment, when released into the environment. The ROI for hazardous materials and waste management for the Proposed Action is VSFB.

3.5.1 Hazardous Materials Management

Hazardous material use on VSFB is regulated by Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention,* and emergency response procedures for hazardous materials spills are established in VSFB's Hazardous Materials Emergency Response Plan (US Air Force 2014). VSFB requires that all hazardous materials be obtained through the HazMart, a base function that centrally manages the procurement of hazardous materials. Specifically, the HazMart approves the use of hazardous materials only after it reviews the composition of the commodity and how it is to be used to ensure compliance with environmental, safety, and occupational health regulations and policies. Hazardous materials potentially used during construction and demolition projects are petroleum, oils and lubricants (POLs) in demolition

equipment and vehicles, solvents for paint abatement or equipment cleaning, and compressed gases for welding or cutting equipment.

3.5.2 Hazardous Waste Management

Management of hazardous waste at VSFB complies with the RCRA Subtitle C (40 CFR 240-299) and with California hazardous waste control laws as administered by the California Environmental Protection Agency's Department of Toxic Substances Control, under CCR Title 22, Division 4.5. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled according to defined procedures. The VSFB Hazardous Waste Management Plan (US Space Force 2022a) outlines the procedures to be followed for hazardous waste management on VSFB.

3.5.3 Installation Restoration Program

The federal Installation Restoration Program (IRP) was implemented at DoD facilities to identify, characterize, and restore hazardous substance release sites. There are currently 604 IRP sites throughout VSFB. The IRP sites are remediated through the Federal Facilities Site Remediation Agreement, a working agreement between the DAF, the Regional Water Quality Control Board (RWQCB) – Central Region, and the Department of Toxic Substances Control. IRP sites include identified Areas of Concern (AOCs), where potential hazardous material releases are suspected, Areas of Interest (AOIs), defined as areas with the potential for use or presence of a hazardous substance, and the Military Munitions Response Program Munitions Response Sites.

The following criteria were used to determine the sites included in this discussion:

- Active IRP sites, AOCs, and AOIs within 2,000 feet of the project site
- Sites containing surface water drainage or groundwater flow within the Culvert 10 drainage area
- Sites upstream of the project site

There are six closed IRP sites at and within 2,000 feet of the Proposed Action Area (**Figure 3-3**). However, there are no active IRP sites identified within 2,000 feet of the Proposed Action Area.

3.5.4 Hazardous Materials and Waste Transport

The Department of Transportation (DOT) regulates the transport of hazardous materials and waste. Anyone transporting hazardous materials or waste must obtain USEPA identification numbers as transporters. The USEPA has incorporated DOT statutes (49 USC) into its regulatory scheme and has added other requirements such as recordkeeping and cleanup of spills. Transporters of hazardous materials and waste at VSFB are regulated by the aforementioned laws and are DOT-certified transporters. VSFB follows the California Department of Transportation requirements for traveling with hazardous materials on State Route (SR) 1, which runs through part of the eastern edge of VSFB, and SR 246, which physically divides the base into North and South VSFB.

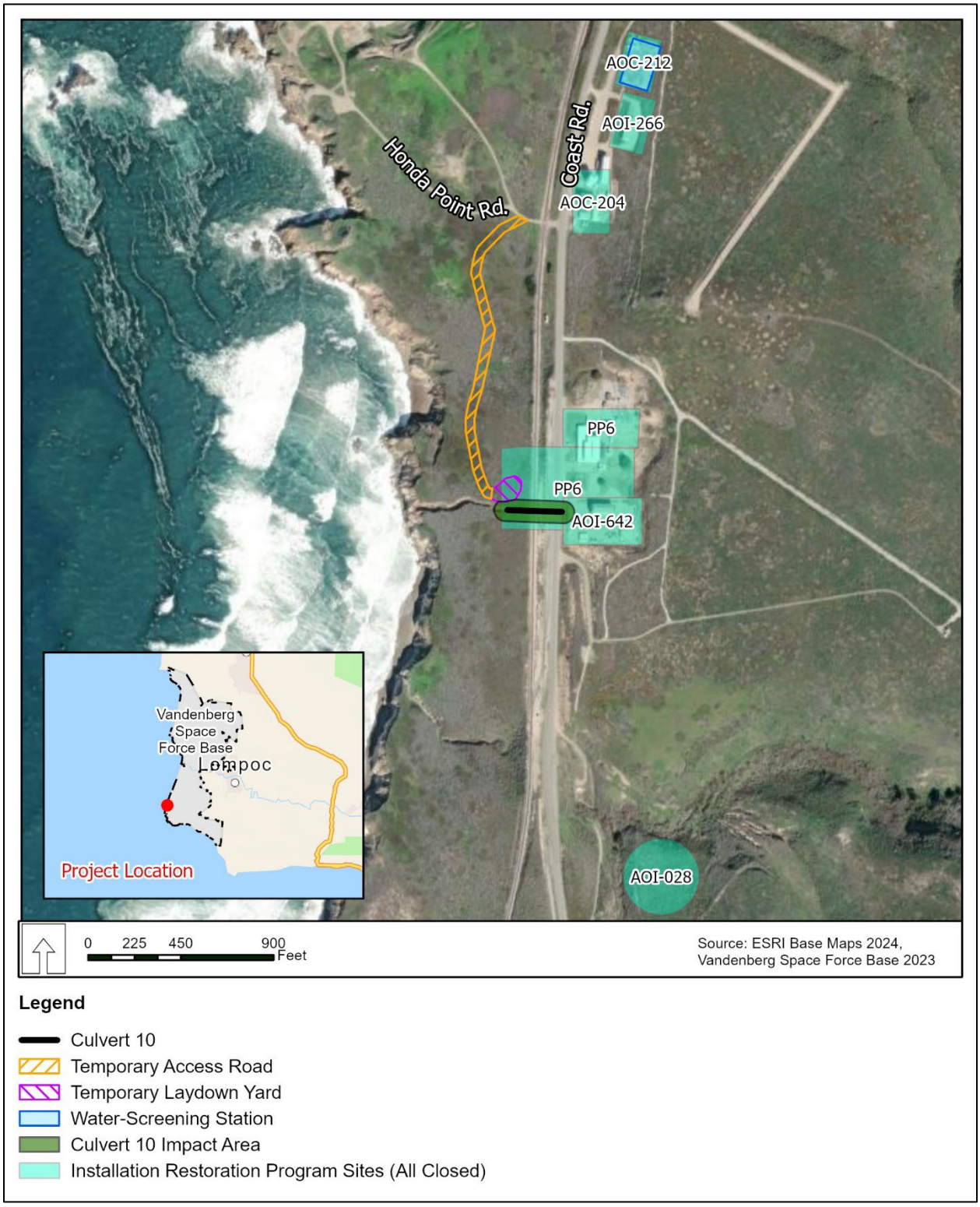


Figure 3-3. Installation Restoration Program Sites Proximate to the Proposed Action Area at Vandenberg Space Force Base

3.6 Human Health and Safety

Hazards associated with some past and present mission activities on VSFB can constrain locations where projects can be sited in order to ensure the health and safety of workers. The following hazard zones have been established on VSFB to protect workers from various hazards:

- **Toxic Hazard Zones** are areas established downwind of launch site operations to protect workers from exposure to toxic vapors emitted during the transfer or loading of liquid propellants or maintenance of launch systems. These zones can extend 20,000 feet or more from a launch site.
- **Missile/Space Launch Vehicle Flight Hazard Zones and Explosive Safety Zones** are established under the flight path of missile or space launch vehicle launches to protect personnel from debris fallout under the launch trajectory. Explosive safety zones are established from 75 feet to 5,000 feet around launch sites and buildings where rocket propellants are stored to protect personnel from potential explosive hazards. Both of these hazard zones must be evacuated before any launch.
- **Radiofrequency Radiation Hazard Areas** are established around transmitters on VSFB that can present radiation hazards to people and potentially detonate electroexplosive devices. The sizes of the hazard areas vary depending on the transmitter power and antenna reception.
- **Airfield Clear Zones, Lateral Clear Zones (LCZs), and Accident Potential Zones (APZs)** are established around the VSFB airfield runway and contain restrictions on certain land uses. Clear zones and LCZs are areas where the accident potential is so high that land use restrictions prohibit reasonable use of the land. Clear zones occur at both ends of the runway, and LCZs extend 1,000 feet from both sides of the centerline along the length of the runway. The ground surface within the LCZ must be graded to certain requirements and kept clear of fixed or mobile objects, except for necessary navigational aids and meteorological equipment. There are two APZs, APZs I and II, which are less critical than clear zones but still possess significant potential for accidents. Acceptable uses within APZ I areas include industry or manufacturing, communication and utilities transportation, wholesale trade, open space, recreation, and agriculture, but not uses that concentrate people in small areas. Acceptable uses within APZ II areas include low business services and commercial retail trade uses of low intensity or scale of operation, but not high-density operations.
- **Air Installation Compatible Use Zones** are areas where certain land uses are restricted due to the combination of the potential for accidents and noise and the need for clearance of obstacles.
- **Unexploded Ordnance Closure Areas** are areas on VSFB that were used as ordnance training ranges and have the potential to contain unexploded ordnance (UXO). On 27 September 2010, all areas known or suspected to contain UXO on VSFB were closed to nonmission/recreational activities. Any proposed work in these areas must be

coordinated with the Weapons Safety and Explosive Ordnance Disposal offices. Depending on the area, escorts may or may not be required.

The affected environment for health and safety is the regulatory environment for health and safety issues established to minimize or eliminate potential risk to the general public and personnel involved in the proposed project. The Proposed Action would involve manual labor and heavy equipment operation activities where workers would potentially be exposed to conditions that could adversely impact their health and safety. The ROI of these potential impacts is the Proposed Action Area and surrounding vicinity.

- Hazardous materials, primarily POLs, would be used for operating heavy equipment under the Proposed Action. The potential exists for unexpected releases of these POLs, which would generate hazardous waste.
- The construction contractor would transport hazardous material used in or resulting from the Proposed Action. A permitted hazardous waste hauler would transport hazardous waste. The transportation of these materials is discussed in **Section 3.5** (Hazardous Materials and Waste Management) of this EA.
- Heavy equipment operation activities create noise, discussed below.

Because of the above conditions, the potential exists for persons participating in the culvert repair activities to become exposed to hazardous materials and hazardous waste. In addition to these more obvious risks to human health and safety, the following, more mundane, physical features, which have the potential to be present in the vicinity of the proposed project, also have the potential to adversely impact the health and safety of the site workers:

- Physical hazards including road traffic, holes and ditches, uneven terrain, sharp or protruding objects, slippery soils or mud, and unstable ground.
- Biological hazards such as animals (insects, spiders, and snakes), and disease vectors (ticks and rodents).

3.7 Solid Waste Management

In 1989, the California Integrated Waste Management Act (Assembly Bill 939) mandated a 50 percent reduction of the quantity of solid waste disposed of in California landfills from a 1990 baseline. The 50 percent reduction was to be accomplished by 1 January 2000. Waste prevention and recycling requirements at VSFB follow the requirements of DoD Instruction 4715.23, *Integrated Recycling and Solid Waste Management*, which prescribes procedures to implement integrated solid waste management through waste prevention and recycling, and AFMAN 32-7002.

The Pollution Prevention Act of 1990 focused the national approach to environmental protection toward P2. Implementation of the Air Force Environmental Management System (EMS) carries P2 a step further toward mission sustainability principles. The P2 program is defined in detail in the VSFB Pollution Prevention Management Plan, 30 SW Plan 32-7001, and is aimed at achieving

30 SLD EMS objectives and targets, through documented practices, procedures, and operational requirements. VSFB implements EMS and its associated P2 program elements by following the P2 hierarchy:

- Reduce (source reduction to prevent the creation of wastes);
- Reuse (keep item or material for its intended purpose);
- Recycle (use item or material for some other beneficial purpose);
- Disposal (in an environmentally compliant manner, only as a last resort).

The State of California passed Senate Bill 1374, amending the Public Resources Code, Section 42912, which addresses the issue of construction and demolition debris, diversion requirements, and the development of a model ordinance to be implemented by local jurisdictions (e.g., Santa Barbara County). EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, was signed on 5 October 2009. With respect to solid waste diversion, EO 13514 requires federal agencies to have as a goal the achievement of 50 percent or higher diversion rate for nonhazardous solid waste and construction and demolition materials and debris by fiscal year 2015. In August 2010, the DoD issued its updated Strategic Sustainability and Performance Plan (SSPP), which was followed up by Headquarters Air Force releasing its SSPP Implementation Plan in October 2011. The established diversion goals of the SSPP are 60 percent diversion, by weight, for construction and demolition debris by 2015. AFMAN 32-7002, requires installations to strive to divert as much solid waste as is economically feasible, and the VSFB Integrated Solid Waste Management Guide (US Space Force 2022b) requires source segregation of recyclable materials to the greatest extent possible. The ROI of potential impacts on solid waste management as a result of the Proposed Action is VSFB.

3.8 Noise

The Noise Control Act (NCA) (42 USC 4901 et seq.) sought to limit the exposure and disturbance that individuals and communities experience from noise. It focuses on surface transportation and construction sources, particularly near airport environments. The NCA also specifies that performance standards for transportation equipment be established with the assistance of the DOT. Section 7 of the NCA regulates sonic booms and gave the Federal Aviation Administration regulatory authority after consultation with the USEPA. In addition, the 1987 Quiet Community amendment gave state and local authorities greater involvement in controlling noise.

Noise is often defined as unwanted sound that can interfere with normal activities or otherwise diminish the quality of the environment. Depending on the noise level, it has the potential to disrupt sleep, interfere with speech communication, or cause temporary or permanent changes in hearing sensitivity in humans and wildlife. Noise sources can be continuous (e.g., constant noise from traffic or air conditioning units) or transient (e.g., a jet overflight or an explosion) in nature. Noise sources also have a broad range of frequency content (pitch) and can be nondescript, such as noise from traffic or be specific and readily definable such as a whistle or a horn. The way the

acoustic environment is perceived by a receptor (animal or person) is dependent on the hearing capabilities of the receptor at the frequency of the noise, and their perception of the noise.

The amplitude of sound is described in a unit called the dB. Because the human ear covers a broad range of encountered sound pressures, dB are measured on a quasi-logarithmic scale. The dB scale simplifies this range of sound pressures and allows the measurement of sound to be more easily understood.

There are many methods for quantifying noise, depending on the potential impacts in question and on the type of noise. One useful noise measurement in determining the effects of noise is the one-hour average sound level (L_{eq1H}). The L_{eq1H} can be thought of in terms of *equivalent* sound; that is, if a L_{eq1H} is 45.3 dB, this is what would be measured if a sound measurement device were placed in a sound field of 45.3 dB for one hour. The L_{eq1H} is usually A-weighted (dBA) unless specified otherwise. A-weighting is a standard filter used in acoustics that approximates human hearing and in some cases is the most appropriate weighting filter when investigating the impacts of noise on wildlife as well as humans. Examples of A-weighted noise levels for various common noise sources are shown in **Table 3-4.**

Existing noise levels on VSFB are generally quite low due to the large areas of undeveloped landscape and relatively sparse noise sources. Background noise levels are primarily driven by wind noise; however, louder noise levels can be found near industrial facilities and transportation routes. Rocket launches and aircraft overflights create louder intermittent noise levels. On VSFB, general ambient L_{eq1H} measurements have been found to range from around 35 to 57 dB (Berg et al. 2002). Most activities associated with the Proposed Action would generate relatively continuous noise throughout construction activities and would then cease after construction was completed.

Table 3-4. Comparative A-Weighted Sound Levels

Noise Level (dBA)	Common Noise Levels	
	Indoor	**Outdoor**
100–110	Rock band inside New York subway	Jet flyover at 1,000 feet
90–100	Food blender at 3 feet	Gas lawnmower at 3 feet
80–90	Garbage disposal at 3 feet	Diesel truck at 50 feet; noisy urban daytime
70–80	Shouting at 3 feet; vacuum cleaner at 10 feet	Gas lawnmower at 100 feet
60–70	Normal speech at 3 feet	Commercial area heavy traffic at 330 feet
50–60	Large business office; dishwasher next room	
40–50	Small theater or large conference room (background)	Quiet urban nighttime
30–40	Library (background)	Quiet suburban nighttime
20–30	Bedroom at night	Quiet rural nighttime
10–20	Broadcast and recording studio (background)	
0–10	Threshold of hearing	

dBA - A-weighted decibel

3.9 Coastal Zone Management

The CCC manages development in California's coastal zone, as defined under the CZMA and the California Coastal Act (CCA). Federal activity in, or affecting, the state coastal zone requires preparation of a consistency determination or a ND assessing the potential effects of the federal activity in the state coastal zone, in accordance with the CZMA of 1972. The California Coastal Management Program (CCMP) was formed through the CCA of 1972. SLD 30 is responsible for making final consistency determinations or negative determinations for its activities within the state coastal zone or having effects on it. The CCC reviews these federal agency determinations for consistency with the enforceable policies of the CCMP through a concurrence or objection.

As provided in section 304(1), definition of a coastal zone under the CZMA (16 USC 1453(1)), states, "Excluded from the coastal zone are lands the use of which is by law subject solely to the discretion of or which is held in trust by the federal government, its officers or agents." Notwithstanding this exclusion, if activities on excluded lands affect land or water uses or natural resources of the state's coastal zone, they must be reviewed for consistency with the CCMP. Although the Proposed Action does not occur within the state coastal zone, it may potentially affect resources within the state coastal zone. SLD 30 determined that the appropriate review for this Proposed Action pursuant to the CZMA was to prepare a ND. Therefore, the DAF prepared a ND and the CCC concurred with that ND on 18 October 2024 (**Appendix A**).

3.10 Transportation

For the purpose of this EA, the ROI for transportation would be the combination of highway, arterial, and local roads that provide service to VSFB and the Proposed Action Area. Existing roadway conditions are evaluated based on roadway capacity and traffic volume. The capacity, which reflects the ability of the network to serve the traffic demand of a roadway, depends on the roadway width, number of lanes, intersection control, and other physical factors. Traffic volumes can be reported as the number of vehicles averaged over a daily period (Average Daily Traffic [ADT]) or an annual period (Annual Average Daily Traffic [AADT]). Peak-hour volume is defined as the highest volume of traffic in a 24-hour period that is recorded on a roadway or intersection during a one-hour period.

The performance of a roadway is generally expressed in terms of Level of Service (LOS). As shown in **Table 3-5,** the LOS scale ranges from A to F, with each level defined by a range of volume-to-capacity (V/C) ratios. LOS A, B, and C are considered good operating conditions with minor to tolerable delays experienced by motorists. LOS D represents below-average conditions. LOS E reflects a roadway at maximum capacity, and LOS F represents traffic congestion.

Table 3-5. Level of Service Scale

LOS	Description	Criteria (V/C)		
		Multilane Arterial	Two-Lane Highway	Delays[(a)]
A	Free flow with users unaffected by presence of other roadway users	0–0.30	0–0.15	< 10.0

LOS	Description	Criteria (V/C)		
		Multilane Arterial	Two-Lane Highway	Delays[(a)]
B	Stable flow, but presence of the users in traffic stream becomes noticeable	0.31–0.50	0.16–0.27	10.0–20.0
C	Stable flow, but operations of single users becomes affected by interaction with others in traffic stream	0.51–0.70	0.28–0.43	20.0–35.0
D	High density, but stable flow, speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.71–0.84	0.44–0.64	35.0–55.0
E	Unstable flow; operating conditions at capacity with reduced speeds; maneuvering difficult and extremely poor levels of comfort and convenience	0.85–1.00	0.65–1.00	55.0–80.0
F	Forced breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	> 1.00	> 1.00	> 80.0

V/C - volume to capacity; **(a)** - average stop delay at intersections

3.10.1 Region of Influence

VSFB is located approximately 5 miles west of the City of Lompoc. The main access route to VSFB is US Highway 101 (US 101). US 101 is a coastal four-lane divided freeway connecting northern California to southern California. The VSFB connections to US 101 are California SR 1, SR 135, and SR 246. SR 1, a north-south highway, traverses VSFB and provides access to Santa Maria to the northeast, and Santa Barbara to the southeast (**Figure 3-4**). When used in conjunction with US 101, SR 246, an east-west highway, provides access to Lompoc to the east, and Santa Barbara to the southeast (**Figure 3-4**). SR 135 and SR 246 are mostly two-lane undivided highways with four-lane rural expressway portions.

Roadways in the vicinity of the Proposed Action Area lie within the jurisdiction of VSFB and Caltrans. These roadways include SR 1, SR 246, West Ocean Avenue, Coast Road, Honda Ridge Road, and Honda Canyon Road (see **Figure 3-4**).

VSFB is a federal military installation, and access to portions of the base is only permitted to authorized military personnel and their families, civilian employees of the base with approved identification, and visitors with preapproved authorization. Roadways within the Proposed Action Area are restricted to the general public, except during special military events or operations.

The Proposed Action Area is located on Coast Road. Project personnel and equipment would access the location via US 101, turning onto either SR 1 or SR 246 (West Ocean Avenue). From West Ocean Avenue, personnel and equipment would turn onto Coast Road to access the site. During the culvert repair, which is estimated to be 3 months, Coast Road would remain open.

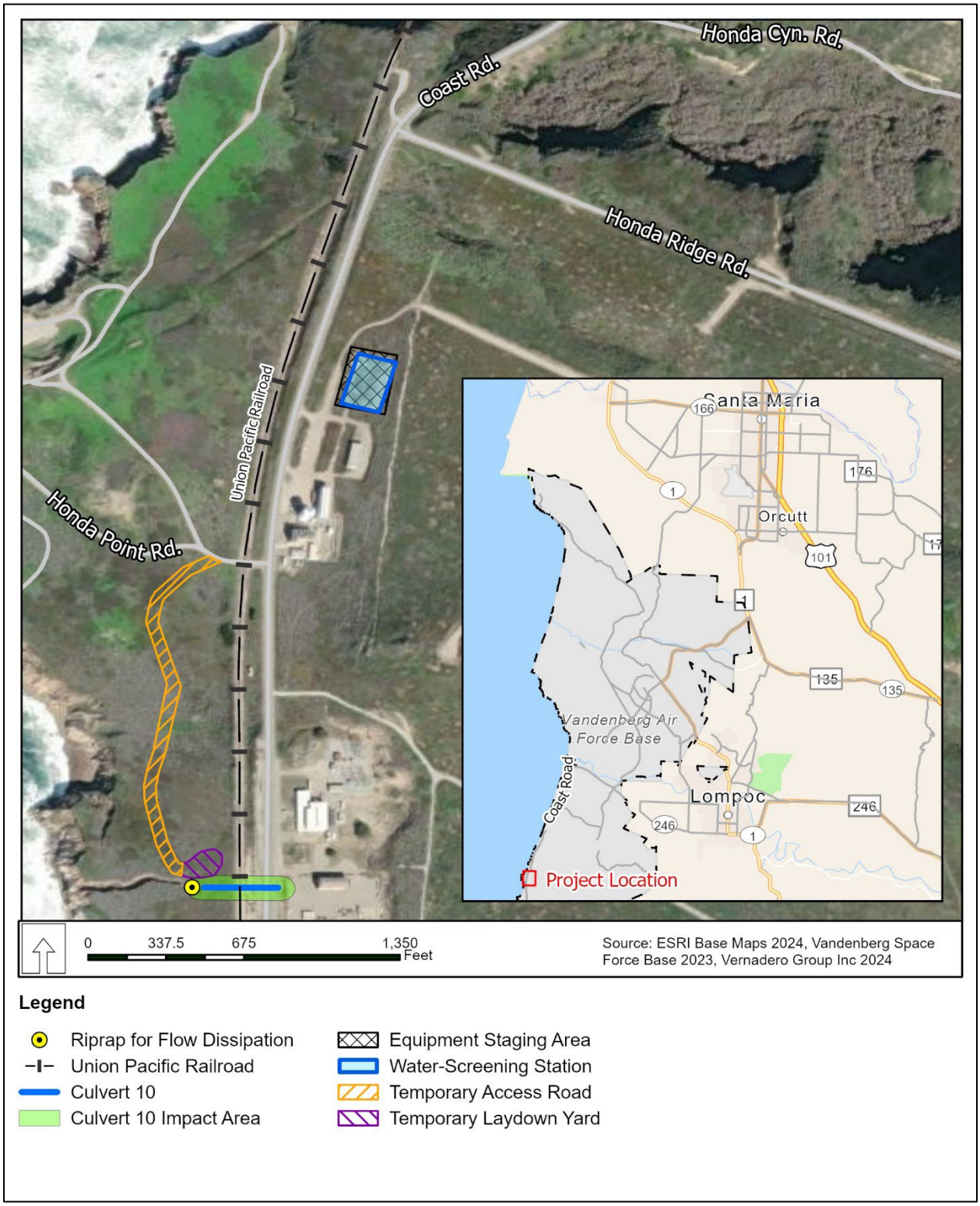


Figure 3-4. Main Access and Transportation Routes Associated with the Proposed Action at Vandenberg Space Force Base

3.10.1 Project Traffic and Haul Routes

The haul route to an off-base landfill from the Proposed Action Area would be as follows: to Santa Maria Landfill, travel north on Coast Road, then east onto SR 246/West Ocean Avenue to proceed onto US 101 north to Santa Maria, approximately 20 miles, one way; or to Lompoc Landfill, travel on Coast Road, then north to Bear Creek Road heading east, then north to Arguello Road, east onto Ocean Road, then south onto Bailey Street, east onto Olive Street, and then south onto Avalon Street.

There is one route available to traffic leaving the local area, accessible by exiting the project site traveling east on SR 246/West Ocean Avenue and continuing straight to connect to SR 1/US 101, or turning south onto SR 1, and continuing straight to connect to US 101.

3.10.2 Project Traffic and Haul Routes

The haul route to an off-base landfill from the Proposed Action Area would be as follows: to Santa Maria Landfill, travel north on Coast Road, then east onto SR 246/West Ocean Avenue to proceed onto US 101 north to Santa Maria, approximately 20 miles, one way; or to Lompoc Landfill, travel on Coast Road, then north to Bear Creek Road heading east, then north to Arguello Road, east onto Ocean Road, then south onto Bailey Street, east onto Olive Street, and then south onto Avalon Street.

There is one route available to traffic leaving the local area, accessible by exiting the project site traveling east on SR 246/West Ocean Avenue and continuing straight to connect to SR 1/US 101, or turning south onto SR 1, and continuing straight to connect to US 101.

3.11 Water Resources

In California, the State Water Resources Control Board (SWRCB) and the RWQCBs administer the Clean Water Act (CWA) and state water regulations. The California Water Code provides a framework for establishing beneficial uses of water resources and the development of local water quality objectives to protect these beneficial uses. State regulations require a Waste Discharge Requirements document for permitting discharge. The California Water Code is the State law for water quality protection in California.

The CWA mandates that point source discharges to surface water or to the ocean are subject to the National Pollutant Discharge Elimination System (NPDES) permit program. In California, there are NPDES General Permits for municipal, industrial, and construction site discharges. Construction General Permit coverage for construction activities ensures that water discharged from a site meets water quality standards at the point of discharge. The NPDES Construction General Permit also reduces and eliminates storm water and non-storm-water discharges associated with construction activities through BMPs, site inspections, and monitoring to evaluate the effectiveness of the permit implementation actions. NPDES Construction General Permit coverage is required for construction projects with soil disturbance equal to or greater than 1.0 acre in size that potentially discharge to WOTUS. Construction General Permit coverage requires

the development of a Storm Water Pollution Prevention Plan (SWPPP), which describes BMPs to prevent pollutant and sediment.

The Central Coast RWQCB (CCRWQCB) is the local agency responsible for the VSFB region. The CCRWQCB regulates surface water bodies on VSFB primarily by adoption of its region-specific Water Quality Control Plan (Basin Plan) (CCRWQCB 2019). The Basin Plan incorporates SWRCB plans and policies and contains a strategy for maintaining or achieving the highest water quality possible for the region's surface water and groundwater resources. The Basin Plan antidegradation policy states "wherever the existing quality of water is better than the quality of water established herein as objectives, such existing quality shall be maintained unless otherwise provided by the provisions of the State Water Resources Control Board Resolution No. 68-16" (CCRWQCB 2019).

Section 404 of the CWA regulates the discharge of dredged or fill material into WOTUS. Section 404 permits are reviewed and issued by the USACE. Under Section 401 of the CWA, a federal agency cannot issue a permit or license for an activity that may result in a discharge to WOTUS until the state where the discharge would originate has granted or waived the Section 401 water quality certification. There are no jurisdictional WOTUS in the Proposed Action area; therefore, no CWA permit would be required to implement the Proposed Action.

The Water Quality Control Plan for Ocean Waters of California (Ocean Plan) controls the discharge of waste to the ocean to prevent degradation of marine communities or threats to public health. It establishes beneficial uses and water quality objectives for the protection of ocean waters. The Ocean Plan and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California were amended in 2015 to prohibit the discharge of trash.

3.11.1 Region of Influence

VSFB encompasses portions of two major and four minor drainage basins. San Antonio Creek and the Santa Ynez River represent the major basins, while Shuman Creek, Bear Creek, Honda Creek, and Jalama Creek comprise the minor basins on VSFB. The Pacific Ocean is adjacent to the Proposed Action area. The drainage conveyed through Culvert 10 drains to the Pacific Ocean.

3.11.2 Surface Water and Floodplains

The drainage area for Culvert 10 includes portions of VSFB on the east side of Coast Road and primarily picks up overland drainage that is discharged through Culvert 10 to the Pacific Ocean. Rate of flow is seasonal with higher flows during the rainy season from November to May and lower flow during the rest of the year when precipitation is infrequent. Summer flow is derived from several springs along both sides of the canyon that occasionally cease during particularly dry periods. Mean rainfall for the region, measured at Lompoc City Hall from 1954 through 2023, is 14.73 inches (County of Santa Barbara Public Works Department 2023).

The Culvert 10 project is not subject to EO 11988, *Floodplain Management,* requirements and objectives because floodplains would not be impacted by project activities. Floodplains are

mapped in the vicinity of the proposed project but not within the project limits. The floodplains are in a depressed area located between Coast Road and the railroad. The culvert work will take place beneath Coast Road and the mapped floodplain with surface ground-disturbing activities limited to the heavily eroded area at the outlet of the culvert where floodplains are not mapped. Additionally, completion of this project will ensure Culvert 10 continues to transport stormwater and reduce flood risk east of and along Coast Road.

3.11.3 Groundwater

The Proposed Action Area is within the Central Coast Hydrologic Region but not within a defined groundwater basin, which is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction (California Department of Water Resources 2021). The majority of California's land area is in nonbasin areas, and groundwater extraction and use does occur within these nonbasin areas. Within the Central Coast Hydrologic Region, iron, manganese, and nitrate were the most commonly detected chemicals above a regulatory limit between 2009 and 2018 (California Department of Water Resources 2021). No groundwater wells or groundwater extraction occurs near Culvert 10.

3.11.4 Waters of the United States and Wetlands

WOTUS encompass the jurisdictional limits of the authority of the USACE and include perennial and intermittent streams and their tributaries that have defined bed and banks, have an ordinary high water mark (OHWM), or are below the high tide line (HTL). The OHWM is a line on the shore established by the fluctuations of ordinary water flows, while the HTL is equivalent to the highest predicted high tide for the calendar year. In addition to these waters, WOTUS also include adjacent jurisdictional wetlands, defined in the 2020 Navigable Waters Protection Rule (NWPR): "waters of the United States" are wetlands with a direct surface connection to a nonwetland WOTUS (FR 33 Part 328; 40 CFR 110, 112, 116, 117, 120, 122, 230, 232, 300, 302, and 401).

A jurisdictional wetland delineation was conducted at Culvert 10 and it was determined that under the Proposed Action, no construction would occur within the bounds of potential WOTUS, including jurisdictional wetlands (ManTech SRS Technologies Inc. 2024).

3.11.5 Waters of the State and Wetlands

In addition to federal protections afforded by the federal CWA and NWPR, aquatic resources are protected in California through regulation of activities within inland streams, wetlands, and riparian zones. The RWQCB and the California Department of Fish and Wildlife both hold jurisdiction over all wetland and nonwetland WOTUS under USACE jurisdiction, along with additional features such as riparian zones, ground water, and a broader scope of isolated and ephemerally present surface and ground waters. The California Water Code gives the State very broad authority to regulate WOTS which are defined as surface water or groundwater, including saline waters. The local RWQCB administers the Porter-Cologne Water Quality Control Act and determines the exact definition of WOTS within its region.

The State of California also regulates water resources under Sections 1600 to 1603 of the Fish and Game Code. WOTS include ephemeral, intermittent, and perennial watercourses. Jurisdiction is extended to the limit of riparian zones that are located contiguous to the water resource and that function as part of the watercourse system. Section 2785(e) of the Fish and Game Code of California defines “riparian zones” as lands which contain habitat which grows close to and which depends on soil moisture from a nearby freshwater source. WOTS include all wetland WOTUS, as well as wetlands that meet the state’s own definition. State wetlands include isolated wetlands with no surface connection to a traditionally navigable water, as well as wetlands that are unvegetated, so long as they have hydric soils and wetland hydrology. WOTS also include all nonwetland WOTUS, and some ephemeral streams that do not qualify as WOTUS may qualify as WOTS if they have indicators of an OHWM, for instance.

A jurisdictional wetland delineation was conducted at Culvert 10, and it was determined that under the Proposed Action, no construction would occur within the bounds of potential WOTS (see **Appendix F**; ManTech SRS Technologies Inc. 2024).

FORMAT PAGE

4.0 ENVIRONMENTAL CONSEQUENCES

The following analysis of environmental consequences is based on the potential direct, indirect, short-term and long-term, and cumulative effects of the Preferred Alternative and the No Action Alternative as described in Chapter 2. A list of factors to be considered in determining whether impacts are significant, for purposes of NEPA, are provided in each subsection. Both beneficial and adverse effects are considered. Whether beneficial impacts may occur will be discussed in the analysis of each subsection since the listing of factors to be considered in each subsection is normally focused on the potential for adverse impacts. The decision as to whether to prepare an Environmental Impact Statement is based on the impacts of the action as a whole considering context and intensity of the potential impacts.

The Proposed Action would temporarily impact 1.80 acres for the construction and use of the temporary access road and the construction and use of the temporary laydown yard. The Proposed Action would permanently impact approximately 0.06 acre of the drainage channel from riprap placement downstream of the culvert outfall.

4.1 Air Quality

Factors considered in determining whether implementing an alternative may result in significant impacts on air quality include the extent or degree to which implementation of an alternative would:

- Expose people to localized (as opposed to regional) air pollutant concentrations that potentially exceed federal or state ambient air quality standards; or
- Exceed caps (limits) as imposed by federal and state GHG regulations.

To determine the significance of operational impacts, emissions from the project were compared with the federal major source thresholds. The federal major source threshold for criteria pollutants is 250 tons per year, which is the major source threshold under 40 CFR Part 70, the Federal Operating Permit Program, for all pollutants.

Standard dust control measures (see **Section 2.1.2.1**) must be implemented for any discretionary project involving earth-moving activities. Some projects have the potential for construction-related dust to cause a nuisance. Since Santa Barbara County violates the state standard for PM_{10}, dust mitigation measures are required for all discretionary construction activities regardless of the significance of the fugitive dust impacts based on the policies in the 1979 Air Quality Attainment Plan.

On 1 August 2016, the CEQ released final guidance on addressing climate change in NEPA documents. Although similar to earlier guidance, this provides a more comprehensive climate policy than the 2010 draft guidance, which recommended quantification of GHG emissions and proposed a threshold of 25,000 metric tons of CO_2e emissions. The 2010 guidance indicated that use of 25,000 metric tons of CO_2e emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, to provide action-specific

evaluation of GHG emissions and disclosure of potential impacts. This analysis complies with the recommendations of both the 2010 and 2014 versions of the draft guidance.

For purposes of this air quality analysis, project emissions within the VSFB region would be potentially significant if they exceed these thresholds. This is a conservative approach, as the analysis compares emissions from both project-related stationary and mobile sources to these thresholds.

4.1.1 Preferred Alternative

Impacts on air quality from activities related to repairs of Culvert 10 under Alternative 1 would be generated primarily from fugitive dust from temporary road construction and the combustive emissions of fossil-fuel-powered equipment. The analysis therefore involves estimating emissions generated from the Proposed Action and assessing potential impacts on air quality. The emissions from these activities are calculated on an annual basis. The assumptions concerning the construction required to implement the Proposed Action that were used for the analysis were presented in Chapter 2.

Restoration activities emissions were calculated using the DAF's Air Conformity Applicability Model (ACAM). ACAM is an air-emissions estimating model that performs an analysis to assess the potential air quality impacts associated with a DAF action (e.g., military construction, aircraft operations) in accordance with the AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*; Clean Air Act Section 176(c); the EIAP (32 CFR Part 989); and the General Conformity Rule (40 CFR Part 93 Subpart B). The ACAM model estimates air emissions for activities associated with the Proposed Action and performs an analysis against regulatory thresholds.

As shown in **Table 4-1,**the emissions are below the applicable *de minimis* levels. A Conformity Determination is not required, and a Record of Non-Applicability has been prepared. **Appendix G** contains the detailed ACAM report and the Record of Non-Applicability.

GHG emissions would be produced under Alternative 1. Emissions produced under Alternative 1 would be approximately 117.1 metric tons of CO_2e per year, which is comparable to approximately 26 passenger vehicles driving for a year, or one year's worth of electricity for just under 23 homes, using the USEPA's greenhouse gas equivalency calculator. As the national GHG emissions are approximately 53.9 billion metric tons per year, implementation of Alternative 1 would not significantly contribute to climate change or global warming.

Table 4-1: Estimated Annual Air Pollutant Emissions from Activities within the Santa Barbara County Air Pollution Control District (Tons per Year)

Air Pollutant Emissions	CO	NOx	ROG	SOx	PM_{10}	$PM_{2.5}$
Total Emissions	0.435887	0.318261	0.063463	0.001241	0.012190	0.012042
***De minimis* levels**	**100**	**100**	**100**	**100**	**100**	**100**

CO – carbon monoxide; **NOx** – nitrous oxides; **ROG** – reactive organic gases; **SOx** – sulfur oxides; **PM_{10}** – particulate matter, 10 microns; **$PM_{2.5}$** – particulate matter, 2.5 microns

4.1.2 No Action Alternative

Under the No Action Alternative, Culvert 10 would not be replaced. There would be no change to baseline air emissions and no additional impacts associated with the No Action Alternative. Therefore, implementing the No Action Alternative would not have a significant effect on air quality.

4.2 Biological Resources

Factors considered in determining whether implementing an alternative may result in significant impacts on biological resources include the extent or degree to which implementation of an alternative would result in the following:

- Unmitigable loss of important quantities of declining vegetation communities (including wetlands) that are considered rare;
- Impacts on endangered, threatened, or protected species; or
- Alteration of regionally and locally important wildlife corridors that would severely and permanently limit their use.

Impacts on biological resources would occur if species (endangered, threatened, rare, candidate, or species of concern) or their habitats, as designated by federal and state agencies, would be affected directly or indirectly by project-related activities. These impacts can be short- or long-term impacts; for example, short-term or temporary impacts from noise and dust during activities related to site access and water diversion or long-term impacts from the loss of habitat to support wildlife populations.

4.2.1 Preferred Alternative

Potential impacts on biological resources as a result of the Proposed Action include the following:

- Long-term (permanent) loss of habitat from construction-related activities such as access and modification to culvert outtake and intake areas;
- Loss of individuals within the work area due to excavation, crushing, or burial;
- Abandonment of breeding or roosting sites due to project-related noise and associated disturbance; and
- Disruption of foraging or roosting activities due to project-related noise and associated disturbance.

<u>Vegetation</u>

Both native and nonnative vegetation alliances occur within the Proposed Action Area (see **Section 3.2.3**). Disturbances to the native plant community in the impacted area would be unavoidable during the construction of temporary access roads, turn arounds, and laydown areas. The estimated impacts on vegetation alliances are shown in **Table 4-2.** Upon completion of the Proposed Action restore site contours and habitat types of temporarily impacted areas to preconstruction conditions. SLD 30 would also replant native herbaceous vegetation to restore all

temporarily disturbed areas. Impacts would be offset by performing habitat restoration (see **Section 2.4.1** for details).

Table 4-2. Status and Extent of Vegetation Types Expected to Be Impacted

Alliance Name	Common Name	Percent Cover of Dominant Species	Acres Impacted	Alliance Acres Impacted
Artemisia californica – (*Salvia leucophylla*) Alliance	California Sagebrush - (Purple Sage) Scrub	95% *Artemisia californica*	0.38	0.53
Artemisia californica – (*Salvia leucophylla*) Alliance	California Sagebrush - (Purple Sage) Scrub	85% *Artemisia californica*; 15% *Ericameria ericoides*	0.13	
Artemisia californica – (*Salvia leucophylla*) Alliance	California Sagebrush - (Purple Sage) Scrub	75% *Solanum douglasii*; 15% *Artemisia californica*; 10% *Baccharis pilularis*; 5% *Brassica nigra*	0.02	
Ehrharta spp. Alliance	Perennial Veldt Grass Grassland	97% *Ehrharta calycina*	0.04	0.04
Mesembryanthemum spp. – *Carpobrotus* spp. Alliance	Iceplant Mats	65% *Carpobrotus* spp.; 30% *Artemisia californica*; 5% *Ericameria ericoides*	0.70	1.23
		70% *Carpobrotus* spp.; 25% *Artemisia californica*	0.53	
			Grand Total	**1.80**

The small amount of native vegetation loss associated with the implementation of the Proposed Action would not be considered adverse due to the abundance of these communities within the Proposed Action's vicinity. This loss is also expected to be temporary and the site will be restored with native vegetation following completion of the Proposed Action. Additionally, by implementing the EPMs in **Section 2.2.2.2**, impacts on native plant communities would be minimized to the greatest extent feasible. Any unavoidable losses would be less than significant. No special-status plant species have been documented within the impact area of the Proposed Action during the biological surveys in support of this project or prior surveys of the project area.

General Wildlife Resources

Movement of workers and vehicles, construction activities, and relocation of individuals out of the project area could directly or indirectly affect wildlife species. Direct impacts within the project footprint potentially include injury or mortality from inadvertent crushing by workers as they walk and operate construction equipment, by vehicles hauling or placing materials, during the placement of materials. However, the risk of these potential effects would be substantially reduced because qualified biologists would monitor construction activities and, to the extent practicable, capture all wildlife within the project area and relocate them outside of the project area.

Vegetation clearing, construction of temporary access roads and laydown areas, and repair of the culverts would generate noise and disturbance that could result in temporary impacts on wildlife species. Temporary disturbances due to noise and human presence could disrupt foraging and

roosting activities or cause wildlife species to avoid the work areas. Wildlife species would be expected to experience some level of noise disturbance during the day; however, construction would be temporary (approximately 3 months) and create noise above ambient levels over a relatively small area. Individuals are expected to experience temporary behavioral disruption and likely acclimate to construction noises or expected to move to adjacent suitable habitat until the noise disturbance ceases. A qualified biological monitor would be present to ensure that EPMs designed to minimize and avoid impacts on native wildlife species are implemented (see **Section 2.1.2.2**). As a result, potential impacts on wildlife species resulting from construction noise would be less than significant.

Special-Status Wildlife Species

Special-status wildlife species occur or have the potential to occur within or near the Proposed Action Area. Activities associated with the Proposed Action have the potential to result in permanent and temporary adverse effects on special-status species. **Table 4-3** presents a summary of potential project-related impacts on special-status wildlife species. The Proposed Action Area is not located within designated or proposed critical habitat for any species; therefore, the Proposed Action would not affect critical habitat.

Table 4-3. Potential Impacts on Special Status Wildlife Observed within Proposed Action Area

Species	Status		Potential Impacts
	USFWS	CDFW	
Invertebrates			
Crotch Bumble Bee (*Bombus crotchii*)	-	SCE	Direct physical impacts and loss of habitat.
Amphibians			
California Red-Legged Frog (*Rana draytonii*)	FT	SSC	Direct physical impacts.
Reptiles			
Northern California Legless Lizard (*Anniella pulchra pulchra*)	-	SSC	Direct physical impacts and loss of habitat.
Two-Striped Gartersnake (*Thamnophis hammondii*)		SSC	Direct physical impacts.
Birds			
Allen's Hummingbird (*Selasphorus sasin*)	BCC	-	Disturbance due to noise and loss of habitat.
Bald Eagle (*Haliaeetus leucocephalus*)	BGEPA	Fully protected	Disturbance due to noise.
Black Oystercatcher (*Haematopus bachmani*)	BCC	-	Disturbance due to noise.
California Condor (*Gymnogyps californianus*)	FE	SE	Disturbance due to noise.
Loggerhead Shrike (*Lanius ludovicianus*)	BCC	SSC	Disturbance due to noise and loss of habitat.

Species	Status		Potential Impacts
	USFWS	CDFW	
Peregrine Falcon (*Falco peregrinus anatum*)	BCC	Fully protected	Disturbance due to noise.
Mammals			
American badger (*Taxidea taxus*)	-	SSC	Disturbance due to noise and loss of habitat.

BCC - federal bird of conservation concern; **BGEPA** - Bald and Golden Eagle Protection Act; **CDFW** - California Department of Fish and Wildlife; **FE** - federal endangered species; **FT** - federal threatened species; **SCE** - state candidate endangered; **SE** - state endangered species; **SSC** - state candidate species; **USFWS** - US Fish and Wildlife Service

California Red-Legged Frog

Potential Impacts

Activities associated with the Proposed Action have the potential to result in short-term temporary adverse effects on populations of CRLF in the immediate area of disturbance. The activities that could directly or indirectly adversely affect CRLF include movement of workers and vehicles, construction activities, and relocation of individuals out of the project area. Direct impacts on CRLF within the project footprint potentially include injury or mortality from inadvertent crushing by workers as they walk and operate construction equipment, by vehicles hauling or placing materials, during the placement of materials. However, the risk of these potential effects would be substantially reduced because CRLF are very unlikely to occur at the project area and qualified biologists would monitor construction activities and capture all CRLF within the project area and relocate them outside of the project area.

All life stages of CRLF can detect noise and vibrations (Lewis and Narins 1985). Noise and vibration may cause CRLF to temporarily abandon habitat adjacent to work areas. This disturbance may increase the potential for predation and desiccation when CRLF leave shelter sites. Relocating CRLF out of the project will minimize the threat of noise disturbances adversely affecting CRLF.

Mortality, injury, and reduced fitness may occur to CRLF that are captured and relocated due to improper handling, containment, a lack of familiarity with the site, increased competition, or from releasing them into unsuitable habitat. However, CRLF are very unlikely to occur in the project area and only qualified biologists would handle CRLF to minimize this risk. Suitable relocation sites would be selected within the Honda Creek watershed, which supports the necessary environmental conditions for CRLF to maximize the likelihood of survival.

Conclusion

The US Space Force determined that the Proposed Action may affect and is likely to adversely affect the CRLF. VSFB submitted a prenotification (2021-F-0516) to the USFWS under PBO (8-8-13-F-49R; **Appendix D**). The prenotification was approved by the USFWS on 10 September 2021. Although the Proposed Action may result in adverse effects on CRLF, these impacts are very unlikely due to the lack of suitable aquatic habitat at the site, would be temporary (3 months),

and affect a small proportion of available upland habitat. Furthermore, given the EPMs that will be employed to avoid or minimize the potential adverse effects on the maximum extent practicable (see **Section 2.1.2.2**), effects on CRLF would not be significant.

Migratory Birds

Removing vegetation from the Proposed Action Area during the construction would result in the temporary loss of existing breeding and roosting habitat for migratory birds. However, given the abundance of suitable habitat in the vicinity, this adverse impact would be less than significant. In addition, removing vegetation during the nonbreeding season for avian species (September through February) would prevent adverse effects on these species.

Increased levels of human activity and associated noise could potentially displace special-status species from adjacent nesting habitat. Disturbances to nearby breeding birds include abandonment of breeding sites, egg breakage by "panicked" adults, physical damage to the eggs due to noise, heating, and cooling from exposure during periods of nest abandonment, and increased vulnerability to predation. Impact severity would mostly depend on the timing of the activity-related disturbance. If disturbance occurs after nesting has already been initiated, project-related noise could adversely impact reproductive success.

The protection measures outlined in **Section 2.1.2.2** should serve to avoid or minimize potential adverse effects on special-status avian species, including special-status wildlife species, during implementation of the Proposed Action. Thus, implementing these measures should result in less than significant adverse effects on avian species. Therefore, the Proposed Action would not have a significant effect on special-status avian species.

4.2.2 No Action Alternative

Under the No Action Alternative, the proposed repairs to Culvert 10 would not be conducted. While construction and disturbances to native plant communities and special-status wildlife species would be avoided, erosion and scouring of the existing culvert structure would continue to occur as a result of high flow during storm events. As a result, there would be a greater need for culvert repair in the future and the risk of failure, which could result in more serious adverse impacts on native vegetation and special-status species. Therefore, implementation of the No Action Alternative would not have an immediate significant effect on biological resources but could result in greater long-term impacts on biological resources than the Proposed Action.

4.3 Cultural Resources

The Proposed Action is subject to compliance with Section 106 of the NHPA and AFMAN 32-7003, *Environmental Conservation.* Compliance with Section 106 also satisfies federal agencies' responsibilities for considering potential project-related effects on cultural resources under NEPA. Section 106 of the NHPA requires federal agencies to consider the effects of proposed federal undertakings on cultural resources that are listed in or eligible for listing in the NRHP. If a cultural resource is listed in, or eligible for, the NRHP it is considered a "historic property" for purposes of Section 106 and is significant. Compliance with Section 106 requires the federal agency to determine either that the undertaking would have no effect, no adverse effect, or an adverse effect

on historic properties (that is, to significant cultural resources). The Section 106 implementing regulations (36 CFR 800) prescribe the process for making these determinations.

Cultural resources would be adversely affected if the Proposed Action would cause loss of the value or characteristics that qualify the resource for listing on the NRHP, or if the Proposed Action substantially alters the natural environment or access to it in such a way that traditional cultural or religious activities are restricted. The Proposed Action will comply with all relevant authorities governing cultural resources, including Section 106 of the NHPA and AFMAN 32-7003. 30 SLD requires archaeological and Native American monitoring during construction through or adjacent to any known archaeological site, regardless of a site's NRHP eligibility. Archaeological and Native American monitoring is also typically required in areas where buried sites are possible.

If previously undocumented cultural resources are discovered during construction activities, the extent and significance of the discovery will be initially assessed by a qualified archaeologist. Recommendations for appropriate treatment of the discovery will be developed in consultation with the SLD 30 cultural resources manager and the Native American representative.

4.3.1 Preferred Alternative

The continued use of Culvert 10 would result in stormwater being directed through the erosional channel to prehistoric archaeological site CA-SBA-666. Repairing Culvert 10 and installing stormwater dissipation at the outfall of Culvert 10 would continue to impact the site. Although the flow of water would be minimized by the stormwater dissipation, no prudent and feasible historic property protection measure could be developed to completely stop channel erosion from affecting archaeological deposits downstream from Culvert 10. As a result, SLD 30 will conduct archaeological data recovery excavations to recover information that would otherwise be lost due to damage and/or destruction to the site. SLD 30 prepared an MOA stipulating how the adverse effects of the Culvert 10 repairs on historic properties will be resolved through archaeological data recovery. The SHPO reviewed the MOA and concurred with SLD 30's mitigation measures, the responsibilities of SLD 30 to implement those mitigation measures, and SLD 30's compliance with Section 106 of the NHPA (**Appendix B**).

4.3.2 No Action Alternative

By not installing stormwater flow dissipation at the outfall of Culvert 10, continued erosion of the channel downstream of the culvert would cause larger impacts on CA-SBA-666 than the Preferred Alternative would. In addition, Culvert 10 could fail causing the collapse of Coast Road, leading to a greater area of temporary impacts than would be expected for the Preferred Alternative; those impacts may extend to other nearby, significant archaeological sites.

4.4 Earth Resources

Factors considered in determining whether implementing an alternative may have a significant adverse impact on geology and earth resources include the extent or degree to which implementation of an alternative would do the following:

- Result in substantial soil erosion or the loss of topsoil, or
- Expose people or structures to potential substantial adverse effects, involving rupture of a known earthquake fault, strong seismic ground shaking, or liquefaction.

These hazards have the potential to cause significant damage to Culvert 10 and Coast Road even after completion of culvert repair.

4.4.1 Preferred Alternative

Based on a review of the documentation available on the geological characteristics and seismic activity of the region, there would be no impact on geological resources under the Preferred Alternative. Implementation of the Proposed Action would require the removal of vegetation and disturbance of approximately 1.80 acres of soil during construction for temporary access roads, the temporary laydown yard, and stabilization of the channel downstream of the Culvert 10 outfall. These activities typically loosen the soil and tend to promote erosion during periods of wind or rainfall. Because soils in the area are subject to high wind erosion, appropriate sediment and soil control techniques would be used to minimize soil loss. Soil erosion at conclusion of the project would be prevented through the revegetation of the Proposed Action Area, including implementation of BMPs and preparation of a SWPPP. Therefore, there would be temporary minor adverse impacts on soils from implementation of the Proposed Action under the Preferred Alternative. The placement of riprap downstream of the Culvert 10 outfall would reduce channel erosion and associated soil disturbance. This would be a long-term beneficial impact on soils as a result of the Preferred Alternative.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed repairs to Culvert 10 would not be conducted. In the foreseeable future, there would be minor adverse impacts on earth resources as the channel downstream of the Culvert 10 outfall would continue to erode during and immediately following storm events. Further, if Culvert 10 caused Coast Road to fail, there would likely be substantial erosion at the site and emergency road repairs or replacement would be required leading to short-term moderate impacts on soils.

4.5 Hazardous Materials and Waste Management

Factors considered in determining whether implementing an alternative may have a significant adverse impact on hazardous materials and waste management include the extent or degree to which implementation of an alternative would result in the following:

- Noncompliance with applicable regulatory requirements, or
- Human exposure to hazardous materials and wastes, or environmental release above permitted limits.

Potential impacts as a result of hazardous materials and hazardous waste were evaluated using federal, state and local regulatory requirements, contract specifications, and base operating constraints, as outlined in Chapter 3. Hazardous materials management requirements are found

in federal and state environmental protection and OSHA regulations and AFMAN 32-7002. Hazardous waste management requirements are found in federal, state, and local regulations and the VSFB Hazardous Waste Management Plan. Noncompliance with applicable regulatory requirements, human exposure to hazardous materials and wastes, or environmental release above permitted limits, would be considered adverse impacts.

4.5.1 Preferred Alternative

Implementing the Proposed Action would require the use of hazardous materials. As described in Chapter 3, these hazardous materials are commonly used for construction projects, and would be the same types as currently used and managed on VSFB. Because the Proposed Action would last only up to three months and the construction team would be relatively small (approximately 10 workers), there would not be a significant increase in the amounts of hazardous materials present on VSFB. Thus, no significant adverse impacts are anticipated.

Potential adverse effects at the project site could result from accidental releases of POLs from vehicle and equipment leaks and from hazardous wastes generated by abatement actions. The contractor would be subject to hazardous materials and waste management regulations as required by federal, state, and local laws and regulations, and would follow procedures as outlined in the AFMAN 32-7002, and VSFB Hazardous Waste Management Plan. All hazardous wastes would be properly managed and disposed of in accordance with applicable federal, state and local hazardous waste regulations, and the VSFB Hazardous Waste Management Plan. Prior to project implementation, the contractor would prepare a hazardous material Spill Prevention and Response Plan and obtain concurrence from 30 CES/CEI. All hazardous wastes would be managed either during release response and cleanup, or during abatement removal actions. In addition, the EPMs described in **Section 2.1.2.5** would be implemented. As a result, the Preferred Alternative would not have a significant impact caused by the use and generation of hazardous materials and hazardous wastes.

4.5.2 No Action Alternative

Under the No Action Alternative, the proposed Culvert 10 repairs would not be conducted. The No Action Alternative would create no additional hazardous materials or waste on VSFB than exist in current baseline conditions. Therefore, no significant impacts on hazardous materials or waste management would occur in the foreseeable future. However, if Culvert 10 was to cause Coast Road to fail, hazardous materials that are part of the existing structure may be released unabated the drainage channel downstream, and into the Pacific Ocean, potentially causing a significant impact on biological resources and human health and safety.

4.6 Solid Waste Management

Factors considered in determining whether implementing an alternative may have significant adverse impacts on solid waste management include the extent or degree to which implementation of an alternative would result in noncompliance with applicable regulatory requirements.

Solid waste impacts were evaluated using federal, state, and local regulatory requirements, permit conditions, contract specifications, the VSFB Solid Waste Management Guide, and operating constraints as outlined in Chapter 3.

4.6.1 Preferred Alternative

The Preferred Alternative would involve removal and screening of soil during the cultural resources mitigation and vegetation removal for temporary access road and laydown area construction. It is unknown as to how much sediment would be removed and how much new material (i.e., fill soil), would be needed to conduct the Culvert 10 repair, mitigate for cultural resources impacts, and to stabilize the temporary access roads. The contractor would determine material requirements and quantities once the repair design is complete. However, all temporarily disturbed areas would be restored following completion of Culvert 10 repair activities.

The generation of construction and demolition debris during implementation of the Proposed Action does not have the potential to adversely affect waste diversion rates on VSFB as disposal of any solid waste would be transported to a municipal landfill. Unrecyclable wastes generated during construction and demolition would be disposed of off base by the contractor. However, to the greatest extent practicable, the contractor would segregate all waste generated during the Proposed Action and manage the wastes separately. To the extent practicable, construction and demolition debris would be reused or transported to a recycler. Soils that are not reused at the Proposed Action Area would be transported to an on-base borrow pit for storage and use on future VSFB projects.

The evaluation of potential P2 impacts includes solid waste diversion requirements, particularly as applied to demolition debris. Noncompliance with applicable regulatory requirements or disposal of quantities of solid waste that would cause the proposed project to exceed mandated diversion rates would be considered an adverse impact. Debris would be segregated to facilitate subsequent P2 options. P2 options would be exercised in the following order: reuse of materials, recycling of materials, and then regulatory compliant disposal.

Compliance with all applicable federal, state, and local regulations, rules and requirements, and applicable VSFB plans would govern all actions associated with implementing the Proposed Action; therefore, no significant effects on solid waste management are anticipated.

4.6.2 No Action Alternative

Under the No Action Alternative, the proposed Culvert 10 repairs would not be conducted. Because solid wastes would not be generated, there would be no significant impact on solid waste management in the foreseeable future. However, if Culvert 10 were to cause Coast Road to fail, concrete, asphalt, and other materials would likely be released into the drainage channel and the Pacific Ocean, requiring emergency retrieval and proper disposal as well as a large influx of waste onto VSFB infrastructure without the benefits of planning. Additionally, retrieval of all materials would be unlikely. Therefore, if Coast Road were to collapse, it would likely result in significant impacts on solid waste management on VSFB.

4.7 Human Health and Safety

Factors considered in determining whether implementing an alternative may have a significant adverse noise impacts include the extent or degree to which implementation of an alternative would expose people to noise levels in excess of applicable standards, or at levels that may be harmful.

4.7.1 Preferred Alternative

Construction sites, in general, can be dangerous to the public. For the activities associated with implementation of the Proposed Action under the Preferred Alternative, the Culvert 10 repair contractor would comply with federal OSHA and AFOSH regulations, as required and appropriate, to provide for the health and safety of the public who may be exposed to the operations, hazardous materials in use, and hazardous wastes generated and transported. Therefore, human health and safety would not be adversely impacted by general construction hazards.

Section 2.1.2.5 describes health and safety guidelines that would be implemented in the handling and transportation of hazardous materials and waste. Several known health and safety issues occur within the Proposed Action Area:

- Physical hazards, including holes or ditches, uneven terrain, sharp or protruding objects, slippery soils or mud, quicksand, loose soil, steep grades, and unstable ground are or could be present throughout the Proposed Action Area.
- Biological hazards, including vegetation (i.e., poison oak and stinging nettle), animals (i.e., insects, spiders, and snakes), and disease vectors (i.e., ticks, rodents), exist at and in the vicinity of the Proposed Action Area and have the potential to adversely impact human health and safety.

Adherence to federal OSHA and AFOSH regulations would minimize the exposure of the public to these hazards, and result in no significant effects as they relate to human health and safety from the Proposed Action.

4.7.2 No Action Alternative

Under the No Action Alternative, the proposed repairs would not be conducted. Therefore, there would be no human health and safety impacts resulting from project activities. However, if Culvert 10 was to cause failure of Coast Road, access would be impeded. This would result in a significant impact on health and safety of personnel at VSFB since emergency vehicle access would be impeded from quickly accessing some portions of VSFB.

4.8 Noise

Factors considered in determining whether implementing an alternative may have a significant adverse noise impacts include the extent or degree to which implementation of an alternative would expose people to noise levels in excess of applicable standards, or at levels that may be harmful.

4.8.1 Preferred Alternative

The Proposed Action Area is located where Culvert 10 crosses under Coast Road. The immediate vicinity is currently undeveloped. Existing noise levels near this project site are low due to the large areas of undeveloped landscape and sparse noise sources.

The Preferred Alternative would temporarily increase the ambient noise levels within the Proposed Action Area and in neighboring areas during project implementation activities. Relatively continuous noise would be generated during project activities. These continuous noise levels are generated from equipment that has source levels (at 3.28 feet) ranging from approximately 70 to 110 dB. As a sound source gets further away, the sound level decreases. This is called the attenuation rate. The rates are highly dependent on the terrain over which the sound is passing and the characteristics of the medium in which it is propagating. The rate used in these estimates was a decrease in level of 4.5 dB per doubling of distance. This average rate has been shown to be an accurate estimate from field data on grassy surfaces (Harris 1998). At 164 feet these levels range from 50 to 95 dB. Typical noise levels of heavy construction equipment are presented in **Table 4-4.**

Table 4-4. Noise Levels of Heavy Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 Feet (dBA)
Front End Loader	79-80
Excavator	81-85
Crane	75–87
Dump Truck	76-84

Source: US Department of Transportation 2016
dBA - A-weighted decibel

At a distance of 1,093 feet from the construction activities, the predicted maximum noise levels would drop below 65 dB, a noise level that is equivalent to normal conversation or background music. The project site is not located adjacent to inhabited areas and no buildings or structures that are used by personnel are within 1,093 feet of the Proposed Action Area. Further, noise generated during construction activities would not travel off-base; therefore, adverse impacts as a result of noise would be short-term and minor and cease at the completion of Culvert 10 repair activities.

4.8.2 No Action Alternative

Under the No Action Alternative, the proposed Culvert 10 repairs would not be conducted. Therefore, there would be no noise impacts that would expose people to unsafe or undesirable noise levels resulting from project activities. However, if Culvert 10 was to cause Coast Road to fail, there would likely be short-term increases in noise at the site associated with emergency road repairs or replacement and the noise would be longer in duration than under the Preferred Alternative as more extensive repairs would be required.

4.9 Coastal Zone Management

Although the Proposed Action Area does not occur directly within the state coastal zone, it may potentially affect resources within the state coastal zone; therefore, a ND was prepared for the Preferred Alternative.

4.9.1 Preferred Alternative

The DAF prepared a ND and the CCC concurred with that ND on 18 October 2024 that the Proposed Action would meet CZMA compliance requirements and have no effect on state coastal resources (**Appendix A**).

4.9.2 No Action Alternative

Under the No Action Alternative, the Culvert 10 repairs would not be implemented. Therefore, there would be no CCC review of the federal agency determinations of the potential effects on state coastal zone uses or resources from a proposed federal action pursuant to the CZMA and enforceable policies of the CCMP.

4.10 Transportation

Factors considered in determining whether implementing an alternative may have significant adverse impacts on transportation include the extent or degree to which implementation of an alternative would do the following:

- Result in the inability of the primary roadway to service existing traffic demands, or
- Result in a traffic to shift to a roadway that was incompatible with those traffic increases (e.g., inadequate pavement structure or design capacity) or could cause potential safety hazards

4.10.1 Preferred Alternative

Given the short-duration, low ADT volumes and good LOS currently experienced on the roadways that would be affected by Culvert 10 repair activities on VSFB and its vicinity, and the relatively small increase in daily truck traffic that would be generated by the Proposed Action, no adverse effects on capacity would occur in the Proposed Action Area roadways. However, brief restrictions of traffic may occur occasionally throughout the projects' duration. Alternate routes during this time would not be necessary. All roadway sections would continue to operate at an LOS in the range of A to B with project-added traffic.

Increased truck activity affects the integrity of roadway sections by increasing the flexures of the pavement. The design life for asphalt pavement, generally selected as either 10 or 20 years, drives engineering specifications for the road based upon the strength of the base soil and the Traffic Index for the design life. The Traffic Index is calculated based upon the number of truck trips that are expected during the design life of the pavement. The theory states that the pavement, during its lifetime, can tolerate a finite number of flexures due to loaded trucks. If the number of truck trips is increased, the life of the pavement is shortened. For example, if a 20-year

design were based upon an AADT of 1,000 trucks for 20 years and the volume increases to 2,000 ADT, the structural life of the pavement would be reduced to 10 years. While the current condition of the pavement on affected roads is fair to good, added truck traffic could cause faster-than-estimated deterioration of the pavement surface and require additional maintenance. Although an adverse effect, it would not be considered significant given that the number of truck trips per day anticipated from the Proposed Action is not high. Therefore, the Proposed Action is not anticipated to create any significant impacts on transportation. In addition, the recommended EPMs, described in **Section 2.1.2.8**, would further reduce the potential for adverse effects on transportation.

4.10.2 No Action Alternative

Under the No Action Alternative, the proposed repairs would not be conducted. Therefore, there would be no effect on existing transportation beyond baseline conditions. However, if the failure of Culvert 10 was to cause Coast Road to collapse, traffic would be forcibly diverted to other roads, and this would result in an interruption of mission-essential transportation on VSFB. In addition, such a situation would result in emergency repair involving intensive construction activities. Such an action could affect local traffic conditions and cause significant impacts on local transportation routes.

4.11 Water Resources

Factors considered in determining whether implementing an alternative may have significant adverse impacts on water resources include the extent or degree to which implementation of an alternative would do the following:

- Cause substantial flooding or erosion;
- Reduce surface water quality of creeks, rivers, streams, lakes, or the ocean; or
- Reduce surface or groundwater quality or quantity

4.11.1 Preferred Alternative

Construction General Permit coverage under Section 402 of the CWA is required if the Proposed Action disturbs 1 acre or greater of soil, including laydown atop soil that potentially discharge to WOTUS. The total area that may be disturbed by the Proposed Action is up to 2.60 acres, including the developed equipment staging area. Therefore, the Proposed Action may require Construction General Permit coverage. Being less than 5 acres, the Proposed Action may qualify for a Rainfall Erosivity Waiver if the risk factor calculations result in a rainfall erosivity factor of less than 5.

All EPMs described in detail in **Section 2.1.6** would be implemented to minimize the potential for adverse impacts on local water resources. The contractor would incorporate these requirements into work practices and procedures to ensure compliance for all project-related activities. With the implementation of the EPMs described in **Section 2.1.6**, adverse effects on water resources would be less than significant.

Surface Water and Floodplains

Surface water quality of the Pacific Ocean and the drainage channel could potentially be temporarily degraded as a result of erosion, contaminant or sediment discharge during the construction of the temporary access road, vegetation removal, disturbance to the channel banks, creation of laydown areas and turn-around site, and the installation of the liner in the culvert. Temporary disturbances of the drainage channel banks as a result of removing vegetation, loosening and exposing soils, and stockpiling materials during project implementation may result in increased erosion and sediment load.

Potential increases in erosion and sedimentation in the vicinity of the Proposed Action area would be minimized by implementing the EPMs described in detail in **Section 2.1.6**. Installing erosion control devices as appropriate, working outside of the channel during significant rainfall and runoff, and revegetating the site upon completion of construction will minimize any potential erosion and sedimentation. Therefore, the risk of potential sediment loading would be significantly reduced through the soil stabilization and revegetation of project-affected areas.

Construction-related contaminants, such as an oil leak from a vehicle, would be minimal and any accidental spills would be localized. All hazardous wastes would be managed and disposed of in accordance with applicable federal, state, and local hazardous waste regulations to include the VSFB Hazardous Waste Management Plan. The contractor would implement spill prevention and response practices, have spill kits readily accessible, and clean up spills immediately and dispose of them properly. Maintenance and refueling of equipment would occur in the staging areas outside of the drainage channel; however, if it is necessary to refuel or repair equipment adjacent to the channel, secondary containment materials would be used and a USFWS-qualified biologist would be present to monitor activities. Hazardous materials would be stored in proper containers, covered prior to rain events, within the staging areas outside the creek bed. Grout pumped from a concrete truck on Coast Road would be used to grout the HDPE liner in place inside the culvert. The grout used around the pipe liner would be properly managed to prevent accidental discharge. Any grout washout water would be contained for evaporation in a temporary pit in the staging area or trucks would be washed out off-base. All refuse and construction debris would be properly handled, stored, and removed from the site as soon as possible. As a result, the Proposed Action is not anticipated to have a significant effect on surface water quality.

The Culvert 10 project is not subject to EO 11988, *Floodplain Management,* requirements and objectives because it is not in a floodplain. The Proposed Action would provide improvements to Culvert 10, maintaining adequate drainage beneath Coast Road and reducing downstream erosion. Therefore, there would be no increased flood risk with the implementation of the Proposed Action.

Groundwater

Groundwater is not likely to be encountered under the Proposed Action as no project activity requires removing soil or excavating to a depth that would disturb groundwater. Therefore, the Proposed Action is not anticipated to have a significant effect on groundwater resources. Potential

impacts on groundwater from the accidental release of hazardous materials within the drainage channel do exist. However, with the EPMs outlined in **Section 2.1.6**, it is unlikely that such an event would occur; therefore, the Proposed Action is not anticipated to have a significant effect on groundwater resources.

Waters of the United States, Waters of the State, and Wetlands

EO 11990, *Protection of Wetlands*, is focused on minimizing the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. EO 11990 requires an evaluation of alternatives prior to proceeding with federal actions that may affect wetlands. A jurisdictional wetland delineation was conducted at Culvert 10 and it was determined that under the Proposed Action, no construction would occur within the bounds of potential WOTUS or potential WOTS, including jurisdictional wetlands (ManTech SRS Technologies Inc. 2024).

All of the temporarily disturbed habitat would be restored after repair activities have been completed. In addition, EPMs (see **Section 2.1.2.9**) would be implemented. As a result, the Proposed Action would not have a significant impact on potential WOTUS, WOTS, or wetland resources.

4.11.2 No Action Alternative

Under the No Action Alternative, the proposed repairs would not be conducted. Therefore, there would be no impacts to water resources resulting from project activities. However, if the culverts were to cause Coast Road to fail, there would likely be significant adverse effects on water resources by debris, bank erosion, and emergency road and culvert repairs. In addition, culvert failure is likely to cause scour and erosion that would alter the hydrology of the drainage.

4.12 Cumulative Impacts

The effects of the Proposed Action and No Action Alternative in combination with the effects of other relevant past, present, and reasonably foreseeable future projects have been evaluated in this cumulative effects analysis. A list of relevant past, present, and reasonably foreseeable projects that have been/would be constructed on VSFB is provided in **Table 4-6.** The foregoing analysis is based on the same resource thresholds as discussed in **Sections 4.1 to 4.11**.

4.12.1 Past, Present, and Reasonably Foreseeable Future Actions in the Region of Influence

The ROI for the Proposed Action is defined as the area over which effects of the Proposed Action could contribute to cumulative impacts on the environment. Therefore, the ROI includes both North and South VSFB. Future large projects on VSFB that are currently projected for the next several years have the greatest potential to result in cumulative impacts. VSFB projects contain environmental contract specifications and are individually evaluated for their environmental impacts. Based on the environmental impacts associated with each specific project, environmental protection measures and requirements are included in the project activities to reduce adverse environmental effects. Thus, individually implemented measures provide

cumulative protection reducing overall adverse effects on VSFB environmental resources. **Table 4-6** lists the past, present, and reasonably foreseeable future federal and private actions that may contribute to cumulative effects of the Proposed Action and may be under construction at the same time as the Proposed Action.

Table 4-6. Reasonably Foreseeable Projects

Projects	Status
Replacement of culverts at Honda Creek.	Completed in 2023.
Repair of three culverts along Coast Road	Environmental Impact Analysis Process complete; construction initiated in 202.
La Cañada Honda Bridge Replacement Project	Environmental Impact Analysis Process complete; construction initiated in 2024.
ULA commercial rocket launches and landings at SLC 6 (past action)	Six launches annually
Falcon 9 and Falcon 9 heavy launch vehicle programs from SLC 4 East	Environmental Impact Analysis Process completed in 2023. SpaceX proposed launching the Falcon 9 from SLC-4 East up to 36 times per year.
Boost-back and landing of the Falcon 9 first stage at SLC 4 west and offshore	Environmental Impact Analysis Process completed in 2023. Following each launch from SLC-4E, SpaceX proposed to perform a boost-back and landing of the first stage up to 36 times, either downrange on a droneship or at SLC-4 West.
Increased yearly launches at SLC 4 (SpaceX)	Environmental Impact Analysis Process completed in November 2024. The proposed action would increase the Falcon 9 annual launch cadence at SLC-4.
Construction and operation of new SLC 5 (Phantom)	Construction and operation of a new SLC. Environmental Impact Analysis Process completed in 2024. A total of 48 launches per year has been proposed. The first launch was originally anticipated in 2025, but construction has not yet commenced.
Construction and operation of new SLC 9 (Blue Origin)	Construction and operation of a new SLC that would launch 36 rockets per year. The first launch was originally anticipated in 2025, but construction has not yet commenced.
Future expansion and operation of existing SLC-6 and increased launch cadence (SpaceX)	The Environmental Impact Analysis Process was initiated with the issuance of a Notice of Intent in December 2024. Improve infrastructure at SLC-6, add facilities and two new boostback pads, add Falcon Heavy launch capacity at SLC-6 up to 18 times per year. Combined annual launch cadence from SLC-4 and SLC-6 to 100 per year.

NEPA - National Environmental Policy Act

4.12.2 Preferred Alternative

Air Quality

VSFB has several other construction or demolition projects proposed or underway in the ROI for the Proposed Action. Air emissions from other construction projects would be localized and short-term in nature. Long-term emissions from the construction projects are not anticipated to increase. Proposed increased launch operations at VSFB would increase air emissions during rocket transport activities, site preparation, mobilization activities, static fire and launch events, and recovery events. However, cumulative emissions from the Proposed Action combined with other concurrent construction projects and launch operations would not exceed the significance thresholds in Santa Barbara County and would not produce any significant cumulative air quality impacts. This determination was made by reviewing the total emissions of this project with the cumulative emissions from all planned concurrent projects.

Biological Resources

The Proposed Action and other construction and launch projects that involve ground-disturbing activities and noise could have temporary and localized effects on biological resources. Cumulative adverse impacts could result if concurrent projects, along with the Proposed Action, cause disturbances to special-status species or their habitats. Implementation of the Proposed Action under the Preferred Alternative would result in a temporary loss of habitat, potential loss of individuals of special-status species, and potential disruption of foraging and breeding activities. Although the Preferred Alternative and other concurrent projects may disturb wildlife, these disturbances would be temporary, and wildlife would continue to use habitat in the periphery of the projects. Through habitat restoration, the implementation of the EPMs listed in **Section 2.1.2.2**, and the requirements stated in the PBO and Biological Opinions issued by the USFWS for these projects, potential adverse effects would be less than significant and would not affect special-status species populations. Additionally, VSFB routinely implements projects and specific measures and procedures set forth in the Integrated Natural Resources Management Plan (VSFB 2022), which tend to ensure project-specific and cumulative adverse effects on biological resources are avoided and minimized. As a result, the Preferred Alternative, in combination with other past, concurrent, and planned activities, should not result in significant adverse cumulative impacts on biological resources.

Cultural Resources

Implementing the Proposed Action and other construction activities on VSFB involving activities that disturb intact, native soils or demolish structures over 50 years of age could result in impacts on cultural resources. Cumulative impacts would result if maintenance activities cause major ground disturbances in areas of high paleontological sensitivity or in areas that may contain intact subsurface prehistoric or historic archaeological resources. VSFB completed an archaeological site record and literature search and conducted a survey of the Proposed Action Area. Temporary construction features were modified to ensure avoidance of identified cultural resources sites. Further, mitigation of one cultural resources site is included as part of the Proposed Action. With

the avoidance measures in place and the mitigation that would be implemented, the Preferred Alternative would not result in significant adverse cumulative impacts on historic properties.

EPMs would be implemented to minimize impacts on sensitive archaeological resources. If cultural resources are discovered during project-related ground-disturbing activities, all excavation will be halted until the significance of the find is assessed. Significant adverse cumulative impacts from other projects and the Preferred Alternative are not expected.

Earth Resources

Other projects at VSFB involving grading, excavations, and construction or demolition could result in erosion-induced sedimentation of adjacent drainages and water bodies. Potential cumulative effects would include an increase in soil disturbance associated with construction, demolition, and road building activities that could substantially increase erosion, landslides, soil creep, mudslides, and unstable slopes. These impacts would be minimized by the use of BMPs and site restoration to minimize soil erosion and reduce fugitive dust. Erosion-induced sedimentation of surface drainages could occur as a result of other proposed and active projects at VSFB.

All projects located in the region are subject to seismically induced ground shaking due to an earthquake on a local or regional fault. By incorporating modern construction engineering and safety standards, all adverse seismic-related impacts at the project site, as well as the projects in the region, should be avoided. Therefore, the Preferred Alternative would not result in significant adverse cumulative impacts on geology and earth resources.

Hazardous Materials and Waste Management

Management of any hazardous materials for all projects would occur under compliance with Air Force Instruction 32-7086, and emergency responses to spills would follow the Hazardous Materials Emergency Response Plan. Projects must also follow the Integrated Solid Waste Management Plan. EPMs would be implemented to minimize hazardous materials or hazardous waste management impacts. The Preferred Alternative would not contribute to cumulative effects on hazardous materials and wastes in or around VSFB. The Preferred Alternative's implementation of the Proposed Action in combination with other proposed projects would not result in significant cumulative impacts.

Solid Waste Management

The projects listed in **Table 4-6** along with the Proposed Action, would result in an overall increase in solid waste generation resulting from construction, renovation, and demolition. Solid waste would be minimized by compliance with VSFB's Integrated Solid Waste Management Plan and the implementation of EPMs, including segregating, reusing, and recycling waste to the greatest extent practicable, would reduce cumulative impacts of solid waste. Local landfills would be able to process the projected temporary cumulative increases in solid waste. No significant cumulative impacts on solid waste management are expected.

Human Health and Safety

The implementation of the Proposed Action under the Preferred Alternative and other concurrent projects on VSFB could result in increased risks to human health and safety. Implementation of the Proposed Action and other similar actions at VSFB would slightly increase the short-term risk associated with construction contractors performing work at project locations. Contractors would be required to establish and maintain safety programs that would provide protection to their workers and limit the exposure of Base personnel to construction hazards. Impacts would be minimal and confined to the immediate project site. The safety program would include coordination with the Air Force Civil Engineer Center/Comprehensive Zoning Ordnance Military Munitions Response Program manager and contact with the weapons safety specialist for SLD 30, Weapons Safety Office for information on VSFB policies on UXO safety for construction work at VSFB. With implementation of required safety measures, there would be no significant cumulative impacts resulting from the Preferred Alternative and other anticipated projects.

Noise

Culvert 10 repair activities within the Proposed Action Area and for other projects would result in temporary, intermittent impacts localized to each project site. Construction projects are typically temporary in duration and the noise impact from the Preferred Alternative would not be a major contributor to the noise setting on VSFB. In addition, the other proposed and active projects listed in **Table 4-6** are not located in the immediate vicinity of the Proposed Action Area or would not occur at the same time, and would therefore would not interact with the Preferred Alternative to produce a cumulative noise impact.

Coastal Zone Management

The Preferred Alternative would have no effect on coastal zone use or resources pursuant to the CZMA. The other proposed and active projects identified in **Table 4-6** are all on VSFB and would conform to DAF regulations and planning principles or comply with county/state requirements. Cumulative projects would be modified during the project review process to ensure compatibility with existing land uses and consistency with management plans. These projects have been and would be assessed separately under NEPA and the effects would be analyzed and disclosed. The implementation of the Proposed Action and other cumulative projects are not expected to result in significant adverse cumulative effects on land use or coastal zone resources.

Transportation

Cumulative construction and demolition projects on VSFB would contribute to increased traffic volumes in the region. However, given the low ADT volumes and good LOS currently experienced on the roadways that would be affected by project activities on VSFB and its vicinity, and the relatively small and temporary increase in daily truck traffic that would be generated by the Proposed Action, no cumulative adverse effects on capacity are expected to occur as a result of the Proposed Action.

Water Resources

Cumulative impacts on water resources could occur if other projects were to inadequately address effects on water resources at project locations. However, projects on VSFB, including the Preferred Alternative, are required to utilize site-specific BMPs and conduct site restoration, as necessary, to minimize impacts on water quality. Impacts tend to be localized and temporary during the project duration. In addition, SLD 30 would implement EPMs for all construction projects on the base to minimize impacts on water resources. Therefore, implementation of the Proposed Action would not contribute to cumulative negative effects on water resources.

4.12.3 No Action Alternative

Under the No Action Alternative, the proposed Culvert 10 repair would not occur. Therefore, no cumulative impacts would be expected on any resources in the short term. However, if Coast Road was to fail, significant adverse impacts on the environment would be expected. Since failure would likely occur in an unplanned fashion, it would necessitate emergency repairs or demolition and replacement. Without the benefit of environmental planning and review, this scenario would likely result in significant impacts on biological resources, earth resources, hazardous materials and waste, human health and safety, solid waste management, transportation, and water resources and therefore have a significant adverse contribution to cumulative effects on the environment.

5.0 LIST OF PREPARERS

Preparer and Organization	Role	Years of Experience	Education
Alice Abela ManTech SRS Technologies Inc.	Biological Resources and Water Resources	23	BS, Biology, California Polytechnic State University, San Luis Obispo, CA
Maggie Fulton Vernadero Group Inc.	Technical Editor	38	BS, English, Arizona State University, Tempe, AZ
John LaBonte, PhD ManTech SRS Technologies Inc.	Biological Resources, Water Resources, and Technical Review	28	PhD, Biology, University of California, Santa Barbara, CA
Carey Lynn Perry Vernadero Group Inc.	Technical Reviewer	17	MS, Oceanography and Coastal Sciences, Louisiana State University, Baton Rouge, LA
Jennifer Ritter Vernadero Group Inc.	Technical Editor	23	BA, English, Rutgers University, New Brunswick, NJ; EDM., Language Arts, Rutgers University; EDM Administration, Temple University, Philadelphia, PA
Crystal Ramey Vernadero Group Inc.	Document Production and Section 508 Compliance	23	BA, Visual Arts, Northwestern State University, Natchitoches, LA
Eric Webb, PhD Vernadero Group Inc.	Project Manager	27	PhD, Oceanography and Coastal Sciences, Louisiana State University, Baton Rouge, LA
Lawrence Wolski ManTech SRS Technologies Inc.	Air Quality	28	BS, Environmental Studies, University of California, Santa Barbara, CA

FORMAT PAGE

6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS CONTACTED

California Coastal Commission – Energy, Ocean Resources, and Federal Consistency Division, San Francisco, CA

California Department of Fish and Wildlife, South Coast Region, Sacramento, CA

California Environmental Protection Agency, Sacramento, CA

California Native Plant Society, Channel Island Chapter, Ojai, CA

California Office of Historic Preservation, Sacramento, CA

California Trout, Ventura, CA

Central Coast Regional Water Quality Control Board - Central Coast Ambient Monitoring Program, San Luis Obispo, CA

Central Coast Regional Water Quality Control Board – Department of Defense Program Manager, San Luis Obispo, CA

City of Lompoc, Economic and Community Development, Lompoc, CA

Environmental Defense Center, Santa Barbara, CA

Federal Aviation Administration, Planning and Environmental Division

Gaviota Coast Conservancy, Goleta, CA

La Purisima Audubon Society, Vandenberg Village, CA

Lompoc Public Library, Lompoc, CA

National Park Service, Channel Islands National Park, Ventura, CA

NOAA – Channel Islands National Marine Sanctuary, Santa Barbara, CA

NOAA - National Marine Fisheries Service, Southwest Regional Office, Long Beach, CA

Office of the Governor, Office of Planning and Research, Sacramento, CA

Santa Barbara County Air Pollution Control District, Santa Barbara, CA

Santa Barbara County Board of Supervisors, Santa Barbara, CA

Santa Barbara County Planning and Development, Santa Barbara, CA

Santa Barbara Museum of Natural History, Santa Barbara, CA

Santa Barbara Public Library, Santa Barbara, CA

Santa Maria Public Library, Santa Maria, CA

Santa Ynez Band of Chumash Indians Elders Council, Santa Ynez, CA

Sierra Club – Los Padres Chapter, Santa Barbara, CA

US Army Corps of Engineers, VSFB, CA

US Army Corps of Engineers, Regulatory Division, Los Angeles District

US Coast Guard, Eleventh Coast Guard District, Alameda, CA

US Environmental Protection Agency, Region 9, San Francisco, CA

US Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura, CA

Vandenberg Space Force Base Library, Vandenberg SFB, CA

7.0 REFERENCES

Alterman, I.B., R.B. McMullen, L.S. Cluff, and D.B. Slemmons (eds.). 1994. "Seismotectonics of Central California Coast Ranges." Geological Society of America Special Paper. 292 pp.

Applied EarthWorks, Inc. 2023. "Archaeological Investigation Supporting Section 106 Compliance for the Culvert 10 Repair Project, Vandenberg Space Force Base, California (813-22-033CR)". Letter report. April.

Arnold, Jeanne E. 1992. "Complex Hunter-Gatherer-Fishers of Prehistoric California: Chiefs, Specialists, and Maritime Adaptations of the Channel Islands." *American Antiquity* 57:60–84.

Berg, E.A., M.P. Nieto, J.K. Francine, L.E. Fillmore, and P.H. Thorson. 2002. *Acoustic Measurements of the 5 October 2001 Titan IV B-34 Launch and Quantitative Analysis of Behavioral Responses of Pacific Harbor Seals on Vandenberg Air Force Base, California.* January.

California Air Resources Board (CARB). 2020. Days exceeding ozone and particulate standards 2020-2015. Available: https://www.ourair.org/days-exceeding-ozone-andparticulate-standards-santa-barbara-county. Accessed 28 August 2020.

California Department of Fish and Wildlife. 2023. California Natural Diversity Database. Available: https://wildlife.ca.gov/Data/CNDDB. Accessed December 2023.

California Department of Water Resources. 2021. "California's Groundwater Update." Bulletin 118. November.

California State Parks. 2007. *OHV BMP Manual for Erosion and Sediment Control.* Prepared for the State of California, Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division, Sacramento, California. November.

Central Coast Regional Water Quality Control Board (CCRWQCB). 2019. *Water Quality Control Plan for the Central Coastal Basin.* 14 June 2019 edition.

Christopher, S.V. 2018. A review and case study of California red-legged frog (*Rana draytonii*) movement patterns in terrestrial habitats. Prepared for 30 CES/CEI, Vandenberg Air Force Base, Ca. 17 pp.

County of Santa Barbara Public Works Department. 2023. "Historic Monthly Rainfall, Lompoc Station." https://www.countyofsb.org/2322/Monthly-Yearly-Rainfall.

Dibblee Jr., T.W. 1950. "Geology of the Southwestern Santa Barbara County, California." California Division of Mines Bulletin 150.

Erlandson, Jon M. 1994. *Early Hunter-Gatherers of the California Coast.* Plenum, New York.

Erlandson, Jon M., and Kevin Bartoy. 1995. “Cabrillo, the Chumash, and Old World Diseases.” Journal of California and Great Basin Anthropology 17:153–173.

Erlandson, Jon M., and Kevin Bartoy. 1996. “Protohistoric California: Paradise or Pandemic?” Proceedings of the Society for California Archaeology 9:304–309.

Fellers, G.M., A.E. Launer, G. Rathbun, S. Bobzien, J. Alvarez, D. Sterner, R.B. Seymour, and M. Westphal. 2001. Overwintering tadpoles in the California red-legged frog (*Rana aurora draytonii*). Herpetological Review 32(3): 156-157.

Glassow, Michael A. 1990. *Archaeological Investigations on Vandenberg Air Force Base in Connection with the Development of Space Transportation System Facilities with Contributions by Jeanne E. Arnold, G. A. Batchelder, Richard T. Fitzgerald, Brian K. Glenn, D. A. Guthrie, Donald L. Johnson, and Phillip L. Walker.* Department of Anthropology, University of California, Santa Barbara. Submitted to US Department of the Interior, National Park Service, Western Region Interagency Archeological Services Branch, San Francisco. Contract No. CX-8099-2-0004.

Glassow, Michael A. 1996. *Purisimeño Chumash Prehistory: Maritime Adaptations along the Southern California Coast.* Case Studies in Archaeology. Jeffrey Quilter, series editor. Harcourt Brace College Publishers, San Diego.

Greenwood, Roberta S. 1972. “9,000 years of Prehistory at Diablo Canyon, San Luis Obispo County, California.” San Luis Obispo County Archaeological Society Occasional Paper No. 7.

Greenwood, Roberta S. 1978. “Obispeño and Purisimeño Chumash in California.” Edited by Robert F. Heizer, pp. 520–523. *Handbook of North American Indians*, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.

Harris, C.M. 1998. *Handbook of Acoustical Measurements and Noise Control.* Third edition. McGraw Hill: New York, New York.

Jennings, C.W. 1994. “Fault Map of California and Adjacent Areas.” California Division of Mines and Geology. California Geological Data Map Series, Map No. 6, Scale 1:750,000.

Jennings, M.R., and M.P. Hayes. 1990. Status of the California red-legged frog, *Rana aurora draytonii*, in the Pescadero Marsh Natural Preserve. 57pp.

King, Chester D. 1981. “The Evolution of Chumash Society: a Comparative Study of Artifacts Used in Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804. PhD dissertation, Department of Anthropology, University of California, Davis.

King, Chester D. 1984. “Ethnohistoric Background.” In *Archaeological Investigations on the San Antonio Terrace, Vandenberg Air Force Base, California*, in Connection with MX Facilities Construction, pp. I-1–I-54. Chambers Consultants and Planners, Stanton, California. Submitted to US Army Corps of Engineers, Los Angeles District. Contract No. DAC09-81-C-0048.

King, Chester D. 1990. “Evolution of Chumash Society: a Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804.” In *The Evolution of North American Indians,* edited by David Hurst Thomas. Garland, New York.

Landberg, Leif. 1965. “The Chumash Indians of Southern California.” Southwest Museum Papers No. 19. Los Angeles.

Lebow, Clayton G., Douglas R. Harro, Rebecca L. McKim, and Carole Denardo. 2001. *Archaeological Excavations at CA-SBA-246, an Early Holocene Site on Vandenberg Air Force Base, Santa Barbara County, California.* Applied EarthWorks Inc., Fresno, California, for Tetra Tech Inc., Santa Barbara, California. Submitted to 30 CES/CEV, Vandenberg Air Force Base, California. US Air Force Contract No. F04684-95-C-0045.

Lebow, Clayton G., Douglas R. Harro, Rebecca L. McKim, Charles M. Hodges, Ann M. Munns, Erin A. Enright, and Leeann G. Haslouer. 2014. *The Sudden Flats Site: A 10,910–10,600-Year-Old Coastal Shell Midden on Vandenberg Air Force Base, Santa Barbara County, California.* Applied EarthWorks Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Installation Management Flight, Environmental Section, Environmental Assets, Vandenberg Air Force Base, California.

Lebow, Clayton G., Douglas R. Harro, Rebecca L. McKim, Charles M. Hodges, Ann M. Munns, Erin A. Enright, and Leeann G. Haslouer. 2015. “The Sudden Flats Site: A Pleistocene/Holocene Transition Shell Midden on Alta California’s Central Coast.” California Archaeology 7(2):265–294.

Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, and Ann M. Munns. 2006. *Prehistoric Land Use in the Casmalia Hills throughout the Holocene: Archaeological Investigations along Combar Road, Vandenberg Air Force Base, California.* 2 vols. Applied EarthWorks Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight, Vandenberg Air Force Base, California.

Lebow, Clayton G., Rebecca L. McKim, Douglas R. Harro, Ann M. Munns, and Carole Denardo. 2007. *Littoral Adaptations throughout the Holocene: Archaeological Investigations at the Honda Beach Site (CA-SBA-530), Vandenberg Air Force Base, Santa Barbara County, California.* 2 vols. Applied EarthWorks Inc., Lompoc, California. Submitted to 30th Civil Engineer Squadron, Environmental Flight, Vandenberg Air Force Base, California.

Lewis, E.R., and P.M. Narins. 1985. Do frogs communicate with seismic signals? Science 227(4683): 187-189.

ManTech SRS Technologies Inc. 2019. Conceptual California Red-Legged Frog Habitat Assessment, Population Status, and Chytrid Fungus Infection in Cañada Honda Creek, Cañada del Jolloru, and Seasonal Pools on Vandenberg Air Force Base, California. Prepared for 30 Space Launch Delta. September.

ManTech SRS Technologies Inc. 2023. Arguello Slender Salamander (*Batrachoseps wakei*) Management Plan Vandenberg Space Force Base, California. Prepared for 30 Space Launch Delta. January.

ManTech SRS Technologies Inc. 2024. *Revised Assessment of Potential Jurisdictional Waters Associated with Culverts 9 and 10 on Vandenberg Space Force Base, California.* Prepared for Space Launch Delta 30. May.

Moratto, Michael J. 1984. *California Archaeology.* New York and London: Academic Press.

Palmer, Kevin (Lex). 1999. *Central Coast Continuum—from Ranchos to Rockets: a Contextual Historic Overview of Vandenberg Air Force Base, Santa Barbara County, California.* Prepared by Palmer Archaeology and Architecture Associates, Santa Barbara, California. Draft submitted to 30 30th Civil Engineer Squadron, Environmental Flight, Vandenberg Air Force Base, California.

Preston, William. 1996. “Serpent in Eden: Dispersal of Foreign Diseases into Pre-Mission California.” Journal of California and Great Basin Anthropology 18:2–37.

Reynolds, Smith and Hill Inc. 1985. *Phase I Problem Identification and Records Search, Vandenberg Air Force Base, Installation Restoration Program.* Jacksonville, Florida.

Stevens, Nathan E. 2011. “Technological Plasticity and Cultural Evolution along the Central Coast of California.” PhD dissertation, University of California, Davis.

US Air Force (Air Force). 1987. *Mineral Resource Management Plan: Potential Exploration, Development, and Production of Oil and Gas Resources, Vandenberg Air Force Base.*

US Air Force (Air Force). 2021. *Environmental Assessment for Honda Creek Culverts Repair and Corrosion Prevention at Vandenberg Air Force Base, California.*

US Air Force (Air Force). 2014. Hazardous materials emergency response plan. 30 Space Wing Plan 32-4002-A. July.

US Air Force (Air Force). 2023 *Integrated Natural Resources Management Plan, Vandenberg Space Force Base, California.* 103 pp plus appendices.

US Department of Agriculture. 1972. Soil Survey of Northern Santa Barbara Area, California. United States Department of Agriculture Soil Conservation Service, University of California Agricultural Experiment Station. 182 pp.

US Department of Transportation (DOT). 2016. *Construction Noise Handbook.* https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed 22 September 2016.

US Environmental Protection Agency (USEPA). 2016. NAAQS table. Available: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed 28 August 2020.

US Fish and Wildlife Service (USFWS). 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

US Space Force. 2022a. *Hazardous Waste Management Plan. 30 Space Launch Delta.*

US Space Force. 2022b. *Vandenberg Air Force Base Integrated Solid Waste Management Guide.*

Vandenberg Air Force Base (AFB). 2019. *Installation Development Plan, Vandenberg Air Force Base, California.* 146 pp.

Western Regional Climatic Center. 2020. Climate data for Lompoc, California, Station 045064. Available: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5064. Accessed 28 August 2020.

FORMAT PAGE

Appendix A. California Coastal Commission Negative Determination

FORMAT PAGE

CALIFORNIA COASTAL COMMISSION
NORTH CENTRAL COAST DISTRICT OFFICE
455 MARKET STREET, SUITE 300
SAN FRANCISCO, CA 94105
VOICE [redacted]

October 18, 2024

Beatrice L. Kephart
30 CES/CEI
1028 Iceland Avenue
Vandenberg SFB, CA 9437-6919
Via e-mail to: [redacted]

Re: Negative Determination No. ND-0035-24: Repairs to Culvert 10, Vandenberg Space Force Base, Santa Barbara County

Dear Ms. Kephart:

The California Coastal Commission (Commission) has reviewed the above-referenced negative determination (ND), dated August 5, 2024, for the Department of the Air Force (DAF) proposed repairs to Culvert 10 to provide proper stormwater drainage beneath Coast Road.

Culvert 10 is a 276-foot-long, 36-inch-diameter corrugated metal pipe (CMP) stormwater drainage that begins on the inland side of Coast Road, continues beneath the road, and exits on the seaward side of Coast Road onto a coastal bluff. Culvert 10 is corroded, degraded, and at risk of collapse. Coast Road is the primary access road for multiple space launch complexes (SLCs) within Vandenberg Space Force Base (VSFB) and collapse of Culvert 10 would threaten the integrity of Coast Road, thus preventing access to and operation of these SLCs. There is also substantial erosion at the outlet of Culvert 10 where stormwater flows exit the drainage onto the coastal bluff. During stormwater flows, sediments from this erosion are carried along an incised channel within the bluff until they eventually exit out onto the beach and into the ocean.

Repairs to Culvert 10 would include installing a high-density polyethylene (HDPE) liner within the existing CMP and grouting the liner into place. The project would also include stabilization of the eroded channel banks at the outlet of Culvert 10 and placement of approximately 7,500 cubic yards riprap along a 50 linear floor segment of the incised channel bottom in order to dissipate high velocity stormwater flows from the outlet and prevent further erosion.

The project would require construction of a temporary access route beginning at Honda Point Road and continuing to the west side of Culvert 10. The temporary access road would be approximately 45 feet wide and 1,500 feet long (1.5-acres in area) and would be constructed by grubbing and grading, and then applying a layer of compacted fill soil. The project would also construct a 0.3-acre temporary equipment and materials storage area and vehicle turnaround area at the end of the temporary access road, adjacent to

the Culvert 10 outfall. The project would use an approximately 0.73-acre, previously disturbed area located inland of Coast Road for staging of vehicles.

Equipment for the project would include a compact track loader, a compactor, a concrete truck, a dump truck, a flat bed, a grader, a rough terrain crane, a rough terrain forklift, and multiple pickup trucks. The project is anticipated to require approximately three months to complete.

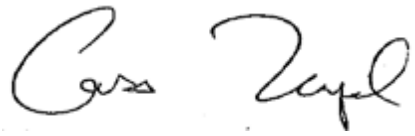
The project analyzed multiple alternatives to the proposed culvert repair and determined that the proposed project was the only feasible alternative. Additionally, the project analyzed multiple alternatives to the proposed temporary access road and laydown area. However, due to the location of the Union Pacific Railroad (UPRR) track located in the immediate area of Culvert 10, access to the site is limited and requires using the existing railroad crossing at Honda Point Road followed by construction of the temporary access road.

The project includes Environmental Protection Measures (EPMs) such as pre-construction surveys for federally listed species and scheduling of construction activities to avoid sensitive breeding and blooming seasons in habitat occupied by federally listed species, to the maximum extent feasible. Equipment and vehicles would be inspected and cleaned prior to the start of construction and erosion control measures would be implemented to prevent runoff of sediment and construction materials. Archaeologists and native American monitors would be onsite to survey construction activities.

DAF surveyed vegetation in the area of the proposed access road and laydown area and determined that the majority of the vegetation consists of nonnative iceplant (*Carpobrotus spp.*). Veldt grass (*Ehrharta calycina*) and California sagebrush (*Artemisia californica*) with codominant mock heather (*Ericameria ericoides*) were also identified. Following completion of the project, DAF would, as part of its restoration plan, restore any graded site contours to their previous slopes, apply native seed and would plant native vegetation within all disturbed areas of the access road and laydown area. Non-native, invasive weeds would be controlled for one year post-construction and native plantings would be watered regularly. DAF would prepare and provide to Commission staff a report one year post-construction to document site conditions and recovery of the disturbed areas. If after one year restoration is not achieving the goals outlined in the restoration plan, DAF would work with Commission staff on possible corrective actions, including potential mitigation.

With implementation of the coastal resource protections proposed as part of this project, including those described above, we agree that the proposed project will not adversely affect coastal zone resources. We therefore **concur** with your negative determination made pursuant to 15 CFR Section 930.35 of the NOAA implementing regulations. Please contact Wesley Horn at [redacted] if you have any questions regarding this matter.

Sincerely,



Cassidy Teufel
Director
Energy, Ocean Resources, and Federal Consistency
(for)

Dr. Kate Huckelbridge
Executive Director

FORMAT PAGE

Appendix B. State Historic Preservation Office Consultation

FORMAT PAGE

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

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

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

November 16, 2023

Reply in Reference to: USAF_2023_1018_001

Lt. Col Nicholas C. Van Elsacker
Commander, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

VIA ELECTRONIC MAIL

Re: Section 106 Consultation for Culvert 10 Repair, Vandenberg SFB, Santa Barbara County

Dear Lt. Col. Van Elsacker:

The United States Air Force (USAF) is initiating consultation with the State Historic Preservation Officer (SHPO) regarding its effort to comply with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. 306108), as amended, and its implementing regulation found at 36 CFR Part 800.

The USAF are proposing to repair Culvert 10 at Vandenberg Space Force Base. Further project details may be found in the USAF's consultation letter.

Based on their historic property identification efforts the USAF determined that CA-SBA-666 is individually eligible for National Register of Historic Places (NRHP) inclusion as it "contains archaeological deposits with data that contribute to a greater understanding of prehistoric land-use, subsistence, and technology that can be tied into a chronological framework and those deposits retain integrity." The USAF further determined that CA-SBA-1145 is within the APE but will not be affected by project activities.

After reviewing the information provided in support of a finding of adverse effect, the SHPO has the following comments:

1. The SHPO has no objection to the USAF's Area of Potential Effects definition.

2. It is the SHPO's understanding that the USAF will continue to consult with the Santa Ynez Band of Chumash Indians regarding the identification of historic properties and the resolution of adverse effects.

3. Please provide clarification as to whether CA-SBA-1145 is individually eligible for NRHP inclusion and if so, under what criteria and context.

4. Please provide a discussion as to whether CA-SBA-1145 and CA-SBA-666 may or may not be contributing elements to an undocumented potential historic district. If so, additional historic properties identification and consultation will be required to evaluate the potential historic district to determine its NRHP eligibility criteria, physical boundaries, applicable context(s) and all contributing and non-contributing elements.

5. The SHPO cannot concur with the USAF's finding of adverse effect at this time and anticipates receiving the information requested in this letter in the interest of continuing this consultation.

This letter is being sent in electronic format only. Please confirm receipt of this letter and notify Ed Carroll, Historian II, at [redacted] or [redacted] if there are any questions or to request a hard copy of this letter.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

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

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

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

February 5, 2024

Reply in Reference to: USAF_2023_1018_001

Lt. Col Nicholas C. Van Elsacker
Commander, 30th Civil Engineer Squadron
1172 Iceland Avenue
Vandenberg AFB, CA 93437-6011

VIA ELECTRONIC MAIL

Re: Section 106 Consultation for Culvert 10 Repair, Vandenberg SFB, Santa Barbara County

Dear Lt. Col. Van Elsacker:

The United States Air Force (USAF) is continuing consultation with the State Historic Preservation Officer (SHPO) regarding its effort to comply with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. 306108), as amended, and its implementing regulation found at 36 CFR Part 800.

At the SHPO's request, the USAF provided additional information supporting their finding of adverse effect, historic property identification and eligibility determinations for CA-SBA-1145 and CA-SBA-666. After reviewing the documentation provided the SHPO has the following comments:

1. The SHPO concurs that CA-SBA-1145 is not individually eligible for NRHP inclusion or as a potential district contributor.

2. The SHPO concurs that CA-SBA-666 is eligible for NRHP inclusion under criteria D.

3. The SHPO concurs that the undertaking will adversely affect CA-SBA-666 and that a finding of adverse effect to historic properties is appropriate. Please notify the ACHP to determine their interest in participating in the preparation and execution of a memorandum of agreement to resolve adverse effects.

This letter is being sent in electronic format only. Please confirm receipt of this letter and notify Ed Carroll, Historian II, at [redacted] or [redacted] if there are any questions or to request a hard copy of this letter.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

MEMORANDUM OF AGREEMENT
BETWEEN
THE DEPARTMENT OF THE AIR FORCE
AND THE
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE CULVERT 10 REPAIR PROJECT,
SANTA BARBARA COUNTY, CALIFORNIA

WHEREAS, the Department of the Air Force, Vandenberg Space Force Base (DAF), determined that the Culvert 10 Repair Project (Undertaking), is subject to compliance with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. § 300101 et seq.) (NHPA), as amended and re-codified, and its implementing regulations at 36 Code of Federal Regulations (CFR) § 800; and

WHEREAS, DAF, in consultation with the California State Historic Preservation Officer (SHPO), determined and documented the Undertaking's area of potential effects (APE) in accordance with 36 CFR § 800.4(a) (Attachment A) to encompass the project footprint and all project-related activities in addition to access routes and laydown areas; and

WHEREAS, DAF will repair Culvert 10 by installing a high-density polyethylene slip liner within the existing corrugated metal pipe, constructing a riprap outfall structure extending 50 feet downstream from the base of the culvert outlet to slow stormwater, constructing a 12-foot wide, 1,450 foot long temporary access road, establishing a 2,000 square foot laydown area at the end of the access road and a 32,200 square foot equipment storage laydown area in a former parking lot (Attachment B, Section 1.1); and

WHEREAS, DAF determined that CA-SBA-666, a precontact coastal residential site consisting of shell midden, stone tools, and faunal remains, is eligible for National Register of Historic Places (NRHP) inclusion under Criterion D for its potential to contribute to a greater understanding of precontact occupation along the central coast of California and the SHPO concurred (Attachment C); and

WHEREAS, DAF determined that, CA-SBA-666 is the sole historic property within the APE; and

WHEREAS, DAF invited the federally recognized Santa Ynez Band of Chumash Indians (Tribe), to consult on historic properties that may have religious and cultural significance and the Tribe notified DAF of their decision to consult on the undertaking in a letter dated 23 October 2023 (Attachment C) and will be afforded the opportunity to participate in the implementation of this MOA and the Undertaking, and has been invited to concur in this MOA; and

WHEREAS, DAF determined that effects to CA-SBA-666 occurred due to the installation and use of Culvert 10; and

WHEREAS, DAF determined the Undertaking will adversely affect CA-SBA-666 and the SHPO concurred in a letter dated 5 February 2024; and

WHEREAS, DAF notified the Advisory Council on Historic Preservation (ACHP) by letter on 9 February 2024 and 14 March 2024 of the adverse effect finding pursuant to 36 CFR § 800.6(a)(1) and the ACHP did not respond;

NOW, THEREFORE, DAF and the SHPO agree the Undertaking shall be implemented in accordance with the following stipulations to take the Undertaking's effects on historic properties into account.

STIPULATIONS

The DAF will ensure that the following measures are carried out:

I. Area of Potential Effects

A. If DAF determines that conditions necessitate the revision of the APE subsequent to the execution of this MOA, DAF shall notify the consulting parties of any proposed change to the APE by providing a map and narrative description of the revision.

B. These parties shall then have fifteen (15) days, or as extended by the Signatories, to comment on the modified APE. If a party does not comment on the modified APE within fifteen (15) days, no further consultation by the DAF is required.

C. If the Signatories cannot agree or DAF receives an objection from a consulting party on the revision, then DAF shall attempt to resolve the dispute following the Dispute Resolution Stipulation in Section VIII of this MOA.

D. If the Signatories reach mutual agreement on the proposed revisions, then DAF shall provide a final map and narrative description of the revisions in writing to all consulting parties no later than fourteen (14) days following such agreement.

II. Mitigation Measures

A. DAF shall mitigate and resolve adverse effects to historic properties by carrying out a program of controlled archaeological excavations where the proposed Undertaking would result in adverse effects upon significant archaeological deposits in accordance with the research design in Chapter 3 of *Historic Property Treatment Plan Resolving Adverse Effects to CA-SBA-666* (Nocerino 2024)(Attachment B). Data recovery will be in accordance with the ACHP's standard treatment for recovering significant information. Adverse effects to CA-SBA-666 would be resolved to acceptable levels by employing the following mitigation measures:

1. Adverse effects from the continued use of Culvert 10 that directs water runoff at CA-SBA-666 and has carved a ravine through site deposits will be resolved by archaeological data recovery excavations using the following methods (see Attachment B, Section 4.1.1):

a. CA-SBA-666 is a 13,300 square meter precontact archaeological site along the coast south of Point Pedernales.
b. Based on field observations and area calculations with geographic information systems software, it is estimated that a 323 square meter area, containing 120 cubic meters of soil and archaeological deposits was lost to erosion from Culvert 10 outflow.
c. During consultation for this project, the Santa Ynez Band of Chumash Indians requested that data recovery excavation be as minimal as possible to avoid generating a large collection and causing further damage to the archaeological deposit. Given that request and field observations about the density of archaeological material in the affected area, it was decided that recovery of a one percent sample (1.2 cubic meters) of the lost deposit would be sufficient to address research questions stated in Attachment B, Chapter 3.
d. Given the depth and distribution of archaeological materials observed during site evaluation, data recovery excavations of up to 1.5 cubic meters of archaeological material will occur.
e. The principal archaeologist in consultation with the DAF cultural resources manager will decide which unit size is most efficient. Units could include a 1 by 1 meter square or up to two 0.5 by 1 meter rectangles. Alternatively, to sample more spatially distinct locations, up to five 20 by 20 centimeter column samples could be excavated. Additional excavation units may be used until the maximum recovery volume of 1.5 cubic meters is reached.
f. Excavation units will be terminated after two successive culturally-sterile levels are excavated, the maximum depth of the archaeological deposit is reached, or 1.5 cubic meters is excavated.

2. Following data recovery excavations, archaeological remains and all associated forms will be sent to a local laboratory for processing and data entry (see Attachment B, Section 4.2). Screen residues will be size sorted through the field mesh size grade, separated by material/artifact class, counted and weighed, and cataloged. When the catalog is complete, materials will be given to specialists for technical analysis. Results of technical analyses and an updated California Department of Parks and Recreation (DPR) 523 site record form will be included in the technical report referenced below in Section III Part B.

B. In addition to the data recovery efforts described above, DAF shall install stormwater flow dissipation at the outfall of Culvert 10 and a slip liner inside of the culvert to decrease water flow velocities and associated downstream erosion. Following construction, DAF shall plant native vegetation along the ravine, within the area of direct impact to stabilize ravine slopes and slow erosion.

C. DAF shall add CA-SBA-666 to its Sensitive and Threatened Site Condition Assessment Program that monitors sites with at-risk, significant archaeological deposits on an annual basis. Monitoring will include mapping erosional edges with GPS equipment to track the rate and severity of erosion over time.

III. Treatment of Historic Properties

A. Initial project ground disturbing activities within 100 feet of archaeological sites recorded within the APE will be monitored by an archaeologist and a representative from the Santa Ynez Band of Chumash Indians.

B. DAF shall prepare a draft technical report that includes all data collected during the Data Recovery and an updated DRP 523 site record form.

1. DAF shall submit the draft technical report to the Tribe for 45-day review period. DAF shall address any comments received within the 45-day review period and prepare a revised draft technical report.
2. DAF shall submit the revised draft technical report to SHPO who shall have 45 days to review and approve the report. If the SHPO fails to comment within 45 days, DAF may finalize the report. If the SHPO comments, DAF and SHPO shall consult to resolve any comments. Should DAF and SHPO be unable to come to agreement and finalize the report, DAF shall follow Stipulation VIII.
3. DAF will provide copies of the final report to all parties of this MOA, the Council, and the Central Coast Information Center.

C. Within one calendar year after the completion of the data recovery excavations, DAF shall produce interpretive materials in cooperation with the Santa Ynez Band of Chumash Indians to promote cultural resources awareness and provide information about the prehistory of the VSFB region.

1. Results of the data recovery excavations will be used to develop interpretive materials for public use. Interpretive materials would include a brochure, pamphlet, or poster that presents the results of the data recovery excavations and its meaning to descendant populations in a manner appropriate for a public audience. The interpretive material will be designed in coordination with the Santa Ynez Band of Chumash Indians and VSFB cultural resources staff and produced in accordance with Section 4.8 of the Historic Property Treatment Plan included in Attachment B.
2. DAF shall submit the draft interpretive material to the SHPO who shall have a 30 day review period. Once DAF receives and addresses comments, a final copy will be produced and provided to the SHPO and Santa Ynez Band of Chumash Indians.

IV. Discoveries and Unanticipated Effects

A. If DAF determines during implementation of the MOA or construction of the Undertaking that either the implementation of the MOA or the Undertaking will affect a previously unidentified property that may be eligible for the National Register or affect a known historic property in an unanticipated manner, DAF will address the discovery or unanticipated effect in accordance with 36 CFR § 800.13(b)(3). DAF at its discretion may

hereunder, and pursuant to 36 CFR § 800.13(c), assume any discovered property to be eligible for inclusion in the National Register.

B. Discoveries and unanticipated effects will be treated following the procedures outlined in Volume 5, Section 7.3 of the VSFB Integrated Cultural Resource Management Plan (ICRMP: Lebow and Moratto 2005).

C. Discoveries and treatment of human remains will follow the procedures outlined in Volume 5, Chapter 8 of the VSFB Integrated Cultural Resource Management Plan (ICRMP; Lebow and Moratto 2005).

D. Discoveries and treatment of NAGPRA-defined objects will comply with NAGPRA and 43 CFR 10.

V. Administrative Provisions

A. Definitions

This MOA and documentation produced under it us the definitions provided in 36 CFR § 800.16.

B. Professional Qualifications

Pursuant to Section 112(a)(1)(A) of the National Historic Preservation Act (54 U.S.C. § 306131(a)(1)(A) and 36 CFR § 800.2(a)(1), DAF shall ensure that all work carried out in accordance with this MOA will be done by or under the direct supervision of appropriate historic preservation professionals who meet the Secretary of the Interior's Professional Qualifications Standards and that all documentation produced under this MOA is prepared by or under the direct supervision of a person meeting the Secretary of Interior's Professional Qualifications Standards in the relevant discipline (48 FR 44738-9). DAF will ensure that contractors retained for services also meet these professional qualifications standards.

C. Communication

Letters signed by the agency official and delivered via electronic mail (email) will serve as the official correspondence method for all communications regarding this Agreement and its provisions. See Attachment D for a list of contacts and email addresses. Contact information in Attachment D may be updated as needed without an amendment to this MOA. It is the responsibility of each party to this MOA to immediately inform DAF of any change in name, address, email address, or phone number of any point-of-contact. DAF will forward this information to all signatories and concurring parties by email.

D. Documentation Standards

Activities prescribed by Stipulations II and III of this MOA shall conform to the *Secretary of the Interior's Guidelines for Archaeology and Historic Preservation* (48 FR 44716-44740), as well as to applicable standards and guidelines established by the SHPO.

E. **Curation and Curation Standards**
DAF shall ensure that, to the extent permitted under §§ 5097.98 and 5097.991 of the California Public Resources Code, the materials and records resulting from the historic preservation work prescribed by this MOA are curated in accordance with 36 CFR Part 79.

VI. Confidentiality

The parties to this MOA acknowledge that Historic Properties covered by this MOA are subject to the provisions of Section 304 of the NHPA and 36 CFR § 800.11 (c), relating to the disclosure of sensitive archaeological site information and, having so acknowledged, will ensure that all actions and documentation prescribed by this MOA are consistent with Section 304 of the NHPA, 36 CFR § 800.11(c), and 5 U.S.C. § 552, as amended (Freedom of Information Act).

VII. Changes to the Undertaking

If DAF determines that the Undertaking must be modified, it will consult with the SHPO to determine the effect of such modifications. The SHPO will have 45 days to respond to the notice of changes to the undertaking. If the modifications are determined to constitute additional adverse effects to historic properties, additional mitigation to resolve adverse effects shall be determined in consultation with the SHPO and appended to this MOA.

VIII. Dispute Resolution

A. Should Signatories to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, DAF shall consult to resolve the objection. If DAF determines that such objection cannot be resolved, DAF shall:

1. Forward all documentation relevant to the dispute, including DAF's proposed resolution, to the ACHP. The ACHP shall provide the DAF with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, DAF shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and signatories and provide them with a copy of this written response. DAF will then proceed according to its final decision.

2. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, DAF may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, DAF shall prepare a written

response that considers any timely comments regarding the dispute from the signatories to the MOA and provide them with a copy of such written response.

3. DAF's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged**.**

IX. Reporting Requirements

A. DAF shall provide all parties to this MOA an Annual Report documenting actions carried out pursuant to this MOA via email. The reporting period shall commence one year from the date of the MOA's execution.

B. The Annual Report shall address the following: status of Undertaking (e.g., phases complete and upcoming), scheduling changes, status of mitigation, any objections received and how they were resolved, status of any proposed amendments, and any interest from the public in the Undertaking and/or terms of the MOA.

C. DAF shall coordinate a meeting with all MOA parties to be scheduled within ninety (90) days of distribution of the Annual Report, or another mutually agreed upon date, to discuss activities carried out pursuant to this MOA during the preceding year and activities scheduled for the upcoming year. This meeting, should it be deemed unnecessary, may be cancelled by mutual consent of the Signatories.

X. Amendments

A. This MOA may be amended when such an amendment is agreed to in writing by all Signatories. The amendment will be effective on the date a copy signed by the Signatories is filed with the ACHP.

B. If the Signatories cannot agree to appropriate terms to amend the MOA, either Signatory may terminate the MOA in accordance with Stipulation XI.

C. Each Appendix to this MOA may be individually revised or updated through consultation with the Signatories without requiring amendment of the MOA, unless the Signatories through such consultation decide otherwise. Within thirty (30) days of revising any Appendix, the Federal Agency shall append any revised document to this MOA and share the final revised document with all consulting parties.

XI. Termination

A. If Signatories to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other party to attempt to develop an amendment per Stipulation X. If within thirty (30) days (or another time period agreed to by both signatories) an amendment cannot be reached, either signatory may terminate the MOA upon written notification to the other signatory.

B. Once the MOA is terminated, and prior to work continuing for the Undertaking, DAF must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, consider, and respond to the comments of the ACHP under 36 CFR § 800.7. DAF shall notify the SHPO as to the course of action it will pursue.

XII. Duration

This MOA will expire if its terms are not carried out within five (5) years from the date of its execution. Prior to such time, DAF may consult with the SHPO to reconsider the terms of the MOA and amend it in accordance with Stipulation XI.

XIII. Anti-Deficiency Act

This MOA does not authorize the expenditure or reimbursement of any funds, nor does it obligate the partners to expend appropriations or enter into any contract or other obligation. All obligations of the partners under this MOA shall be subject to the availability of funds and resources for such purposes. No provision in this MOA will be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341.

EXECUTION of this MOA by DAF and the SHPO, its filing with the ACHP under 36 CFR § 800.6(b)(1)(iv), and implementation of its terms shall evidence that DAF has afforded the ACHP an opportunity to comment on the Undertaking and its effects on historic properties, and that DAF has taken the effects of the Undertaking's effects on historic properties into account.

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES AIR FORCE
AND THE
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE CULVERT 10 REPAIR PROJECT,
SANTA BARBARA COUNTY, CALIFORNIA

SIGNATORY:

Space Launch Delta 30 of the United States Space Force, Vandenberg Space Force Base

By: MIZ.LAURA.L.1155372849 Digitally signed by MIZ.LAURA.L.11553728 9 Date: 202 .10.31 1 :19:50 -07'00' _____ Date: _____

LAURA L. MIZ
Deputy Base Civil Engineer

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES AIR FORCE
AND THE
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE CULVERT 10 REPAIR PROJECT,
SANTA BARBARA COUNTY, CALIFORNIA

SIGNATORY:

California State Historic Preservation Officer

By:  Date: 01/16/2025

Julianne Polanco
State Historic Preservation Officer

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES AIR FORCE
AND THE
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE CULVERT 10 REPAIR PROJECT,
SANTA BARBARA COUNTY, CALIFORNIA

CONCURRING PARTY:

Santa Ynez Band of Chumash Indians

By: _____ Date: 12/30/2024
The Honorable Kenneth Kahn
Tribal Chairman

FORMAT PAGE

Appendix C. Native American Tribal Consultation

FORMAT PAGE

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE
SPACE LAUNCH DELTA 30

Eric Nocerino, PhD., RPA
Space Launch Delta 30 CES/CEIEA
1028 Iceland Avenue
Vandenberg SFB, CA 93437-6010

Ms. Nakia Zavalla
Santa Ynez Band of Chumash Indians
P.O. Box 517
Santa Ynez, CA 93460

Dear Ms. Zavalla

The Department of the Air Force (DAF), Vandenberg Space Force Base (VSFB), proposes to repair a culvert along Coast Road on South VSFB (VSFB project number 813-22-033). The proposed *Culvert 10 Repair Project* intends to repair a culvert that provides storm water drainage beneath the critical mission support route. Immediate repair is needed to avoid road failure and mission impacts.

The DAF determined the proposed action is an undertaking subject to compliance with Section 106 (codified at 54 United States Code [USC] 306108) of the National Historic Preservation Act of 1966, as amended (54 USC 300101 et seq.: Historic Preservation). The DAF will comply with Section 106 using the implementing regulations (Title 36 Code of Federal Regulations [CFR] Part 800). Per 36 CFR §800.3, the DAF is consulting the Santa Ynez Band of Chumash Indians and the California State Historic Preservation Officer (SHPO).

The proposed *Culvert 10 Repair Project* will include installing a slip liner in the existing corrugated metal pipe. The liner would be grouted in place and the existing pipe would remain on the outside. An outfall structure would be constructed at the culvert outlet to slow stormwater. The outfall structure would consist of riprap placed at the base of the outlet of Culvert 10 and would extend approximately 50 feet downstream. Construction activities are expected to extend 100 feet beyond each end of the pipe and up to 50 feet on each side of the pipe. To access the culvert, a 12 foot wide, 1,450 foot long temporary access road will be constructed by clearing and grubbing. In addition, a 2,000 square foot laydown area will be cleared at the end of the access road and a 32,200 square foot laydown area in a parking lot off Coast Road will used. To the extent feasible, DAF would restore site contours and habitat types of temporarily disturbed areas to preconstruction conditions.

VSFB determined that the Project is an undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (54 USC 306108), as amended, and will comply with Section 106 using the implementing regulations [36 CFR Part 800]. With this letter and the accompanying report, VSFB is initiating consultation with the Tribe.

VSFB has carried out a reasonable and good-faith cultural resources investigation that fulfills federal agency responsibilities pursuant to 36 CFR 800.4(a)-(d) and 36 CFR 800.5(a)-(d). Details of the investigation are provided in the attachment. DAF identified the area of direct impact (ADI) in which all

project activities, detailed above, will occur. The Area of Potential Effect (APE) is defined as the intersection of the ADI and any archaeological sites.

Pursuant to 36 CFR 800.5, DAF applied the criteria of adverse effect provided at 36 CFR 800.5(a)(1) to 2 historic properties within the APE and determined that 1 historic property would not be adversely affected by the Culvert 10 Repair Project because the project will avoid the historic property as described in the attachment.

For the current study, CA-SBA-666 was evaluated for National Register of Historic Places (NRHP) eligibility. The DAF determined that the site is eligible for the NRHP. Pusuant to 36 CFR 800.5, DAF applied the criteria of adverse effect provided at 36 CFR 800.5(a)(1) and 36 CFR 800.5(a)(2) and determined that CA-SBA-666 would be adversely affected by the Culvert 10 Repair Project and the DAF shall consult further to resolve adverse effects pursuant to 36 CRF 800.6.

The DAF is seeking any comments or concerns you may have about cultural resources regarding the proposed undertaking. If you have any questions or require additonal information, please do not hesitate to contact me. I would appreciate receiving any feedback as part of this consultation within the next 30 calendar days. Please feel free to let me know if you require additional time. I can be reached at [redacted] or via email at [redacted]. Thank you for your assistance with this undertaking.

Sincerely

NOCERINO.ERIC.1619658112 Digitally signed by NOCERINO.ERIC.1619658112 Date: 2023.10.04 12:51:17 -07'00'

Eric Nocerino
Cultural Resources Manager
Space Launch Delta 30 CES/CEIEA

Attachment:
Identification of Historic Properties and Assessment of Effects, Culvert 10 Repair Project, Vandenberg Space Force Base, Santa Barbara County, California (813-22-033).

Santa Ynez Band of Chumash Indians
Tribal Elders' Council
P.O. Box 517 ◆ Santa Ynez ◆ CA ◆ 93460
Phone: (805)688-7997 ◆ Fax: (805)688-9578

October 23, 2023

Department of the Air Force United States Space Force
Space Launch Delta 30 CES/CEIEA
1028 Iceland Avenue
Vandenberg SFB, CA 9343-6010

Att.: Eric Nocerino, Cultural Resources Manager

Re: VSFB Culvert 10 Repair Project

Dear Mr. Nocerino:

Thank you for contacting the Tribal Elders' Council for the Santa Ynez Band of Chumash Indians. We would like to have a formal consultation with regards to the above-mentioned project.

Please contact me at your earliest availability for a time and date.

Thank you for your time and attention to this matter.

Sincerely Yours,

Crystal Mendoza

Crystal Mendoza
Administrative Assistant | Cultural Resources
Santa Ynez Band of Chumash Indians | Tribal Hall
[redacted]

FORMAT PAGE

Appendix D. United States Fish and Wildlife Service Consultation

FORMAT PAGE

Date sent to FWS: 4 August 2021 **VAFB Reference:** XUMU201023B

Project Title: Repair 9 culverts, Coast Road and Arguello Road

Project Proponent: CEN – Heinze

CEAN POC: Evans, 805-606-4198

Location: South Vandenberg (Figure 1)

Species impacted: Likely to adversely affect: California red-legged frog

Expected start date of project: Late Fall 2021 (probably no more than three of nine; others in late Spring or summer 2022).

Project Description:

Over the past several years, roadside erosion has occurred across Vandenberg SFB due to damaged culverts, causing significant road damage. Many roads are the only route to and from mission critical facilities; as a result, road closures can significantly impact the primary Space Force mission. This project will replace or install a new lining in nine, heavily degraded culverts, ranging from 15-60 inches in diameter and variable in length from 53-366 feet (see table 1). "Replace" (option 1) will be to dig up and remove existing corrugated iron culverts and replace them with High Density Polyurethane (HDPE) piping; "Install new lining" includes one of two possible actions (2a and 2b); a.) Insert rigid segments of new HDPE pipe into the existing pipe. This involves connecting the new pipe segment by segment and sliding it into place, through the existing pipe. The new liner pipe will be anchored in place by sealing both ends with concrete bulkheads and filling the annular space, fuse them in place and then backfill all gaps with a slurry mix or b.) Inserting a Cured in Place Pipe (CIPP), soft liner, into the existing pipeline. This method involves treating the liner with an embedded adhesive (activated by air, water or steam) to harden or cure it in place. Each pipe may be replaced in any one of the three methods, however the Space Force will likely not know which method will occur at each site until later in the engineering and design process. A key difference in these three potential actions is that 2b can be completed in hours, whereas 2a might take days and 1 could take more than a week.

These culverts (see Figures 2 and 3) were listed as Level 5, "IMMEDIATE ATTENTION" condition in a 2019 south base culvert assessment (previous pre-notification, 2019-F-0486, approval transmitted 16 May 2019). There are critical issues with the structure of the pipes, and due to serious corrosion, sedimentation and deposition, the flow capacity of the pipes has been severely reduced. They do not need to be cleared (with a vacuum truck) prior to the next phase of their repair. Several of these work sites will require the construction of temporary access roads. The contractor will ensure that all sites are brought back to original condition to the extent possible, including erosion control measures and replanting of native vegetation.

The expected project disturbance area is approximately 2.5 acres (see table 1); in addition to table 1, expected disturbance has been increased to account for currently unknown areas of laydown and logistical space, which can likely be selected by CEI in areas dominated by non-native iceplant or in paved or otherwise previously disturbed areas.

This work will only occur outside the non-breeding season for CRLF (15 Jan-15 Apr) and is expected to take about 20 weeks (work on each culvert will average about two weeks).

Equipment may include: large excavation equipment, loaders, dump trucks, equipment and material trucks, compacting equipment, concrete truck, asphalt patching equipment, work/tool trucks, and road plates (if necessary).

30 CES/CEIEA Analysis:

A biological monitor will be present to observe construction activities in all areas, but primarily at the start of the project, at least one day per week during construction and the last 2-3 days of construction. Presence of the biologist will be required for all phases including vegetation damage, and the biologist will be responsible for environmental awareness briefings for all key personnel working on the site.

Programmatic Biological Opinion Reference:

Section: 2.2 Utility Installation, Maintenance and Removal (Storm Water Lines) Pages: 21-22

Analysis of Effects:

Maximum expected disturbance area: 2.5 acres); limited vegetation removal to allow equipment access, however most is non-native iceplant (*Carpobrotus spp*.). Disturbance area (see Table 1) was calculated in the following manner: length of each culvert x 20 feet on either side; add an area of 50x50 feet at the upstream end and an area of 20x20 feet at the downstream end.

CRLF: Based on proximity to CRLF habitat, the project is "likely to adversely affect" CRLF. CRLF are somewhat common within several areas near individual components of this project (see table 2).

Impact if project not completed: Failure to maintain roads (and culverts under roads) can result in significant damage to a mission-essential road (Coast Road).

Minimization Measures which will NOT be implemented for this project:

PBO Section 7.1 (Basewide): None

PBO Section 7.2 (Species-specific): None

Summary:

CEIEA has determined that the proposed project should be considered and authorized for action because:

a.) the project fits within the scope of the actions described in the PBO,
b.) the effects analyzed are identical or similar to those that were analyzed in the PBO,
c.) sensitive time periods for listed species will be avoided to the extent practicable, and
d.) all pertinent minimization measures will be implemented.

We request concurrence from FWS within 30 days of the date of this document. This project will also be discussed and/or listed within our annual report.

Site Map or Imagery:

Figure 1: Project Location

Table 1:

Culvert #	Diameter (inches)	Length (feet)	Replace	Install Liner	Cure in Place	Project Area (square feet) (L x 40)	2500 sq. ft @ upstream end; 400 sq ft @ downstream end
3	60	366		X		14640	2900
4	18	242	X		O	9680	2900
9	24	85		X		3400	2900
10	36	276	X		O	11040	2900
14	60	268			X	10720	2900
33	18	59	X		O	2360	2900
34	15	53	X		O	2120	2900
41	18	103	X		O	4120	2900
42	18	91	X		O	3640	2900
		Total	Square Feet: 87,820				**Acres: 2.016**

NOTES: Table 1 does NOT include access roads and staging areas; "O" indicates an option that may be selected by the contractor, post-award.

*Project area in each location includes expected, larger impact area (50x50 feet) at the upstream end and a smaller impact area (20x20 feet) at the downstream end of each culvert.

Table 2:

Culvert #	Distance to nearest known CRLF (in meters)
3	1200
4	1000
9	800
10	910
14	150
33	2600
34	2500
41	450
42	470

Figure 2: Project Map

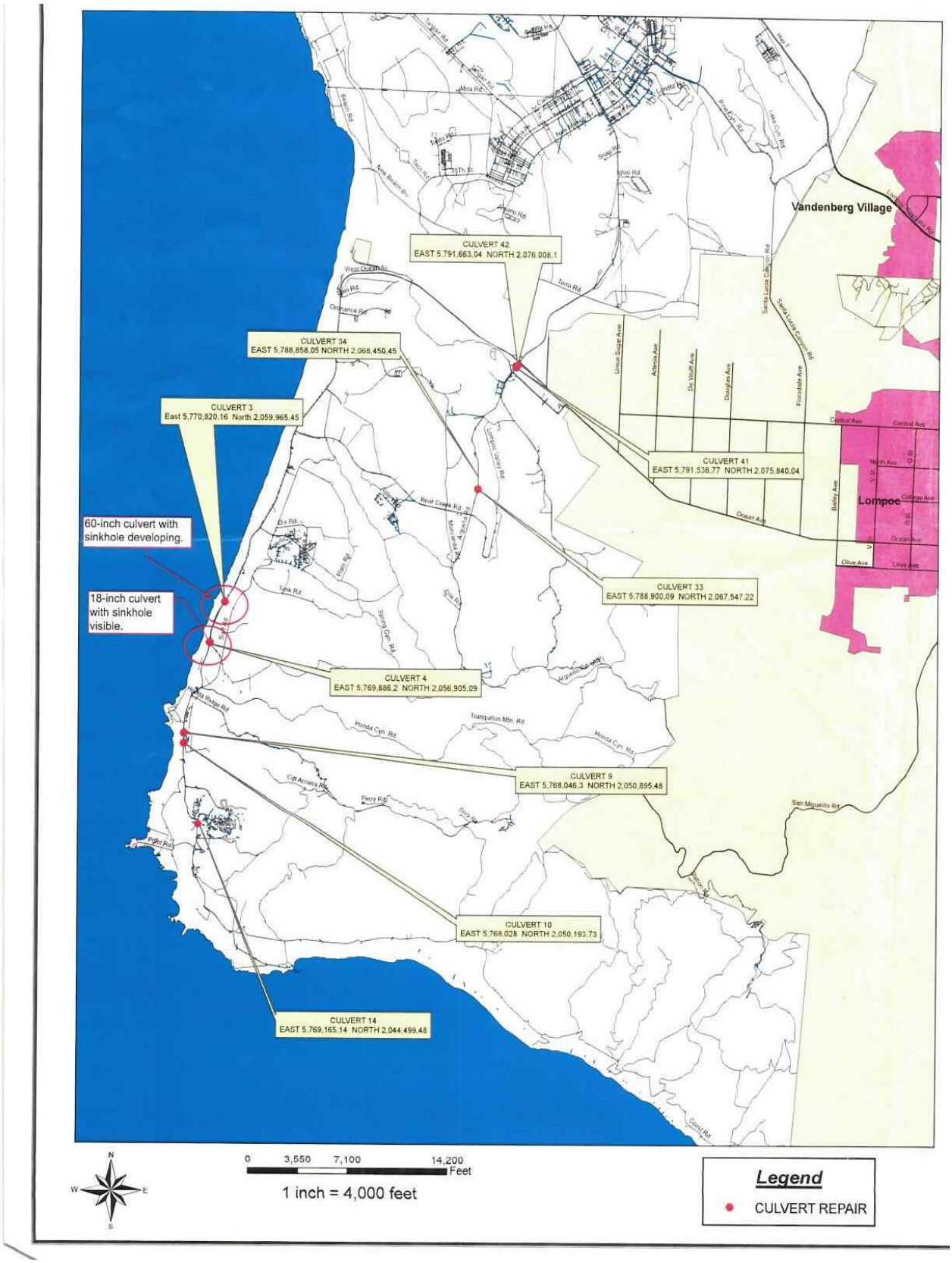


Figure 3: Culvert locations (yellow lines, enlarged for visibility) with closest known California red-legged frog (purple dots)

From:	Diel, Christopher
To:	EVANS, RHYS M CIV USSF SPOC 30 CES/CEIEA
Cc:	KAISERSATT, SAMANTHA O CIV USSF SPOC 30 CES/CEIEA; YORK, DARRYL L GS-14 USSF SPOC 30 CES/CEIE; Termondt, Sarah E; Arnold, Erin M
Subject:	[Non-DoD Source] PRENOTIFICATION: 9 culverts along Coast Road and Arguello Road in South Vandenberg Space Force Base
Date:	Friday, September 10, 2021 11:23:22 AM

2021-F-0516

Hi Rhys,

We are responding to your notification sent via electronic mail on August 20, 2021, regarding repairing 9 culverts along Coast Road and Arguello Road in South Vandenberg Space Force Base (VSFB). The proposed project would include the repair of 9 heavily degraded culverts ranging in diameters from 15 inches to 60 inches and lengths from 53 feet to 366 feet. The Space Force identified these culverts as Level 5 (Immediate Attention) condition in a 2019 south base culvert assessment that the Service previously approved on May 16, 2019 (prenotification 2019-F-0486). The maximum expected disturbance area is 2.45 acres which includes laydown and logistical space for each of the 9 culverts. The Space Force would replace three of the nine culverts in the late fall of 2021 and replace the remaining culverts in the late spring or summer of 2022.

Under the Terms and Conditions of the Programmatic Biological Opinion, Vandenberg Air Force Base, Santa Barbara County, California (8-8-13-F-49R), you are required to notify us of project activities that may adversely affect any federally listed species analyzed within this programmatic biological opinion (PBO). You have determined that this project is likely to adversely affect the federally threatened California red-legged frog (*Rana draytonii*). The PBO described projects of this nature under section 2.2 Utility Installation, Maintenance, and Removal (Storm Water Lines), pages 21–22. It described the effects of these project activities to California red-legged frog on pages 116-117.

Your notification indicates that no recent or project specific surveys for amphibians have occurred in the area, but that California red-legged frog are common within several areas near individual components of this project. The nearest known California red-legged frog location is approximately 528 feet southwest of one of the 9 culverts proposed for replacement. The remaining 8 culverts range in distance from 0.3 mile to 1.6 miles to their respective nearest California red-legged frog locations. The proposed project would only occur outside the breeding season for California red-legged frog (breeding season typically Jan 15 to April 15) and only during daylight hours. No work would occur during active rain events. Additionally, several of the sites would require construction of temporary access roads though the project proponent would bring all sites back to their original conditions, to the extent possible, using erosion control measures and replanting of native vegetation. If possible, the Space Force would select locations for laydown and logistical space to be in areas dominated by non-native iceplant or in paved or otherwise previously disturbed areas. A biological monitor would be present to observe construction activities in all areas, but primarily at the start of the project, at least one day per week during construction and the last two to three days of construction. The Space Force would require the biological monitor be present for all phases including vegetation damage, and the biological monitor would be responsible for environmental awareness briefings for all key personnel working on the site.

Your notification further states the Space Force found critical issues with these nine culverts due to serious corrosion, sedimentation, and deposition, and the flow capacity of the pipes had been severely reduced. However, the project proponent does not need to clear the 9 culverts with a vacuum truck prior to the next phase of their repair because the Space Force already cleared them during their inspections in 2019 to 2020. Thus, any potential changes to the hydrology of the area would have already occurred when the Service previously approved these culvert inspections in 2019 to 2020. The project proponent may use three options to replace or repair each of the nine culverts, depending on the final engineering and design plans, that would take varying amounts of time and varying levels of disturbance. Option 1 would involve digging up, removing, and replacing the existing culvert; Option 2 would involve inserting rigid segments into the existing pipe and sliding into place; and Option 3 would involve inserting a soft liner into the existing pipe that would then be cured (hardened) in place. Option 1 would take more than a week to complete; Option 2 would take several days; and Option 3 would be completed within hours. The Space Force expects the entirety of the project to take approximately 20 weeks, using approximately 2 weeks per culvert as a conservative estimate.

Per your notification, VSFB will implement all other minimization and avoidance measures outlined in sections 7.1 and 7.2 of the PBO. For any project activities conducted within California red-legged frog dispersal distance (141 feet in the dry season; 689 feet in the breeding season), VSFB will implement California red-legged frog specific avoidance and minimization measures outlined in the reinitiated PBO (2018-F-0664) dated November 20, 2018. This includes, in the event California red-legged frogs are found within the project area during pre-project surveys, daily monitoring where required, or at any other time, ceasing construction activities within the vicinity of the California red-legged frog occurrence until the California red-legged frogs are relocated by a Service-approved biologist or the Service has been contacted and provided alternative guidance (p. 4). The Service-approved biologist will relocate all life stages of California red-legged frogs the shortest distance possible to a location that is (1) within the same drainage, (2) contains suitable aquatic/upland habitat, and (3) is outside of the project impact area (p. 4).

In conclusion, provided the Space Force also implements all appropriate terms and conditions, we agree that the remainder of project activities included in your notification can go forward under the PBO without further consultation. If you have any questions regarding our response to your pre-project notification, please contact Erin Arnold at [redacted] or by electronic mail at [redacted].

Sincerely,

Christopher J. Diel
Assistant Field Supervisor
U.S. Fish & Wildlife Service, Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003
[redacted]
(he/his)

FORMAT PAGE

Appendix E. Notice of Availability for Public Review, Proof of Publication, Comments Received on Draft EA, and SLD 30 Responses to Comments

FORMAT PAGE

Appendix F. Assessment of Potential Jurisdictional Waters for the Culvert 10 Repair at Vandenberg Space Force Base, California

FORMAT PAGE

Revised Assessment of Potential Jurisdictional Waters Associated with Culverts 9 and 10 on Vandenberg Space Force Base, California

May 2024

Prepared for:
Space Launch Delta 30
1028 Iceland Avenue
Vandenberg Space Force Base, CA 93437-6010

Prepared by:
ManTech SRS Technologies, Inc.
Environmental, Range, and Sustainability Services
300 North G Street
Lompoc, CA 93436

Table of Contents

List of Figures

List of Tables

Acronyms and Abbreviations

30 OSS/OSWS	30th Operations Support Squadron / Operations Support-Weather
ac	acre
Base	Vandenberg Space Force Base
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
cm	centimeter(s)
CRLF	California red-legged frog
CWA	Clean Water Act
DOA	Department of the Army
EPA	Environmental Protection Agency
FAC	facultative plant
FACU	facultative upland plant
FACW	facultative wetland plant
FR	Federal Register
ft	foot/feet
ha	hectare
in	inch(es)
km	kilometer
m	meter(s)
mi	mile(s)
MSRS	ManTech SRS Technologies, Inc.
NRCS	Natural Resources Conservation Office
NWPR	Navigable Waters Protection Rule
OBL	Obligate Wetland Plant
OHWM	Ordinary High Water Mark
PCWQCA	Porter-Cologne Water Quality Control Act
RWQCB	Regional Water Quality Control Board
SPI	standard precipitation index
SWRCB	State Water Resources Control Board
UPL	obligate upland plant
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
VSFB	Vandenberg Space Force Base
WIS	wetland indicator status
WOTS	Waters of the State
WOTUS	Waters of the United States
WTI	Wetland Training Institute

Cover: Left habitat at the culvert 9 outflow; right habitat at the culvert 10 outflow

1.0 Introduction

Vandenberg Space Force Base (VSFB or Base) is located on the south-central coast of California in western Santa Barbara County, approximately halfway between San Diego and San Francisco (Figure 1-1). VSFB covers approximately 99,000 acres (ac; 40,063 hectares [ha]). Much of VSFB is open space set aside as security or safety buffer zones for space launch activities, providing large tracts of native habitat. The topography of VSFB is varied and includes hills, mountains, terraces, floodplains, mesas, canyons, beaches, and rocky headlands. VSFB occurs in a transitional ecological region that includes the northern and southern distributional limits for many plant and animal species.

Culverts 9 and 10 are located on south VSFB and require maintenance to ensure continued functionality. The outflow areas of both these culverts are associated with aquatic features. In order to evaluate potential jurisdictional Waters of the United States (WOTUS) and Waters of the State (WOTS) associated with these culverts, ManTech SRS Technologies, Inc. (MSRS) conducted wetland delineations and stream hydrology evaluations to determine status. The surveys were conducted by MSRS biologists experienced with federal jurisdictional wetland delineation and WOTUS/WOTS determination methodology and stream hydrology evaluations. Field work was conducted in October2022.

Figure 1-1. Wetland survey area, landscape setting.

2.0 Regulatory Overview

Waterways and the habitat associated with them are subject to regulation by federal and state laws. Under Section 404 of the Clean Water Act (CWA), the United States Corps of Army Engineers (USACE) regulates the discharge of dredged and/or fill material into jurisdictional wetlands and WOTUS. In the state of California, all WOTUS are protected, as well as surface water, ground water, and additional categories of wetlands and non-wetland waters. See sections 2.1 and 2.2 for additional details and definitions of federal and state regulations.

Wetlands and non-wetland waters protected by federal or state laws may include perennial and intermittent streams, beaches, lakes, vernal pools, and riparian habitats. Some state-protected aquatic resources, such as isolated wetlands, may not be afforded protection under federal rules if the wetland is not connected via surface water to a traditionally navigable waterway such as the Pacific Ocean or a perennial stream. Projects that may impact aquatic features require evaluation to determine jurisdictional status of these sites and applicable regulations.

Waters of the United States Defined

The regulatory framework governing and defining WOTUS has been undergoing annual revisions since 2019. On 23 December 2019, the Environmental Protection Agency (EPA) and Department of the Army (DOA) issued a new rule repealing the 2015 Clean Water Rule. This was intended to restore the CWA to its prior language, with agencies implementing the pre-2015 rule "informed by applicable agency guidance documents and consistent with Supreme Court decisions and longstanding agency practice" (84 Federal Register (FR) 56626). On 22 June 2020, the Navigable Waters Protection Rule (NWPR): Definition of "Waters of the United States" went into effect. This rule gave new definitions of what was included in WOTUS. On 30 August 2021, however, U.S. District Court for the District of Arizona issued an order vacating and remanding the NWPR in the case of Pascua Yaqui Tribe v. EPA which halted implementation of the NWPR. On 18 November 2021, the agencies announced the signing of a proposed rule to again revise the definition of "WOTUS." On May 25. 2023 the Supreme Court decided Sackett v. EPA. This decision limited WOTUS to the following

1. Relatively permanent, standing or continuously flowing bodies of water "forming geographic[al] features" that are described in ordinary parlance as "streams, oceans, rivers, and lakes.;
2. Impoundments of waters otherwise defined as WOTUS under this definition;
3. Tributaries of waters identified in (1) and (2) that are relatively permanent, standing or continuously flowing bodies of water;
4. Wetlands with a continuous surface connection to bodies that are WOTUS in their own right, so that there is no clear demarcation between "waters" and wetlands.
5. The following are not WOTUS, even where they otherwise meet the terms in (2) through (5):
    a. Waste treatment systems, including treatment ponds or lagoons;
    b. Prior converted cropland designated by the Secretary of Agriculture;

c. Ditches excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;
d. Artificially irrigated areas that would revert to dry land if the irrigation ceased;
e. Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;
f. Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;
g. Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and
h. Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

Wetlands are defined by the EPA and USACE as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. The EPA and the USACE use the 1987 USACE Wetlands Delineation Manual and Regional Supplements to define wetlands for the CWA Section 404 permit program. The manual and supplements organize characteristics of a potential wetland into three categories: soils, vegetation and hydrology and contain criteria for each category. With this approach, an area that meets all three criteria is considered a wetland.

Additional term definitions relied upon in this document to characterize and determine status of potential aquatic features include:

Ephemeral- The term ephemeral means surface water flowing or pooling only in direct response to precipitation (e.g., rain or snow fall).

Intermittent- The term intermittent means surface water flowing continuously during certain times of the year and more than in direct response to precipitation (e.g., seasonally when the groundwater table is elevated or when snowpack melts).

Perennial- The term perennial means surface water flowing continuously year-round.

Ordinary high water mark (OHWM)- The term ordinary high water mark means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Typical year- The term typical year means when precipitation and other climatic variables are within the normal periodic range (e.g., seasonally, annually) for the geographic area of the applicable aquatic resource based on a rolling thirty-year period.

2.1 Waters of the State Defined

In addition to federal protections afforded by CWA, aquatic resources are protected in California through regulation of activities within inland streams, wetlands, and riparian zones. The Regional Water Quality Control Boards (RWQCB) and the California Department of Fish and Wildlife (CDFW) both hold jurisdiction over all wetland and non-wetland WOTUS under USACE jurisdiction, along with additional features such as riparian zones, ground water, and a broad scope of isolated and ephemerally-present surface and ground waters. The California Porter-Cologne Water Quality Control Act (PCWQCA) gives the State authority to regulate WOTS which are defined as surface water or groundwater, including saline waters. The local RWQCB administers the PCWQCA and determines the exact definition of waters of the state within its region. The local RWQCB for VSFB is the Central Coast Region.

2.1.1. Non-wetland Waters of the State

The state of California regulates water resources under Sections 1600 to 1603 of the Fish and Game Code. WOTS include ephemeral, intermittent, and perennial watercourses. Jurisdiction is extended to the limit of riparian zones that are located contiguous to the water resource and that function as part of the watercourse system. Section 2785(e) of the Fish and Game Code of California defines "riparian zones" as lands which contain habitat which grows close to and which depends on soil moisture from a nearby freshwater source.

2.1.2. State Wetlands and Waters of the State

In 2017, California began the process of updating its definition of wetlands within its procedures governing discharges into WOTS. These were finalized on 2 April 2019 and became effective on 28 May 2020 (State Water Resources Control Board (SWRCB) 2019). The "*State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*" defines wetlands as follows:

> "An area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation."

This definition brings the state and federal definition of wetlands more closely into alignment but allows for inclusion of unvegetated features such as playas and mudflats in the state definition that would not satisfy the vegetation parameter of the federal definition. For the State, a wetland must meet the hydrologic and soil parameters, but must meet the vegetation parameter only *if vegetation is present*. Vegetated cover of over 5 percent during the growing season qualifies as vegetated (SWRCB 2019).

WOTS includes state wetlands as well as other categories of aquatic features. The Water Code defines "waters of the state" broadly to include "any surface water or groundwater, including saline waters, within the boundaries of the state." In addition, WOTS includes all WOTUS as well as the following wetland types:

1. Natural wetlands,
2. Wetlands created by modification of a surface water of the state,
3. Artificial wetlands that meet any of the following criteria:
    a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,
        iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
        iv. Treatment of surface waters,
        v. Agricultural crop irrigation or stock watering,
        vi. Fire suppression,
        vii. Industrial processing or cooling,
        viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
        ix. Log storage,
        x. Treatment, storage, or distribution of recycled water, or
        xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
        xii. Fields flooded for rice growing.

3.0 Methods

3.1 Non-wetland Waters of the United States

Within the survey area, the limits of potential non-wetland WOTUS were determined using the OHWM. Identification of the OHWM was accomplished by using the USACE manual: *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Lichvar & McColley 2008). Shelving on the bank, bed-and-banks, water staining on rocks and culvert walls, sediment sorting, and drift deposits or entrained debris are commonly-used riverine indicators of the OHWM in the field.

In addition, the hydrologic regime of the aquatic features associated with the culverts were characterized. In order to determine the hydrologic regime of the aquatic features the protocol developed by the Surface Water Quality Bureau, New Mexico Environment Department (Surface Water Quality Bureau 2010) was employed. This document presents a method for determining the hydrologic regime of a waterway based on examining a 492-foot (ft) (150-meter [m]) reach for hydrological, geomorphic and biological indicators of the persistence of water. The protocol and completed data sheets are attached as Appendix A.

3.2 Non-wetland Waters of the State

WOTS in California include all WOTUS, surface and ground water, riparian zones, and additional areas that meet the state definition of wetlands. Non-wetland WOTS were delineated based on features such as an OHWM as indicated by sediment staining and drift deposits.

3.3 Jurisdictional Wetland Delineation

The remaining aquatic resources subject to federal protection consist of wetlands with surface water connections to WOTUS. The USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* requires that the following three elements be present in order for an aquatic feature to qualify as a jurisdictional wetland: hydric vegetation, wetland hydrology, and hydric soils (USACE 2008). This manual was used to determine the status of and delineate potential wetlands tied to culverts 9 and 10. Completed field forms used for these evaluations are included as Appendix B.

Wetland assessments were completed in October 2022. In addition to field surveys, aerial imagery from 2019 and the Soil Survey of Northern Santa Barbara Area, California (United States Department of Agriculture (USDA) 1972) were reviewed.

Vegetation

Hydric vegetation is defined as having more than 50 percent of the dominant species able to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. When classifying vegetation, plants are grouped into four strata depending on growth habit and morphology (Table 3-1; USACE 2008).

Table 3-1. Vegetation Strata Descriptions.

Stratum	Code	Description
Herb	H	All non-woody plants regardless of height
Sapling/Shrub	S	Woody plants less than 3.0 inch diameter at breast height regardless of height
Tree	T	Woody plants greater than or equal to 3 inches at breast height, regardless of height
Woody vine	V	Woody climbing plants regardless of height

Dominant species were determined for each strata using the "50/20 rule". Plants were listed as dominant in order of descending abundance until species comprising 50 percent of the vegetation in a particular stratum, as determined by relative cover, had been tallied. Any additional species occupying at least 20 percent of the stratum were also listed as dominants. Relative cover was determined by visual estimation.

To determine if the vegetation present was hydric, the wetland indicator status (WIS) for the dominant species was determined by consulting the *National Wetland Plant List: 2016 Wetland Ratings* (Lichvar *et al.* 2016). For species not listed in Lichvar *et al.* (2016) that grow in a wetland context in VSFB, the *National List of Vascular Plant Species that Occur in Wetlands* (United States Fish and Wildlife Service (USFWS) 1997), was reviewed as well. These resources classify plants into one of five categories based on their tolerance of or preference for growing in permanently inundated soils within a specific eco-region (Table 3-2). Species not explicitly ranked in these resources were assumed obligate upland plants (UPL) unless supporting evidence was available to the contrary.

The threshold for hydrophytic vegetation is met when more than 50 percent of the dominant species are classified as facultative plants (FAC) or wetter: this is called the Dominance Test. In borderline cases, such as those where all of the dominants were rated FAC or drier, a secondary evaluation was made using the Prevalence Index to clarify status of the vegetation. The Prevalence Index takes all plants and their indicator status into account: it is not restricted to dominant species. Calculation of the Prevalence Index followed methods outlined in USACE (2008), with scores of less than or equal to 3 supporting the classification of the vegetation as hydrophytic. If a vegetation passed either the Dominance Test and/or the Prevalence Index, the vegetation was identified as hydrophytic.

Table 3-2. Plant Species Wetland Indicator Status.

Code	WIS*	Description
OBL	Obligate Wetland	Plants that almost always occur (estimated probability 99%) in wetlands under natural conditions, but may also occur rarely (estimated probability 1%) in non-wetlands under natural conditions.
FACW	Facultative Wetland	Plants that usually occur (estimated probability 67% to 99%) in wetlands, but also occur (estimated probability 1% to 33%) in non-wetlands under natural conditions.
FAC	Facultative	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.
FACU	Facultative Upland	Plants that sometimes occur (estimated probability 1% to 33%) in wetlands, but occur more often (estimated probability 67% to 99%) in non-wetlands under natural conditions.
UPL	Obligate Upland	Plants that rarely (estimated probability 1%) occur in wetlands, but occur almost always (estimated probability 99%) in non-wetlands under natural conditions.

*WIS = Wetland Indicator Status

Soils

Hydric soils are defined as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil column (59 FR 94-16835). Anaerobic conditions are the result of prolonged saturation and microbial activity under anoxic conditions. Such soils are subject to reduction, translocation, and/or accumulation of minerals, particularly iron, manganese, sulfur, and carbon compounds, these soils also are often subject to an accumulation of organic matter. These changes to the physical properties of the soils are manifested visually through color, color pattern, and/or textural characteristics and are detectable through both wet and dry periods (Wetland Training Institute [WTI] 2017).

The project area soil types were reviewed in the *Soil Survey of Northern Santa Barbara Area, California* (USDA 1972). Soil types were assessed for their potential to contain hydric soil inclusions based on their described characteristics, geographic setting, and drainage and permeability. Characteristics such as saturation during the growing season in the upper 12 inches (in) (30.48 centimeters [cm]), descriptions of a tendency to pond, and geographic settings described as alluvial fans or floodplains were considered to have good potential for containing inclusions of hydric soils. Soils described as dry during part of the growing season, in steep or very steep geographic settings, rapid runoff and well drained, etc. were determined to be of low likelihood to contain hydric soils.

Intact soil cores were excavated to a depth of at least 12 in (30.48 cm) from the wettest portion of the aquatic features associated with culverts 9 and 10. Excavated soil cores were evaluated for indicators of hydric soils following procedures detailed in *Field Indicators of Hydric Soils in the United States* (USDA, Natural Resources Conservation Service [NRCS]; 2018).

Evaluations included characterization of soil color and texture for all layers encountered. Soil color was determined by the comparison of moist samples to the color plates in the *Munsell Soil*

Color Charts (2000). Texture was evaluated by touch, following procedures adapted from S. Thien (WTI 2017). The vertical span and distribution of various soil layers, as determined by color and textural differences, was measured and noted. Hydric status determinations were made though review of USDA NRCS (2018).

Hydrology

Areas with wetland hydrology are either permanently or periodically inundated at mean water depths less than or equal to 6.6 ft (2.0 m) or the soil is saturated to the surface for at least 14 days during the growing season of the prevalent vegetation. A determination of wetland hydrology requires the finding of at least one primary indicator, such as a water table within 12 in (30.48 cm) of the surface, or two secondary indicators, such as the FAC-neutral test or sediment deposits (USACE 2008).

Potential wetland areas were visually inspected for surface hydrology indicators, such as inundation, water marks, soil cracks, sediment deposits, and filamentous algae. Soil pits were excavated with a 16 in (40.64 cm) drain spade to a depth of at least 12 in (30.48 cm) to determine the presence of sub-surface indicators such as the depth of the water table, depth to saturated soil, and presence of features such as oxidized rhizospheres surrounding live roots.

3.4 Field Evaluation and Mapping

Field evaluations and mapping were conducted during October 2022. For each culvert aquatic feature, the hydrologic regime was determined (i.e., whether the aquatic feature was ephemeral, intermittent, or perennial), and the OHWM and any associated wetlands and hydric vegetation were delineated using a Trimble model R1 with submeter accuracy.

Surface Water Quality Bureau, New Mexico Environment Department hydraulic regime evaluation forms and USACE wetland delineation forms characterizing vegetation, hydrology, and soils were completed for each plot and are attached as Appendices A and B. The locations of soil test pits were mapped and marked with pin flags.

3.5 Classification Systems Used

Several classification systems were used to characterize the different resources. Federal wetland resources were categorized using the Cowardin classification system for wetlands (Cowardin et al. 1979). The Cowardin classification system separates wetland types based on five Systems: Marine, Estuarine, Riverine, Lacustrine, and Palustrine. These systems then divide into Subsystems and Classes (Figure 3-1).

Federal aquatic resources were also assigned a category based on the USACE Preliminary Jurisdictional Determination Form. The USACE divides waters into several resource categories:

1. Harbor/Ocean,
2. Tidal Wetland,
3. Non-Tidal Wetland,
4. River/Stream,
5. Lake,
6. Pond,
7. Riparian Wetland,
8. Ephemeral Stream/River,
9. Intermittent Stream/River,
10. Perennial Stream/River,
11. Pond/Lake,
12. Vegetated Shallows,
13. Bay/Harbor,
14. Lagoon, or
15. Ocean.

State jurisdictional waters were categorized as:

1. Tidal Wetland,
2. Non-tidal Wetland,
3. Riparian Zone,
4. Stream Channel, or
5. Estuary.

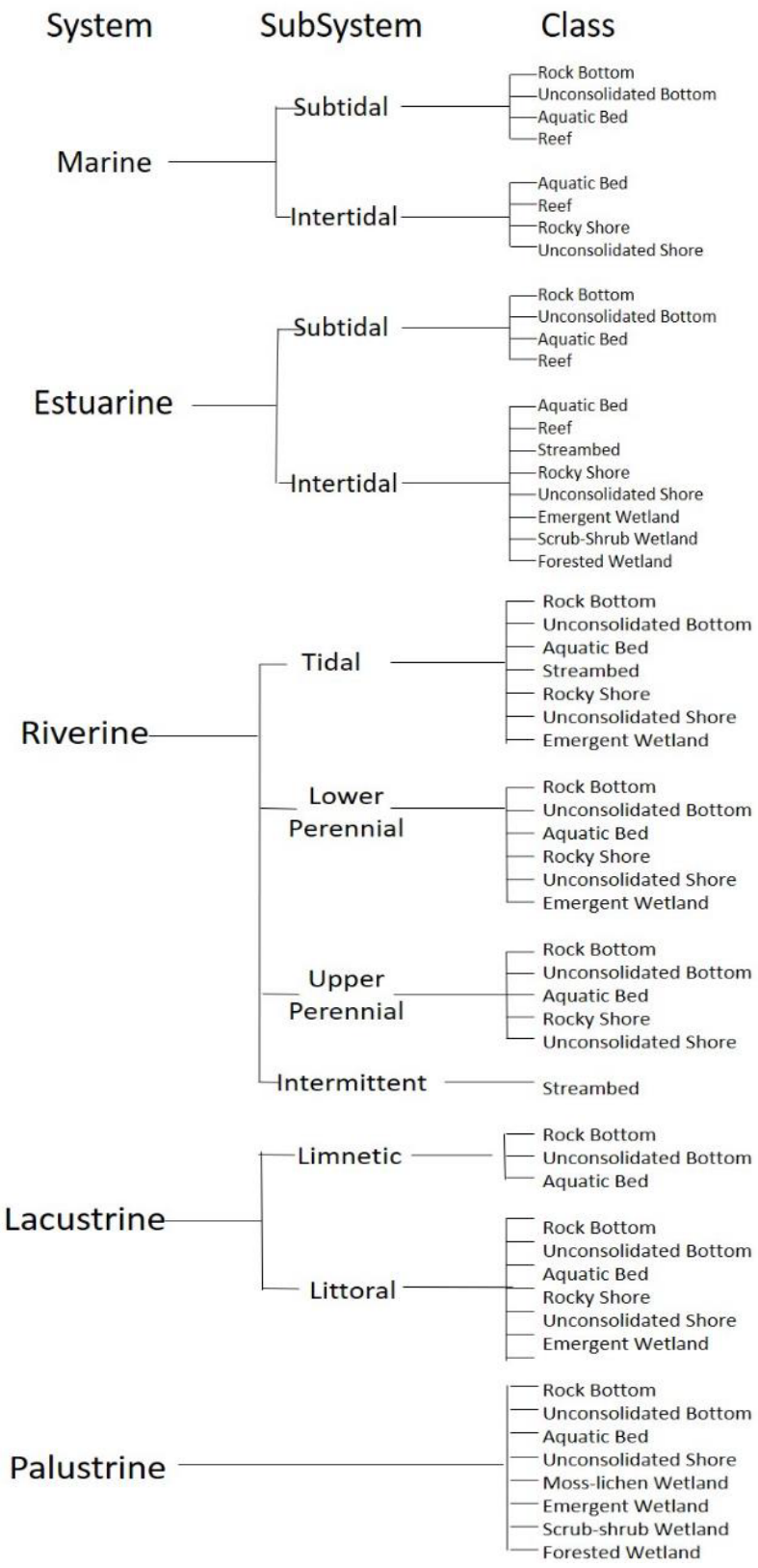


Figure 3-1. Cowardin wetland classification system (Cowardin et al. 1979).

4.0 Results

4.1 Existing Field Conditions

4.1.1. Current Land Use

Current land use within the survey area consists of facilities and associated developed land, transportation corridors, and natural areas. The aquatic features assessed consist of the outflow areas associated with culverts 9 and 10. These culverts are used to convey storm and discharge waters from the facilities on the east side of Coast Road, under Coast Road, into the undeveloped natural areas west of the road.

All environmental and physical differences that define the aquatic features associated with the culvert 9 and 10 outlet areas are the result of human activities. Review of historical aerial imagery from 1994 indicates that aquatic features presently associated with the culvert outlet areas were not in existence at that time. In 1994 aerial imagery there is no change in vegetation indicative of an enhanced moisture regime west of culvert 9 and there is no erosional wash west of culvert 10 (Google Earth Pro 7.3.6 2023; Figure 4-1).

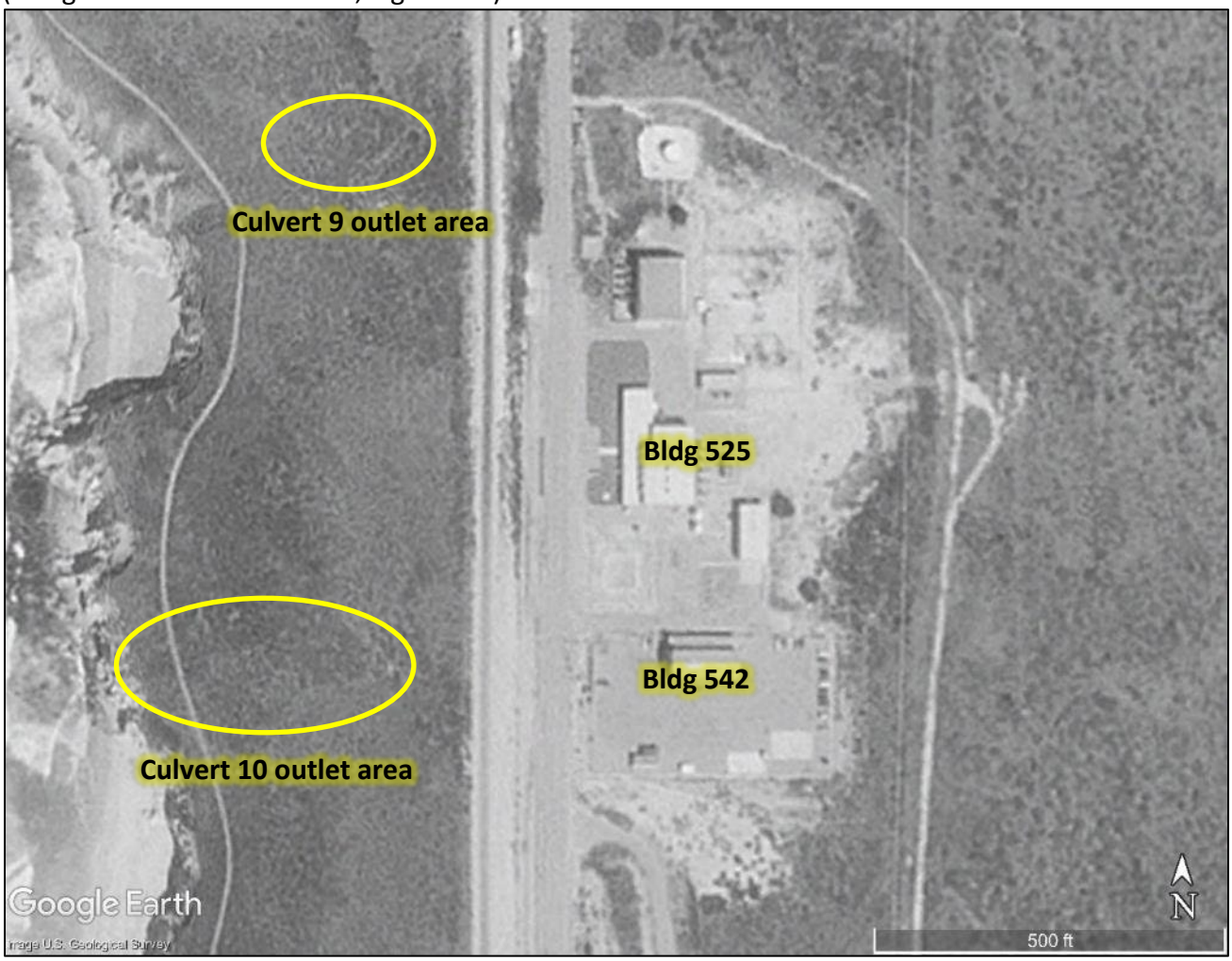


Figure 4-1. Culvert 9 and culvert 10 areas in 1994 (Google Earth Pro 7.3.6 2023).

4.1.2. Climate Conditions

Using the NWPR definition of "typical year", during the three months preceding the wetland delineation, July, August, and September 2022 were wetter than normal. The three months preceding the survey all had precipitation above the 70th percentile. Table 4-1 and Figure 4-2 give the precipitation range for the base interval, the 30th and 70th percentile break points for each month, and the rainfall accumulation for the three months prior to the survey. Rainfall in September 2022 was unusual with September 2022 receiving the second highest rainfall record for the month on VSFB since consistent record keeping began in 1959 (30th Operations Support Squadron / Operations Support-Weather [30 OSS/OSWS] 2022). Annual rainfall levels, as assessed based on water year (September – August), however indicate that drought is still the prevailing condition (Figure 4-3).

Table 4-1. Condition assessment for typical year determination for rainfall (inches) using VSFB precipitation data (30 OSS/OSWS 2022).

Month	30 Year Base Interval			2022 Precipitation	Status
	Precipitation Range	30th Percentile	70th Percentile		
July	0.00-0.28	0.00	0.07	0.12	Wetter than Normal
August	0.00-0.24	0.00	0.02	0.04	Wetter than Normal
September	0.00-2.01	0.00	0.05	2.01	Wetter than Normal

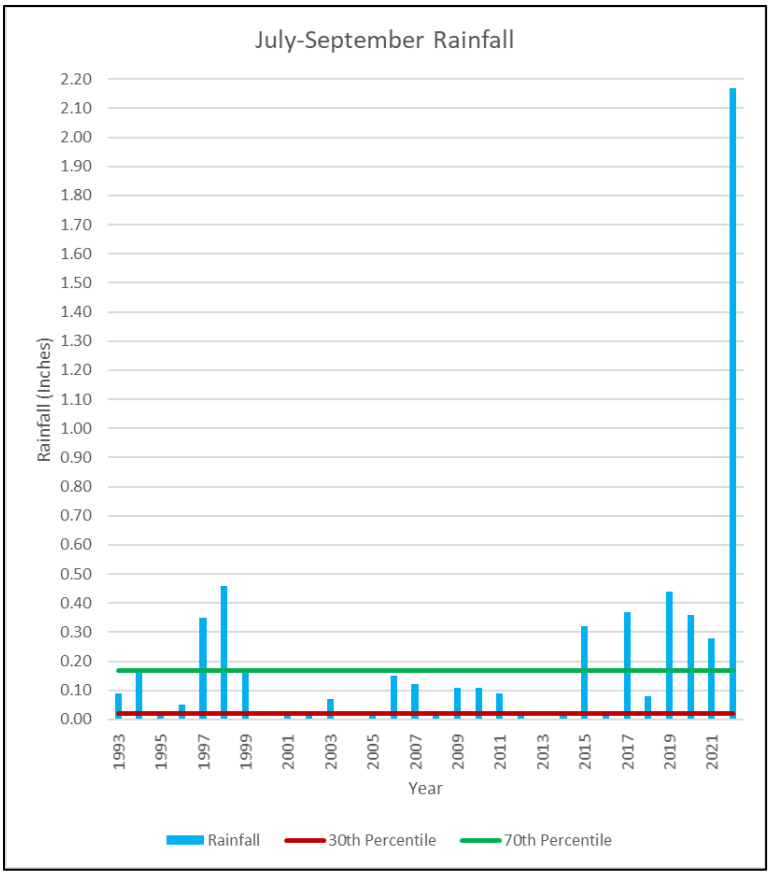


Figure 4-2. Annual rainfall amounts from July through September for the last 30 years (30 OSS/OSWS 2022).

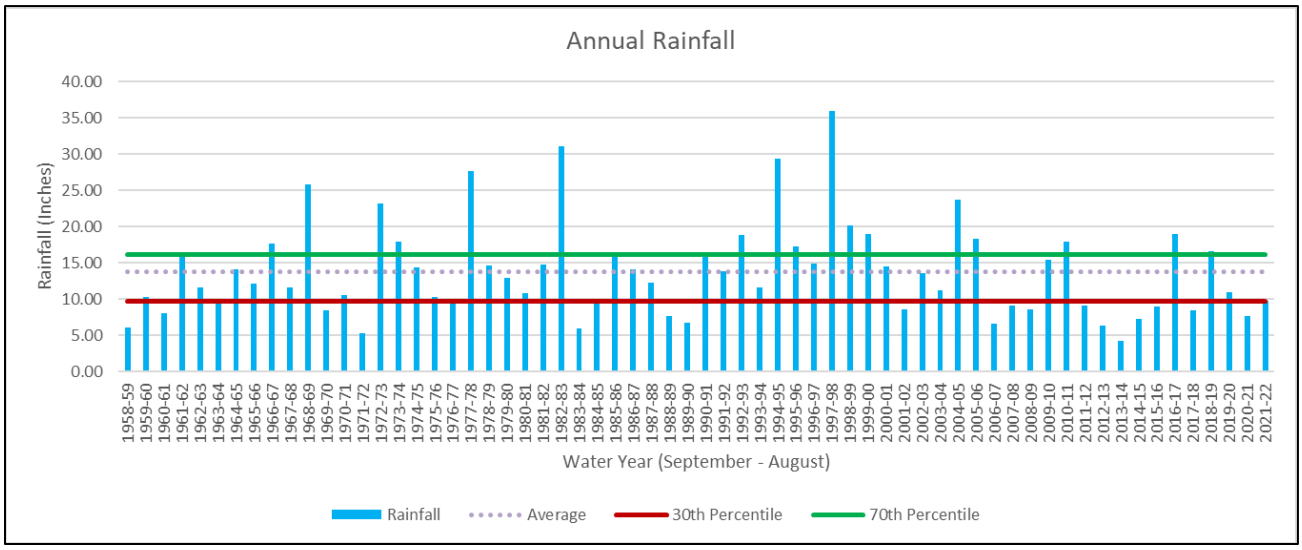


Figure 4-3. Annual VSFB rainfall levels by water year from water year 1958-1959 to present based on VSFB precipitation data (30 OSS/OSWS 2022).

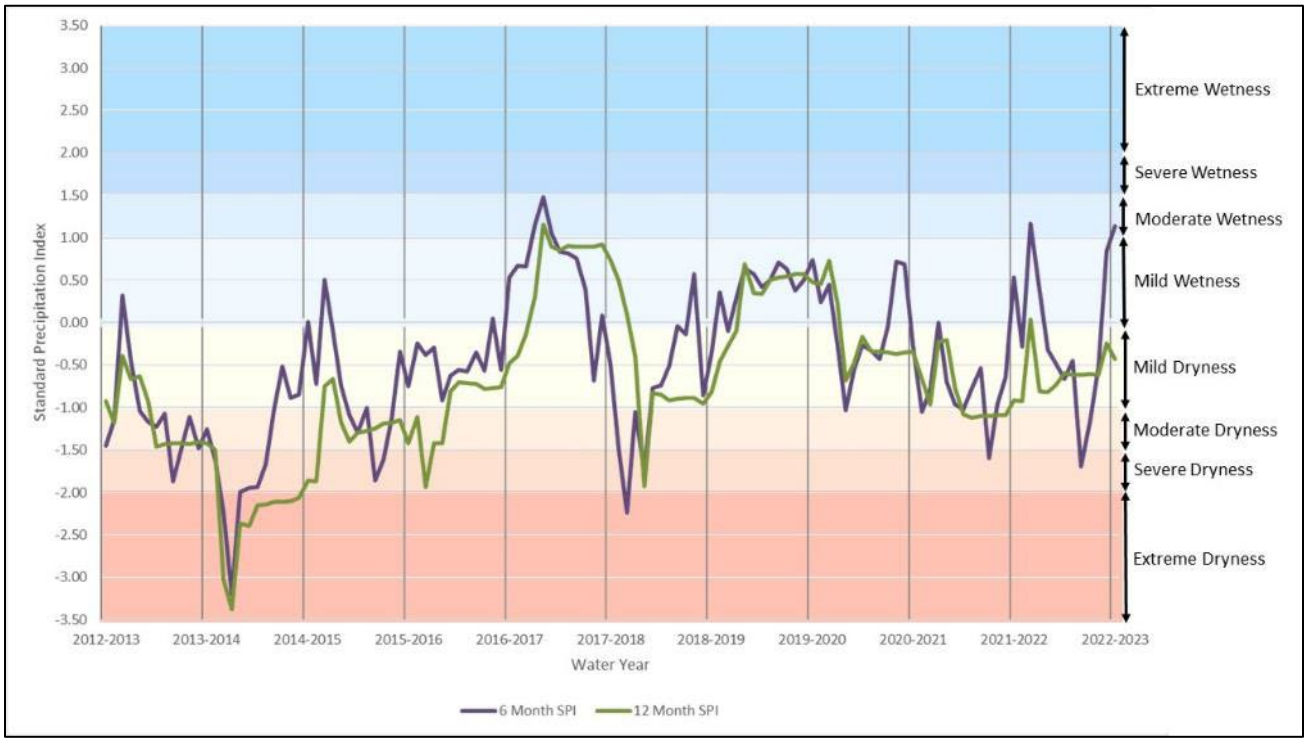


Figure 4-4. 6 and 12-month SPI values for the last 12 years. SPI calculations are based on monthly VSFB precipitation totals from January 1959 through October 2022 (30 OSS/OSWS 2022).

In addition to calculating the NWPR typical year determination, MSRS calculated the standard precipitation index (SPI) as part of the hydrologic regime determination (New Mexico Environmental Department 2010). The SPI is calculated from the historical precipitation record at a weather station, preferably, using at least 50 years of data. Precipitation accumulation over a given period of time is

compared to precipitation amounts in that same period of time throughout the historical record. The SPI for any precipitation accumulation value represents the probability that the location would have received at least the observed amount of precipitation over that time period. Positive SPI values represent wet conditions. Negative SPI values represent dry conditions.

For this evaluation, MSRS calculated both a 6-month and a 12-month SPI. The 6-month SPI value indicates how anomalous the 6 months preceding the survey are compared to that same 6-month period over the course of the historical record. VSFB has consistent monthly precipitation records beginning in 1959, so the historical record covers 64 years. The last ten years of SPI values calculated from this dataset are shown in Figure 4-3. The SPI in October 2022 was 1.34 for the 6-month interval and -0.43 for the 12-month interval. The high SPI value for the 6-month interval is due to the anomalously high September 2022 rainfall. The impact of this unusual rainfall event is diluted in the 12-month SPI which is reflective of predominantly dry conditions of the year overall.

4.2 Vegetation Communities

Vegetation in the uplands surrounding culverts 9 and 10 consists primarily of the central coastal scrub vegetation type in which coyote brush (*Baccharis pilularis*) is the dominant species. California sagebush (*Artemisia californica*), and mock heather (*Ericameria ericoides*) are also common. Outside of the survey area, there are tracks dominated by non-native iceplant (*Carpobrotus* sp.) and veldt grass (*Ehrharta calycina*) and these species have some presence in the survey areas as well (Figure 4-4). For a full list of plant species documented in the survey areas, see Appendix C.

4.2.1. Culvert 9

At the culvert 9 outflow, west of the Union Pacific Railroad, there was an abrupt transition between upland and hydric vegetation. Hydric vegetation was almost entirely dominated by Douglas' nightshade (*Solanum douglasii*; Figure 4-5) with upland vegetation dominated by species characteristic of a central coastal scrub community.

There was one small patch of rabbitsfoot grass (*Polypogon monspeliensis*) which is rated FACW within the outflow area with remaining species including the dominant nightshade rated FAC. No OBL wetland plants were present and the rabbitsfoot grass was too limited in area to be a dominant species. The lack of OBL species and dominance of a FAC species within this aquatic feature likely stems from frequent fluctuation between wet and dry soil conditions. Only plant species that can persist under both moisture regimes can survive. The lack of diversity and longer-lived perennial FAC species may also indicate that the relatively wet regime present at the time of October 2022 surveys is a recent development.

East of the railroad, flow was confined to metal culverts or open engineered concrete channels overtopped by iceplant (*Carpobrotus* sp.).

4.2.2. Culvert 10

Vegetation associated with the culvert 10 aquatic feature west of Coast Road was not hydric. The aquatic feature associated with the culvert 10 outflow was an erosional channel largely scoured to bare soil. Vegetation that had successfully colonized the erosional feature was exclusively dominated

by UPL species with the exception of California blackberry (*Rubus ursinus*; Figure 4-6). Blackberry was a common component of adjacent upland central coast scrub vegetation and its intrusion into the erosional feature did not appear to be tied to any enhanced moisture availability. Instead, its ability to grow via runners from upland rooted plants, has enabled it to rapidly recolonize the erosional feature in the temporal gap between storm flow events. Iceplant, a UPL plant that also spreads by runners, likely owes its persistence in the erosional feature to the same ability.

East of Coast Road, flow was confined to open unvegetated engineered concrete channels and a metal culvert.

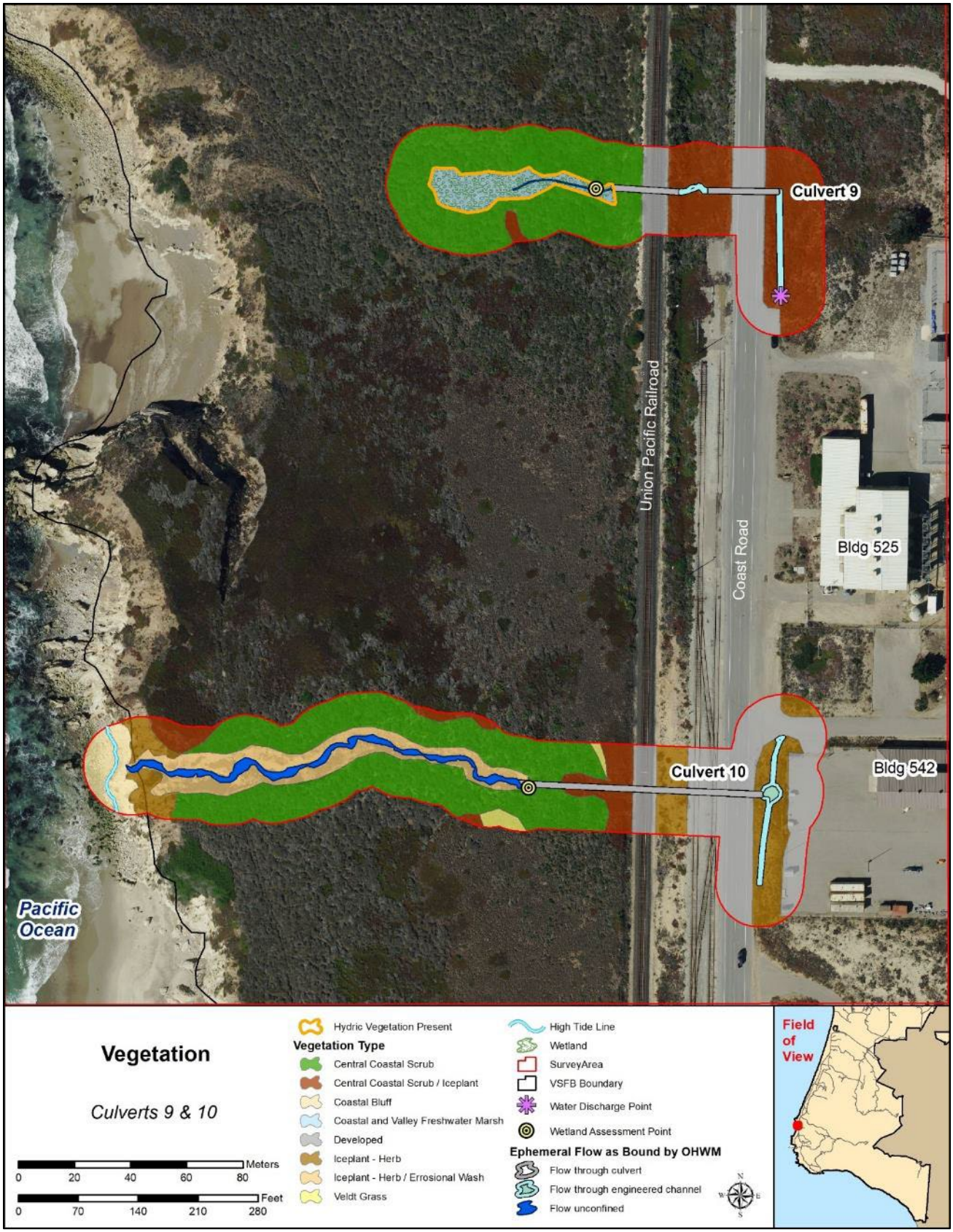


Figure 4-5. Vegetation types within the culverts 9 and 10 survey areas.

Figure 4-6. Douglas' nightshade in culvert 9.

Figure 4-7. California blackberry runners colonizing culvert 10.

4.3 Soils

Botella clay loam and Baywood loamy sand are the primary soil types found within the survey areas associated with culverts 9 and 10. Botella clay loam tends to occur in small valleys and on fans that are subject to overflow from higher areas. gullies are a common feature and the soil is moderately well drained. Baywood series soils are deep, somewhat excessively drained soils that formed in historic coastal sand dunes (USDA 1972, Figure 4-7).

Where the culvert 10 erosional feature reaches the coast, the soil is part of the Santa Lucia series which consists of moderately deep, well drained soils that formed in material derived from weathered white shale (USDA 1972). Within the erosional feature, however, surface sediments are sandy and appear to be consistent with the Baywood loamy sand soil type.

4.3.1. Culvert 9

The soil pit in the culvert 9 area was excavated along the transition between upland and hydric vegetation which corresponded to the transition between soils with surface saturation and soils with a dry surface. Soils in the test pit were determined to be hydric based on the “sandy dark surface” indicator (Figure 4-8). The lack of gley colors or other redoximorphic features may be indicative that hydric status is a relatively recent development.

4.3.2. Culvert10

The soil pit was excavated within the wettest portion of the erosional feature as evidenced by superficial soil cracking and residual surface soil moisture related to the 19 September 2022 rain event. No indicators of hydric soil were present and soils were dry enough to require wetting for analysis (Figure 4-10). Lack of hydric soil comports well with vegetation and hydrological characteristics (see next section). Based on findings during these surveys, water in the erosional feature is currently restricted to periods of precipitation of sufficient volume and intensity to cause run-off from the facilities east of Coast Road. This runoff flows through the erosional feature into the Pacific Ocean. Once runoff ceases, active flow ceases and water is absorbed by the soil. Because of the rapid flow of water through the erosional feature and porous soils, hydration is too transitory to result in the formation of a hydric soil.

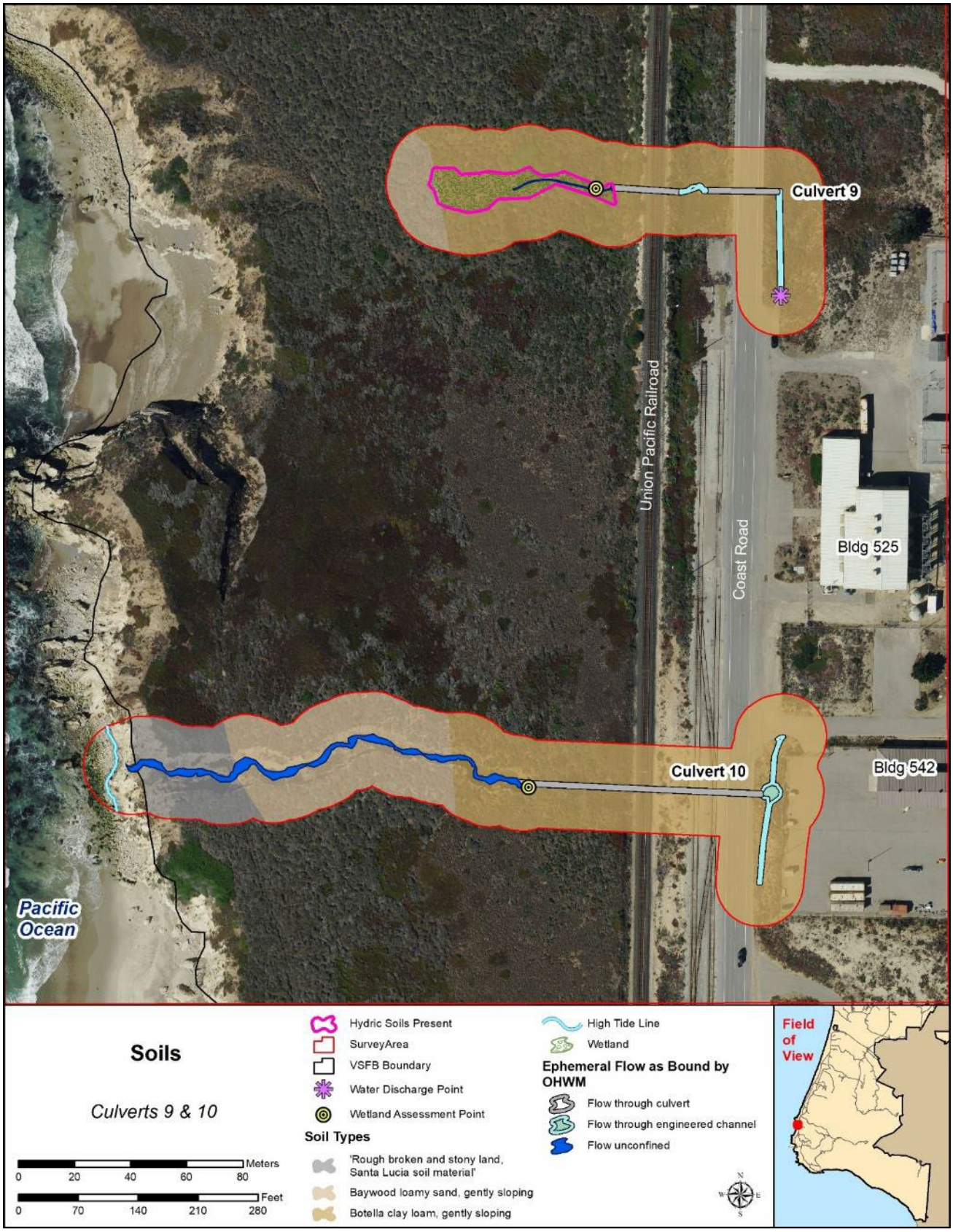


Figure 4-8. Soil types within the culverts 9 and 10 survey areas.

Figure 4-9. Hydric soil from culvert 9 with sandy dark surface.

Figure 4-10. Non-hydric soil from culvert 10.

4.4 Hydrology

4.4.1. Culvert 9

Water conveyed through culvert 9 was entirely comprised of discharge water generated during flushing of water lines associated with Space Launch Complex (SLC) 6 (Figures 4-10 and 11). The intake area associated with culvert 9 was heavily overgrown by iceplant and there was no indication that flows associated with storm water currently enter and drain through the culvert. The current discharge/flushing regime is necessary to maintain water quality standards for SLC-6 and during periods of active discharge, observed while conducting field surveys, there was flow that extended a length of approximately 120 ft (37 m) west from the culvert outlet west of the railroad through the aquatic feature before being absorbed into the sediment.

Discharges have been of sufficient frequency and volume to maintain saturated soil conditions throughout the aquatic feature as mapped. But these discharges do not have sufficient force to cause appreciable levels of sediment transport or establish a defined OHWM. During field surveys conducted on 11 and 18 October 2022 surface water and flow was present in the aquatic feature for the duration of active flushing but water was completely absorbed into the soil as soon as active flushing ceased.

4.4.2. Culvert 10

Water conveyed through culvert 10 has been entirely comprised of stormwater discharges originating from run off associated with building 542. These discharges have been of sufficient volume and intensity to cause significant sediment transport at the culvert 10 outlet which has resulted in the creation of a steep sided gully extending from the culvert outlet west to the Pacific Ocean. Within the gully there was a well-defined OHWM as well as primary indicators of wetland hydrology including features such as drift and sediment deposits (Figure 4-12). Although these indicators were sufficient to establish wetland hydrology, there were no hydrology indicators such as soil saturation in the upper 12 inches, water staining etc., indicative of more than the transitory flows associated with rain events.

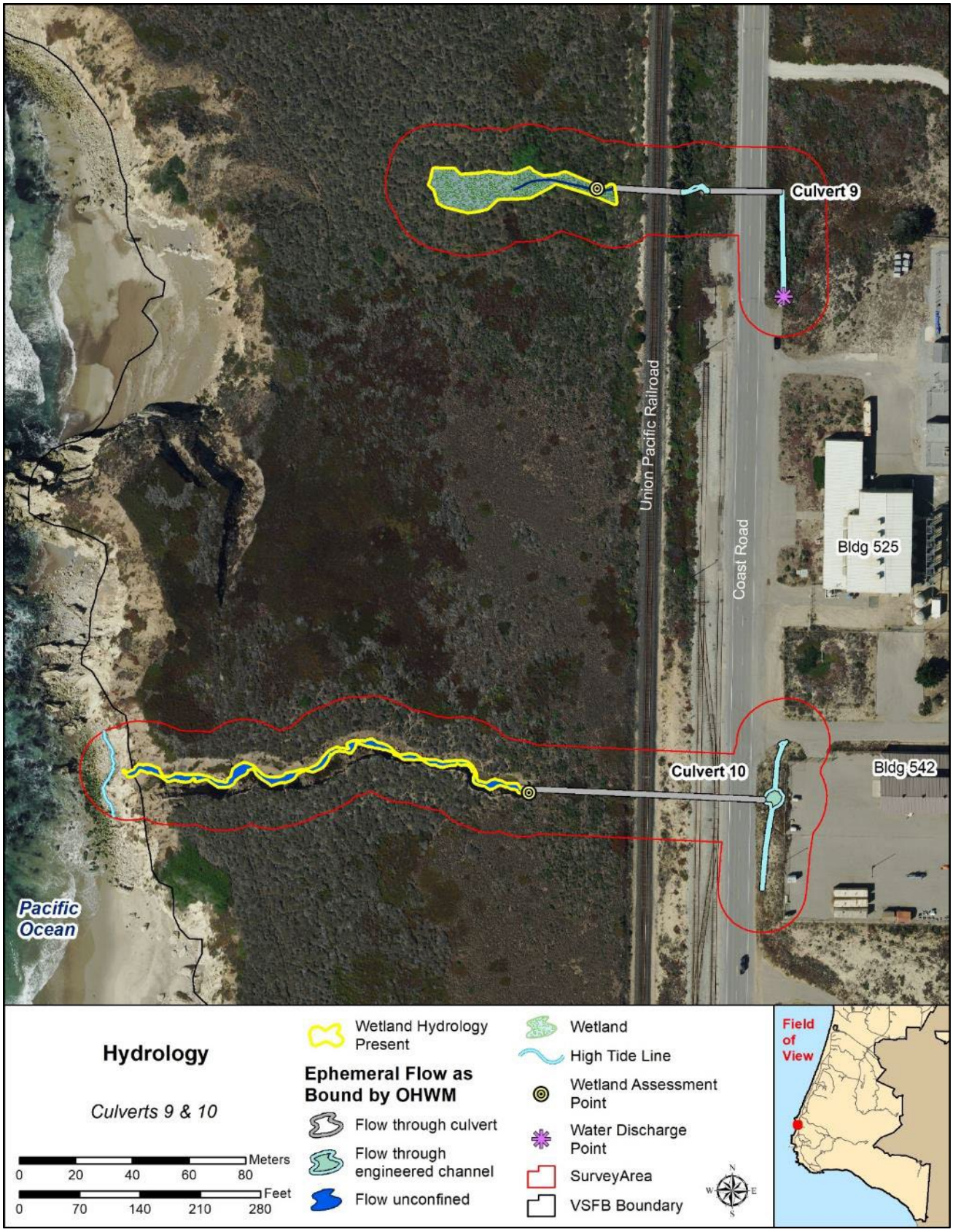


Figure 4-11. Areas with wetland hydrology within the survey area.

Figure 4-12. Outflow from culvert 9 into engineered channel on the west side of Coast Road during flushing.

Figure 4-13. Drift deposits within the culvert 10 erosional feature.

4.5 Potential Jurisdictional Waters of the United States

The aquatic features associated with culverts 9 and 10 do not meet the regulatory requirements necessary for them to be considered WOTUS. The only WOTUS within the survey area consists of the Pacific Ocean west of the culvert 10 erosional feature (Figure 4-13 and 14; Table 4-2).

Table 4-2. Area of Waters of the U.S. within the survey area.

Waters of the U.S. Resource Type	Cowardian Type	Feet^2	Acres	Hectares
Ocean	Marine Intertidal Rocky Shore	2403.07	0.05	0.02

4.5.1. Culvert 9

The culvert 9 aquatic feature meets the regulatory definition of a wetland but falls under the exclusion for "artificially irrigated areas" from WOTUS. Artificially irrigated areas are those areas that would revert to dry land if irrigation ceased. All of the water inputs to the culvert 9 wetland are the result of runoff from pipe flushing. If this activity were to stop, the wetland would revert to dry land. It is therefore categorically excluded from WOTUS.

Even if the categorical exclusion did not apply to culvert 9, in order for an adjacent wetland to qualify as WOTUS, it must meet the relatively permanent requirement and have a continuous surface water connection to the Pacific Ocean which this wetland does not. Flow in culvert 9 was determined to be ephemeral based on the evaluation performed using the New Mexico Surface Water Quality Control Board Hydrology Determination Protocol (see Appendix A).

4.5.2. Culvert 10

The culvert 10 erosional feature, falls under the categorical exclusion for "swales and erosional features characterized by low volume, infrequent, or short duration flows" from WOTUS. Culvert 10 exists to convey storm water off developed land associated with building 542. At the culvert 10 outlet, this has resulted in the creation of an erosional feature that extends west to the Pacific Ocean. Because all flow in this erosional feature occurs in direct response to rain events, the hydrology was determined to be ephemeral based on the evaluation performed using the New Mexico Surface Water Quality Control Board Hydrology Determination Protocol (see Appendix A).

If the categorical exclusion, referenced above, did not apply to culvert 10, in order to be considered WOTUS, as a tributary to the Pacific Ocean, it would have to meet the relatively permanent requirement. Because the flow regime was determined to be ephemeral it does not meet the relatively permanent requirement.

Figure 4-14. Culvert 10 erosional feature and connection to the Pacific Ocean.

4.6 Potential Jurisdictional Waters of the State

Waters of the state include all WOTUS as well as additional categories such as artificial wetlands and ephemeral drainages. Only the Pacific Ocean qualifies as WOTS (Table 4-3).

Table 4-3. Area of Waters of the State within the survey area.

Waters of the State Resource Type	Cowardian Type	Feet^2	Acres	Hectares
Tidal Wetland	Marine Intertidal Rocky Shore	2403.07	0.05	0.02

4.6.1. Culvert 9

The culvert 9 outflow area contains an artificial wetland. Artificial wetlands can only qualify as WOTS provided specific conditions are met. The wetland associated with the outflow of culvert 9 does not meet any of the stated requirements for an artificial wetland to be considered a WOTS. Specifically, this wetland is not an approved compensatory mitigation water, has not been identified in a water quality control plan as a WOTS, is subject to and wholly dependent on ongoing operations, and is less than one acre in size.

4.6.2. Culvert 10

Culvert 10 was constructed to channel stormwater runoff from developed land associated with building 542. Stormwater flows exiting the culvert 10 outlet have created an erosional feature that extends west to the Pacific Ocean. Based on review of historic aerial imagery (Figure 4-1) these ephemeral flows and this erosional feature did not exist prior to the construction of culvert 10: the area currently occupied by culvert 10 and the erosional feature were entirely dry and situated on level ground with no erosion channel present in 1994 (Google Earth Pro 7.3.6 2023). Because culvert 10 and the associated erosional feature solely convey stormwater runoff and unnatural discharges, they would not be considered WOTS. The Pacific Ocean is the only aquatic feature that would qualify as a WOTS (Figure 4-14 and Table 4-3).

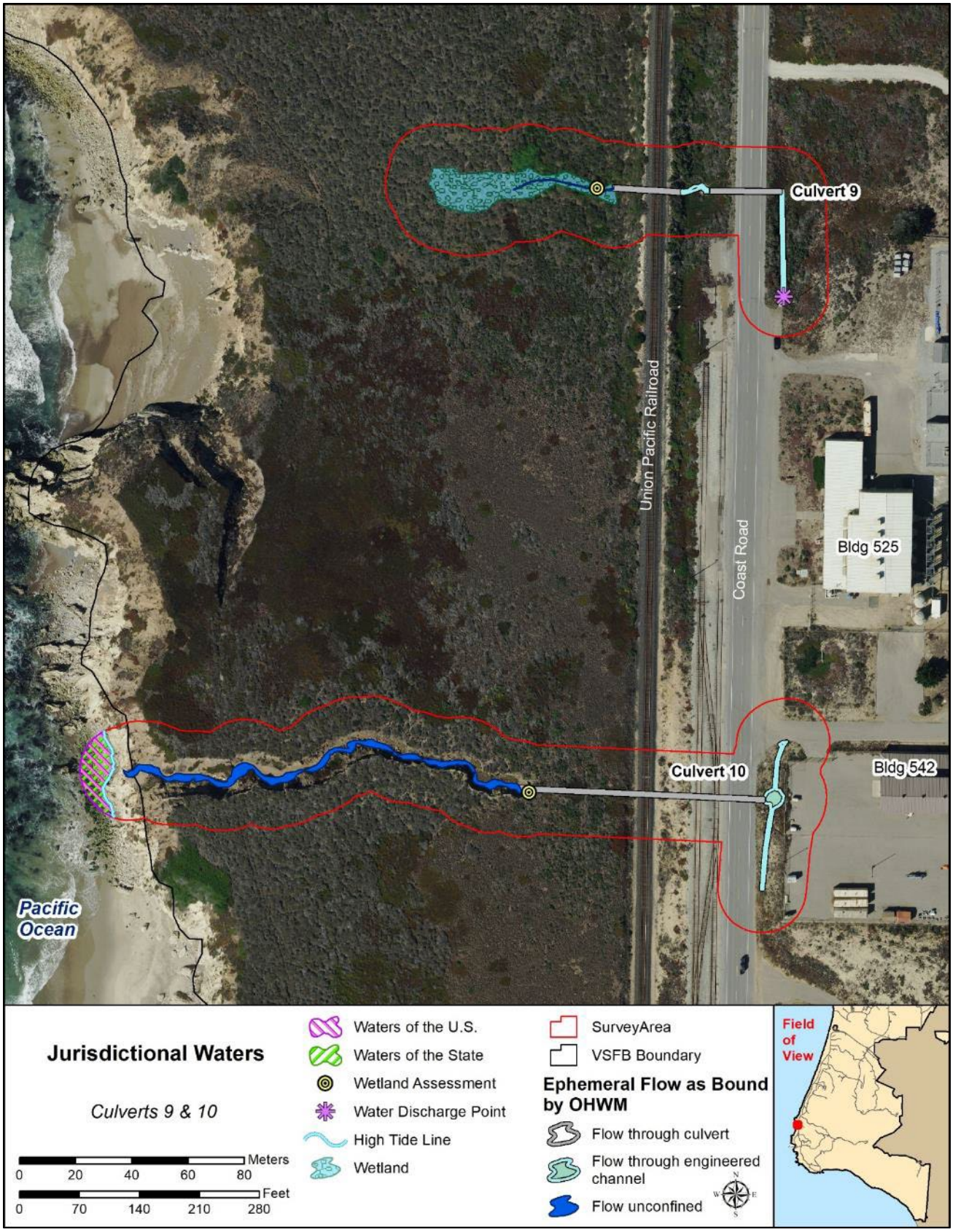


Figure 4-15. Jurisdictional waters within the survey area.

5.0 Potential for Special Status Species

Culvert 9 may provide upland habitat for the federally threatened California red-legged frog (*Rana draytonii*, CRLF) due to enhanced moisture regime. There is no breeding habitat or sustained pool habitat associated with this site so it would be most likely to serve as a transitory stop over point for CRLF making movements from more permanent and extensive aquatic sites.

The closest consistently occupied CRLF habitat is present in Honda Creek, 0.55 mi (0.89 km) to the north (Figure 5-1). Historically occupied sites to the south in the SLC-6 area 1.25 mi (2.01 km) south no longer pool consistently with the most recent instances of CRLF occupancy recorded in 2001. Given the distances involved and the limited nature of the habitat afforded by the culvert 9 outflow, the potential for CRLF presence cannot be excluded but it is unlikely.

Culvert 10 does not provide habitat for CRLF. There is no persistence of enhanced moisture conditions. Flows through the erosional feature associated with culvert 10 are high velocity and transitory. There are no areas of sustained pooling within the base of the erosional feature and vegetation cover is limited and dominated by sparse upland species.

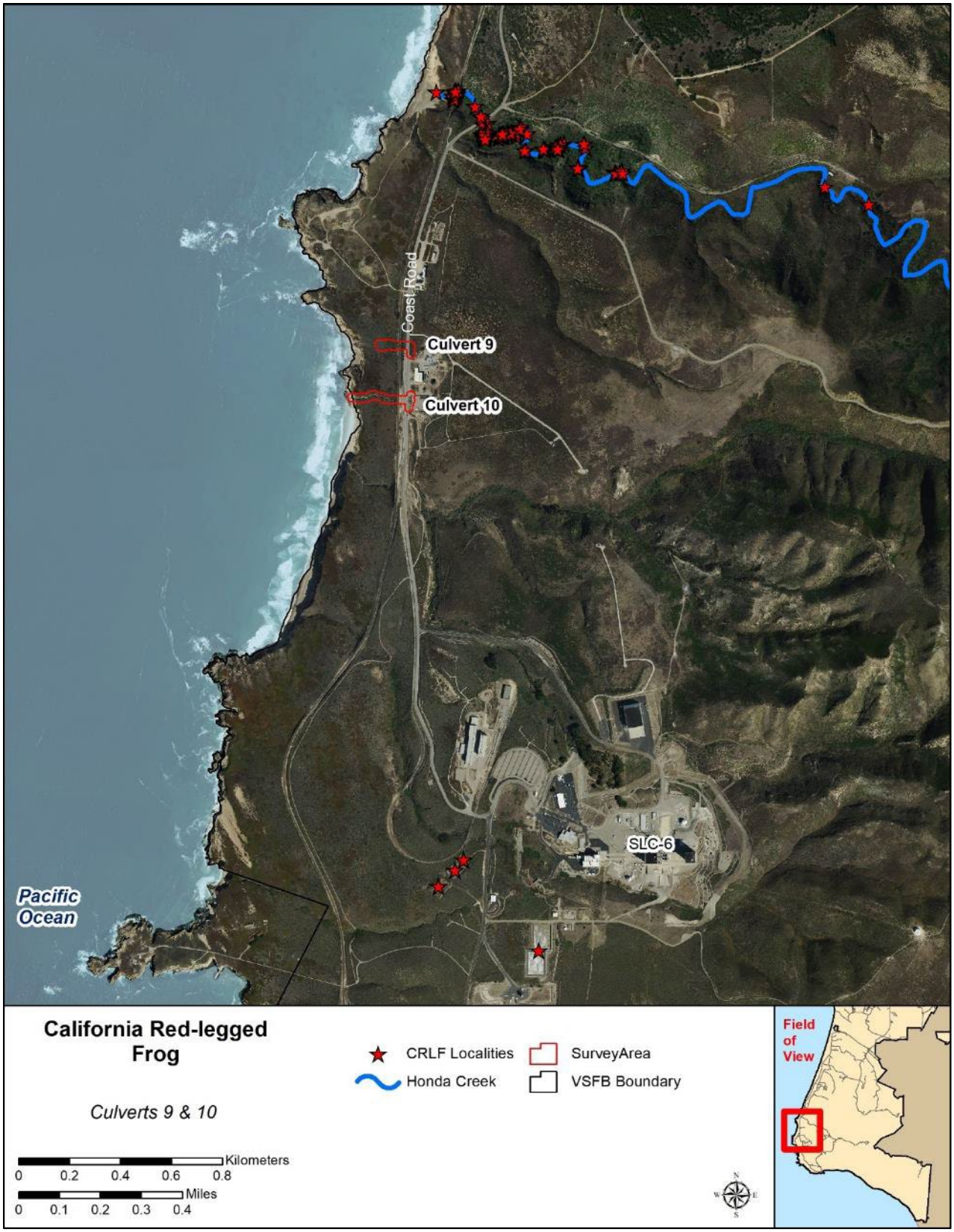


Figure 5-1. Proximity of the survey area to currently occupied CRLF habitat in Honda Creek and historic CRLF habitat in the SLC-6 area.

6.0 Literature Cited

30th Operations Support Squadron / Operations Support-Weather. 2022. October 2022 Vandenberg Space Force Base Climatology Data. 30 OSS/OSWS, Vandenberg Space Force Base, California.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.

Google Earth Pro 7.3.6. 2023. 1994 Google Earth Image from U.S. Geological Survey of the Building 525 and 542 Areas on South Vandenberg Space Force Base, California. Retrieved 27 April 2023.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016 (30). 17 pp.

Lichvar, R.W. and S.M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Cold Regions Research and Engineering Laboratory US Army Engineer Research and Development Center. Hanover, NH. 84 pp.

Munsell Color Corporation. 2000. Soil Color Charts. New Windsor, NY.

State Water Resources Control Board (SWRCB). 2019. State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. Adopted 2 April, 2019.

New Mexico Environment Department Surface Water Quality Bureau. 2010. Hydrology Protocol for the Determination of Ephemeral, Intermittent, and Perennial Waters- Final Draft.

United States Army Corps of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. U.S. Army Corps of Engineers, U.S. Army Engineer Research and Development Center. ERDC/EL TR08-28 September 2008. Vicksburg, MS.

US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2018. Field Indicators of Hydric Soils in the United States, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils. 55pp.

USDA. 1972. Soil Survey of Northern Santa Barbara Area, California. United States Department of Agriculture Soil Conservation Service, University of California Agricultural Experiment Station. 182 pp.

United States Fish and Wildlife Service. 1997. National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary. Biological Report 88(24). 209 pp.

Wetland Training Institute (WTI). 2017. Pocket Guide to Hydric Soil Indicators. v. 8. Robert J. Pierce (ed.). Wetland Training Institute, Inc., Glenwood, NM. 196 pp.

A. Appendix A: New Mexico Surface Water Quality Control Board Hydrology Determination Protocol and Data Sheets

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date:10/18/2022	**Stream Name: n/a**	**Latitude:34.599307**
Evaluator(s): Alice Abela	**Site ID: Culvert 9**	**Longitude: -120.63822**
TOTAL POINTS: 8.5 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:**	**Drought Index (12-mo. SPI Value): -0.43**

WEATHER CONDITIONS	**NOW:** 1 %cloud cover 99 %clear/sunny	**PAST 48 HOURS:** 100 %cloud cover 100 %clear/sunny	**Has there been a heavy rain in the last 48 hours?** ___ YES X NO **OTHER:** **Stream Modifications** ___ YES X NO **Diversions** ___ YES X NO **Discharges** X YES ___ NO

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. No evidence of base flows was found.
	6	**4**	**2**	**0**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.3. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.4. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.5. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.6. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**4**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined ~~with a wide, active floodplain.~~	~~**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.~~	~~**Ratio < 1.2.** Stream is incised with a noticeably confined channel.~~ Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5***	**0**	
1.9. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**5.5**
If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL. If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL. YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.				
1.10. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the ~~riffles/runs~~	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are <u>not</u> found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**8.5**
SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. <u>If the indicator is present</u> record score below and tally with previous score to compute TOTAL.**				
1.13. Seeps and Springs	Seeps and springs are found within the study reach.		Seeps and springs are <u>not</u> found within the study reach.	
	Present = 1.5		**Absent = 0**	
1.14. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.		Iron-oxidizing bacteria and/or fungi are <u>not</u> found within the study reach.	
	Present = 1.5		**Absent = 0**	
			TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**8.5**

LEVEL 1 Field Measurements

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	**Bankfull Stage (#2)**	**Maximum Depth Value (#3)**	**2x Maximum Depth Value (#3)**	**Flood-Prone Area Location (#4)**	**Flood-Prone Area Width (#5)**	**Bankfull Width (#6)**	**Floodplain to Active Channel Ratio** (FPA Width / Bankfull Width)
0	1.5 inches	0	3.0 inches	Point 9-1	65.0 inches	11.0 inches	5.9*

*Floodplain to active channel ratio is high, but there are no field indicators of an actual floodplain: mature upland shrubs are present in the floodplain as measured at the same density and age class as those in adjacent uplands. Flow in the active channel is entirely due to water generated by flushing pipes and water is only present while pipes are being flushed. Due to low volume and velocity of flows the bankfull stage is poorly defined at the site assessed within the drainage and completely obscured within the remainder of the channel.

Current conditions at the culvert 9 inlet (overgrown vegetation) appear to preclude storm runoff from entering the culvert: there are no high volume flows that can establish a flood plain.

NMED Surface Water Quality Bureau – LEVEL 1 Hydrology Determination Field Sheet

Date:10/11/2022	**Stream Name: n/a**	**Latitude:34.597377**
Evaluator(s): Alice Abela	**Site ID: Culvert 10**	**Longitude: -120.63422**
TOTAL POINTS: 4.5 *Stream is at least intermittent if ≥ 12*	**Assessment Unit:**	**Drought Index (12-mo. SPI Value): -0.43**
WEATHER CONDITIONS	**NOW:** 100 %cloud cover **PAST 48 HOURS:** 100 %cloud cover	**Has there been a heavy rain in the last 48 hours?** **___ YES X NO** **OTHER:** **Stream Modifications ___ YES X NO** **Diversions ___ YES X NO** **Discharges X YES ___ NO**

LEVEL 1 INDICATORS	**STREAM CONDITION**			
	Strong	**Moderate**	**Weak**	**Poor**
1.1. Water in Channel	Flow is evident throughout the reach. Moving water is seen in riffle areas but may not be as evident throughout the runs.	Water is present in the channel but flow is barely discernable in areas of greatest gradient change (i.e. riffles) or floating object is necessary to observe flow.	Dry channel with standing pools. There is some evidence of base flows (i.e. riparian vegetation growing along channel, saturated or moist sediment under rocks, etc)	Dry channel. ~~No evidence of base flows was found~~. Moist sediment below culvert outlet.
	6	**4**	**2**	**0.5**
1.2. Fish	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Fish are not present.
	3	**2**	**1**	**0**
1.4. Benthic Macroinvertebrates	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Macroinvertebrates are not present.
	3	**2**	**1**	**0**
1.5. Filamentous Algae/Periphyton	Found easily and consistently throughout the reach.	Found with little difficulty but not consistently throughout the reach.	Takes 10 or more minutes of extensive searching to find.	Filamentous algae and/or periphyton are not present.
	3	**2**	**1**	**0**
1.6. Differences in Vegetation	Dramatic compositional differences in vegetation are present between the stream banks and the adjacent uplands. A distict riparian vegetation corridor exists along the entire reach – riparian, aquatic, or wetland species dominate the length of the reach.	A distinct riparian vegetation corridor exists along part of the reach. Riparian vegetation is interspersed with upland vegetation along the length of the reach.	Vegetation growing along the reach may occur in greater densities or grow more vigorously than vegetation in the adjacent uplands, but there are no dramatic compositional differences between the two.	No compositional or density differences in vegetation are present between the streambanks and the adjacent uplands.
	3	**2**	**1**	**0**
1.7. Absence of Rooted Upland Plants in Streambed	Rooted upland plants are absent within the streambed/thalweg.	There are a few rooted upland plants present within the streambed/thalweg.	Rooted upland plants are consistently dispersed throughout the streambed/thalweg	Rooted upland plants are prevalent within the streambed/thalweg.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.6)	**2.5**

If the stream being evaluated has a subtotal ≤ 2 at this juncture, the stream is determined to be EPHEMERAL.
If the stream being evaluated has a subtotal ≥ 18 at this point, the stream is determined to be PERENNIAL.
YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 2 and 18 continue the Level 1 Evaluation.

LEVEL 1 INDICATORS	STREAM CONDITION			
	Strong	Moderate	Weak	Poor
1.7. Sinuosity	**Ratio > 1.4.** Stream has numerous, closely-spaced bends, few straight	**Ratio < 1.4.** Stream has good sinuosity with some straight sections.	**Ratio < 1.2.** Stream has very few bends and mostly straight sections.	**Ratio = 1.0.** Stream is completely straight with no bends.
	3	**2**	**1**	**0**
1.8. Floodplain and Channel Dimensions	**Ratio > 2.5.** Stream is minimally confined with a wide, active floodplain.	**Ratio between 1.2 and 2.5.** Stream is moderately confined. Floodplain is present, but may only be active during larger floods.	**Ratio < 1.2.** Stream is incised with a noticeably confined channel. Floodplain is narrow or absent and typically disconnected from the channel.	
	3	**1.5**	**0**	
1.10. In-Channel Structure: Riffle-Pool Sequence	Demonstrated by a frequent number of riffles followed by pools along the entire reach. There is an obvious transition between riffles and pools.	Represented by a less frequent number of riffles and pools. Distinguishing the transition between riffles and pools is difficult.	Stream shows some flow but mostly has areas of pools or of riffles.	There is no sequence exhibited.
	3	**2**	**1**	**0**
			SUBTOTAL (#1.1 – #1.9)	**3.5**
If the stream being evaluated has a subtotal ≤ 5 at this juncture, the stream is determined to be EPHEMERAL. If the stream being evaluated has a subtotal ≥ 21 at this point, the stream is determined to be PERENNIAL. YOU MAY STOP THE EVALUATION AT THIS POINT. If the stream has a subtotal between 5 and 21 continue the Level 1 Evaluation.				
1.11. Particle Size or Stream Substrate Sorting	Particle sizes in the channel are noticeably different from particle sizes in areas close to but not in the channel. There is a clear distribution of various sized substrates in the stream channel with finer particles accumulating in the pools, and larger particles accumulating in the riffles/runs	Particle sizes in the channel are moderately similar to particle sizes in areas close to but not in the channel. Various sized substrates are present in the stream channel and are represented by a higher ratio of larger particles (gravel/cobble).	Particle sizes in the channel are similar or comparable to particle sizes in areas close to but not in the channel. Substrate sorting is not readily observed in the stream channel.	
	3	**1.5**	**0**	
1.11. Hydric Soils	Hydric soils are found within the study reach.		Hydric soils are not found within the study reach.	
	Present = 3		**Absent = 0**	
1.12. Sediment on Plants and Debris	Sediment found readily on plants and debris within the stream channel, on the streambank, and within the floodplain throughout the length of the stream.	Sediment found on plants or debris within the stream channel although it is not prevalent along the stream. Mostly accumulating in pools.	Sediment is isolated in small amounts along the stream.	No sediment is present on plants or debris.
	1.5	**1**	**0.5**	**0**
			TOTAL POINTS (#1.1 – #1.12)	**4.5**
SUPPLEMENTAL INDICATORS: **The following indicators do not occur consistently throughout New Mexico but may be useful in the determination of perenniality. If the indicator is present record score below and tally with previous score to compute TOTAL.**				
1.13. Seeps and Springs	Seeps and springs are found within the study reach.		Seeps and springs are not found within the study reach.	
	Present = 1.5		**Absent = 0**	
1.15. Iron Oxidizing Bacteria/Fungi	Iron-oxidizing bacteria and/or fungi are found within the study reach.		Iron-oxidizing bacteria and/or fungi are not found within the study reach.	
	Present = 1.5		**Absent = 0**	
			TOTAL *plus* SUPPLEMENTAL POINTS (#1.1 – #1.14)	**4.5**

LEVEL 1 Field Measurements

INDICATOR #1.8 (*Floodplain and Channel Dimensions*) – MEASUREMENTS & CALCULATIONS**							
Max Depth (#1)	**Bankfull Stage (#2)**	**Maximum Depth Value (#3)**	**2x Maximum Depth Value (#3)**	**Flood-Prone Area Location (#4)**	**Flood-Prone Area Width (#5)**	**Bankfull Width (#6)**	**Floodplain to Active Channel Ratio** (FPA Width / Bankfull Width)
0	11 inches	11 inches	22 inches	Point 10-1	37 inches	11.0 inches	1.03

All flow originates from run-off in direct response to storm events. There is no evidence of pooling within the length of the channel. There is no evidence that there is any sustained flow upon cessation of rainfall / runoff.

B. Appendix B: U.S. Army Corps of Engineers Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Culvert 9 City/County: Santa Barbara Sampling Date: 10/14/2022

Applicant/Owner: VSFB State: CA Sampling Point: 9-1

Investigator(s): Alice Abela Section, Township, Range:

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): California Lat: 34.599307 Long: -120.63822 Datum: NAD 83

Soil Map Unit Name: NWI classification: Riparian Wetland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ✓ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

Record rainfall event in mid-September during prevailing drought conditions; site entirely dependent on artificial water input

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1x5m)			
1. Solanum douglasii	50	Y	FACW
2. Conium maculatum	1	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: 1x5m)			
1. Toxicodendron diversilobum	1	N	FACU
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0* % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species 1	x 2 = 2
FAC species 50	x 3 = 150
FACU species 1	x 4 = 4
UPL species ____	x 5 = ____
Column Totals: 52 (A)	156 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

*48% litter

US Army Corps of Engineers Arid West – Version 2.0

SOIL

Sampling Point: 9-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-15	7.5YR3/1	100						loamy sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

S7=Sandy dark surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1.5

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

flow/surface water only present during active flushing; once flushing stopped, flow ceased

US Army Corps of Engineers

Arid West – Version 2.0

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Culvert 9 City/County: Santa Barbara Sampling Date: 10/11/2022

Applicant/Owner: VSFB State: CA Sampling Point: 10-1

Investigator(s): Alice Abela Section, Township, Range:

Landform (hillslope, terrace, etc.): gully Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): California Lat: 34.597377 Long: -120.63422 Datum: NAD 83

Soil Map Unit Name: NWI classification: Ephemeral Stream

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✓ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

Record rainfall event in mid-September during prevailing drought conditions

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 1x5m)			
1. Carpobrotus	20	Y	UPL
2. Oxalis pes-caprae	2	N	UPL
3. Bromus diandrus	3	Y	UPL
4. Ehrharta calycina	0.5	N	UPL
5.			
6.			
7.			
8.			
	25.5 = Total Cover		
Woody Vine Stratum (Plot size: 1x5m)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 74.5 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species 25.5	x 5 = 127.5
Column Totals: 25.5 (A)	127.5 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Upland vegetation only along length of the channel except for some minor intrusions of Rubus ursinus

US Army Corps of Engineers Arid West – Version 2.0

SOIL

Sampling Point: 10-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR4/3	100						sandy loam
4-13.5	7.5YR4/6	50						loamy sand
4-13.5	10YR4/3	50						loamy sand
13.5-15	7.5YR3/2	100						sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

no evidence of any sustained pooling in the channel, water restricted to storm runoff and drains quickly

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✓ Sediment Deposits (B2) (**Riverine**)
- ✓ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

indicators likely due to storm flows; drift deposits abundant downstream of assessment plot

US Army Corps of Engineers

Arid West – Version 2.0

C. Appendix C: Species Observed During Field Surveys

Plant species present in survey areas

Family	Scientific Name	Common Name	Wetland Indicator Status	General Status	Culvert 9	Culvert 10
Aizoaceae	*Carpobrotus sp.*	iceplant	Upland	Non-native	X	X
Aizoaceae	*Conicosia pugioniformis*	narrow leaved iceplant	Upland	Non-native	X	
Anacardiaceae	*Toxicodendron diversilobum*	poison oak	Facultative Upland	Native	X	
Apiaceae	*Conium maculatum*	poison hemlock	Facultative Wetland	Non-native	X	
Asteraceae	*Artemisia californica*	California sagebrush	Upland	Native	X	X
Asteraceae	*Baccharis pilularis*	coyote brush	Upland	Native	X	X
Asteraceae	*Ericameria ericoides*	mock heather	Upland	Native	X	
Asteraceae	*Isocoma menziesii*	coastal goldenbush	Upland	Native		X
Asteraceae	*Leptosyne gigantea*	giant coreopsis	Upland	Native	X	
Asteraceae	*Sonchus asper*	prickly sow thistle	Facultative	Non-native		X
Brassicaceae	*Brassica nigra*	black mustard	Upland	Non-native	X	
Brassicaceae	*Hirschfeldia incana*	summer mustard	Upland	Non-native	X	X
Convolvulaceae	*Calystegia macrostegia*	coast morning glory	Upland	Native		X
Euphorbiaceae	*Croton californicus*	California croton	Upland	Non-native	X	X
Fabaceae	*Acmispon glaber*	deerweed	Upland	Native		X
Fabaceae	*Lupinus arboreus*	coastal bush lupine	Upland	Native		X
Geraniaceae	*Erodium cicutarium*	redstem filaree	Upland	Non-native		X
Myrsinaceae	*Lysimachia arvensis*	scarlet pimpernel	Facultative	Non-native	X	
Oxalidaceae	*Oxalis pes-caprae*	Bermuda buttercup	Upland	Non-native	X	X
Poaceae	*Avena barbata*	slim oat	Upland	Non-native		X
Poaceae	*Bromus diandrus*	ripgut brome	Upland	Non-native		X
Poaceae	*Ehrharta calycina*	veldt grass	Upland	Non-native		X
Poaceae	*Polypogon monspeliensis*	rabbotsfoot grass	Facultive Wetland	Non-native	X	
Rosaceae	*Rubus ursinus*	California blackberry	Facultative	Native		X
Scrophulariaceae	*Scrophularia californica*	California figwort	Facultative	Native	X	
Solanaceae	*Solanum douglasii*	Douglas nightshade	Facultative	Native	X	

Animal species observed

Due to the close proximity of the culvert 9 and 10 survey areas and mobility of animal species, animals observed would be expected in both survey areas.

Scientific Name	Common Name
Invertebrates	
Cnemotettix bifasciatus	silk-spinning cricket
Danaus plexippus	monarch butterfly
Amphibians	
Pseudacris hypochondriaca	Baja California treefrog
Reptiles	
Plestiodon skiltonianus	western skink
Birds	
Calypte anna	Anna's hummingbird
Chamaea fasciata	wrentit
Geothlypis trichas	common yellowthroat
Haemorhous mexicanus	house finch
Melospiza melodia	song sparrow
Toxostoma redivivum	California thrasher
Troglodytes aedon	house wren
Tyrannus verticalis	western kingbird
Zonotrichia leucophrys	white-crowned sparrow

FORMAT PAGE

Appendix G. Air Quality Modeling Results

FORMAT PAGE

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Culvert 10 Construction

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

Short-term construction project.

f. Point of Contact:

Name: Lawrence Wolski
Title: Director, Technical Projects
Organization: ManTech
Email: lawrence.wolski@mantech.com
Phone Number: 858-345-1951

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

_____ applicable
__X__ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.063	100	
NOx	0.318	100	
CO	0.436	250	
SOx	0.001	250	
PM 10	0.012	250	
PM 2.5	0.012	250	
Pb	0.000	25	No
NH3	0.000	250	
CO2e	117.1		

2025 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	
NOx	0.000	100	
CO	0.000	250	
SOx	0.000	250	
PM 10	0.000	250	
PM 2.5	0.000	250	
Pb	0.000	25	No
NH3	0.000	250	
CO2e	0.0		

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality.Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs.No further air assessment is needed.

_____ _____

Lawrence Wolski, Director, Technical Projects DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: VANDENBERG AFB
State: California
County(s): Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Culvert 10 Construction

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2024

- Action Purpose and Need:

- Action Description:
Short-term construction project.

- Point of Contact
Name: Lawrence Wolski
Title: Director, Technical Projects
Organization: ManTech
Email: lawrence.wolski@mantech.com
Phone Number: 858-345-1951

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construction

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Santa Barbara
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construction

- Activity Description:
Culvert 10 Construction

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Indefinite: False
End Month: 4
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.063463
SO_x	0.001241
NO_x	0.318261
CO	0.435887
PM 10	0.012190

Pollutant	Total Emissions (TONs)
PM 2.5	0.012042
Pb	0.000000
NH_3	0.000347
CO_2e	117.1

2.1 Building Construction Phase

2.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 10

2.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 1
Height of Building (ft): N/A
Number of Units: 1

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 7

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Dumpers/Tenders Composite	4	8
Graders Composite	2	8
Off-Highway Trucks Composite	2	4
Plate Compactors Composite	2	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Dumpers/Tenders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0091	0.0001	0.0581	0.0313	0.0021	0.0021	0.0008	7.6451
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Off-Highway Trucks Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1188	0.0026	0.5286	0.5400	0.0163	0.0163	0.0107	260.33
Plate Compactors Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0050	0.0001	0.0314	0.0263	0.0012	0.0012	0.0004	4.3251
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.164	000.003	000.093	001.268	000.017	000.006		000.025	00285.560
LDGT	000.217	000.004	000.177	001.754	000.018	000.007		000.027	00356.560
HDGV	000.273	000.005	000.286	002.004	000.029	000.010		000.052	00545.059
LDDV	000.026	000.002	000.237	000.323	000.031	000.020		000.008	00225.935
LDDT	000.017	000.003	000.082	000.161	000.025	000.013		000.009	00309.267
HDDV	000.176	000.007	002.043	000.559	000.124	000.067		000.033	00760.601
MC	005.697	000.002	000.762	018.634	000.019	000.008		000.053	00210.432

2.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = NU * 0.11 * HT$

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons