DRAFT
ENVIRONMENTAL ASSESSMENT
FOR
FLIGHTLINE INSTALLATION DEVELOPMENT AT
BEALE AIR FORCE BASE, CALIFORNIA

Prepared for:
Department of the Air Force

Unique ID Number: EAXX-007-57-UAF-1737969450

December 2025

Privacy Advisory

This Draft Environmental Assessment (EA) has been provided for public comment in accordance with the National Environmental Policy Act (NEPA), which provides an opportunity for public input on U.S. Department of the Air Force (DAF) decision-making, allows the public to offer input on alternative ways for DAF to accomplish what it is proposing, and solicits comments on DAF's analysis of environmental effects.

Public input allows DAF to make better-informed decisions. Letters or other written or verbal comments provided may be published in this EA. Providing personal information is voluntary. Private addresses will be compiled to develop a stakeholders inventory. However, only the names of the individuals making comments and specific comments will be disclosed. Personal information, home addresses, telephone numbers, and e-mail addresses will not be published in this EA.

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Air Force Civil Engineer Center CIE certifies that DAF has considered the factors mandated by NEPA; that the Draft EA represents DoD's good-faith effort to prioritize documentation of the most important considerations required by the statute within the congressionally mandated page limits; that this prioritization reflects DAF's expert judgment; and that any considerations addressed briefly or left unaddressed were, in DAF's judgment, comparatively unimportant or frivolous.

COVER SHEET
DRAFT ENVIRONMENTAL ASSESSMENT FOR FLIGHTLINE INSTALLATION DEVELOPMENT, BEALE AIR FORCE BASE, CALIFORNIA

Unique ID Number: EAXX-007-57-UAF-1737969450

a. Responsible Agency: Department of the Air Force (DAF)

b. Cooperating Agency: None

c. Proposals and Actions: The Environmental Assessment (EA) analyzes the potential environmental impacts from the Proposed Action and alternatives to implement Flightline installation development projects to provide infrastructure improvements necessary to support the mission of the 9th Reconnaissance Wing (9 RW) and tenant units. The 15 Installation Development Plan projects considered in this EA were identified as priorities for installation development in Base planning documents. These documents identify requirements for improving the physical infrastructure and functionality of Beale Air Force Base (AFB), including current and future mission and facility requirements, development constraints and opportunities, and land use relationships.

d. For Additional Information: 9 RW Public Affairs, 9rw.pa@us.af.mil

e. Designation: Draft Environmental Assessment

f. Abstract: This EA has been prepared pursuant to provisions of the National Environmental Policy Act (NEPA) as amended by Public Law 30 118-5, Fiscal Responsibility Act of 2023 (42 United States Code 4321 et seq.) and the DoD NEPA Implementing Procedures.

The purpose of the Proposed Action is to improve physical infrastructure and functionality, meet current and future mission requirements, and eliminate unneeded buildings at Beale AFB. The need for this Proposed Action is to provide and maintain facilities and infrastructure that are adequate to support the needs of 9 RW and its tenant units. The Proposed Action meets the Beale AFB need to ensure mission readiness and to protect the health and safety of its personnel.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action and alternatives concluded that compensatory mitigation measures would need to be applied to the Proposed Action to reduce impacts to surface waters and federally listed species to less than significant. With the implementation of these compensatory mitigation measures, in addition to the application of proposed environmental protection measures and Best Management Practices, there would be no significant adverse impacts from the Proposed Action on the following resources: airspace management and use, noise, air quality, water resources, geological resources, surface waters, biological resources, cultural resources, infrastructure, hazardous materials and waste, and safety and health. While the timing of the Proposed Action may overlap with other development or maintenance actions on Beale AFB, impacts would be minor and short in duration; therefore, significant cumulative impacts are not anticipated from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions.

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
9 CES	9th Civil Engineer Squadron
9 RW	9th Reconnaissance Wing
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing material
ADP	Area Development Plan
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFJCS	Air Force Joint Chiefs of Staff
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFPET	Air Force Petroleum Office
AM&OP	Airfield Management and Operations Plans
APE	Area of Potential Effect
APZ	Accident Prevention Zone
AQCR	Air Quality Control Region
BA	Biological Assessment
BASH	Bird/Wildlife Aircraft Strike Hazard
BMP	Best Management Practice
CAA	Clean Air Act
CARB	California Air Resources Board
CEIE	Civil Engineer Installation Environmental Element
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CM	Conservation Measure
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CZ	Clear Zone
DAF	Department of the Air Force
DAFMAN	DAF Manual
dBA	A-weighted decibels
DCA	dichloroethane
DCE	dichloroethene
DESR	Defense Explosives Safety Regulation
DOT	Department of Transportation
EA	Environmental Assessment
ECA	Engineering Condition Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
E.O.	Executive order

ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FPTA	Fire Protection Training Area
FRAQMD	Feather River Air Quality Management District
GHG	greenhouse gas
HAZMAT	hazardous materials
HMMP	Hazardous Materials Management Process
HWMP	Hazardous Waste Management Plan
HQ ACC	Headquarters Air Combat Command
HVAC	heating, ventilation, and air conditioning
IBC	International Building Code
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
INRMP	Integrated Natural Resource Management Plan
JP-8	Jet Propellant 8
JPTS	Jet Propellant-Thermally Stable
LBPM&OP	Logistics, Base Personnel Management, and Operations Plan
LBP	lead-based paint
LF	linear feet
LUFT	leaking underground fuel tank
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
$MMTCO_2e$	million metric tons of CO_2 equivalent
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrous oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
Ops/Mx	Operations/Maintenance
Pb	lead
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi/L	picocuries per liter
PFAS	perfluorooctanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PG&E	Pacific Gas and Electric
PJD	Preliminary Jurisdictional Determination

PM	particulate matter, either less than 10 microns (PM_{10}) or smaller than 2.5 microns ($PM_{2.5}$)
POV	privately owned vehicle
PPE	Personal Protective Equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
PSPTS	Physiological Support Training Squadron
PT	physical training
PVC	polyvinyl chloride
Q-D	quantity-distance
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
SF	square feet
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_x	sulfur oxides
SR	State Route
SVAB	Sacramento Valley Air Basin
SWB	Stormwater basins
SWPPP	Storm Water Pollution Prevention Plan
TCA	trichloroethane
TCE	trichlorethene
TCP	Traditional Cultural Property
tpy	tons per year
TRIRIGA	an Integrated Workplace Management System developed by IBM
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
UFC	Unified Facilities Criteria
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VC	vinyl chloride
VOC	volatile organic compound
WOTUS	Waters of the United States
WRRB	Work Request Review Board
WTP	Water Treatment Plant

CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The 9th Reconnaissance Wing (9 RW) at Beale Air Force Base (AFB), California, and Headquarters Air Combat Command (HQ ACC) have identified priorities for Flightline installation development and propose to implement them over an approximate 5-year period from 2026 through 2030. This Environmental Assessment (EA) was prepared to evaluate the potential environmental impacts of these proposed projects and alternatives in compliance with the National Environmental Policy Act of 1969 (NEPA) as amended by Public Law 30 118-5, Fiscal Responsibility Act of 2023 (42 United States Code [U.S.C.] 4321 et seq.) and the DoD NEPA Implementing Procedures and Air Force Instruction (AFI) 32-1015 (2025).

The intent of the ongoing processes of installation development at Beale AFB is to provide infrastructure improvements necessary to support the mission of the 9 RW and tenant units. The 15 projects considered in this EA were identified as priorities for installation development in the Beale AFB Installation Development Plan (IDP) (Beale AFB, 2015) and Area Development Plan – Airfield District (ADP) (Beale AFB, 2018). These plans identify requirements for improving physical infrastructure and functionality of Beale AFB.

Beale AFB is located in north-central California, approximately 40 miles north of Sacramento, and occupies 23,192 acres of land **(Figure 2-1)**. It was established in 1942 and has hosted a variety of missions and aircraft types throughout its history. Beale AFB is home to the 9 RW and is responsible for providing national and worldwide command authorities with timely, reliable, high-quality, high-altitude reconnaissance products.

The intent of the 9 RW and HQ ACC is to streamline NEPA compliance and facilitate the installation development process by evaluating — in one integrated document — the potential impacts of projects proposed for execution at Beale AFB at the Flightline district.

Information presented in this document will serve as the basis for deciding whether the proposed actions would result in significant impacts to the human environment and therefore would require preparation of an environmental impact statement (EIS), or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate. If execution of any of the proposed actions would involve “construction” in a wetland as defined in Executive Order (E.O.) 11990, Protection of Wetlands, or “action” in a floodplain under E.O. 11988, Floodplain Management, a Finding of No Practicable Alternative (FONPA) would be prepared in conjunction with the FONSI. An early public notice is required for actions occurring in wetlands. Letters notified potential project stakeholders of the project and requested input prior to the Draft EA. That correspondence is included in **Appendix A**.

1.2 Purpose of Installation Development

The IDP and ADP provide a comprehensive planning framework to identify future priority requirements and goals for base development to ensure successful base operations, adequate support capacity, and continued ability of the base to support its assigned mission sets. Planning must integrate NEPA processes to ensure that planning and decisions reflect environmental values; to identify alternatives considered; to document which alternatives would be carried forward for full analysis; to describe the rationale for those dismissed; to avoid delays later in the process; and to head off potential conflicts.

1.3 Need for Installation Development

Installation development is needed at Beale AFB to provide and maintain facilities and infrastructure that are adequate to support the needs of the 9 RW and its tenant units, and to do so in a manner that:

- Supports Air Force mission requirements, future mission capabilities requirements, and quality of life of units and airmen hosted by the installation;
- Meets applicable DoD installation master planning criteria, consistent comprehensive planning policy and directives;
- Meets all applicable DoD, federal, state, and local laws and regulations such as, but not limited to, the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Clean Water Act (CWA), Clean Air Act (CAA), Resource Conservation and Recovery Act (RCRA), and Migratory Bird Treaty Act (MBTA). More detailed information regarding resource-specific laws and regulations is provided in the specific resource sections located in Chapter 3.

1.4 List of Projects and Purpose and Need

The 15 projects involving facility and infrastructure construction, demolition, and renovation are described in **Section 2.3.** The purpose of, and need for, each of the 15 proposed Flightline projects is described in **Table B.1** in **Appendix B**.

1.5 Environmental Analysis Approach and Methodology

The DAF has identified projects within the Flightline for environmental analysis that are related to various categories of activities considered and geographic areas associated with the installation and will assess the impacts of these projects that may occur over approximately 5 years. The analysis focuses on future development and priorities of the installation as established by the Wing Commander in conjunction with ACC and Air Force mission planning. Interagency/Intergovernmental Coordination and Consultations

1.5.1 Interagency Coordination and Consultations

Scoping is an early and open process for developing the breadth of issues to be addressed in an EA and for identifying significant concerns related to a proposed action. Per requirements of the Intergovernmental Cooperation Act of 1968 (42 U.S.C. 4231(a)) and E.O. 12372, Intergovernmental Review of Federal Programs, federal, state, and local agencies with jurisdiction that could be affected by the proposed actions were notified during development of this EA.

Appendix A contains the list of agencies consulted during this analysis and copies of correspondence.

1.5.2 Government-to-Government Consultations

Consistent with NHPA of 1966 implementing regulations (36 Code of Federal Regulations [CFR] Part 800); DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*; Department of the Air Force (DAF) Instruction 90-2002, *Interactions with Federally Recognized Tribes*; and DAF Manual (DAFMAN) 32-7003, *Environmental Conservation*, the Air Force is consulting with federally recognized tribes that are historically affiliated with the geographic region of each alternative site being considered for the Proposed Action regarding the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination processes, and it requires separate notification of all relevant tribes. Timelines for tribal consultation are also distinct from those of other consultations. The Beale AFB point of contact for Native American tribes is the Installation Commander. Beale AFB will coordinate or consult with Native American tribal governments listed in **Appendix A** regarding these actions**.**

1.5.3 Other Agency Consultations

Per requirements of Section 106 of the NHPA and implementing regulations (36 CFR Part 800), Section 7 of the ESA and implementing regulations, and the MBTA, findings of effect and request for concurrence have been transmitted to the California State Historic Preservation Officer (SHPO) and the U.S. Fish and Wildlife Service (USFWS). Correspondence regarding findings and concurrence and resolution of any adverse effect is included in **Appendix A** – Intergovernmental and Stakeholder Coordination.

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Proposed Action consists of 15 projects involving both facilities and infrastructure, including 9 construction projects, 5 renovation and repair projects, and 1 demolition project. The proposed projects are estimated to occur over a 5-year period starting in 2026, although some could occur later. Individual projects analyzed in the EA should be considered independent of each other. Beale AFB might choose to implement all, none, or any combination of these projects.

The proposed location for each project is identified on **Figure 2-1**, with closer views of each project vicinity in **Figures 2-2** through **2-8.** Project numbers correspond to the map locations on **Figure 2-1.**

2.2 Selection Standards for Alternative Screening

Selection standards were developed to establish a means for evaluating the reasonableness of an alternative and whether an alternative should be carried forward for further analysis in an EA. The following selection standards meet the purpose of and need for the Proposed Action and were used to identify reasonable alternatives for analysis in this EA. Selection standards were developed to screen project-specific options.

Universal Selection Standards

To be carried forward for analysis, alternatives must comply with the following standards:

Standard 1: Planning Constraints: be compatible with installation operational aspects, natural and built resources, and land use requirements and compatibility, including *2017 Beale Design Compatibility Guide*, *2015 Installation Development Plan*, and *2018 Area Development Plan*.

Standard 2: Health and Safety: remedy deficiencies in facilities and infrastructure to comply with all applicable health and safety guidelines, such as:

- Occupational Safety and Health Administration (OSHA)
- National Electric Safety Codes
- AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*
- California Water Works Standards
- Safe Drinking Water Act
- DoD Unified Facilities Criteria (UFC) 3-230-03, *Water Treatment*
- American Water Works Association Standards
- UFC 4-211-02, *Aircraft Corrosion Control and Paint Facilities*
- International Building Code (IBC) 2018; and
- Department of Air Force Manual 32-1084, *Standard Facility Requirements*

Standard 3: Protection and Security Compliance*:* comply with UFC 4-010-01, DoD Minimum Antiterrorism Standards for Buildings.

Standard 4: Base Asset Management Principles: including developing shared facilities and ensuring flexibility for future growth; minimize operational inefficiencies, and promote sustainable development.

Standard 5: Timeframe and Feasibility: be feasible to implement, generally within a 5-year timeframe, to meet the urgent need and be economically practicable. Projects outside the timeframe may require some level of NEPA or other re-evaluation.

Standard 6: Presence of Special Environmental Resources: be permittable and minimize environmental impacts as measured by the amount the project footprint overlaps with sensitive resources.

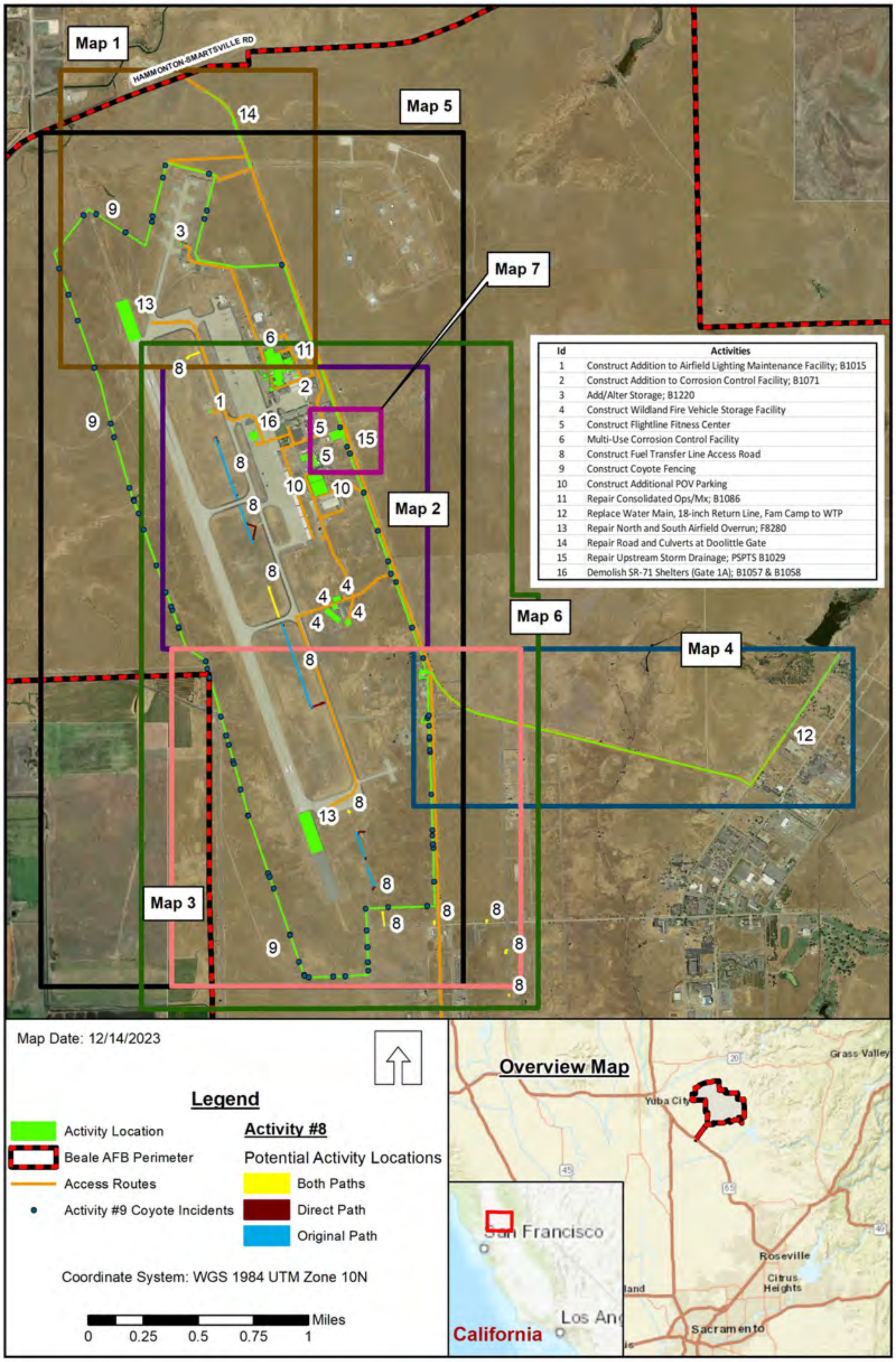

Figure 2-1 Locations of Proposed Installation Development Projects and Access Routes

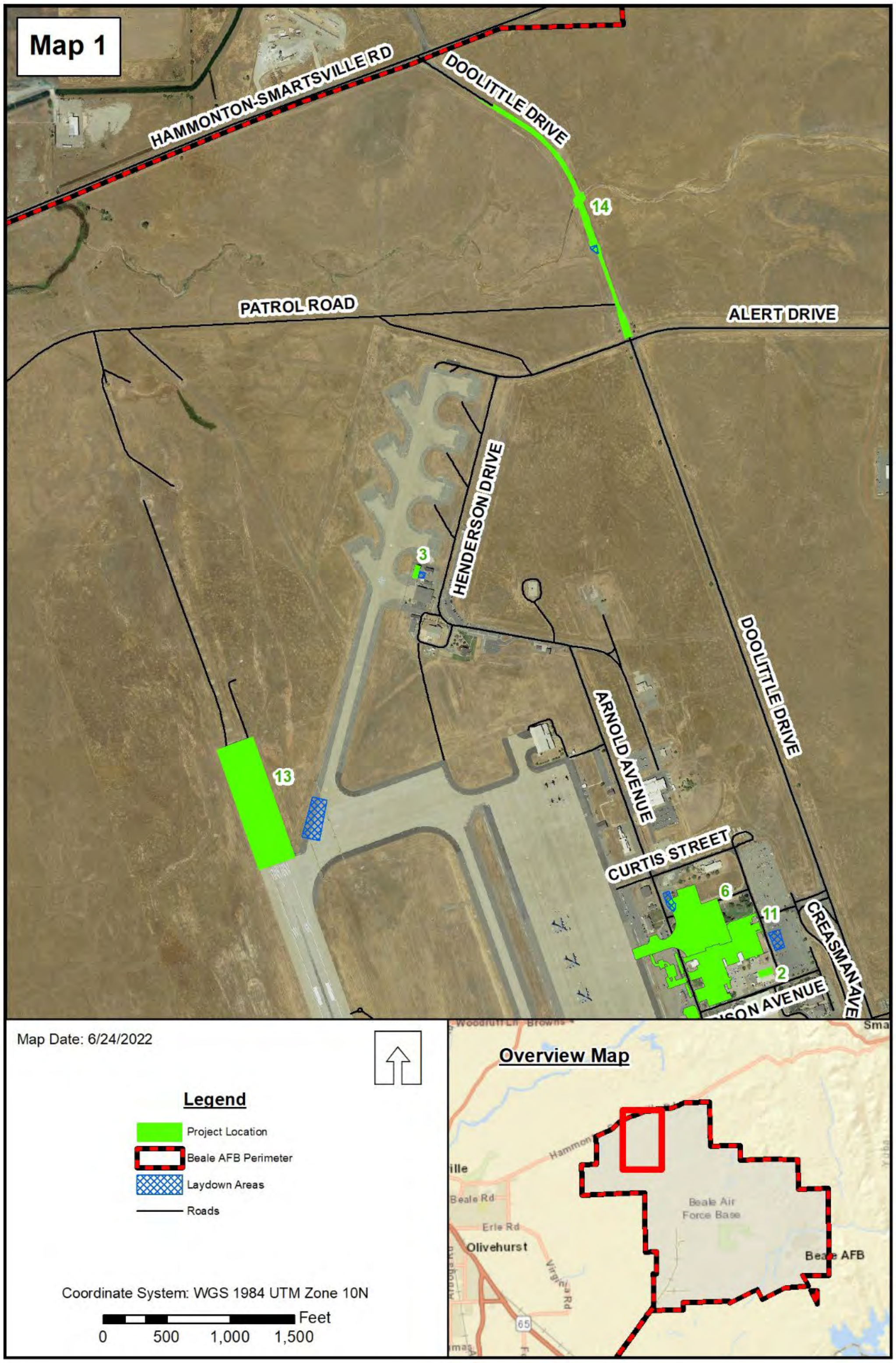

Figure 2-2 Map 1. Locations of Proposed Projects 2, 3, 6, 11, 13 and 14

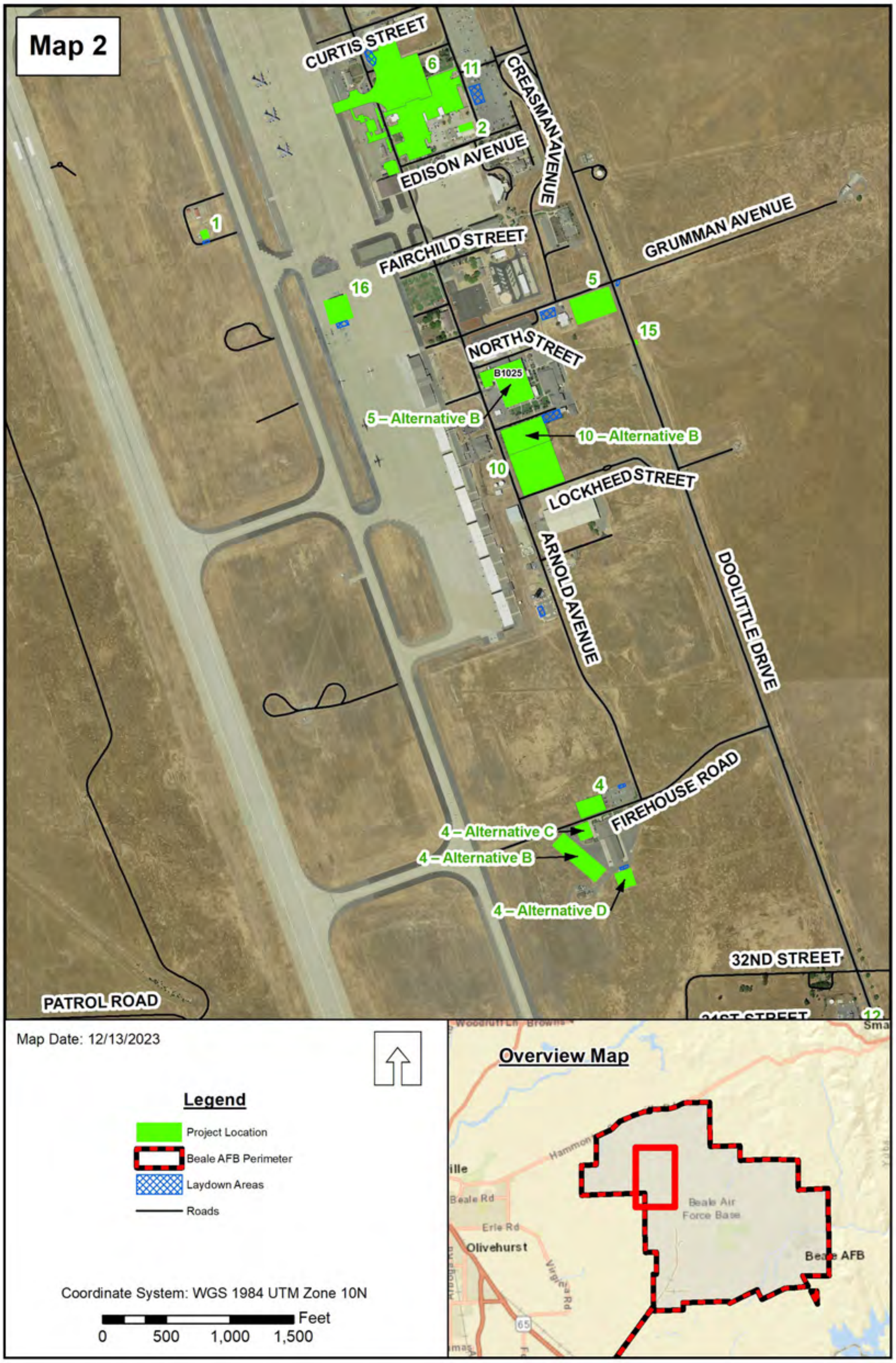

Figure 2-3 Map 2. Locations of Proposed Projects 1, 4, 5, 10, 11, 15 and 16

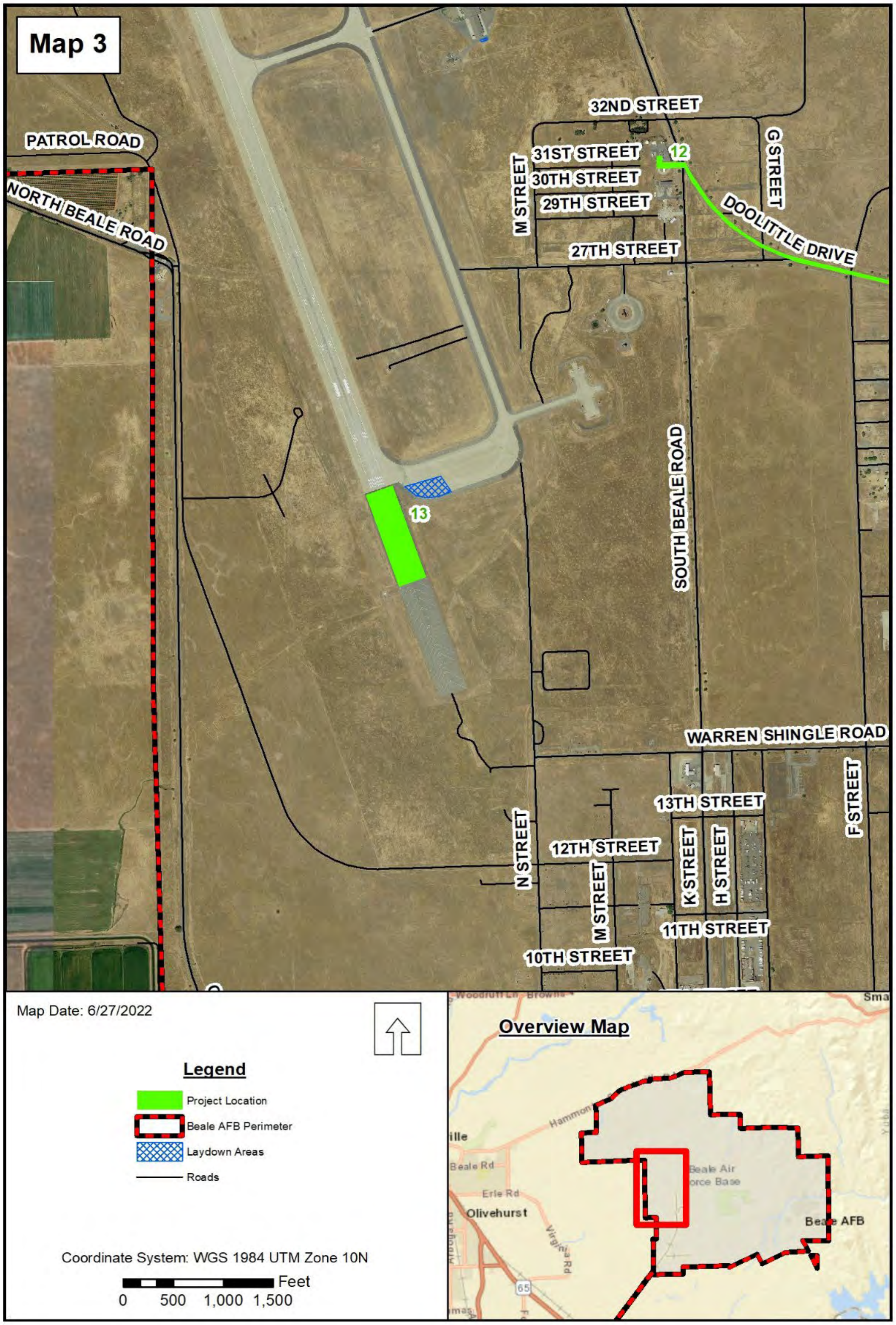

Figure 2-4 Map 3. Locations of Portions of Proposed Projects 12 and 13

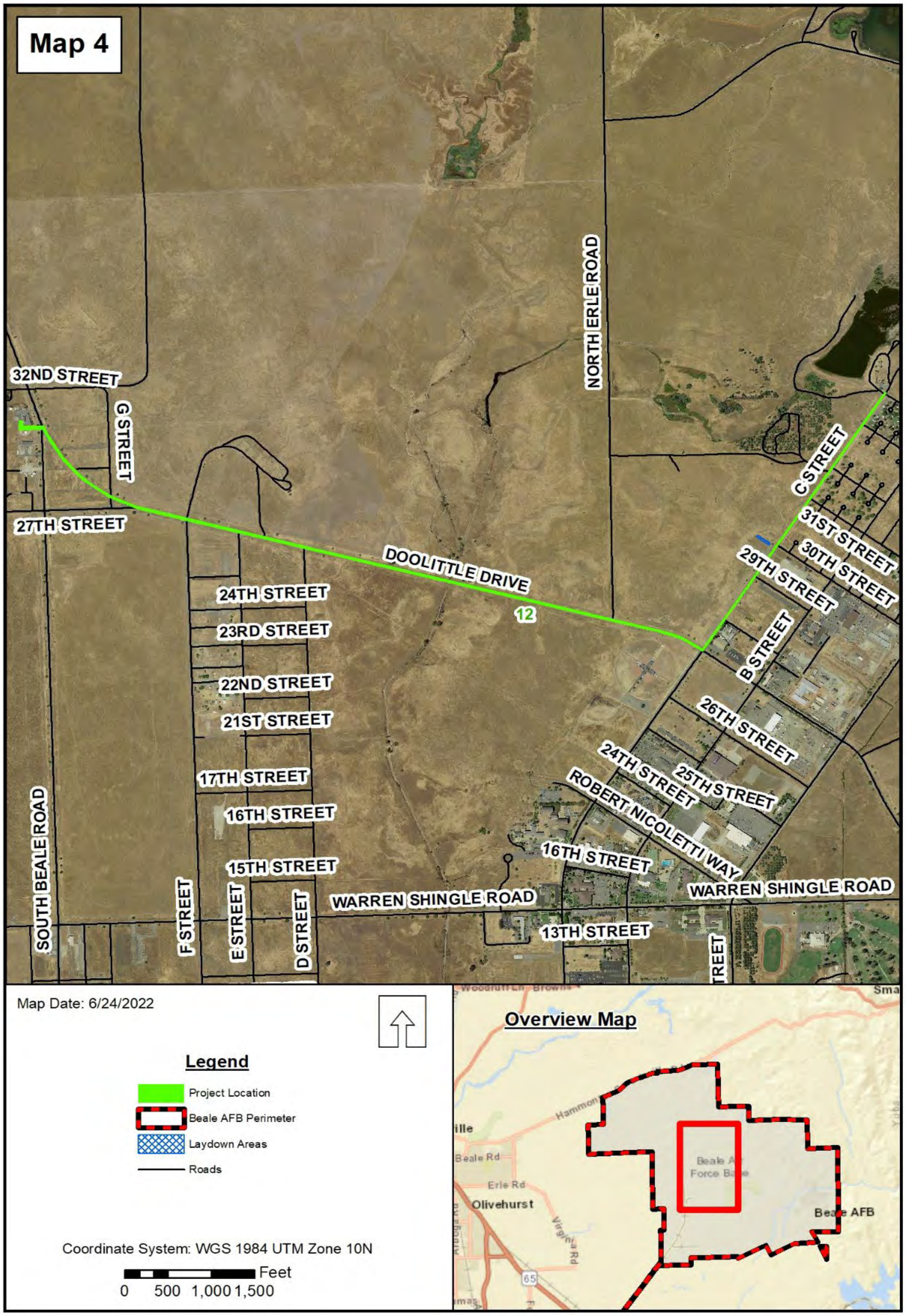

Figure 2-5 Map 4. Location of Proposed Project 12

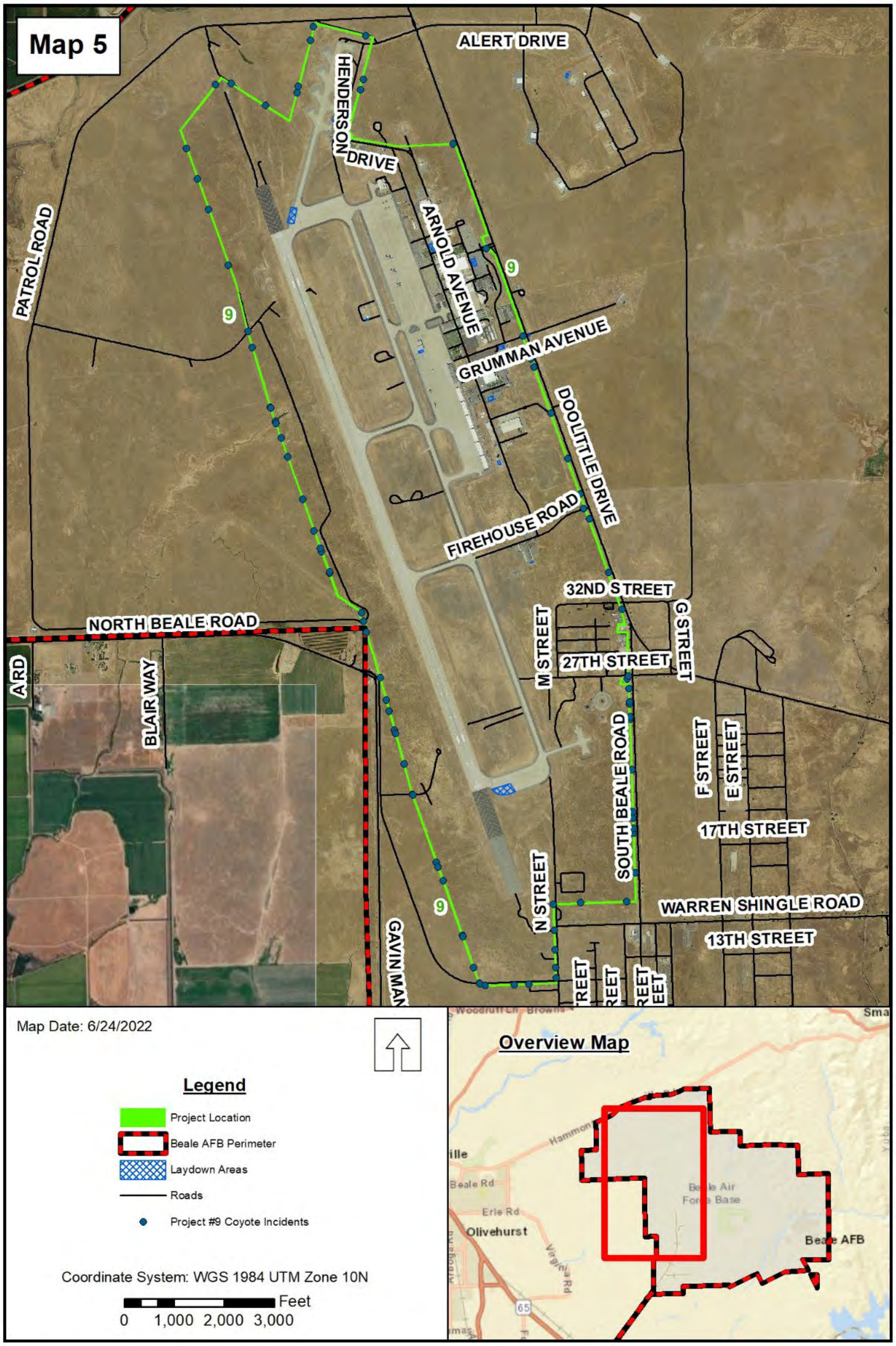

Figure 2-6 Map 5. Location of Proposed Project 9

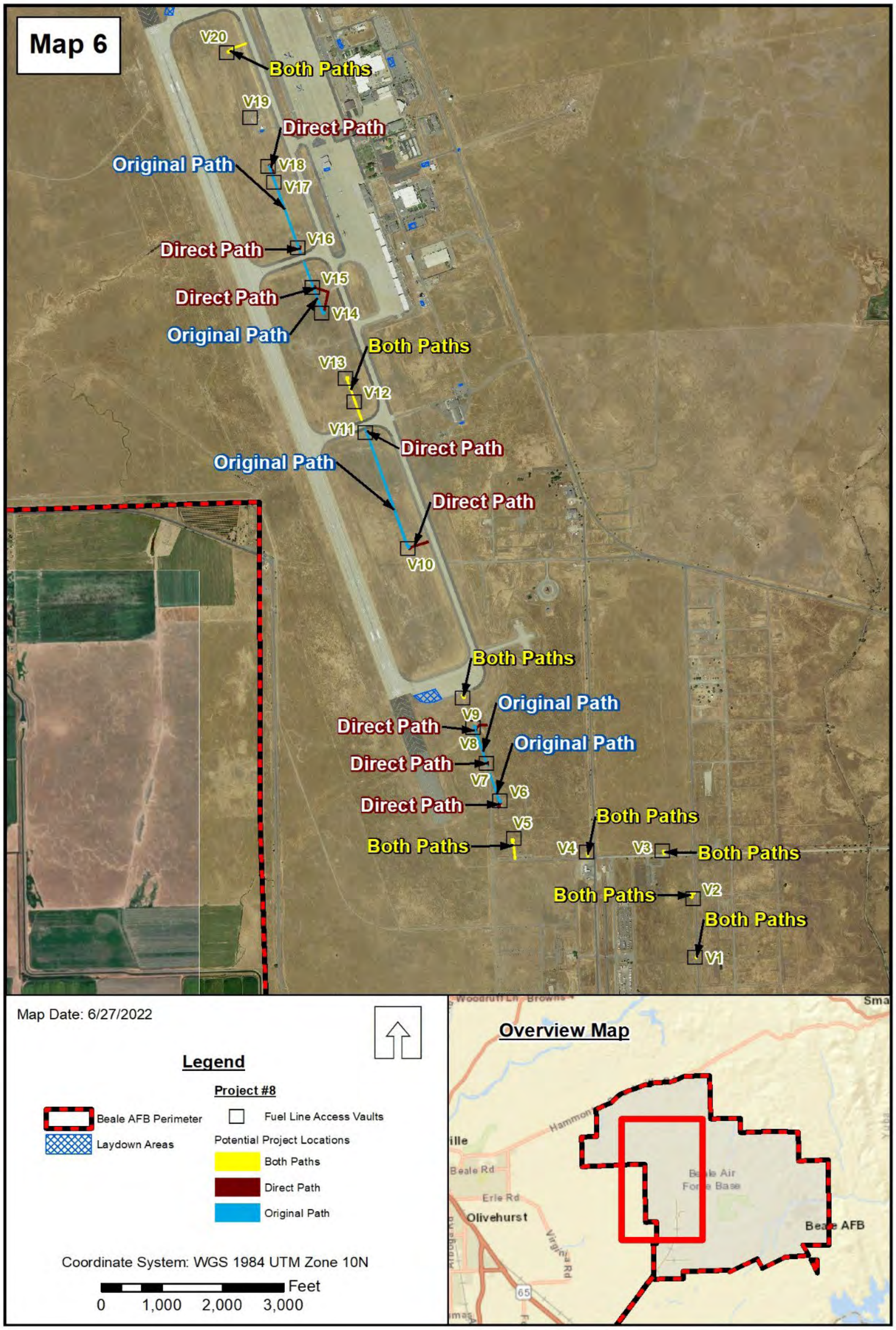

Figure 2-7 Map 6. Location of Proposed Project 8

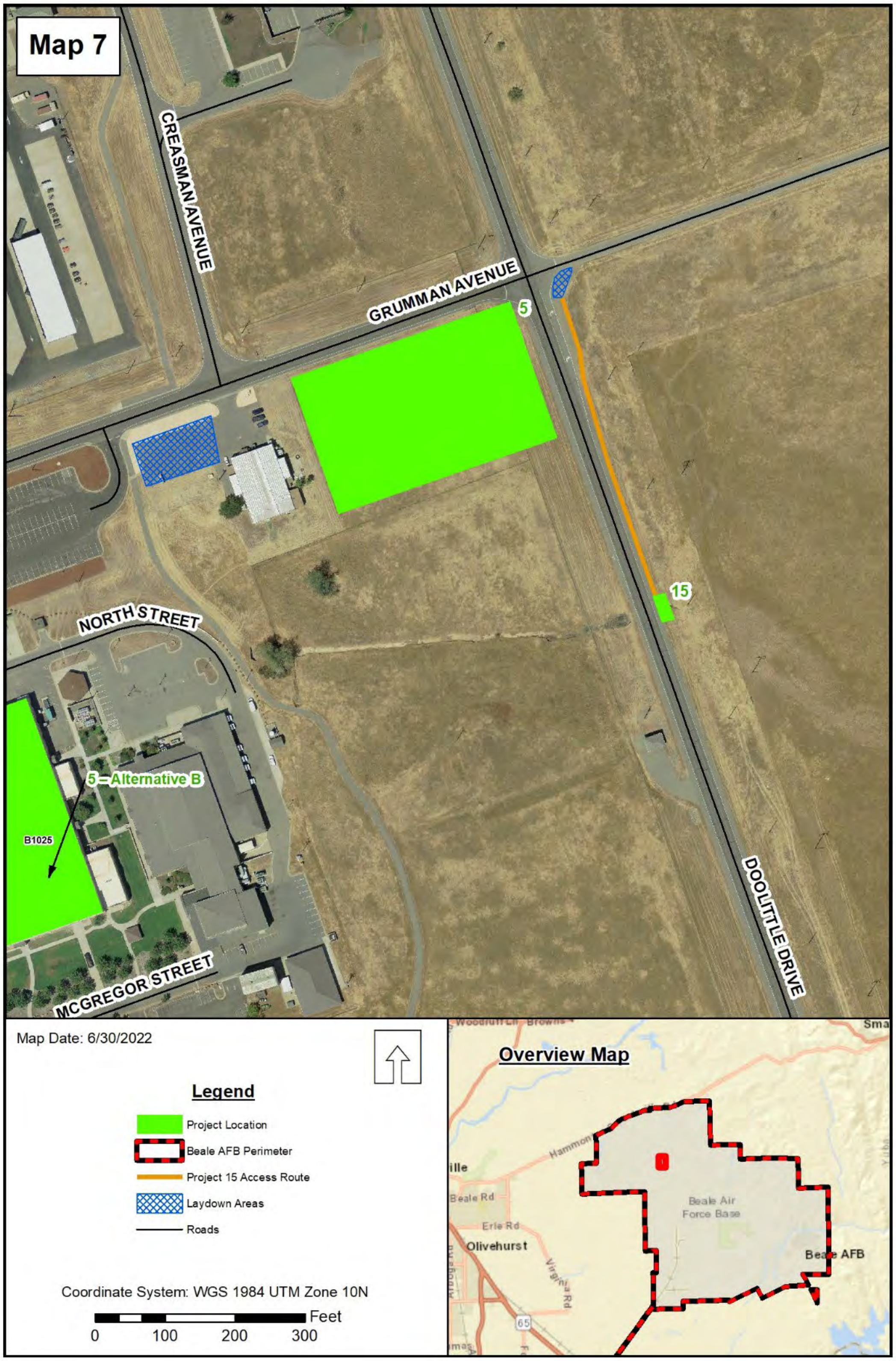

Figure 2-8 Map 7. Location of Proposed Project 15, and Alternative Locations for Project 5

Waters of the United States: The CWA of 1977 (33 U.S.C. § 1251 et seq.) regulates pollutant discharges that could affect aquatic life forms or human health and safety. The U.S. Army Corps of Engineers (USACE) regulates discharge of dredged or fill material into surface waters under Section 404 of the CWA.

Floodplains: E.O. 11988, Floodplain Management, requires federal agencies to take action to reduce risk of flood damage; minimize impacts of floods on human safety, health, and welfare; and restore and preserve natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to floodplains.

Additional Project-Specific Selection Standards

In addition to the six universal selection standards, as applicable, two project-specific selection standards were used to address particular project requirements. These standards are narrower in focus than the universal selection standards. Project-specific selection standards were not developed for all projects; projects with specific selection standards are shown in **Table 2-1**.

Table 2-1 Project-Specific Selection Standards

Project Number	Project Title	Project-Specific Selection Standard
1	Construct Addition to Airfield Lighting Maintenance Facility; B1015	Be immediately adjacent to Airfield Lighting Maintenance Facility.
6	Multi-Use Corrosion Control Facility	Consolidate facilities with their functional areas.

2.3 Proposed Actions and Alternatives

NEPA regulations mandate consideration of reasonable alternatives to proposed actions. “Reasonable alternatives” are those that also could be used to meet the purpose of and need for each proposed action.

The NEPA process is intended to support flexible, informed decision-making; the analysis provided by this EA and feedback from public and other agencies will inform decisions made about whether, when, and how to execute the proposed actions. Among the alternatives evaluated for each project is a No-Action alternative. The No-Action Alternative will substantively analyze the consequences of not undertaking the Proposed Action, and not simply conclude no impact, and will serve to establish a comparative baseline for analysis.

The scope, location, and objectives of the Proposed Action are described here, grouped by project category. This section also presents reasonable and practicable alternatives for projects where multiple viable courses of action exist. Those alternatives are assessed relative both to selection standards and project-specific selection standards, where applicable. Alternatives that met all selection standards were considered reasonable and were retained for consideration in this EA. Alternatives that did not meet one or more of the standards were considered unreasonable and are not retained for consideration in the EA.

Construction Projects

Nine construction projects totaling 122,552 gross square feet (SF) of new buildings or additions, and 460,860 SF of new pavement, road, and parking areas are proposed. While some projects listed may also include renovation or demolition components, construction is the largest part of these projects.

Renovation/Repair Projects

Five repair or renovation projects are proposed, including one renovation project that includes demolition, and four infrastructure repair projects. Renovation and repair projects would affect approximately 724,337 gross SF.

Demolition Projects

One demolition project is proposed, consisting of removal of two buildings totaling approximately 19,200 SF (footprint). This total does not include minor demolition that is associated with the proposed renovation or construction projects.

2.4 Common to All Projects

Construction traffic would enter the base through the Wheatland Gate, where commercial vehicles are inspected. Access routes are shown on **Figure 2-1.** Projects 12 and 14 would require temporary road closures and detours, as described in project narratives in **Section 2.6**.

Construction laydown areas are shown on **Figures 2-1** through **2-7**. These areas are in parking lots close to project sites. No relocation of personnel would be necessary except for Project 11, which would require temporary relocation during renovation. Additional details are in the project narrative description in **Section 2.6**.

Environmental protection measures that would be implemented under all of the action alternatives are included in **Appendix C**. Mitigation measures required to reduce the impacts of projects 8, 10, 14, and 15 on wetlands and federally listed species to less than significant are described in **Appendix D.**

2.5 Construction Projects

Project 1 – Construct Addition to Airfield Lighting Maintenance Facility, B1015

The Proposed Action is to construct an 880 SF building extension to the Airfield Lighting Vault to replace two maintenance trailers being used to repair airfield equipment and store spare parts. No surface waters would be affected. The location of this project is shown on **Figure 2-3**. The heating, ventilation, and air conditioning (HVAC), electrical, and data systems would be expanded to accommodate the addition to the facility. A fire detection and alarm system would be added to the facility. A lightning protection system would also be added to the building, and a drainage swale would be built to ensure proper drainage away from the building. The project includes removal and disposal of two trailers that are currently in use.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, the addition to the Airfield Lighting Maintenance Facility would not be constructed. Continued use of the trailers would risk both the health and safety of personnel and failure of airfield lighting circuits. The trailers are beyond their service life, do not offer adequate space or climate control, and do not have a secondary fire/safety egress as required for personnel safety. The lighting vault also does not have fire detection or notification systems, posing a risk to both personnel and high-value equipment. The current configuration has been cited by the ACC Airfield Inspection Team.

Project 2 – Construct Addition to Corrosion Control Facility, B1071

The Proposed Action is to repair Building 1071 and construct an addition to combine Buildings 1071 and 1079 into one facility to improve workflow and to ensure that the corrosion control facility is abiding by standards outlined in UFC 4-211-02 and Air Force Corrosion Control Facility Reference Guide. The project location is shown on **Figure 2-2**. While facility construction is under way, a temporary decontamination trailer would be provided to allow the mission to continue. The addition would add a total of 1,200 SF to the facility, which includes a new office and breakroom, a walk-in media blaster and spare hose storage, and an enclosed staging area for the walk-in media blaster and dirty composite room. The repair portion of the project includes repairing exterior walls, interior finishes, the fire protection system, and certain parts of the plumbing. It also includes adding air showers, converting the office into a clean room, converting the tool room into a laundry room, renovating restrooms, and upgrading the facility's HVAC systems. No surface waters would be affected.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, no addition to the corrosion control facility would be constructed. The facility currently being used for this function was not designed to support corrosion control operations and does not comply with OSHA requirements. Workflow is currently segmented and inefficient because of the building layout, which creates a contamination risk because personnel repeatedly travel between buildings without proper transitory stages (showers and decontamination areas). Under the No Action Alternative, there would continue to be unnecessary delays in repair and maintenance of mission-essential aircraft and continued risk of contaminating the facility's interiors and aircraft. Personnel would remain overexposed to hazards, and the building would remain out of compliance with UFC 4-211-02.

Project 3 – Add/Alter Storage Building, Building 1220

The Proposed Action would renovate Building 1220 by adding a 2,400 SF second-floor mezzanine and constructing a 20-foot extension on the south end of Building 1220 to provide another 800 SF of space, totaling 3,200 SF of additional storage capacity. No surface waters would be affected. The project location is shown on **Figure 2-2**. This project includes updates to electrical distribution, HVAC, fire protection, alarm, and mass notification systems. The project also includes life cycle maintenance and repairs of Building 1220.

Alternatives Considered for this Project*:* None.

No Action Alternative. Currently, storage space is insufficient for materials and equipment. Mobile containers are being used to provide additional storage space as a temporary solution. Because of the growing need for additional storage space, more shipping containers would be needed to meet that need. Furthermore, as a result of limited space surrounding Building 1220, adding additional storage containers could hinder access for emergency vehicles. Under the No Action Alternative, safety issues would remain, and lack of adequate future storage space would hinder efficient logistical process of storing and providing personnel with vital equipment and materials.

Project 4 – Construct Wildland Fire Vehicle Storage Facility

The Proposed Action would construct a 2,400 SF (60 feet wide by 40 feet long by 20 feet high) prefabricated metal building to protect high-value wildland firefighting equipment and vehicles from the weather. The project location is shown on **Figure 2-3**. Surface waters may be affected. The project footprint would be 0.06 acre. The facility would include a concrete slab and air-conditioned storage area. The structure would include three pull-through vehicle bays. Bollards are required for each bay to protect the structure from damage by vehicles. The facility would also house heavy equipment (transport trucks and dozers) and small equipment (chainsaws, shovels, axes, and hoses). The bays would also include workspace for small tool maintenance.

Alternatives Considered for this Project*:* The following alternatives consist of three alternative sites for the building; locations are shown on **Figure 2-3.**

- **Alternative B – Southwest of the Fire Station.** Under Alternative B, the building would be constructed at a site southwest of the fire station in a currently undeveloped area.
- **Alternative C – West of the Fire Station.** Under Alternative C, the building would be constructed at a site west of the fire station in an area where the basketball court is currently located. This alternative

would require relocation of the basketball court to one of the other locations currently considered for the storage building.

- **Alternative D – South of the Fire Station.** Under Alternative D, the building would be constructed at a site south of the fire station in a currently undeveloped area.

No-Action Alternative. Under the No Action Alternative, the storage facility for wildland fire vehicles would not be constructed, and high-value equipment would continue to be stored outside and degraded by the weather.

Project 5 – Construct Flightline Fitness Center

The Proposed Action would construct a two-story, 80,729 SF physical fitness center with a footprint of 40,365 SF to meet Air Force Joint Chiefs of Staff (AFJCS) physical fitness requirements in the Flightline area with an adjacent 28,400 SF parking lot The project location is shown on **Figure 2-3**. The project footprint would be 1.58 acres. A very small area (0.08 acres) of a surface water (ditch), which may or may not be regulated as a Waters of the United States (WOTUS), may be affected.

Alternatives Considered for this Project: Alternative B – Use Existing Space in Building 1025. Under Alternative B, a new building for the fitness center would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025 **(Figure 2-8)**.

No-Action Alternative. Under the No Action Alternative, Flightline personnel would either continue to travel to existing undersized facilities at the gym in the Cantonment area or would not meet their Physical Training (PT) requirements.

Project 6 – Construct Multi-Use Corrosion Control Facility

The Proposed Action would construct a 36,543 SF multi-bay corrosion control facility with full paint and composite repair capabilities to comply with UFC 4-211-02 and IBC 2018. The project location is shown on **Figure 2-2**. No surface waters would be affected. Mechanical ventilation is required to remove paint particulates and solvent vapors from the Corrosion Control Facility. In addition to the new building, the Proposed Action includes 175,000 SF of airfield pavement, a 500 linear foot (LF) sidewalk, a 500 LF sanitary sewer, a 300 LF storm sewer, 500 LF of electrical wiring, and 500 LF of water line.

Alternatives Considered for this Project: None.

No-Action Alternative. Beale AFB lacks composite repair capabilities and has extremely limited corrosion control capabilities for aircraft and ground equipment. The 9 Maintenance Group is unable to accomplish large-scale painting of KC-135, T-38, U-2, or Aerospace Ground Equipment at Beale AFB in accordance with UFC 4-211-02NF. Under the No Action Alternative, these limitations would continue, adversely affecting the fully mission capable rate by increasing maintenance downtime through the need to ship parts off-station for repair.

Project 8 – Construct Fuel Transfer Line Access Road

The Proposed Action would construct segments of an access road to allow access to the existing Jet Propellant 8 (JP-8) fuel vaults along the fuel transfer line during the wet season. The segments would connect to the fuel vaults from the nearest existing pavement and are labelled “Direct Path” on **Figure 2-7**. The project footprint would be 55,432 SF, with a total project area of 2.25 acres. This project would result in impacts to federally listed species. Surface waters would be affected.

The road segments would total 0.7 miles long. They would be 10 feet wide and would consist of geotextile fabric with a leveled 6-inch compacted gravel surface. Most of the road would be constructed within the airfield boundary. There are two locations where the new access roads cross small portions of ditches. At these locations, culverts would be installed within each ditch to maintain the same hydrology and pooling. The proposed routes avoid surface waters as much as possible.

The road would allow year-round access to existing fuel vaults so required monthly inspections could occur, and accumulated water could be removed. Inspections are currently not conducted monthly due to environmental restrictions against driving off road during the rainy season. Currently, a waiver from Air Force Petroleum Office (AFPET) allows inspections to be postponed from November through April. In addition, uneven terrain along the route increases the possibility of fuel-contaminated water spills.

Under the Proposed Action (Direct Path), there are three options to cross a small intermittent waterway for access to Vault #8: construction of a bridge, installation of a culvert, or via a low-water crossing. All three are considered in this analysis.

Alternatives Considered for this Project: Alternative B – Original Path. An alternative route for portions of the road is considered in this analysis. This 1.2-mile-long route, which follows the alignment of the fuel transfer line, is labeled Original Path on **Figure 2-7**. Access to Vault #8 for this alternative is via a low-water crossing.

No-Action Alternative. Under the No Action Alternative, the road would not be constructed and the AFPET waiver would not be approved. The base would thus be out of compliance with requirements.

Project 9 – Construct Coyote Fenceline

This project is a BASH requirement to prevent coyotes from accessing the Flightline. This project would modify the base of 50,525 LF of an existing fence using chain link apron panels (when more than 20 feet from surface waters) and large animal dig barriers (when less than or equal to 20 feet from surface waters). The aprons are 3-foot-wide strips of chain link fence attached to the outside base of the existing fence at a perpendicular angle and placed on top of the ground. To minimize potential damage to surface waters, large animal dig barriers would be used in proximity to (less than or equal to 20 feet from) surface waters. Dig barriers come in panels of spikes (approximately 32 inches x 12 inches), which would be driven into the ground at the base of the fence. The dig barrier would be installed by hand using a mallet with little ground disturbance. The total project area would be 3.48 acres. The project location is shown on **Figure 2-6**.

The project area would be accessed via paved or gravel surfaces. Chain link apron panels and dig barriers would be staged along the fence during the dry season using utility terrain vehicles or light trucks with low ground pressure tires before they are installed. The vehicles would follow the existing fence line and use weight-dispersing mats to traverse surface waters (wetlands) that could not be avoided. Vehicle access would take place only during the dry season, with guidance by a biological monitor. Chain link apron panels and dig barriers would be installed by hand during the dry season and would require no significant ground disturbance. If soils are too hard to install dig barriers without disturbing the soil during the dry season, work would be done during the wet season, and a USFWS permitted (Section 10 [a][1][A] large branchiopod) biologist would accompany the installation crew to ensure minimal impacts occur to protected species. The permitted biologist would direct activities within and adjacent to standing water and ensure the appropriate response if impacts were to occur.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, modifications to the fence line for coyote prevention would not occur, and aircraft and personnel would continue to be at risk from collisions between coyotes and aircraft. Trapping and killing of coyotes would continue.

Project 10 – Construct Additional Privately Owned Vehicle (POV) Parking

The Proposed Action would construct a 105,000 SF addition to the parking area for Building 1025. Existing parking in the area is inadequate for current and future parking needs. The project location is shown on **Figure 2-3**. Surface waters would be affected. The total project area would be 2.74 acres. Development of the proposed parking area would disturb the soil to a depth of 15 inches: 9 inches of soil would be removed, and 6 inches of disturbed soil would be left in place. Parking lot material would extend to a depth of 9 inches.

Alternatives Considered but Eliminated from Further Analysis: None.

Alternatives Considered for this Project: Alternative B – Two-story Parking Structure. Alternative B would construct a two-story parking structure at the location of the existing parking area so that it could be built completely on previously disturbed land **(Figure 2-3)**. The existing paved parking area would be removed, and a 71,890 SF parking structure built at the site.

No-Action Alternative. Under the No Action Alternative, additional POV parking would not be constructed, and personnel would continue using existing parking, which could hinder future growth.

2.6 Renovation and Repair Projects

Project 11 – Repair Consolidated Operations and Maintenance (Ops/Mx), Building 1086

The Proposed Action would consolidate Building 1086 by structurally isolating and repairing two areas within the building and demolishing the remainder of the building (148,877 SF) to correct life, health, and safety issues. Also included would be new pavement totaling approximately 124,860 SF, including 80 new parking stalls. The project location is shown on **Figure 2-3**. No surface waters would be affected. The project would include renovation of two areas of Building 1086 that are in better condition than others (90,123 SF) and possibly demolishing the east keeper space (39,333 SF). Renovation would overhaul electrical, fire suppression, mass notification, HVAC, and communications systems. It would convert retained areas into purpose-built aircraft maintenance backshops, removing administrative functions and consolidating aircraft maintenance operations. A number of personnel who do not need to be in close proximity to the Flightline have already been permanently relocated out of this facility, and others would be temporarily relocated to other buildings until renovations are completed. These buildings have capacity to house relocated personnel, so relocations would not disrupt operations.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No-Action Alternative, personnel would continue to work in unsafe areas and inefficient facilities. The new services and other benefits of the proposed modifications would not be realized.

Project 12 – Replace Water Main, 18-inch Return Line, Fam Camp to WTP

The existing 18-inch steel water distribution return line (constructed in 1944) would be abandoned and replaced with a new 18-inch C-905 polyvinyl chloride (PVC) water distribution return line that avoids surface waters along the route and would be accessible for repairs during the winter wet season. The project location is shown on **Figure 2-4**. The line would be approximately 2.4 miles long and the trench would be approximately 6 feet deep and 24 to 30 inches wide. The total disturbance area would be 68 acres. Surface waters would not be affected. The new return line would be installed from the Family Camp (Fam Camp) area (C St/34th St) to the Water Treatment Plant (WTP) and would be routed adjacent to existing roads to allow for easier maintenance and repair. The existing return line would remain in service until the new return line is ready for connection. After the new return line is connected, the existing line would be permanently taken out of service by concrete capping each end and abandoning in place. Trenchless installation would be employed below major road crossings, creek crossings, and in designated environmental areas such as vernal pools. Open trench installation would be used in all other locations. Doolittle Drive would be temporarily closed from 31st Street to C Street; an alternative route would be south on J Street to Warren Shingle Road, and east on Warren Shingle Road to C Street. C Street would be closed from 27th Street to 34th Street; an alternative route would be B Street, which parallels C Street.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, failure of the 18-inch return line would prevent water transfer to the Flightline storage tank, which would adversely affect multiple mission critical systems and facilities on the Flightline. In addition, the potential would continue for environmentally sensitive areas (wetlands) to be disturbed each time maintenance on the water main is required, and winter access would remain limited.

Project 13 – Repair Runway North and South Airfield Overrun, Facility 8280

The Proposed Action would reconstruct runway overruns by milling and removing the existing 3-inch surface asphalt pavement, replacing any material if needed, and re-compacting the existing base, on a total of 631,814 SF. The project location is shown on **Figure 2-4**. Runway repairs would include providing proper slopes and finish elevations to avoid electrical rework and inlaying 3-inch hot-mix asphalt airfield pavement in accordance with UFC 3-260-02, *Pavement Design for Airfields*. The total disturbance area would be 27 acres. Surface waters may be affected. After repairs are complete, overrun pavement markings would be repainted in accordance with UFC 3-260-04, *Airfield and Heliport Marking*.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, the overruns would remain in poor condition and would continue to deteriorate. Both ratings for Pavement Condition Index and foreign object debris potential would worsen, reducing flight safety.

Project 14 – Repair Road and Culverts at Doolittle Gate

The Proposed Action would repair the existing road, consisting of laying 97,139 SF of asphalt. The project location is shown on **Figure 2-2.** In addition, inbound and outbound lanes would be added adjacent to Hammonton-Smartsville Road but will merge into a two-lane configuration prior to the first culvert. An approximately 3,600-SF asphalt pullout would also be added on the east side of the road, and three culverts would be replaced. The Reeds Creek culverts would be replaced with a larger system to both increase capacity and span the width of the new road. The smaller culvert north of Reeds Creek and a small culvert south of Doolittle Gate would be replaced in-kind. The total project area would be 5.7 acres. Surface waters would be affected. During construction, Doolittle Drive would be closed from Hammonton-Smartsville to Alert Drive, and the Doolittle Gate would be closed during construction. Non-commercial traffic would be transferred to the Schneider Gate and commercial vehicles to the Wheatland Gate.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, roads and culverts would not be repaired at the Doolittle Gate. Vehicle throughput capacity would not be increased, and safety issues would continue.

Project 15 – Repair Upstream Storm Drainage, Physiological Support Training Squadron (PSPTS), Building 1029

The Proposed Action would repair and modify the existing upstream storm drainage system east of Doolittle Drive to correct issues that led to clogging and subsequent flooding of Building 1029 in January 2019. The project location is shown on **Figure 2-3**. The total project area would be 0.17 acres. Surface waters would be affected. A metal trash rack would be installed at the intake of the twin 48-inch culvert pipes on the east side of Doolittle Drive and would involve minor demolition associated with existing infrastructure and new concrete placement. The existing culvert headwall would be demolished and replaced with a new headwall that incorporates 8-foot wing walls, a debris pit, and protective grating to capture large debris. Localized grading around the new headwall and trash rack (up to 5 feet) would be required to minimize future erosion and provide positive drainage.

This project would begin in the dry season when soils are dry and cannot be easily compacted (approximately May) and would be completed by October, or during periods of dry weather outside this timeframe. The staging area would be on and beside Grumman Road, approximately 500 feet north of the culvert headwall. Equipment would access the culvert via a gentle slope running parallel to Doolittle Drive, north of the project area (see **Figure B-8**). Maintenance would consist of manual removal of vegetation from the trash racks seasonally to maintain proper drainage.

Alternatives Considered for this Project: Alternative B – Smaller Wing Walls. Alternative B would be similar to the Proposed Action, except that the wing walls would be 6 feet instead of 8 feet long (to help minimize impacts on vernal pool habitat). This alternative would include excavating rounded cobble and replacing it with angular riprap at a lower elevation. Native low-height wetland vegetation would also be added to avoid net loss of wetland vegetation.

No-Action Alternative. Under the No Action Alternative, the storm drainage system would not be repaired and Building 1029 would continue to be at risk of flooding.

2.7 Demolition Project

Project 16 – Demolish SR-71 Shelters, Buildings 1057 and 1058

The Proposed Action would demolish two remaining SR-71 shelters that have reached the end of their lifecycles. The shelters were constructed to protect aircraft from weather; however, this function is no longer needed. The SR-71 aircraft have been retired; the only current aircraft that can fit in them is the T-38, and additional shelters are not needed for these aircraft. The shelters are currently being used to build pallets for cargo deployment function. This function is planned to be consolidated with other related function in a different facility, leaving the shelters with no future use. The project location is shown on **Figure 2-3**. No surface waters would be affected. The project would include installation of 18 aircraft tiedowns and reflective aircraft parking lines consisting of up to 100 feet of 6-inch retro-reflective yellowing striping. The concrete-mounted tiedowns would include anchor bolts and rods that would be drilled down to 10 feet below grade. The top of the tiedowns would be set at pavement grade, which would also include saw-cutting through concrete up to 1 foot surrounding the tiedowns. Lead and asbestos are present in the buildings, and abatement would be accomplished during demolition.

Alternatives Considered for this Project: None.

No-Action Alternative. Under the No Action Alternative, the buildings would not be demolished and the area of aircraft load-rated concrete underneath Buildings 1057 and 1058 would continue to be underutilized.

2.8 Summary of Potential Environmental Consequences

The potential impacts associated with the alternatives and the No Action alternative are summarized in **Table 2-2**. The summary is based on information discussed in detail in **Chapter 3** (**Environmental Consequences**) of the EA with mitigation where applicable. The table provides a concise definition of the issues addressed and the potential environmental impacts associated with each alternative action.

Table 2-2 Summary of Potential Impacts by Alternative

Alternative	Noise	Air Quality	Geological Resources	Water Resources	Biological Resources	Surace Waters	Cultural Resources	Infrastructure	Hazardous Materials and Waste	Safety
Alternative 1: Proposed Action	Minor, short-term, impacts caused by noise generated by heavy equipment. No sensitive receptors would be affected.	Minor, short-term impacts from construction emissions. Minor long-term impacts from comfort heating equipment. Based on the ACAM analysis, the proposed project emissions would not be considered significant with respect to air quality impacts.	Minor, short-term, adverse impacts on soils resulting from site stabilization and revegetation. No changes or impacts on topography or regional geology.	Minor, short-term, adverse impacts on surface water. Minor to moderate, long-term beneficial impacts on surface waters. Minor, long-term adverse impacts on floodplains. Minor, long-term, beneficial impact on stormwater management.	Minor, short-term adverse impacts on wildlife resulting from disturbance. Negligible, short-and long-term adverse impacts on vegetation. Minor, short and long-term impacts on vernal pool branchiopods would be mitigated to less than significant through purchase of vernal pool preservation credits at a USFWS-approved conservation or mitigation bank.	Minor, short-and long-term, adverse impacts on surface waters from Projects 4, 8, 9, 10, 13, 14, and 15. Compensatory mitigation would be required to ensure no net loss and to reduce impacts to less than significant.	No historic properties affected.	Minor, short-term, adverse impacts on infrastructure caused by temporary service interruptions during construction. Long-term, minor to moderate, beneficial impacts from improvement of the physical infrastructure and functionality of Beale AFB.	Negligible short-term, adverse impacts created by increase in usage during project construction. Minor, short-term, adverse impacts are possible from ACMs, LBP, or PCBs during renovation work.	Moderate, long-term, beneficial impacts on safety and health as existing deficiencies would be corrected. Short-term, minor, adverse impacts resulting from contractors performing construction, renovation, and demolition work.
Project 4 Alternative B	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Indirect impacts on 0.17 acres of potential branchiopod habitat	No impacts on surface waters	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 4 Alternative C	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	No impacts on surface waters	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 4 Alternative D	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Indirect impacts on 0.05 acres of potential branchiopod habitat	No impacts on surface waters	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 5 Alternative B	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 8 Alternative B	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	8.33 acres more branchiopod habitat affected	0.38 acres more surface waters affected but impacts still minor	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 10 Alternative B	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	7 acres less vegetation affected and less chance of affecting a nearby vernal pool,	No impacts on surface waters	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
Project 15 Alternative B	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Slightly more branchiopod habitat affected, but impacts still minor	Slightly more surface waters affected, but impacts still minor	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1	Same as Alternative 1
No Action Alternative	No impacts	No impacts	No impacts	No adverse impacts, but no beneficial impacts from improved stormwater infrastructure.	No adverse impacts, but no beneficial impact on branchiopod habitat from Project 12.	No adverse impacts, but no beneficial impact on vernal pools from Project 12.	No impacts	No adverse impacts, but no beneficial impacts on infrastructure functionality.	No impacts	No impacts

Notes:
ACAM = Air Conformity Applicability Model; ACM = asbestos-containing materials; LBP = lead-based paint; PCB = polychlorinated biphenyls

CHAPTER 3 AFFECTED ENVIRONMENT AND CONSEQUENCES

3.1 Introduction

This EA analyzes potential impacts on existing environmental conditions associated with implementation of the proposed installation development projects. The analysis considers the current (baseline) conditions of the affected environment and compares those with conditions that could occur should DAF implement the Proposed Action, any of the alternatives, or the No Action Alternative.

Each resource is defined, and the geographic scope of the analysis is identified in this section. The expected geographic scope of potential consequences is referred to as the region of influence (ROI). The ROI boundaries vary depending on the nature of each resource.

In an EA, the magnitude of impact is considered regardless of whether the impact is adverse or beneficial. Environmental consequences are weighed by their significance. Under NEPA, significance is analyzed based on the potentially affected environment and degree of the effects of the action (40 CFR § 1501.3[b]). In considering the potentially affected environment, agencies should consider, as appropriate to the specific action, the affected area (national, regional, or local) and its resources, such as listed species and designated critical habitat under the ESA. Significance varies with the setting of the proposed action. In considering the degree of effects, agencies should consider the following, as appropriate to the specific action: both short- and long-term effects; both beneficial and adverse effects; effects on public health and safety; and effects that would violate federal, state, tribal, or local law protecting the environment.

Potential effects were evaluated for each resource in terms of type, duration, and degree. Type describes whether impacts would be beneficial or adverse, and direct or indirect:

- Beneficial: A positive change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.
- Adverse: A change that moves the resource away from a desired condition, or detracts from its appearance or condition.
- Direct: An effect caused by the action that occurs in the same place and at the same time.
- Indirect: An effect caused by the action but occurs later in time or farther removed in distance, but is still reasonably foreseeable.

Duration describes the length of time an effect would occur, either short term or long term. Short term generally describes effects that would be experienced during construction, renovation, or demolition, and long-term refers to effects that would persist after the activities causing the effects cease. Further descriptions of the criteria used to evaluate impacts are included in the environmental consequences sections of each resource.

Resource areas that are evaluated include noise, air quality, water resources, geological resources, surface waters, biological resources, cultural resources, infrastructure, hazardous materials and waste, and safety and health. Reasonably foreseeable future actions that could result in increased impacts to these environmental resources in conjunction with the Proposed Action are summarized in **Appendix E**. Impacts are defined in general terms and are qualified as adverse or beneficial, and as short- or long-term. For this EA, short-term impacts are generally considered those that would have temporary effects. Long-term impacts are generally considered those that would result in permanent effects. Impacts are defined as:

- Negligible, the impact is localized and not measurable or at the lowest level of detection;
- Minor, the impact is localized and slight but detectable;

- Moderate, the impact is readily apparent and appreciable; or
- Major, the impact is severely adverse or highly noticeable and considered significant.

Major impacts are considered significant and receive the greatest attention in the decision-making process. Major impacts require application of a mitigation measure to achieve a less than significant impact. These impacts are described prior to mitigation so the effectiveness of proposed mitigations can be discerned. Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Minor impacts have little to no effect on the environment and are not easily detected; impacts defined as negligible are the lowest level of detection and are generally not measurable. Beneficial impacts would provide desirable situations or outcomes.

Cumulative effects on environmental resources result from incremental effects of the Proposed Action, when combined with other past, present, and reasonably foreseeable future projects in the analysis area. Cumulative effects can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. Informed decision-making is served by consideration of cumulative effects resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future. Past and present projects are described in the Affected Environment section as part of the baseline conditions for each resource.

Several projects are ongoing and in the planning phases at Beale AFB. For this EA, reasonably foreseeable future actions are those for which Beale AFB has begun environmental review, engineering design, or has approved funding and are located near the project site. Actions announced for the ROI for this project that could occur during the same time as the Proposed Action that could result in an increased impact on environmental resources in conjunction with the Proposed Action are listed in **Appendix E**. The effects of these future actions, and others that may be supported by the infrastructure projects included in this analysis, would be analyzed through their own separate NEPA processes.

Full definitions of the resources analyzed below can be found in **Appendix F**.

3.2 Resources Eliminated from Further Analysis

In compliance with NEPA the description of the affected environment focuses on those resources that may be affected by the proposed actions. It was determined that land use and socioeconomics would not be affected. None of the projects would change land uses at the sites or in adjacent areas, and all proposed facilities would be in a compatible land use area and would be consistent with land use policies specified in the Beale IDP (Beale AFB, 2015). Implementation of the Proposed Action and alternatives would not directly or indirectly affect activities outside of Beale AFB or alter socioeconomic factors such as changes in local economic bases, salary levels, land use zoning, housing demand, or plans and programs of other agencies. Although the projects could increase short-term employment directly associated with proposed construction and renovation, the beneficial impact would be insignificant compared with normal economic activity within the region; no long-term or substantial change to economic factors would occur. Therefore, these resources were not analyzed further.

3.3 Noise

3.3.1 Definition of the Resource

Noise is characterized as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise considered an irritant. Noise can be intermittent or continuous, steady, or impulsive, and can involve any number of sources and frequencies. Noise can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to source type, characteristics of the source, distance between the source and the receptor, receptor sensitivity, and time of day. Potentially affected sensitive noise receptors are specific (such as residential areas, schools, churches, or hospitals) or broad (for example, nature preserves or designated districts) areas where occasional or persistent sensitivity or noise above ambient levels exists. The ROI for this resource includes the project locations described in **Section 2.1**.

3.3.2 Existing Conditions

The noise environment at Beale AFB is affected primarily by military aircraft operations, aircraft maintenance activities, vehicle traffic, and training. The noise contours include aircraft operations for assigned and transient aircraft and use of associated aerospace ground equipment. Vehicle uses at Beale AFB includes military, privately owned passenger vehicles, delivery trucks, and other special-purpose vehicles. Training that adds to the noise environment includes operations and small arms training.

In California, noise from aircraft operations is assessed using the daily average metric, Community Noise Equivalent Level (CNEL) (Caltrans, 2013). CNEL is similar to day/night sound level in that it measures the A-weighted average of sound levels gathered throughout a 24-hour period. However, in addition to the 10 A-weighted decibels (dBA) penalty assigned to events that occur between the hours of 10:00 p.m. and 7:00 a.m., a 5 dBA penalty is assigned to events that occur between the hours of 7:00 p.m. and 10:00 p.m.

3.3.3 Environmental Consequences

The level of impact from noise generated by demolition activities is largely based on the:

- Existing sensitive receptors (such as schools, churches, and residential neighborhoods);
- Distance of construction and demolition activities to sensitive receptors; and
- Absent sensitive receptors, distance from construction and demolition activities to the installation boundary.

Potential noise impacts are considered adverse if sensitive receptors experience continuous noise exposures exceeding 65 A-weighted decibels.

Proposed Action

Project 12 is the only one of the 15 projects that could result in noise impacts. The other 14 projects are located on the west side of the base where there are no sensitive noise receptors.

Noise associated with operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The construction equipment that has the potential to generate the loudest noise includes concrete saws, jack hammers, and other pneumatic tools that emit noise of 85 to 90 dBA at 50 feet (U.S. Department of Transportation [DOT], 2006). Most other equipment, including heavy machinery, typically emit noise from 70 to 85 dBA range at 50 feet.

At construction sites, standard measures would be taken to minimize the impact of additional noise. These recommended standard measures would be incorporated into construction plans:

- Limit the operation of heavy equipment and other noisy procedures to daylight hours whenever possible.
- Install and maintain effective mufflers on equipment.
- Locate equipment and vehicle staging areas as far from noise sensitive areas as possible.
- Limit unnecessary idling of equipment.

In addition, noise is generally attenuated as distance from the source increases; sound levels measured from point sources usually decrease at a rate of 6 dB each time distance is doubled (DOT, 2006). For example, a point source that generates 85 dBA at 50 feet is reduced to 79 dBA at 100 feet and 73 dBA at 200 feet. Once construction is complete, the noise associated with these activities would cease.

Workers at construction sites would have the greatest potential to experience potential hearing loss from the noise generated during renovation and demolition activities. Construction workers would be expected to use hearing protection and follow OSHA standards and procedures.

The only sensitive noise receptor in the vicinity of proposed projects is the Child Development Center, located about 1,900 feet (0.36 miles) south of Project 12. At this distance, construction noise would be attenuated down to ambient noise levels. Direct impacts from construction would be short term, moderate, and would not change the long-term noise environment. Impacts associated with periodic operation of generators would be negligible and would not increase the noise environment from current levels.

Facilities adjacent to these project sites may experience some direct effects from moderate noise. These facilities are located within airfield operations, industrial land use areas, and are also within airfield noise contours. These disturbances would be temporary and would not pose a threat to hearing or change the long-term noise environment. In addition, noise generated during construction would be mitigated using environmental commitments listed in **Appendix C**.

Noise impacts from all of the alternatives to Projects 4, 5, 8, 10, or 15 would be the same as those described for the Proposed Action.

No Action Alternative

Under the No Action Alternative, the proposed projects would not occur and, as such, there would be no change to the Beale AFB noise environment.

Cumulative Effects

Any of the action alternatives, in addition to the reasonably foreseeable future actions listed in **Appendix E**, may result in additional impacts on the noise environment. With the addition of ongoing and proposed construction, renovation, and demolition projects at Beale AFB, local noise may increase; however, these increases would be short in duration and confined to on-base areas. The potential incremental impact on the noise environment would be negligible.

3.4 Air Quality

3.4.1 Definition of the Resource

Air quality refers to the presence and concentration of various pollutants that can affect human health and the environment. Air pollution is the presence of one or more contaminants (for example, dust, fumes, gas, mist, odor, smoke, or vapor) in the atmosphere that harm human, plant, or animal life. As a resource, air quality incorporates several components that describe the levels of overall air pollution within a region, sources of air emissions, and regulations governing air emissions. The ROI for air quality analysis is the Sacramento Valley Intrastate Air Quality Control Region (AQCR) airshed, within which Beale AFB, and the Proposed Action, is located. A detailed discussion on air quality regulations, general conformity, and greenhouse gas (GHG) emissions is contained in **Appendix G**.

3.4.2 Existing Conditions

Beale AFB is in a climatic zone classified as dry-summer subtropical or Mediterranean Climate, which is characterized by hot, dry summers and cool, rainy winters. The average temperature at Beale AFB is 61.3

degrees Fahrenheit (°F). The warmest month on average is July, with an average temperature of 79.2°F. The coolest month on average is January, with an average temperature of 44°F. The average amount of precipitation at Beale AFB is 23.8 inches. The month with the most precipitation on average is January, with 5.2 inches of precipitation. The month with the least precipitation on average is July, with an average of 0.0 inches (Weatherbase, 2022). The Sacramento Valley Air Basin (SVAB) is relatively flat, bordered by mountain ranges to the east, west, and north. These mountain ranges channel winds through the SVAB, but also, under certain meteorological conditions, inhibit dispersion of pollutant emissions in the valley.

Based on the climate description in the Feather River Air Quality Management District (FRAQMD) *Indirect Source Review Guidelines* (FRAQMD, 2010), in summer, prevailing conditions are from the south; during winter, north winds become more frequent but winds from the south still predominate. In addition to prevailing wind patterns that control the rate of dispersion of local pollutant emissions, Yuba County experiences two types of inversions that affect air quality. The first type of inversion layer contributes to photochemical smog problems by confining pollution to a shallow layer near the ground. This type occurs in the summer, when sinking air forms a "lid" over the region. The second type of inversion occurs when the air near the ground cools while the air aloft remains warm. These inversions occur during winter nights and can cause localized air pollution "hot spots" near emission sources because of poor dispersion.

The Proposed Action at Beale AFB is in Yuba County, which is located within the Sacramento Valley Intrastate AQCR. The FRAQMD is responsible for implementing and enforcing state and federal air quality regulations in Yuba County, Sutter County, and portions of the Northern Sacramento Valley Air Basin. The U.S. Environmental Protection Agency (USEPA) has designated Yuba County, including where the Proposed Action is located, as a maintenance area for particulate matter smaller than 2.5 microns ($PM_{2.5}$) (2006) National Ambient Air Quality Standard (NAAQS). In addition, the Air Conformity Applicability Model (ACAM) indicates General Conformity *de minimis* thresholds for volatile organic compounds (VOCs), nitrous oxides (NO_x), and sulfur oxides (SO_x) because these pollutants are known precursors for $PM_{2.5}$ pollutants.

Beale AFB operates various stationary air emission sources that emit criteria pollutants and hazardous air pollutants. They include boilers, hot water heaters, generators, fuel storage tanks, and surface coating. However, Beale AFB is not designated as a major stationary source, and thus, is not subject to Title V permitting requirements. Also, the base is not located within 10 kilometers (6.2 miles) of a Class I area or subject to prevention of significant deterioration (PSD) regulations, and thus, visibility impairment is not a concern.

3.4.3 Environmental Consequences

The USEPA has designated Yuba County as a maintenance area for the $PM_{2.5}$ (2006) NAAQS. In addition, ACAM indicates General Conformity *de minimis* thresholds for VOCs, NO_x, and SO_x because these pollutants are known precursors for $PM_{2.5}$ pollutants. This air quality analysis includes a review of emissions for applicability to General Conformity. For the Proposed Action, alternatives, and No Action Alternatives, the net-change emissions are compared against the General Conformity *de minimis* value of 100 tons per year. If the estimated emissions are found to be below 100 tons per year (tpy), a formal general conformity determination would not be required.

The air quality analysis for all attainment criteria pollutants was performed without considering General Conformity. Based on guidance in Chapter 4 of the *Air Force Air Quality Environmental Impact Analysis Process Guide, Volume II – Advanced Assessments*, attainment criteria pollutant emissions were compared against the insignificance indicator of 250 tpy for PSD major source permitting threshold (except 25 tpy for lead). These insignificance 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 the specified criteria pollutant is considered so insignificant that the action would not cause or contribute to emissions that exceed one or more NAAQSs. Although PSD and Title V are not applicable to Beale AFB, the PSD major source thresholds provide a benchmark to compare air emissions against and to determine project impacts.

ACAM, Version 5.0.17b, was used to estimate criteria and precursor pollutant emissions for construction and demolition operations. Assumptions of the data used in the model are discussed in **Appendix G**. Emissions at or above *de minimis* thresholds or insignificance indicators would be considered significant, which would require a full conformity analysis or further evaluation. Emissions below thresholds and indicators would be considered moderate or, if very low, minor adverse impacts.

Proposed Action

Activities associated with the Proposed Action would result in minor adverse impacts to air quality because of the anticipated increase in construction emissions. Impacts from construction are primarily short term, direct, and minor in nature, with longer-term, minor, operational emissions arising from comfort heating equipment. Construction (short-term) emissions estimated using ACAM would primarily be associated with earth disturbance activities, operation of diesel-fuel construction equipment and vehicles hauling materials, worker trips, and architectural coating application. Even though the various project activities for Alternative 1 are spread over many years, Air Force Civil Engineer Center (AFCEC) policy requires that all construction and demolition activities be assumed to occur within a single calendar year. Operational (long-term) emissions are estimated for comfort heating (such as boilers and heaters), which would come into effect once construction ends and the facility is operational. Other operational emissions would arise from new paint booths, degreasers, and emergency generators, as applicable. Operational activities are assumed to start at the end of construction and then continue indefinitely.

Table 3-1 presents the annual estimated emissions for the Proposed Action using ACAM (assuming a 2026 start date). For the proposed activities, annual construction emissions and operational emissions, each, would be well below General Conformity Rule *de minimis* thresholds for all relevant pollutants, and thus a General Conformity Determination is applicable.

Table 3-1 Proposed Action Annual Emissions Estimates

Activity	Emissions (tons per year)							
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	CO_2e
Construction and Demolition[1]	3.65	11.42	13.65	0.04	22.04	0.46	0.00	3,338
Operational[2]	2.94	3.17	2.27	0.48	0.57	0.57	0.00	1,314
Total Emissions[3]	**6.58**	**14.59**	**15.91**	**0.51**	**22.61**	**1.02**	**0.00**	**4,652**
General Conformity *de minimis* threshold	100	100	N/A	100	N/A	100	N/A	N/A
Insignificance Indicator	N/A	N/A	250	N/A	250	N/A	25	N/A
Exceeds threshold/indicator	No	No	No	No	No	No	No	N/A

Notes:
Source: Air Conformity Applicability Model output (refer to **Appendix G**)
[1] Source: Construction for all Proposed Action activities assumed to occur within a single calendar year.
[2] Operational emissions assumed to start when construction ends, and would then continue indefinitely.
[3] May not sum to total because of rounding.
CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable; NO_x = nitrogen oxides; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; VOC = volatile organic compound.

As shown in **Table 3-1**, the highest emission rate for any pollutant for which a General Conformity *de minimis* threshold exists (11.42 tpy for NO_x) from construction and demolition activities is less than 15 percent of its respective *de minimis* threshold for General Conformity Rule applicability. All remaining criteria pollutants are also well below their *de minimis* thresholds or insignificance indicator values of 250 tpy except lead (25 tpy). Based on the ACAM analysis, the proposed project emissions would not be considered significant with respect to air quality impacts. These emission findings, along with a detailed emissions report, are documented in the Record of Conformity Analysis and are contained in **Appendix G**.

Table 3-2 presents the annual estimated emissions from just construction activity for each of the proposed projects under. **Table 3-3** presents the annual estimated emissions from just operational activity for each relevant project under Proposed Action.

Table 3-2 Proposed Action Annual Construction and Demolition Emissions Estimates (2025)

	Emissions (tpy)							
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	CO_2e
BAEY1011908: Construct Airfield Lighting Maintenance Facility, Building 1015	0.07	0.30	0.43	0.00	0.02	0.01	0.00	106.80
BAEY1073191: Construct Addition to Corrosion Control Facility, Building 1071	0.07	0.31	0.47	0.00	0.01	0.01	0.00	117.30
BAEY1014475: Add/Alter Storage, Building 1220	0.09	0.30	0.43	0.00	0.03	0.01	0.00	108.00
BAEY 1056321: Construct Wildland Fire Vehicle Storage Facility	0.04	0.20	0.32	0.00	1.31	0.01	0.00	79.10
BAEY 1072025: Construct Flightline Fitness Center	1.19	1.56	1.93	0.00	1.04	0.06	0.00	453.10
BAEY192006: Multi-Use Corrosion Control Facility	0.68	1.77	1.98	0.01	1.61	0.06	0.00	524.00
Construct Fuel Transfer Line Access Road	0.02	0.11	0.12	0.00	0.19	0.01	0.00	31.30
Construct Additional POV Parking	0.10	0.54	0.67	0.00	0.58	0.03	0.00	139.90
BAEY221000: Repair Consolidated Ops/Mx, Building 1086	0.36	2.26	2.84	0.01	0.53	0.09	0.00	631.70
BAEY211006: Repair Water Main, 18-inch Return Line, 3-million-gallon Tank to Flightline, Facility 8611	0.02	0.12	0.15	0.00	0.52	0.00	0.00	41.50
BAEY1054983: Repair Runway North and South Airfield Overrun, Facility 8280	0.90	3.34	3.51	0.01	15.84	0.14	0.00	908.40
BAEY1081611: Repair Road and Culvert at Doolittle Gate	0.07	0.35	0.49	0.00	0.20	0.01	0.00	119.20
BAEY1086069: Repair Upstream Storm Drainage PSPTS, Building 1029	0.03	0.15	0.20	0.00	0.01	0.01	0.00	49.60
BAEY107357: Demolish SR-71 Shelters, Buildings 1057 and 1058	0.01	0.10	0.10	0.00	0.15	0.00	0.00	28.20
Total Emissions	**3.56**	**11.42**	**13.65**	**0.04**	**22.04**	**0.46**	**0.00**	**3,338.1**
General Conformity *de minimis* threshold	100	100	N/A	100	N/A	100	N/A	N/A
Insignificance Indicator Level	N/A	N/A	250	N/A	250	N/A	25	N/A
Exceeds threshold/Indicator Level	No	No	No	No	No	No	No	N/A

The construction activities proposed would also generate GHG emissions from use of fossil fuel in combustion equipment and vehicles, as seen in **Table 3-2**. Natural gas boilers, water heaters, and diesel emergency generators that would become operational in the new facilities would also cause a minor increase in facility-wide GHG emissions. Since the 2004 peak, California's GHG emissions have generally followed a decreasing trend. In 2016, statewide GHG emissions dropped below the state's 2020 GHG Limit and have remained below the limit since that time.

Total CO_2e emissions for the Proposed Action were estimated to be approximately 4,652 tons **(Table 3-1)**. The California Air Resources Board (CARB) reported California's 2019 GHG emissions to be approximately 418.2 million metric tons of CO_2 equivalent ($MMTCO_2e$), which translates to approximately 460.9 million tons of CO_2e (1 tonne = 1.10231 tons) (CARB, 2021). Based on CARB data, Alternative 1 would account for about 0.0010 percent of California's GHG emissions.

Table 3-3 Proposed Action Annual Operational Emissions Estimates (2025)

	Emissions (tpy)							
	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	CO_2e
BAEY1011908: Heating for New Airfield Lighting Maintenance Facility, Building 1015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10
BAEY1073191: Heating for New Addition to Corrosion Control Facility, Building 1071	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.50
BAEY1014475: Heating for New/ Altered Storage, Building 1220	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.70
BAEY 1072025: Heating for New Flightline Fitness Center	0.01	0.26	0.22	0.00	0.02	0.02	0.00	312.90
BAEY192006: Heating, Painting and Degreaser for Multi-Use Corrosion Control Facility	2.34	0.14	0.12	0.00	0.01	0.01	0.00	174.40
BAEY221000: Heating and Emergency Generators at B1086. Repair Consolidated Operation/Maintenance (Ops/Mx), Building 1086	0.58	2.75	1.92	0.47	0.54	0.54	0.00	813.00
Total Emissions	**2.94**	**3.17**	**2.27**	**0.48**	**0.57**	**0.57**	**0**	**1,313.50**
General Conformity *de minimis* threshold	100	100	N/A	100	N/A	100	N/A	N/A
Insignificance Indicator Level	N/A	N/A	250	N/A	250	N/A	25	N/A
Exceeds threshold/Indicator Level	No	No	No	No	No	No	No	N/A

Prior to construction of any fuel-burning equipment, such as boilers and generators, source permit requirements contained in FRAQMD Rule 4.1 should be examined to ensure that permitting requirements for new emission sources are not triggered and they qualify for an exemption from the requirement to obtain a permit. FRAQMD Rule 4.1 requires any source of air emissions constructed or modified as part of the proposed project to first obtain written authorization, or "Authorization to Construct Permit," for such construction. This requirement would apply to any new or modified air emission source (or emission control equipment) including boilers, heaters, generators, paint booths, petroleum storage tanks, degreasers or parts washers, and abrasive blasters. Exemptions from permit are listed in FRAQMD Rule 4.3.

Before any new or modified stationary air emission source is operated, applicable rules in Regulation III of FRAQMD may be reviewed for applicability and compliance. For the proposed project, the following rules may apply:

- Rule 3.14, Surface Preparation and Cleanup

- Rule 3.15, Architectural Coatings
- Rule 3.21, Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters
- Rule 3.22, Stationary Internal Combustion Engines
- Rule 3.23, Natural gas-fired Water Heaters, Small Boilers, and Process Heaters
- Rule 3.8, Storage and Transfer of Gasoline

As discussed above, FRAQMD regulates fugitive dust pollution from land development in California. At a minimum, reasonable precautions — such as use of water for control of dust in demolition of existing buildings or structures, construction operations, grading of roads, or clearing of land — must be followed. Environmental protection measures that would be implemented to minimize air quality impacts are listed in **Appendix C**.

Project 4 Alternative

Under Project 4 Alternatives B, C, and D, the new Wildland Vehicle Storage Facility would be constructed at different sites in the vicinity of the fire station. The area of land proposed for construction under these alternatives would be the same as the Proposed Action. Therefore, total emissions from each of the three alternatives, as well as impact on air quality, would be comparable to those from the Proposed Action. There would not be any major change in the type or magnitude of effects on air quality resources.

Project 5 Alternative

Under Project 5 Alternative B, a new fitness center would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025. Implementation of Alternative B would likely result in reduced emissions as compared with those estimated for the Proposed Action because emissions related to site preparation and construction would be on a reduced scale as compared with the Proposed Action. This difference would likely not change the type or magnitude of effects on air quality resources.

Project 8 Alternative

Under Project 8 Alternative B, portions of the Fuel Transfer Line Access Road would take a different route, called Original Path, that does not avoid surface waters. Implementation of Alternative B would result in increased emissions as compared with those estimated for the Proposed Action. The Original Path area proposed for construction is an additional 44 percent compared with that for the Proposed Action. Therefore, emissions related to site preparation would be on a slightly larger scale as compared with the Proposed Action. However, this difference in increased emissions would likely not change the type or magnitude of effects on air quality resources.

Project 10 Alternative

Under Project 10 Alternative B, additional POV parking would not be constructed at a vacant lot adjacent to the existing parking area. Instead, the existing parking area would be removed, and a two-story parking structure would be constructed at the same site. This alternative would result in a comparable (or perhaps slightly increased) emissions to that estimated for the Proposed Action because, under Alternative B, ground disturbance related to preparing the vacant lot and paving of the parking lot would not occur; however, slightly increased emissions may result from removal (demolition) of the existing parking lot and construction of a two-storied structure. However, this difference in increased emissions would likely not change the type or magnitude of effects on air quality resources.

Project 15 Alternative

Under Project 15 Alternative B, the wing walls would be 6 feet long instead of 8 feet long, and rather than installing a debris pit and protective grating, rounded cobble would be excavated and replaced with angular riprap at a reduced elevation. These changes would likely result in slightly reduced or comparable emissions to those of the Proposed Action. This difference in emissions would likely not change the type or magnitude of effects on air quality resources.

No Action Alternative

The No Action Alternative would not generate any new construction and demolition emissions and would not change emissions from current levels at Beale AFB. Therefore, no impacts would occur to regional air quality under the No Action Alternative.

Cumulative Effects

Most of the reasonably foreseeable future actions at Beale AFB, listed in **Appendix E**, are construction projects that could result in localized short-term adverse cumulative impacts to air quality if several proposed projects occur at the same time. However, emissions from these construction projects would be minimized with environmental protection measures and complying with applicable construction permit requirements. Cumulatively, proposed and future projects are not expected to result in significant adverse impacts to regional air quality.

3.5 Water Resources

3.5.1 Definition of the Resource

Water resources are natural and constructed sources of water that are available for use and benefit of humans and the natural environment. Water resources relevant to the Proposed Action include stormwater and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes and ensures compliance with the CWA of 1972 (33 U.S.C. § 1251 et seq.). Each sub-section below first defines the resource, then describes existing conditions for that resource. The ROI for this resource is Beale AFB and off-site waterways that could be impacted by runoff. Note that the analysis of surface waters, including USACE Section 404 permitting, is included in **Section 3.7**, Surface Waters.

3.5.2 Existing Conditions

Beale AFB is in a climatic zone classified as dry-summer subtropical or Mediterranean Climate, which is characterized by hot, dry summers and cool, rainy winters. The average temperature at Beale AFB is 61.3 degrees Fahrenheit (°F). The warmest month is July, with an average temperature of 79.2°F. The coolest month is January, with an average temperature of 44°F. The average amount of precipitation at Beale AFB is 23.8 inches. with almost 95 percent of all rainfall occurring from October through April (Beale AFB, 2021a). Annual precipitation in California fluctuates significantly, with only 7 of the last 60 years experiencing rainfall between 21 and 23 inches (Beale AFB, 2021a). The most precipitation falls in January, with an average of 5.2 inches. The least precipitation falls in July, with an average of 0.0 inches (Weatherbase, 2022).

Stormwater Management

Stormwater management is the system of drains, water conveyance, and holding structures (for example, ditches, culverts, and retention and detention ponds) designed to collect and discharge stormwater. In developed areas on Beale AFB, stormwater runoff is conveyed through overland sheet flow and on-site storm drain drop inlets to nearby drainage ditches and ultimately to the creeks listed in **Table 3-4**. Stormwater management information was obtained from the Beale AFB Storm Water Pollution Prevention

Plan (SWPPP) (Beale AFB, 2021b) and the Beale AFB Integrated Natural Resource Management Plan (INRMP) (Beale AFB, 2021a). This section provides a brief overview of stormwater management on Beale AFB and describes its current condition.

Table 3-4 Stormwater Drainage Basins at Beale AFB

SWB	Area (acres)	Impervious Surface Area (acres)	Pervious Surface Area (acres)	Activities within SWB	Receiving Waterbodies	Projects Located within SWB
SWB-1	2,676.8	67.7	2,609.1	Agriculture; Open space	Reeds Creek	Yes
SWB-2	3,289.6	410.4	2,879.2	North Flightline; Industrial (aircraft, vehicle, and support equipment maintenance); Warehousing; Open space	Unnamed tributary to Reeds Creek	Yes
SWB-3	12,025.5	371.5	11,654.0	Base Administration; Flightline support functions; Industrial (fuel storage and transfer, vehicle maintenance)	Hutchinson Creek	Yes
SWB-4	4,046.3	203.8	3,824.5	Military family housing and related services	Dry Creek, Best Slough	No
SWB-5	1,104.3	63.3	1,041.0	South Flightline; Industrial; Open space	Unnamed tributaries to Reeds Creek	Yes
Totals[1]	23,142.5	1,116.8	22,025.7			

Notes:
Source: Beale AFB, 2021b
[1] May not equal the totals listed above as a result of rounding.
SWB = stormwater basin

All stormwater capacity requirements at Beale AFB were met over a 4-year study period (Beale AFB, 2015). Principal surface drainage systems at Beale AFB are Dry, Hutchinson, and Reeds Creeks. Dry Creek flows year-round, and Hutchinson and Reeds Creeks are intermittent.

Stormwater runoff is discharged through a system of open ditches, storm sewers, culverts, and pipes. The system includes approximately 49 miles of curbs and gutters, most of which are within the Flightline and military family housing areas. Stormwater flow is directed to drainage ditches and is discharged into the creeks (Beale AFB, 2011b).

Beale AFB stormwater discharges are regulated by the California Statewide General Industrial Activities Storm Water Discharge Permit Number 5A58S009991 (Beale AFB, 2009). There are stormwater drainage ditches and swales in the vicinity of the Proposed Action. The USEPA published stormwater regulations for municipalities and industry in 40 CFR 122 to meet requirements under Section 402(p) of the CWA. The USEPA has delegated authority for the stormwater program to the California Water Resources Control Board. In 1991, Beale AFB was first issued a General Permit for Storm Water Discharges Associated with Industrial Activities (General Permit) by the State Board. The State Board adopted a revised General Permit in 1997, with the latest revision becoming effective July 1, 2015 (Beale AFB, 2021b). DAFMAN 32-1067, *Water and Fuel Systems*, specifies stormwater system designs, operations, maintenance, and compliance. Both the General Permit and DAFMAN 32-1067 require development of a SWPPP to minimize exposure of industrial materials and areas of industrial activity to rain, snow, snowmelt, and runoff.

There are five SWBs at Beale AFB with unique drainage patterns and areas that are affected differently by specific land uses in these basins **(Figure 3-1)**. SWB-1, SWB-2, SWB-3, and SWB-5 receive stormwater runoff from industrial locations, and SWB-4 receives runoff from military family housing **(Table 3-4)**. The proposed projects would occur within SWB-1, SWB-2, SWB-3, and SWB-5. In undeveloped areas, stormwater is discharged by sheet flow directly into the nearest creek, ditch, or overland flow into nearby grasslands.

Floodplains

Beale AFB utilizes stormwater infrastructure to control stormwater and minimize erosion that includes:

- Channels and ditches to direct stormwater;
- Diversion dikes and berms to prevent overland flow;
- Culverts to direct stormwater beneath roadways; and
- Trench drains, storm drains, and storm sewers to collect stormwater runoff and direct it to outfalls.

The majority of proposed projects are located within stormwater basin SWB-2. However, some projects occur within SWB-1 and SWB-3. One project, Project –2 - Repair Water Main, 18-inch Return Line, Fam Camp to WTP, is located mainly in SWB-3, but also falls partially into SWB-5 and SWB-2. More details on stormwater basins are shown in **Table 3-4**.

The SWB-2 is a 3,290-acre basin with approximately 12.5 percent impervious surfaces consisting of paved runways, taxiways, roads, and building structures; previously disturbed grassy areas are located adjacent to the Flightline (Beale AFB, 2021b). Surface and stormwater flow within SWB-2 is to the west. A series of catch basins installed east of the aircraft parking apron collects drainage, conveying it through storm drain piping leading out to the west-side drainage ditch. A north-south trench drain constructed in the apron center drains the aircraft parking; both sides of the apron are sloped toward the trench drain. Collected drainage is carried by a series of pipes installed beneath the drain to the drainage ditch flowing west of the Flightline (Beale AFB, 2021b). Stormwater discharges from SWB-2 are monitored on the eastern fork of an unnamed tributary exiting Beale AFB east of Reeds Creek at Stormwater Monitoring Point MP-042 (Beale AFB, 2021b). The MP-042 (see **Figure 3-1**), along with sampling points from other stormwater basins with industrial runoff (SWB-1, SWB-3, and SWB-5), are sampled in accordance with General Permit requirements.

Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and provision of habitat for a diversity of plants and animals. Flood potential is generally evaluated by the Federal Emergency Management Agency (FEMA). The 100-year floodplain is an area where there is a 1 percent chance of inundation by a flood event in a given year, or a flood event once every 100 years. The 500-year floodplain is an area where there is a 0.2 percent chance of inundation by a flood event in a given year, or a flood event once every 500 years. The likelihood of a 100-year or 500-year flood event is based on historical hydrology; future flood flows may vary in frequency. Risk of flooding is influenced by local topography, frequencies of precipitation events, watershed size above the floodplain, and upstream development.

Federal, state, and local regulations often limit floodplain development to passive uses, such as recreation and conservation activities, to reduce risks to human health and safety. E.O. 11988, Floodplain Management provides guidelines agencies should use as part of their decision-making on projects having potential impacts or that would occur within floodplains. This E.O. requires federal agencies avoid, to the extent possible, long- and short-term, adverse impacts associated with occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

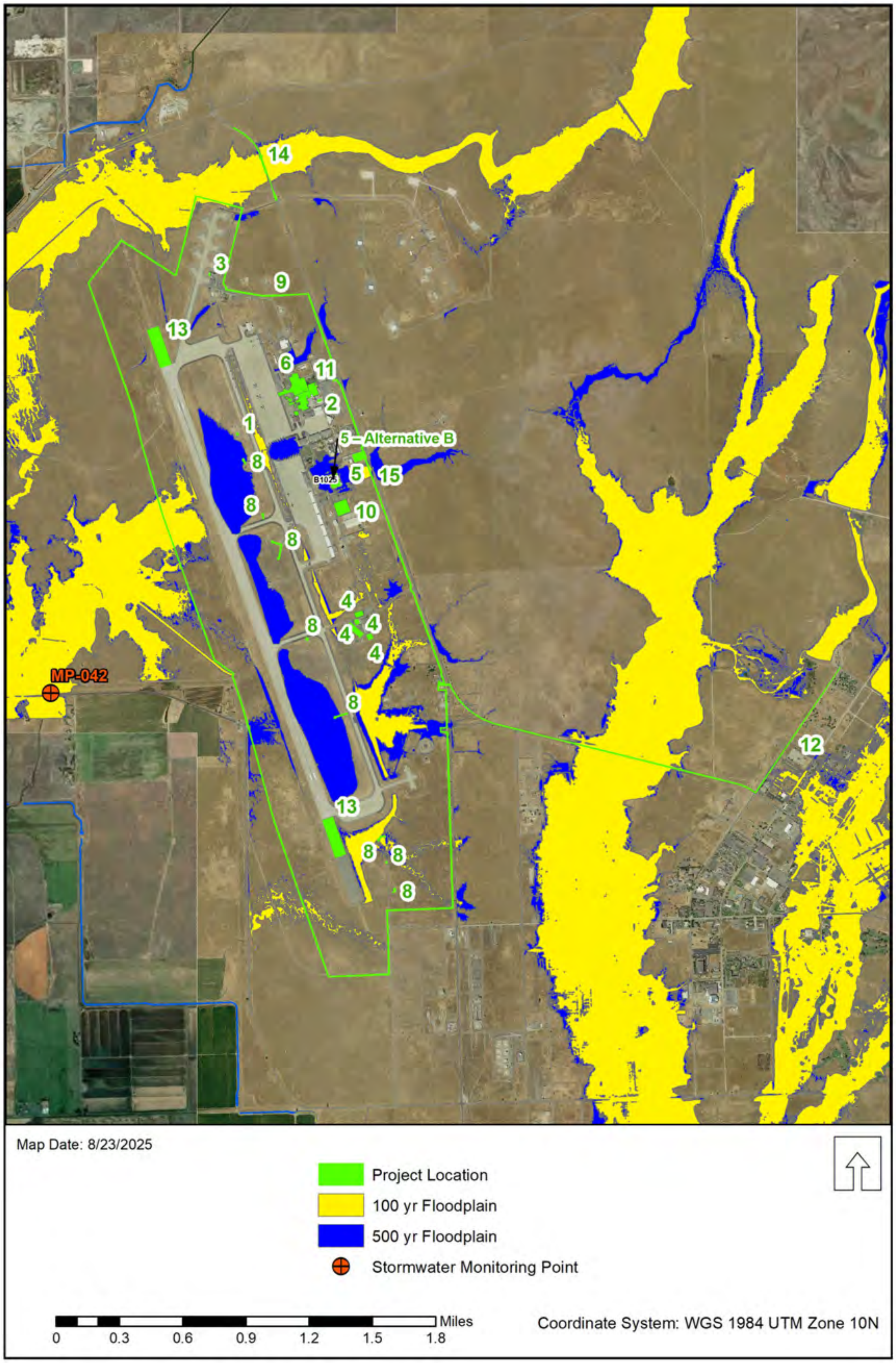

Figure 3-1 Floodplains and Stormwater Monitoring Point in the Project Area

Large floodplains exist around major drainages at Beale AFB (Dry, Reeds, and Hutchinson Creeks and Best Slough) and surround two unnamed drainages west of the Flightline (see **Figure 3-1**). Floodplain areas extend up drainages and, in most cases, include larger portions of banks of each creek. These areas may flood during heavy rainfall due to impervious soil conditions and a lack of topographic relief (Beale AFB, 2021a).

The total area of Beale AFB subject to flooding in a 100-year event is 5,878 acres, while the 500-year event is 7,455 acres (Beale AFB, 2021a). **Table 3-5** displays the properties at risk on Beale AFB under different flood scenarios.

Table 3-5 Number of Assets at Risk under Flooding Scenarios

Assets	100-year Event	500-year Event
Real Property Buildings	25	47
Hazardous Materials Sites	4	24
Hazardous Waste Sites	6	13
Storage Tanks	8	15
Percentage of the Airfield	0.9%	3.7%

Source: CSU, 2020

3.5.3 Environmental Consequences

Proposed Action

This section describes potential impacts of the Proposed Action on the water resources described above. Projects 1, 2, and 3 would have no effect on water resources because they consist solely of additions to existing buildings. All other projects may affect water resources. The following sections describe any differences in these impacts that could occur under the alternatives to Projects 4, 5, 8, 10, and 15.

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Adverse impacts to water resources would occur if the proposed or alternative actions:

- Reduce water availability or supply to existing users;
- Adversely affect water quality;
- Threaten or damage unique hydrologic characteristics;
- Endanger public health by creating or worsening health hazard conditions; or
- Violate established laws or regulations adopted to protect water resources.

Stormwater Management

Any project that increases the amount of impervious surface would increase stormwater flows and decrease infiltration rates. These changes could lead to increased erosion, sedimentation, and stormwater pollution, which would adversely affect surface water quality. Projects 4, 5, 6, 8, 10, and 14 would result in increased impervious surfaces and a negligible long-term adverse impact on stormwater management through increased runoff. Approximately 17.5 acres of new impervious surface would be created by the Proposed Action, consisting of new buildings and new pavement on undisturbed land. Environmental protection measures listed in **Appendix C** would reduce the magnitude of adverse effects.

Beale AFB has developed an SWPPP to comply with federal, state, and local regulations and reduce actual and potential releases of pollutants to stormwater runoff from the Beale AFB installation (Beale AFB, 2021b). The SWPPP includes best management practices (BMPs) to reduce pollution and the potential release of pollutants to stormwater runoff. The Proposed Action includes compliance with all BMPs in the SWPPP, both for on- and off-Beale AFB construction work associated with this alternative. Implementation of BMPs would reduce and minimize any adverse construction-related impacts to stormwater runoff to short-term and negligible levels.

All 15 projects involve some amount of construction, renovation, or demolition. Construction and demolition work itself can impact stormwater; these activities can cause erosion, sedimentation, and soil compaction (from heavy equipment use) that could have adverse impacts on stormwater flow and water quality. Indoor renovation projects also have the potential to impact stormwater from establishment of laydown areas and heavy equipment use at those sites. There could be minor short-term adverse impacts to stormwater from construction, renovation, and demolition. Environmental protection measures listed in **Appendix C** would be implemented to minimize stormwater impacts from construction, renovation, and demolition and would further reduce the magnitude of these effects. Additionally, all Beale AFB activities must adhere to the Beale SWPPP/Industrial General Permit. However, any project with construction activities that disturb 1 or more acres is not covered under the General Permit and is required to obtain a construction SWPPP under the California Construction General Permit Order 2009-009-DWQ. Specific stormwater pollution controls would be implemented specific to the site and the proposed actions.

The sources of impacts from construction would be limited to the area of ground disturbance at any one time and the duration of construction at each project site, and runoff would likely occur only during and after a subsequent precipitation event. A site-specific construction SWPPP would include measures to minimize potential impacts associated with stormwater runoff during construction, including BMPs and standard erosion control measures such as straw bales, sandbags, silt fencing, earthen berms, tarping, water spraying, soil stabilization, temporary sedimentation basins, and re-vegetation with native plant species, to decrease erosion and sedimentation. Potential impacts resulting from erosion or temporary increases in surface stormwater runoff during construction would be temporary, minor, and minimized by applying erosion control measures with limited operations during storm events.

Projects 4, 5, 6, 8, 10, and 14 would result in increased impervious surfaces and negligible long-term adverse impacts on stormwater management. In accordance with UFC 3-210-10, *Low Impact Development* (as amended 2016), and Section 438 of the Energy Independence and Security Act (EISA), projects that include facilities having a footprint consisting of new impervious area that exceeds 5,000 SF (0.1 acre) must maintain or restore pre-development site hydrology to the maximum extent technically feasible. Projects 4, 5, 6, 8, 10, and 14 are all anticipated to increase impervious surfaces by greater than 5,000 SF, meaning they would all be subject to EISA Section 438 requirements. Water quality and detention facilities would be designed into these projects to ensure compliance with EISA Section 438. Compliance with EISA Section 438 would result in no impacts to stormwater and water quality from increased impervious surfaces.

Project 14 (Repair Road and Culverts at Doolittle Gate) would have a long-term beneficial effect on stormwater management, as it would replace existing culverts under Doolittle Road with culverts sized appropriately for managing stormwater runoff. Project 15 (Repair Upstream Storm Drainage) would also have a long-term beneficial effect on stormwater management, as it would prevent clogging and potential flooding of Building 1029.

Floodplains

Portions of Projects 8, 12, and 15 are located within a 100-year floodplain. Projects 5, 6, 11, 13, and 15 are located within the 500-year floodplain. These projects may have a minor adverse impact on the floodplain, including a temporary increase in erosion and sedimentation. Because these projects may affect the floodplains, they would require a FONPA.

Overall Construction Impacts. Short-term, minor adverse impacts on water resources would be anticipated from construction activities from both the construction equipment and the un-stabilized soils after construction. No long-term adverse impacts are anticipated from construction.

Overall Operational Impacts. No short-term or long-term adverse impacts to water resources would be anticipated from operation of facilities associated with construction, renovation, and repair projects. There would be no adverse operational impacts to water resources from the demolition project.

Project 4 Alternatives

Project 4 Alternatives would generally result in the same impacts to water resources as the proposed Project 4, with one exception. Alternative C would relocate the basketball court, which could result in an increase in impervious surface and, therefore, an increase in potential stormwater runoff and the potential for stormwater pollution. Because the basketball court is larger than 5,000 SF, EISA Section 438 would apply. Adverse impacts to water resources from the basketball court would be negligible.

Project 5 Alternative

The Project 5 Alternative to install the new fitness center into an unused space in Building 1025 would result in no impacts to water resources because it would not involve construction and would not increase the amount of impervious surface.

Project 8 Alternative

The Project 8 Alternative would result in a smaller amount of new impervious roadway surface, resulting in less stormwater runoff and less potential for stormwater pollution. It would also entail a low water crossing for access to Vault #8, which would require some construction. Because construction would be necessary, there would be minor short-term adverse impacts to stormwater. There would be impacts to the waterway through loss of natural stream bed and from potential erosion, sedimentation, and direct petroleum contamination caused by vehicle tires and leaking parts. These adverse impacts would be long term, but minor, because of the anticipated infrequent use of the low-water crossing.

Project 10 Alternative

The Project 10 Alternative would result in 2.74 acres less impervious surface compared with the proposed Project 10, decreasing the amount of stormwater runoff, and decreasing the potential for stormwater pollution.

Project 15 Alternative

Impacts to water resources from the Project 15 Alternative would be the same as impacts from the proposed Project 15.

No Action Alternative

Under the No Action Alternative, the proposed stormwater infrastructure improvements would not be installed. The beneficial effects on stormwater management from Project 14 (Repair Road and Culverts at Doolittle Gate) and Project 15 (Repair Upstream Storm Drainage) would not be realized.

Cumulative Effects

Many of the reasonably foreseeable future actions at Beale AFB, listed in **Appendix E**, are construction projects that have potential to impact stormwater the same way projects in this EA may impact stormwater. Additionally, some potential future actions, such as flood control measures, would have a direct beneficial impact to water resources, adding to the stormwater benefits from some of the actions proposed in this EA. The Proposed Action would not result in significant long-term adverse impacts on water resources because implementation of environmental protection measures listed in **Appendix C,** adherence to requirements of the Construction General Permit, and site-specific SWPPPs would ensure that runoff from construction sites is minimized. Potential adverse environmental impacts on water resources from the Proposed Action are negligible to minor on their own and when added to impacts to water resources from other reasonably foreseeable future actions**.**

3.6 Geological Resources

3.6.1 Definition of the Resource

Geological resources are defined as the physiography, topography, geology, and soils of a given area. The ROI for geological resources in this EA is defined as the infrastructure and facilities proposed for alterations or construction and any associated land disturbance, such as laydown areas (see **Figure 2-1**).

3.6.2 Existing Conditions

Physiography and Topography

Beale AFB is located in the northern Sacramento Valley, situated on the divide between the Great Valley and Sierra Nevada physiographic provinces (Beale AFB, 2021a). The Sierra Nevada Province is a strongly asymmetric mountain range formed as a huge block uplifted on the east side of the range and tilted westward along a fault system. The Great Valley Province was formed as a structural down-warp between the Sierra Nevada Province on the east and the Coast Range Province on the west. At Beale AFB, alluvial deposits of the Great Valley overlap bedrock of the Sierra Nevada block (Beale AFB, 2021a). Topography is characterized by flat grasslands and low rolling hills that transition to the foothills of the Sierra Nevada along the east side of Beale AFB. Elevation within the ROI ranges from 100 to 160 feet above mean sea level, southwest to northeast (USGS, 1973).

Geology

Geology within the ROI includes three geomorphic units consisting of Pliocene-Pleistocene non-marine sedimentary deposits, recent alluvium and alluvial fan deposits, and Tertiary volcanic pyroclastic formations (California Department of Conservation, 1965). Most of the ROI lies on the Pliocene-Pleistocene era sediments consisting of silt, sand, clay, and unsorted gravel. The recent alluvial sediments border the southern and western limits of the ROI, while the Tertiary formation occurs along the higher ground to the northeast.

Soils

The ROI contains three primary soil map units: Perkins loam, Redding-Corning complex, and San Joaquin loam (NRCS, 1998). Perkins soils are alluvium derived, occur on stream terraces, and consist of well-drained loam over clay loam and gravels. Redding-Corning complex soils occur on high fan terraces and consist of well-drained gravelly loam. San Joaquin soils occur on low fan terraces and consist of well-drained loam. The Redding-Corning complex and San Joaquin units occurring throughout a majority of the ROI are underlain by low-permeability clays and hardpan (duripan), which typically limit construction to the dry season between May 1 and November 1 (Beale AFB, 2021b).

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are manmade compounds often used to make carpets, fabrics for furniture, clothing, paper packaging for food, firefighting foam, and items resistant to water, grease, fire, and stains (Beale AFB, 2021c). They are part of a group of chemicals called per-and poly-fluoroalkyl substances (PFAS) that can cause adverse health effects to persons exposed to them. The DoD is in the preliminary assessment/site inspection phase of investigating Beale AFB for PFAS use and potential release (DoD, 2022). It is known that aqueous film forming foam may be releasing PFAS into the soils in the vicinity of Project 11.

Groundwater

Beale AFB's water is sourced from a series of wells along the western boundary and not near the project area. Water testing in 2016 and 2021 found that drinking water sources on Beale AFB were non-detect for both PFOA and PFOS (Beale AFB, 2020a; Beale AFB, 2021a).

3.6.3 Environmental Consequences

Protection of unique geological features, minimization of soil erosion, and siting of facilities in relation to potential geologic hazards are considered when potential impacts of the Proposed Action on geological resources are evaluated. Generally, impacts can be avoided or minimized provided proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be adverse if they would alter the lithology, stratigraphy, or geological structures that control groundwater quality or availability. Impacts would also be considered adverse if the Proposed Action changes the soil composition, structure, or function of soil within the environment, or permanently increases the potential for erosion.

Proposed Action

An SWPPP and BMPs would be developed and implemented for each of the 15 proposed projects both during and after project construction, which would reduce the potential for adverse effects associated with erosion and sedimentation and transport of sediments in runoff. Additionally, all work must be performed in accordance with the Soils Management Plan, which outlines procedures and policies that all personnel and construction contractors must follow when disturbing, sampling, or disposing of excess soils (Beale AFB, 2011a). Project 12 – Replace Water Main may have minor permanent impacts to the soil structure in the immediate vicinity of the water main. Environmental protection measures listed in **Appendix C** include minimizing soil compaction and protecting topsoil. Because these projects would be developed and constructed to avoid impacts to geological resources, and the project areas would be stabilized and revegetated after construction, no significant impacts to geological resources are expected from any of the 15 projects to be implemented under the Proposed Action.

Project 4 Alternative

Under Project 4 Alternatives B, C, and D, the new Wildland Vehicle Storage Facility would be constructed at different sites in the vicinity of the Fire Station. Construction of the facility at any of the alternative sites would not affect geological resources differently than the Proposed Action.

Project 5 Alternative

Under Project 5 Alternative B, a new fitness center would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025. This alternative action would not change the type or magnitude of effects on geological resources because there would be no ground disturbing activities within an existing building.

Project 8 Alternative

Under Project 8 Alternative B, portions of the Fuel Transfer Line Access Road would take a different route, called Original Path, that accesses Vault 8 via a low-water crossing, which may increase the potential for erosion. Alternative B may have a slightly more adverse impact on geological resources compared with the

Proposed Action. All construction activities would comply with the Soils Management Plan as detailed above (Beale AFB, 2011a).

Project 10 Alternative

Under Project 10 Alternative B, additional POV parking would not be constructed at a vacant lot adjacent to the existing parking area. Instead, the existing parking area would be removed, and a two-story parking structure would be constructed at the same site. This alternative would not affect geological resources differently than the Proposed Action. All construction activities would comply with the Soils Management Plan as detailed above (Beale AFB, 2011a) and, therefore, no significant impacts to geological resources are expected.

Project 15 Alternative

Under Project 15 Alternative B, the wing walls would be 6 feet instead of 8 feet, and rather than installing a debris pit and protective grating, rounded cobble would be excavated and replaced with angular riprap at a reduced elevation. This alternative would have a slightly lower effect on geological resources compared with the Proposed Action because of the smaller wing walls. All construction activities would comply with the Soils Management Plan as detailed above (Beale AFB, 2011a) and, therefore, no significant impacts to geological resources are expected.

No Action Alternative

Under the No Action Alternative, the proposed Flightline installation development projects would not occur. There would be no potential to adversely affect geological resources. Without implementation of Project 14, the potential for erosion along Reeds Creek caused by the undersized culverts under Doolittle Drive would continue.

Cumulative Effects

No incremental or cumulative effects to geological resources are expected because none of the 15 projects in the Proposed Action or any of the action alternatives would adversely affect geological resources.

3.7 Surface Waters

3.7.1 Definition of the Resource

Surface water includes natural, modified, and constructed water confinement and conveyance features above groundwater. These features may or may not have a defined channel and discernable water flow and are generally classified as streams, springs, wetlands, natural and artificial impoundments (such as ponds and lakes), and constructed drainage canals and ditches. The ROI for this resource consists of the individual sites of the proposed projects and surface waters on and around Beale AFB that potentially receive drainage or infiltration from those sites.

3.7.2 Existing Conditions

Beale AFB is located on the eastern margin of the Sacramento River Basin Hydrologic Area, as designated by the California Department of Water Resources, just east of the confluence of the Feather and Yuba Rivers (Beale AFB, 2021a). Three large creeks pass through the base: Dry Creek in the eastern portion of the base, Reeds Creek along the northwest and west, and Hutchinson Creek, flowing through the middle.

The very southern portion of the Flightline drains into Hutchinson Creek. Reeds Creek and Hutchinson Creek exit Beale AFB to the south, and both pass through cropland before they reach the Bear River. Reeds Creek flanks the Flightline on the north and west, and is fed by water released from Miller Lake, drainages around the Flightline, and Brophy Canal (Beale AFB, 2021a). Both creeks have seasonal flows during spring runoff. **Figure 3-2** displays the surface water features in the project area.

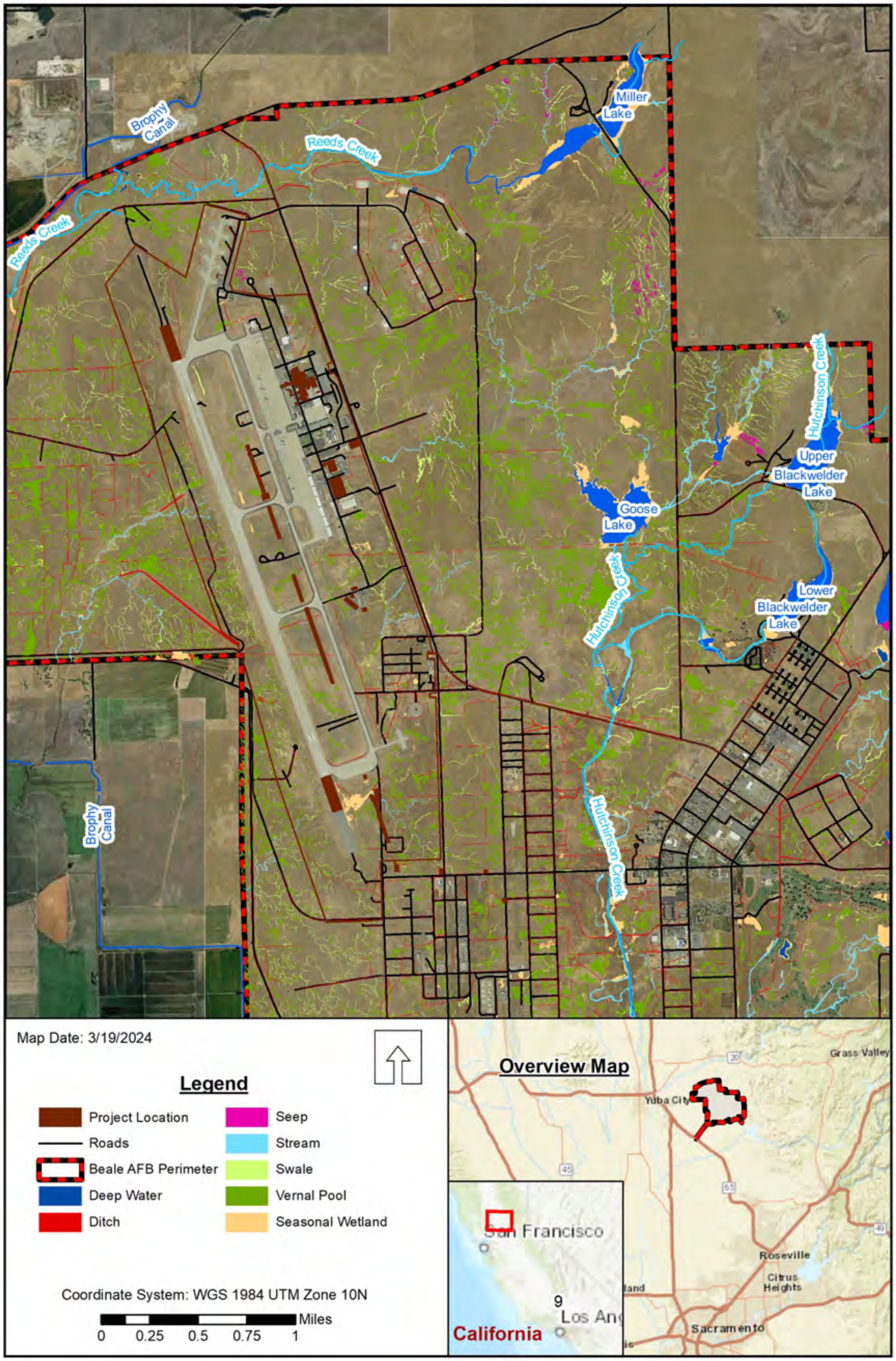

Figure 3-2 Surface Waters in the Project Area

Surface water on the base has low mineral content (total dissolved solids) and is unimpaired by any significant sources of pollution (Beale AFB, 2021a). Reeds Creek, Hutchinson Creek, and Dry Creek are not listed on the 2018 Clean Water Act Section 303(d) list of impaired waterways for California. Some portions of Reeds Creek and Hutchinson Creek are unfenced and used as a water source for livestock on base. The Bear River is listed for chlorpyrifos (pesticides), copper, and mercury from off-base sources related to historical mining in the Sierras and ongoing agriculture.

3.7.2.1 Potentially Jurisdictional Surface Waters (Waters of the United States)

These WOTUS are surface waters that are relatively permanent, standing or continuously flowing bodies of water that have a continuous surface connection to a jurisdictional surface water. These do not include ephemeral drainages that are dry most of the time. The USACE determines which surface waters are jurisdictional and regulates discharge of dredged or fill material into jurisdictional surface WOTUS pursuant to Section 404 of the CWA. Section 401 of the CWA requires that an applicant for a federal license or permit to conduct an activity that could result in a discharge into WOTUS provide the permitting agency a certification from the state where the discharge originates certifying that the license or permit complies with CWA requirements, including applicable state water quality standards.

3.7.2.2 Potentially Non-Jurisdictional Surface Waters

Surface waters that are not relatively permanent, standing or continuously flowing bodies of water that do not have a continuous surface connection to a jurisdictional surface water are potentially non-jurisdictional (in other words, the USACE will not claim jurisdiction). These include ephemeral drainages that are dry most of the time and wetlands lacking a surface connection to a jurisdictional surface water (isolated wetlands), such as vernal pools. These surface waters are regulated by other authorities, such as state and local governments, and a subset of these (wetlands) are protected under E.O. 11990, Protection of Wetlands.

From a regulatory standpoint, surface waters can be divided into two groups: wetlands, and other surface waters. As one of a number of subsets of surface waters, wetlands are singled out because they are protected by both the CWA and E.O. 11990.

3.7.2.3 Wetlands

Wetlands are a subset of surface waters identified as those areas that are inundated or saturated by surface or groundwater 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 (Environmental Laboratory, 1987). Wetlands generally include swamps, marshes, bogs, and similar areas.

E.O. 11990, Protection of Wetlands (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland and the proposed construction incorporates all possible measures to limit harm to the wetland.

Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether to build in wetlands. E.O. 11990 directs each agency to provide for early public review of plans for construction in wetlands.

3.7.2.4 Other Surface Waters

Other surface waters consist of waters that are not classified as wetlands. These include waters such as streams, ponds, lakes, ditches, and canals. These waters may or may not be protected under the CWA.

There are both potentially jurisdictional and potentially non-jurisdictional other surface waters on Beale AFB. Jurisdictional waters are relatively permanent, standing or continuously flowing bodies of water that have a continuous surface connection to another jurisdictional surface water.

3.7.2.5 Clean Water Act

USACE regulates discharge of dredged or fill material into waters and wetlands of the United States pursuant to Section 404 of the CWA. Section 401 of the CWA requires that an applicant for a federal license or permit to conduct an activity that could result in a discharge into WOTUS provide the permitting agency a certification from the state where the discharge originates certifying that the license or permit complies with CWA requirements, including applicable state water quality standards.

All WOTUS are regulated by USACE, under the oversight of USEPA or state equivalents, such as the Central Valley Regional Water Quality Control Board. Typically, only placement of fill into jurisdictional wetlands is regulated. Fill can be defined as nearly anything being placed into a wetland on a long-term basis. California relies primarily on Section 401 of the CWA (water quality certification) and the Porter-Cologne Water Quality Control Act to regulate wetlands statewide. Under CWA Section 401, every applicant for a federal permit or license for any activity that could result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards. Most certifications are issued in connection with USACE CWA Section 404 permits for dredge and fill discharges.

Beale AFB received concurrence on a preliminary jurisdictional determination (PJD) for a light detection and ranging-based surface waters delineation in accordance with USACE Regulatory Guidance Letter 08-02, for the Beale AFB Planning Area in a letter dated October 23, 2012 (USACE, 2012). A Verification Area of 384 acres was reviewed for this group of projects within the area of the 2012 PJD. Project sites were verified and reviewed by qualified wetland scientists during field visits on April 7, 11, and 29, and July 5, 6, 8, and 25, 2022. This review served to verify the existence and nature of surface waters from the 2012 PJD.

Within the Verification Area, the surface waters mapping confirmed 39.13 acres of USACE-verified WOTUS, 1.6 acres of USACE-verified jurisdictional waters were identified as potentially non-jurisdictional, and approximately 2.63 acres of potentially jurisdictional waters were newly delineated. These resources are summarized in **Table 3-6** and shown on **Figure 3-3.**

Table 3-6 Summary of Surface Waters in the Project Area

Surface Water Category	Acres in the ROI	Regulatory Protection
All Surface Waters	**293.28**	
Wetlands (total)	129.64	E.O. 11990 and CWA if jurisdictional
Seasonal wetland	6.37	E.O. 11990 and CWA if jurisdictional
Seep	0.58	E.O. 11990 and CWA if jurisdictional
Swale	15.79	E.O. 11990 and CWA if jurisdictional
Vernal pool	106.90	E.O. 11990 and CWA if jurisdictional
Other surface waters (total)	73.71	
Ditch	33.42	CWA if jurisdictional
Stream	40.29	CWA if jurisdictional

Source: Beale AFB, 2022b and addendum

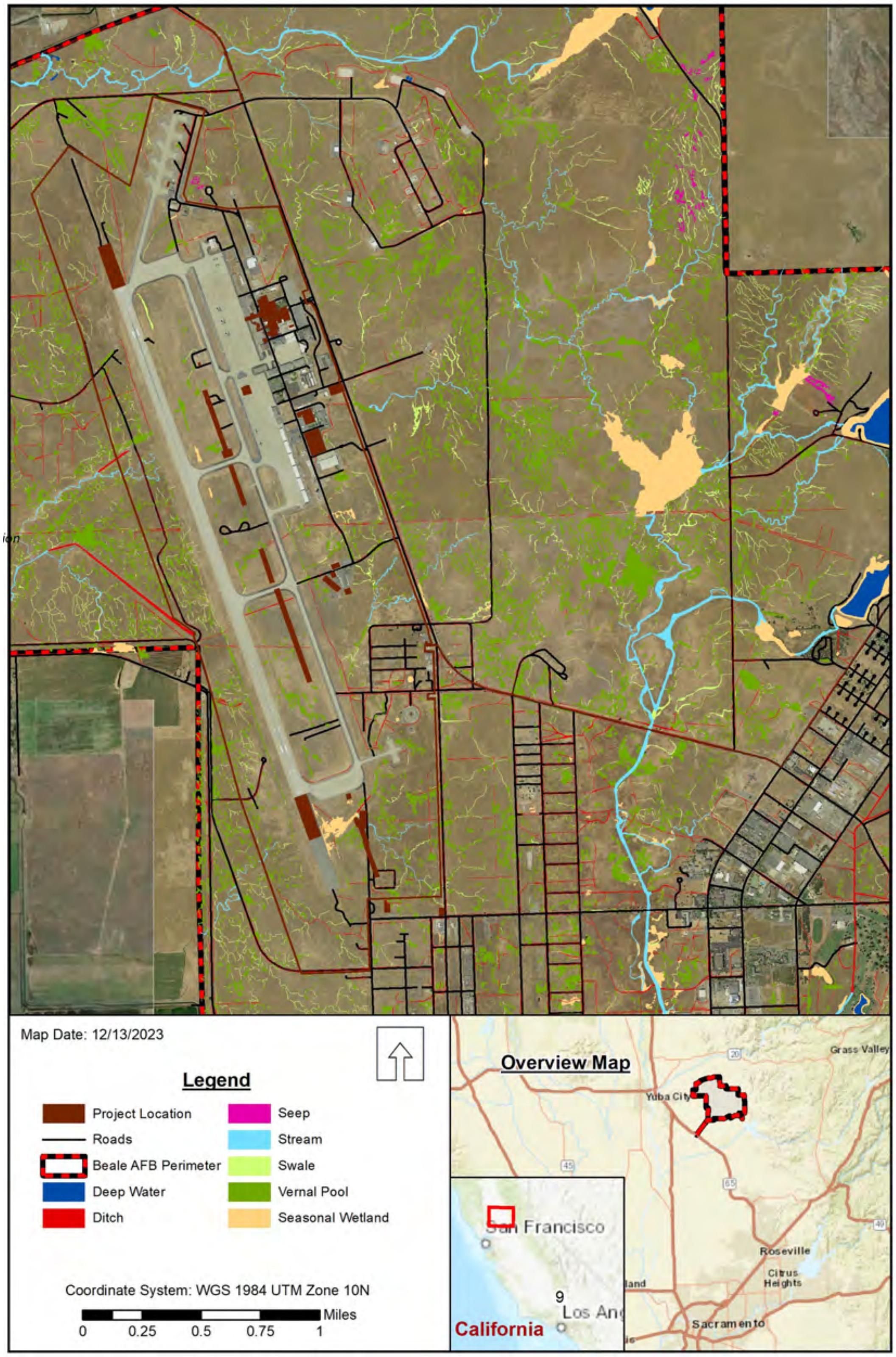

Figure 3-3 Surface Waters in the Vicinity of the Project Area

3.7.3 Environmental Consequences

Construction, renovation, and demolitions projects can directly or indirectly cause adverse effects on surface waters. Direct effects from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in relation to surface waters. Impacts to surface waters from the proposed projects are described in the following subsections. A FONPA has been prepared because the proposed action and all of the action alternatives would affect wetlands. In compliance with E.O. 11990, Protection of Wetlands, for a Finding of No Practicable Alternative, the DAF has analyzed all practicable alternatives (see **Sections 2.5** and **2.6**).

Alternatives for five of the projects (Projects 4, 5, 8, 10, and 15) may affect surface waters differently than the Proposed Action. These alternatives are described in the following sections. Several of these alternatives were developed specifically to avoid or minimize effects on surface waters. Environmental protection measures listed in **Appendix C** would be implemented under all of the action alternatives.

Determination of the significance of surface waters impacts is based on (1) the function and value of the surface water, (2) the proportion of the surface water that would be affected relative to the occurrence of similar surface waters in the region, (3) the sensitivity of the surface water to proposed activities, and (4) the duration of ecological ramifications.

As part of the USACE permitting process, the Air Force would be required to provide compensatory mitigation for the unavoidable loss of jurisdictional surface waters, which would occur under all of the action alternatives. The exact acreage of impact on jurisdictional surface waters will not be known until the USACE makes a jurisdictional determination regarding surface waters. Wetland mitigation would likely be in the form of credit purchase from an off-site mitigation bank. These credits would ensure the project would result in no net loss of surface waters.

Indirect effects on surface waters from erosion and sedimentation during construction would be controlled using BMPs as part of the National Pollutant Discharge Elimination System (NPDES) permit for stormwater runoff and a project-specific SWPPP. Indirect operational impacts would be mitigated through site design that precludes stormwater discharges to surface water. Because all the requirements described above will be met, impacts to surface waters would be mitigated to a level that is less than significant, regardless of action or alternative.

Proposed Action

Under the Proposed Action, surface waters would be permanently affected by direct impacts from Projects 8, 10, 14, and 15. Projects 1, 2, 3, 6, 11, and 16 would not affect surface waters because they are not located on or near any surface waters. Projects 4, 5, 9, 12, and 13 are located adjacent to surface waters, but impacts would be avoided. Of the 293.28 acres of surface waters identified within 250 feet of the project areas, 270.40 acres would be avoided, and 0.42 acres would be permanently impacted. **Table 3-7** presents the estimated impacts on surface waters by type, project, and alternative.

Project 12 would replace the water main line from the Family Camp area to the WTP. The water main line crosses under Hutchinson Creek, which is considered WOTUS. Trenchless installation would be employed below creek crossings; therefore, there would be no impact to Hutchinson Creek.

Project 14 would replace the existing Reeds Creek culverts at the Doolittle Gate with larger culverts to increase capacity and span the new road width. There would be minor short-term adverse impacts to surface water from construction resulting from increased erosion, sedimentation, and soil compaction, which can increase runoff. There would be no long-term adverse impacts to surface water from the larger culverts because the larger culverts would allow for a more natural stream flow.

Table 3-7 Estimated Impacts on Surface Waters by Project and Alternative

Project	Surface Water Impacts (acres)				
	Seasonal Wetland	Swale	Vernal Pool	Ditch	Total
8 – Construct Fuel Transfer Access Line Access Road	0	0	0	0.01	0.01
Alternative B	*5.2*	*0*	*2.22*	*1.44*	*8.86*
10 – Construct Additional POV Parking	0	0	0	0.15	0.15
Alternative B	*0*	*0*	*0*	*0*	*0*
14 – Repair Road and Culvert at Doolittle Gate and Doolittle Drive Pullout	0	0	0.03	0.22	0.25
15 – Repair Upstream Storm Drainage PSPTS, Bldg. 1029	0	0.01	0	0	0.01
TOTAL FOR PROPOSED ACTION	**0**	**0.01**	**0.03**	**0.38**	**0.42**
TOTAL WITH PROJECT 8 ALTERNATIVE B	**5.2**	**0.01**	**2.25**	**1.82**	**9.28**
TOTAL WITH PROJECT 10 ALTERNATIVE B	**0**	**0.01**	**0.03**	**0.38**	**0.42**

Notes:
Source: Beale AFB, 2022b
Totals are for the Proposed Action. Impacts of alternatives are shown in the table by project number.

Table 3-8 is a summary of the surface water impacts by regulatory protection.

Table 3-8 Summary of Surface Water Impacts

Surface Water Category	Acres Impacted	Regulatory Protection
Potentially Jurisdictional Surface Waters		None
Seasonal wetland (total)	0.00	E.O. 11990 and CWA if jurisdictional
Swale	0.01	E.O. 11990 and CWA if jurisdictional
Vernal pool	0.03	E.O. 11990 and CWA if jurisdictional
Ditch	0.38	CWA if jurisdictional

Source: Beale AFB, 2022b and addendum

Project 4 – Wildland Fire Storage Facility

Potential impacts to 0.06 acres of a swale located within a 100-foot buffer around the project footprint would be avoided through the use of erosion controls.

Project 5 – Flightline Fitness Center

Potential impacts to 0.08 acres of a ditch located adjacent to the project footprint would be avoided through differences in elevation and the presence of a road between the work area and the ditch.

Project 8 - Construct Fuel Transfer Line Access Road

Permanent impacts would include 0.02 acres of seasonal wetland, 0.02 acres of vernal pool, and 0.01 acres of ditch. Under the Proposed Action, Project 8 includes three options to cross a small intermittent waterway for access to Vault 8: construction of a bridge, installation of a culvert, or via a low-water crossing. While any of the options would have minor adverse impacts on the waterway, construction of a bridge would have the lowest magnitude of impacts because direct impacts to the waterway would be avoided, and the effects would be temporary. Installation of culvert would require disturbance within the waterway, and the effects would be both temporary (disturbance during construction), and permanent (footprint of the culvert). A low-water crossing would result in long-term disturbance with loss of vegetation.

Project 10 - Construct Additional POV Parking

Construction would directly impact 0.15 acres of a ditch that would be paved and rerouted.

Project 14 - Repair Road and Culverts at Doolittle Gate

Permanent impacts would include 0.22 acres of ditch and 0.03 acres of vernal pool within the project footprint.

Project 15 - Repair Upstream Storm Drainage PSPTS, Building 1029

Permanent impacts would include 0.01 acres of swale within the project footprint.

Under any of the following project alternatives, the area of permanent impacts would be the same as the Proposed Action, except for Project 8 - Alternative B, which would involve 0.04 acres more permanent impacts on surface waters.

Project 4 Alternatives

Under Project 4 Alternatives B, C, and D, the new Wildland Vehicle Storage Facility would be constructed at different sites in the vicinity of the fire station. Alternative C would not affect surface waters.

Project 5 Alternative

Under Project 5 Alternative B, a new fitness center would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025. Therefore, the 1.6 acres of land within the footprint would not be affected. This alternative would not affect surface waters.

Project 8 Alternatives

Under Project 8 Alternative B, portions of the Fuel Transfer Line Access Road would take a different route, called Original Path, that follows the fuel line route and does not avoid surface waters. Compared with the Proposed Action (Direct Path), this route would affect 5.2 acres more seasonal wetlands, 2.22 acres more vernal pools, 1.43 acres less ditch, and the same amount of stream habitat. Therefore, Project 8 Alternative B would have a greater adverse effect on surface waters, including vernal pools.

Project 10 Alternative

Under Project 10 Alternative B, additional POV parking would not be constructed at a vacant lot adjacent to the existing parking area; instead, the existing parking area would be removed and a two-story parking structure would be constructed at the same site. This alternative would not affect any surface waters.

Project 15 Alternative

Under Project 15 Alternative B, the wing walls would be 6 feet instead of 8 feet, and rather than installing a debris pit and protective grating, rounded cobble would be excavated and replaced with angular riprap at a reduced elevation. These changes would slightly reduce the affected area of vernal pool habitat compared with the Proposed Action.

Mitigation

Under all of the action alternatives, compensatory mitigation would be required to reduce the level of impacts to surface waters. Compensatory mitigation would be in the form of a purchase of credits from an off-site mitigation bank, as described in **Appendix D**. Under the Proposed Action and most of the alternatives, there would be approximately 0.42 acres of permanent impacts (see **Table 3-8**). Under the

Proposed Action with Project 8 Alternative B, the total would be approximately 8.86 acres. Mitigation would ensure no net loss of surface waters and reduce the level of impact to less than significant.

No Action Alternative

Under the No Action Alternative, the proposed Flightline installation development projects would not be implemented; therefore, there would be no effects from construction, repair/renovation, or demolition on surface waters in the project area. Without repair of the Water Main (Project 12), the potential would continue for surface waters (including vernal pools) to be disturbed each time maintenance on the water main is required. Impacts to vernal pools along the fuel transfer line inspection road would continue if a new access road (Project 8) is not constructed.

Cumulative Effects

Implementation of the Proposed Action and all of the action alternatives would result in the loss of several types of surface waters. Compensatory mitigation would be required for these impacts, resulting in no net loss, as described in **Appendix D**. Therefore, the impacts of this project would not be additive to the potential future impacts of the reasonably foreseeable future projects listed in **Appendix E**, and no cumulative effects on surface waters would occur.

3.8 Biological Resources

3.8.1 Definition of the Resource

Biological resources include native or naturalized plants and animals, along with the biotic communities, such as wetlands and grasslands, where they exist. Sensitive and protected biological resources include species listed as threatened or endangered by the federal government or state agency.

3.8.2 Existing Conditions

Vegetation

Four wildlife habitat and vegetation associations have been identified at Beale AFB that are of particular importance to fish and wildlife: annual grassland with associated vernal pools and intermittent streams; riparian deciduous woodland associated with perennial streams and lakes; lakes, impoundments, and associated marsh habitat; and oak woodland/savanna (Beale AFB, 2021d). Most of the vegetation in and around the Flightline Area is annual grassland/herbaceous with intermittent streams and vernal pools **(Figure 3-4)**.

Reeds Creek and Hutchinson Creek are the only streams in the project area, and both are intermittent. Reeds Creek begins at a spring off base above Miller Dam/Reservoir and can receive additional water from an irrigation canal on the northwest side of the base. Within the project area, the creek lacks riparian vegetation and is surrounded by grazed grassland. Farther downstream, patchy riparian vegetation composed mostly of willow shrublands is present. Hutchinson Creek is fed by impoundments on the base, rain, and small drainages and seeps north/northeast of the base. Much of Hutchinson Creek is deeply incised/downcut below its natural streambed, which may contribute to declining riparian vegetation (Beale AFB, 2021d). Riparian woodland vegetation and freshwater marsh vegetation are both present along portions of Hutchinson Creek. Within the project area, vegetation along the creek is riparian scrub.

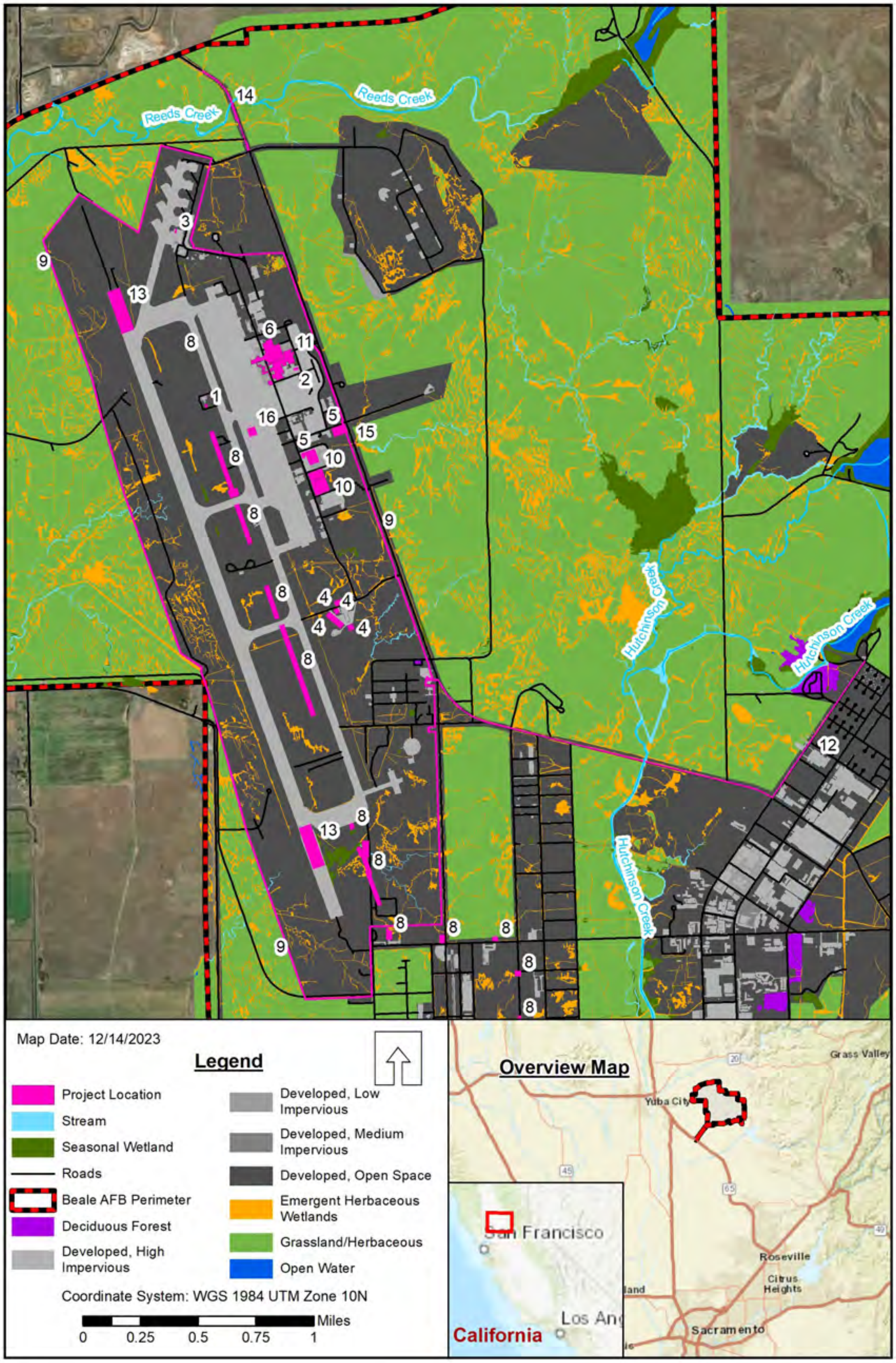

Figure 3-4 Habitat Overview

Wetlands Including Vernal Pools

Wetlands are special aquatic sites that have a greater resource value than other jurisdictional waters, as they provide habitat functions and values that bolster flood control, increase foraging habitat for migratory bird species, and support aquatic habitat for many endangered or threatened plant and wildlife species. These features require specific avoidance and mitigation strategies to ensure no net loss of wetland functions or values. Annual grasslands within Beale AFB support vernal pools, swales, and seasonal wetlands; however, vernal pools are the most common type of wetland at Beale AFB. The major differences in these types of wetlands are the length of time they hold water and the species they attract. All these aquatic features can provide important foraging, breeding, and cover habitat for the federally listed vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*), in addition to special status amphibian, bird, and plant species (Beale AFB, 2021d).

Vernal pools are topographic depressions with impervious clay pan, hardpan, or bedrock bottoms that fill with water in the winter-spring rainy season and then dry completely by early summer. Surface water ponds in these depressions because they lack external drainage, and water infiltration is slow to nonexistent because of the underlying impervious soil layers. The length of time vernal pools can be inundated varies from several days to the entire length of the wet season. There are numerous vernal pools within and adjacent to the Flightline Area; some are located within or near several of the project footprints **(Figure 3-3)**.

Wildlife

Annual grasslands provide nesting and breeding habitat for a variety of grassland birds, and foraging habitat for many bird species that breed in other habitats (Beale AFB, 2021a). The proximity of riparian areas, oak woodlands, and wetlands enhances the value of annual grasslands. Annual grasslands at Beale AFB also provide foraging habitat for several bird species present in the region only during winter. A study of avian use of areas in and around the Flightline found that a majority of the birds were blackbirds, waterfowl, and grassland birds (Cain et al., 2001). Annual grasslands provide important habitat for many mammals and reptiles as well, such as mule deer (*Odocoileus hemionus*), black-tailed jack rabbit (*Lepus californicus*), gophersnake (*Pituophis catenifer*), and North Pacific rattlesnake (*Crotalus oreganus*) (Beale AFB, 2021a).

During the dry season, vernal pools are similar in their wildlife species composition to annual grasslands. During the wet season, however, this habitat supports a higher diversity of bird species from late fall to early spring. Concentrations of several hundred ducks have been observed using seasonal wetlands in the northwestern corner of Beale AFB. Mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and American widgeon (*Mareca americana*) are the most common species. Amphibians such as the Pacific treefrog (*Pseudacris regilla*), and western toad (*Anaxyrus boreas*) also use vernal pools and other seasonal wetlands while they are inundated. Gartersnakes (*Thamnophis sirtalis*), northern raccoons (*Procyon lotor*), and other predators feed on these amphibians. Vernal pools also contain crustaceans, tadpole, and fairy shrimp, which are important prey for other species. Annual grasslands on Beale AFB, especially ungrazed and unmowed areas, provide important floral resources for pollinators (Marty, 2020).

Special Status Species

Sixty-one threatened, endangered, or other special-status plant, fish, and wildlife species are either known to occur or have the potential to occur at Beale AFB (Beale AFB, 2021a). Of these, three federally listed wildlife species, one candidate for federal listing, and five state-listed wildlife species have either been documented within the project area or have moderate potential to occur in the project area because suitable habitat is present. These species are listed in **Table H-1** in **Appendix H**. There is no designated critical habitat for federally listed threatened or endangered species on Beale AFB. Beale AFB consults with USFWS on a project-by-project basis to determine whether suitable habitat for federally listed species occurs within or near a project area. **Figure 3-5** shows the location of occurrences of the two federally listed species: vernal pool fairy shrimp and vernal pool tadpole shrimp at Beale AFB.

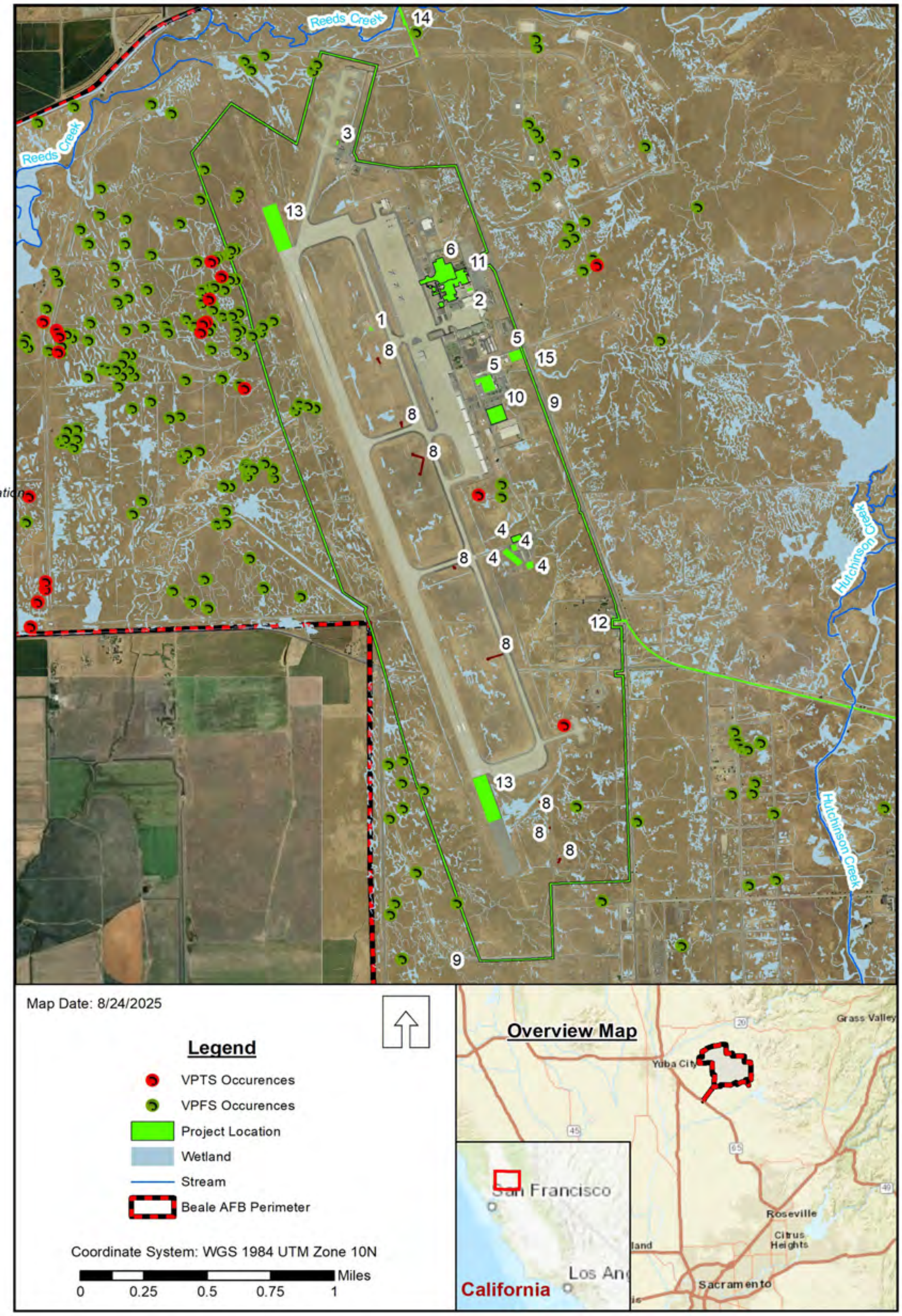

Figure 3-5 Occurrences of Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat

Two state special-status plant species have been documented at Beale AFB and may occur within vernal pools in the project area: dwarf downingia (*Downingia pusilla*) and legenere (*Legenere limosa*).

3.8.3 Environmental Consequences

Impacts to biological resources from the proposed projects are described in the following subsections. The USFWS concluded in a Biological Opinion that the Proposed Action may affect and is likely to adversely affect the vernal pool fairy shrimp and vernal pool tadpole shrimp, as well as may affect but is not likely to adversely affect the valley elderberry longhorn beetle. Alternatives for five of the projects may affect biological resources differently than the Proposed Action (Projects 4, 5, 8, 10, and 15). Several of these alternatives were developed specifically to avoid or minimize effects on biological resources. Environmental protection measures listed in **Appendix C** would be implemented under all of the action alternatives.

Construction, renovation, and demolition projects can directly or indirectly cause adverse effects on biological resources. Direct effects from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in relation to biological resources. Effects would be considered significant if they could cause reductions in population size or distribution of wildlife or affected individuals or habitats of special status species.

The significance of effects on biological resources is based on the following:

- The importance (legal, commercial, recreational, ecological, or scientific) of the resource
- The proportion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications.

Proposed Action

Projects 1, 2, 3, 6, 11, and 16 are located on developed land that lacks vegetation; therefore, those projects would have no effect on vegetation or special status species.

Impacts to Vegetation. Projects 4, 5, 8, 9, 10, 12, 13, 14, and 15 are located on currently undeveloped land vegetated with both native and non-native grassland species. Footprints of 10 projects overlap with wetlands or vernal pools. Upland or wetland vegetation currently within the footprints would be removed prior to construction. Environmental protection measures described in **Appendix C** would avoid and minimize adverse effects to the extent practicable. Loss of wetland area would be mitigated at a minimum of a ratio of 1:1 at an off-site mitigation bank, as described in **Appendix D.**

Because environmental protection measures would be implemented, adverse impacts to vegetation would be short-term (during construction) to long-term (loss of vegetation within project footprints) and negligible to minor (based on compensatory mitigation for wetland vegetation).

General Wildlife Impacts. As a result of the developed nature of most of the project sites, little to no wildlife is expected to be present; therefore, any adverse impacts would be minor. Environmental protection measures described in **Appendix C** would reduce the potential for adverse impacts to wildlife. These measures include preconstruction surveys for nesting birds and avoidance or protection of aquatic habitats. Significant impacts to wildlife are not expected with implementation of environmental protection measures. In addition to potential adverse short-term disturbance impacts during construction, several projects would also have long-term beneficial impacts on wildlife; these projects are described in **Appendix H**.

Impacts to Federally Listed Species. Consultation with the USFWS is required under Section 7 of the ESA regarding actions that may affect federally listed endangered or threatened species and must ensure that these actions do not jeopardize the continued existence of these species or result in destruction or adverse modification of critical habitat designated for these species. In light of the potential for adverse impacts to federally listed species, a Biological Assessment (BA) **(Appendix A.5)** was submitted to the USFWS, and consultation was concluded in September 2025 with receipt of a Biological Opinion **(Appendix A.6),** which includes an Incidental Take Statement for vernal pool branchiopods. Note that in the BA the projects are labeled as activities rather than projects. Consultation was not conducted for the alternatives to Projects 8, 10, and 15; it is limited to the Proposed Action only.

Project 4 Alternatives

Under Project 4 Alternatives B, C, and D, the new Wildland Vehicle Storage Facility would be constructed at different sites in the vicinity of the Fire Station. Construction at any of these sites is not expected to have more than a minor effect on general biological resources because none of the sites contains high-value vegetation or wildlife habitat. However, they could indirectly affect nearby vernal pools, which is habitat for two federally listed shrimp species. The Alternative B site contains 0.17 acres of vernal pools; there is no surface waters at the Alternatives C and D sites. Construction at the B or D site could have minor, temporary, indirect impacts on vernal pool habitat, such as degradation of water quality or changes in the amount, duration, or timing of surface water runoff.

Project 5 Alternative B

Under Project 5 Alternative B, a new fitness center and parking lot would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025. Therefore, the 1.6 acres of land within the footprint would not be affected. This difference would not change the type or magnitude of effects on biological resources.

Project 8 Alternative B

Under Project 8 Alternative B, portions of the Fuel Transfer Line Access Road would take a different route, called Original Path, which follows the fuel line path and does not avoid surface waters. Compared with the Proposed Action (Direct Path), this route would affect 8.33 acres more surface waters. Therefore, Project 8 Alternative B would have a greater adverse effect on biological resources, including loss of or disturbance to vegetation, surface waters, and habitat for federally listed shrimp species. Impacts would be long term and moderate.

Project 10 Alternative B

Under Project 10 Alternative B, additional POV parking would not be constructed at a vacant lot adjacent to the existing parking area; instead, the existing parking area would be removed and a two-story parking structure would be constructed at the same site. Compared with the Proposed Action, this alternative would not affect a nearby vernal pool and would therefore have less effects on vegetation and federally listed species habitat. In addition, 7 acres of vegetation would not be permanently paved.

Project 15 Alternative B

Under Project 15 Alternative B, the wing walls would be 6 feet long instead of 8 feet long, and rather than installing a debris pit and protective grating, rounded cobble would be excavated and replaced with angular riprap at a reduced elevation. These changes would slightly reduce the affected area of vernal pool habitat compared with the Proposed Action, but would not affect the amount of listed species habitat mitigation.

No Action Alternative

Under the No Action Alternative, the proposed Flightline installation development projects would not be implemented; therefore, there would be no effects from construction, repair/renovation, or demolition on biological resources in the project area.

Cumulative Effects

Construction would result in disturbance of vegetation and wildlife habitat. Construction and operations would result in direct and indirect adverse effects on threatened and endangered species and their habitats. Some projects would adversely impact vernal pool crustaceans and surface waters; however, these impacts would be required to be mitigated using compensatory mitigation so that no net loss would occur and no contribution of cumulative effects would occur. The minor, temporary impacts to upland vegetation and wildlife would not require mitigation and would thus be additive to the potential future impacts of reasonably foreseeable future projects listed in **Appendix E**, increasing their overall magnitude.

3.9 Cultural Resources

3.9.1 Definition of the Resource

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and E.O.'s. The Area of Potential Effect (APE) as defined for analyzing historic properties in this EA is defined as the infrastructure and facilities proposed for alterations and any associated areas of land disturbance, such as laydown areas (see **Figure 2-1**). **Figures B-2** through **B-8** illustrate the boundaries of the proposed APE for all projects except Project 12. The APE for Project 12 is defined as the 2.4-mile-long trench 24 to 30 inches wide with a 100-foot buffer **(Figure B-5)**. The California SHPO concurred with this APE definition **(Appendix A)**.

3.9.2 Existing Conditions

The Beale AFB Integrated Cultural Resources Management Plan (ICRMP) identifies 165 previously recorded archaeological sites across the installation, including prehistoric, pre-military, and military sites. Prehistoric site types consist of lithic scatters, seasonal encampments, bedrock milling stations, quarries, and rock art (petroglyphs and pictographs) spanning nearly 5,000 years. Review of the ICRMP indicates only one archaeological site is recorded within the APE, located within the Project 9 footprint (CA-YUB-1287H). This site is a pre-military era refuse dump determined not eligible for listing on the National Register of Historic Places (NRHP) (Beale AFB, 2005; Beale AFB, 2020b).

Architectural Resources. Review of Real Property records and the Beale AFB ICRMP indicates that all architectural resources that would be affected by the proposed projects have been determined not eligible or are less than 50 years old, with the exception of the two SR-71 shelters (Project 16), which have not been formally evaluated, but are assumed eligible for listing in the NRHP.

Traditional Cultural Properties (TCPs). No formally designated TCPs or sacred sites have been recorded on Beale AFB (Beale AFB, 2020b) and none were identified during consultation undertaken for this EA. Correspondence related to tribal consultation can be found in **Appendix A**.

3.9.3 Environmental Consequences

Effects on cultural resources may include physically altering, damaging, or destroying all or part of a resource or altering characteristics of the resource that make it ineligible for listing in the NRHP. Those effects can include introducing visual or audible elements that are out of character with the property or its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For this EA, an effect is considered adverse if it alters the integrity of a historic property (NRHP-listed or eligible archaeological sites or architectural resources) or if it has the potential to adversely affect TCPs and the practices associated with the property.

Proposed Action

With the exception of Project 16, there are no significant archaeological sites, architectural resources, or TCPs within, adjacent to, or in the general vicinity of the APE. Therefore, per 36 CFR § 800.4, *Identification of Historic Properties*, no historic properties would be affected by implementation of any of the 15 other projects associated with the Proposed Action. Project 16 consists of demolition of two SR-71 shelters, which have not been formally evaluated, but are assumed eligible for listing in the NRHP. Before this project would be implemented, they would be evaluated, and consultation with the SHPO under Section 106 of the NHPA would be completed. Environmental protection measures listed in **Appendix C** would be implemented under all of the action alternatives to avoid or minimize the effects of the proposed project activities on any undiscovered cultural resources.

Project 4 Alternative

Under Project 4 alternatives B, C, and D, the new Wildland Vehicle Storage Facility would be constructed at different sites in the vicinity of the Fire Station. Construction of the facility at of any of the alternative sites would not affect cultural resources differently than the Proposed Action.

Project 5 Alternative

Under Project 5 Alternative B, a new fitness center would not be constructed; rather, a new fitness center would be installed within currently unused space in Building 1025. This alternative would not adversely affect architectural resources, as Building 1025 has been previously determined not eligible for inclusion in the NRHP (Beale AFB, 2020b).

Project 8 Alternative

Under Project 8 Alternative B, portions of the Fuel Transfer Line Access Road would take a different route, called Original Path, that accesses Vault 8 via a low-water crossing. Alternative B would not affect cultural resources differently than the Proposed Action.

Project 10 Alternative

Under Project 10 Alternative B, additional POV parking would not be constructed at a vacant lot adjacent to the existing parking area; instead, the existing parking area would be removed, and a two-story parking structure would be constructed at the same site. This alternative would not affect cultural resources differently than the Proposed Action.

Project 15 Alternative

Under Project 15 Alternative B, the wing walls would be 6 feet instead of 8 feet, and rather than installing a debris pit and protective grating, rounded cobble would be excavated and replaced with angular riprap at a reduced elevation. This alternative would not affect cultural resources differently than the Proposed Action.

No Action Alternative

Under the No Action Alternative, the proposed Flightline installation development plan projects would not occur. There would be no potential to adversely affect historic properties.

Cumulative Effects

The Proposed Action and alternatives, in addition to the reasonably foreseeable future actions on Beale AFB listed in **Appendix B**, are not anticipated to result in incremental or cumulative effects to historic properties, including archaeological sites, architectural resources, or TCPs, as there are no historic properties in the APE.

3.10 Infrastructure

3.10.1 Definition of the Resource

Infrastructure consists of the fundamental systems that enable a population in an area to function. Infrastructure includes transportation, power supply, water supply, fire suppression, sewer and wastewater systems, stormwater management, natural gas supply, liquid fuel supply, and communications. Most infrastructure maintenance at Beale AFB is supervised by the 9th Civil Engineer Squadron (9 CES), although Beale AFB also partners with local private utility systems.

The infrastructure components of sewer and wastewater systems, natural gas supply, communications, and solid waste management are not considered in this analysis since the Proposed Action would not affect them. Transportation, power supply, liquid fuel supply, water supply, fire suppression, and stormwater management are analyzed as they have the potential to be affected by the Proposed Action.

3.10.2 Existing Conditions

This section provides an overview of each infrastructure component and a summary of its current condition. Generally, infrastructure systems at Beale AFB are in fair condition with ample capacity for future growth; however, many of the systems require upgrades and ongoing maintenance.

Transportation. Vehicle access to Beale AFB is through three State Routes (SR), SR65, SR70, and SR20. SR65 is a north-south, access-controlled, four-lane divided highway that extends from Interstate 80 to South Beale Road for access to Beale AFB from the south. SR70, a primarily two-lane rural highway, provides access to Beale AFB on the south and to Oroville on the north. SR 20 is an east-west, two-lane rural roadway located north of Beale AFB. Five roadways provide access to Beale AFB. North Beale Road extends from SR70 to the Schneider Gate; Hammonton-Smartsville Road accesses the installation at the Doolittle Gate via North Beale Road and SR20; Chuck Yeager Road provides access to the Grass Valley Gate; South Beale Road from SR65 accesses the installation through the Wheatland Gate; and Spenceville Road to SR65 for access to the Vassar Lake Gate (Beale AFB, 2015).

The Schneider Gate (Main Gate) has historically been considered the main access point to Beale AFB. However, with a shift of Beale AFB personnel to residences in the south, the Wheatland Gate is now the busiest. To accommodate this increased volume in traffic, the gate is open for one-way traffic into the installation during the morning commute and reverse for the evening commute.

The main arterial roads on the installation include Gavin Mandery Drive, Doolittle Drive, Grass Valley Road, Camp Beale Highway, and J Street. Collector roads, such as Arnold Street and Grumman Avenue in the Airfield District, connect the arterial roads and local streets. A Street serves as a collector road in the Main District and East and West Garryana Streets and Delta Drive are collector roads in the Beale Heights District. There are circulation issues, particularly in the Industrial District during peak hours, and some intersections on the installation are dangerous. For example, the intersection of J Street and Doolittle Drive and the three-way stop at the intersection of Spencer Paul Road and Warren Shingle Road are considered unsafe. Overall, the condition of roadway pavement on Beale AFB is fair.

A rail spur from the Union Pacific Railroad mainline runs parallel to the South Beale Road, then parallel to J Street to the Industrial District on Beale AFB. Rail facilities are located at the terminus of the rail spur, including a bulk storage tank. In addition, the installation has an 80-ton locomotive for moving fuel tank cars carrying fuel. Rail facilities on Beale AFB are in poor condition (Beale AFB, 2015).

Electrical. Pacific Gas and Electric (PG&E) is the primary supplier of electrical power to Beale AFB. Power is delivered by three transmission lines to two metering points. These lines enter Beale AFB at the Grass Valley Substation. A project is under way to connect to the Western Area Power Administration 230-kilovolt line via an interconnection to a new substation in the vicinity of the Flightline. Two transformers are located at all substations, with the exception of the Doolittle Substation, which are individually capable of supporting the full load. Most of the transmission lines on the base belong to the DAF. Most areas of the installation have redundant transmission lines to increase reliability (Beale AFB, 2009). At peak demand, the installation is at approximately 35 percent of the design capacity of its electrical system (Beale AFB, 2021d). The base is evaluating other resiliency efforts such as solar and a connection to G2 Energy.

Natural Gas. PG&E provides natural gas and maintains the natural gas distribution system at the Flightline. The Main Base distribution system contains 6.13 miles of steel pipe and 3.22 miles of polyethylene pipe.

Liquid Fuels. JP-8 and Jet Propellant-Thermally Stable (JPTS) are the only liquid aircraft fuels used on the installation. JP-8 is delivered by pipeline, rail, or truck. A series of access vaults for the underground fuel line that delivers JP-8 to the Flightline are accessed via portions of an access road. Some vaults are not accessible during the winter months because there is no all-weather access road.

JPTS is delivered by rail or truck. Refueling trucks transport JPTS from the storage tank farm to the Flightline. There is no pipeline or refueling hydrant system for JPTS. Motor gas and diesel fuel are also used and stored on installation. Two tanks are required for bulk storage, but Beale AFB is currently operating with one. The Type II system hydrants for Beale AFB's fueling system are antiquated and rely on underground/single-wall tanks that do not meet environmental requirements. Tanks at ground fuel service stations are inadequate for servicing C-300 fuel trucks (Beale AFB, 2015). According to the 2012 Infrastructure Program Review, the fuel systems are rated as degraded with an Engineering Condition Assessment (ECA) score of 83 percent. The overall degraded rating primarily comes from the low scores of the fuel storage systems, which is rated at an ECA score of 78 percent.

Water Supply. Beale AFB is completely independent from any outside water source. Water is supplied from seven on-installation wells, located primarily in the north-central portion of Beale AFB, which draw from local groundwater sources. The wells are capable of drawing 5.76 million gallons per day (mgd), which exceeds the current demand of an average of 1.28 mgd during the winter and 3.5 mgd during the summer (Beale AFB, 2015). Water is pumped to a Water Treatment Plant that removes iron and manganese from the well water with a capacity to treat 5 mgd. The installation has a total water storage capacity of 5.2 million gallons.

Water mains consist of PVC, asbestos cement, cast iron, and steel. The installation has funded more than $15 million in upgrades, replacing most of the original steel pipe that was causing deterioration in water quality from tuberculation (formation of small mounds of corrosion products) and iron and manganese deposits. Wells have been renovated and casings grouted to prevent water intrusion from a perched aquifer (Beale AFB, 2015). However, improvements to the drinking and irrigation water supply have been determined to be necessary to comply with AFI 32-1067, *Water and Fuel Systems*; The Public Health Security and Bioterrorism Preparedness Response Act of 2002, Section 1433, *Terrorist and Other International Acts* (12 June 2002); DoD Directive 5160.54, *Critical Asset Assurance Program*; and AFI 10-246, *Food and Water Protection Program requirements.*

The DoD is currently in the preliminary assessment/site inspection phase of investigating Beale AFB for PFAS use and potential release (DoD, 2022). Water testing completed in 2016 and 2021 found that drinking water sources on Beale AFB were non-detect for both PFOA and PFOS (Beale AFB, 2020a; Beale AFB, 2021a).

Fire Protection Systems. According to the 2012 ECA, Beale AFB's fire protection systems are degraded, with an ECA score of 75. This report notes that many facilities do not have fire suppression systems, including several aircraft hangars. Planning actions include investing in fire suppression systems for facilities where systems are not currently installed (Beale AFB, 2015). Beale AFB's fire station facilities are in good condition and can respond to most base locations within the required response times.

3.10.3 Environmental Consequences

Proposed Action

This section describes potential impacts of the Proposed Action on the infrastructure components described above. The sections below describe any differences in these impacts that would occur under the alternatives to Projects 4, 5, 8, 10, and 15. All 15 projects would have long-term beneficial effects on infrastructure at Beale AFB because the purpose of each of the projects is infrastructure improvement.

Transportation. Project 14 (Repair Road and Culverts at Doolittle Gate) would have a long-term beneficial effect on transportation in the vicinity of the Doolittle Gate, as it would increase throughput capacity and safety. Short-term adverse impacts would occur during construction of Projects 12 (Repair Water Main) and 14, which would require temporary road closures and detours. Doolittle Drive would be temporarily closed from 31st Street to C Street for construction of Project 12; an alternative route would be south on J Street to Warren Shingle Road, and then east on Warren Shingle Road to C Street. C Street would be closed from 27th Street to 34th Street; an alternative route would be B Street, which parallels C Street. The Doolittle Gate would be closed during construction of Project 14 and Doolittle Drive would be closed from Hammonton-Smartsville Road to Alert Drive. Non-commercial traffic would be transferred to the Schneider Gate and commercial vehicles to the Wheatland Gate.

Electrical. Project 1 (Construct Airfield Lighting Maintenance Facility, Building 1015) would have a long-term beneficial effect on the airfield lightning circuits. Several other projects would also have a long-term beneficial effect on the electrical system because they would include overhauls to existing deficient systems. Operation of the new Fitness Center (Project 5) and the new Multi-use Corrosion Control Facility (Project 6) would require addition electrical use. This additional use would not adversely affect overall electrical supply because the electrical system capacity currently exceeds demand.

Natural Gas. The footprints of Project 10 – Alternative B (Construct Additional POV Parking) and Project 6 (Construct Multi-Use Corrosion Control Facility) overlap with existing natural gas lines. Depending on project design, temporary interruptions in service may occur during construction of these projects.

Liquid Fuels. Project 8 (Construct Fuel Transfer Line Access Road) would have a long-term beneficial effect on the supply of liquid fuels to the Flightline, as it would allow year-round access to the fuel vaults so they can be inspected monthly as required per T.O. 37-1-1, *General Operation and Inspection of Installed Fuel Storage and Dispensing Systems*, 15 December 2020.

Water Supply. Operation of the Fitness Center (Project 5) and the Multi-use Corrosion Control Facility (Project 6) would require additional water use. This additional use would not adversely affect overall water supply because the installation's water supply exceeds current demand. Project 12 (Repair Water Main) would have a long-term beneficial effect on water supply, as it would replace an outdated water distribution line. No interruption in service would occur because the existing water line would remain in use until the new line is installed. Water required for the Proposed Action would be for dust control associated with construction and to wash equipment. The contractor would be required to obtain water from an existing water supply adequate for these low-volume temporary needs. The Proposed Action would not have any impact on water supplies; therefore, no water supply protection measures are proposed.

Fire Protection Systems. Project 4 (Construct Wildland Fire Vehicle Storage Facility) would have a long-term beneficial effect on fire protection systems, as it would provide shelter for high-value wildland fire vehicles. Fire protection systems would be updated or installed as part of Projects 1 (Construct Airfield Lighting Maintenance Facility), 2 (Construct Addition to Corrosion Control Facility), and 3 (Add/Alter Storage, Building 1220).

Overall Construction Impacts

Short-term, minor, adverse impacts on infrastructure would be anticipated from the Proposed Action because of temporary service interruptions during construction. No long-term adverse impacts are anticipated.

Overall Operational Impacts

Long-term, minor to moderate, beneficial impacts on infrastructure would result from improvement of the physical infrastructure and functionality of Beale AFB associated with the 15 projects. Construction, renovation, and demolition of buildings at Beale AFB would improve the overall state of the infrastructure.

Project 4 Alternatives

The alternative locations proposed for the Wildland Fire Vehicle Storage Facility would change the total amount of impervious surface as follows: the Proposed Action would increase the amount of by 0.3 acres; Alternative B would decrease the amount by 0.9 acres; and Alternative C would decrease the amount by 0.7 acres. None of these differences would change the type, duration, or intensity of impacts on infrastructure described under the Proposed Action.

Project 5 Alternative

The alternative location of the Flightline Fitness Center within an existing building would decrease the amount of impervious surface by 1.6 acres compared with the Proposed Action. This difference would not change the type, duration, or intensity of impacts on infrastructure described under the Proposed Action.

Project 8 Alternative

The alternative route (Direct Route) for the Fuel Transfer Line Access Road would not change the type, duration, or intensity of impacts on infrastructure.

Project 10 Alternative

The alternative to construct a two-story parking structure may require additional electrical use for lighting, compared with the proposed ground-level parking lot. This additional electrical use would not adversely affect overall electrical supply because the capacity of the electrical system currently exceeds demand. This alternative would also decrease the amount of impervious surface by 3.2 acres compared with the Proposed Action. Neither of these differences would change the type, duration, or intensity of impacts on infrastructure described under the Proposed Action.

Project 15 Alternative

The alternative design for the Upstream Storm Drainage Physiological Support Squadron Building 1029 would not change the type, duration, or intensity of impacts on infrastructure because it is expected to operate as effectively at managing stormwater as the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Flightline installation development projects would not be implemented. The infrastructure deficiencies identified in Projects 8, 12, and 14 would not be corrected and deficiencies would continue until other solutions are identified and completed.

Cumulative Effects

The future projects listed in **Appendix E** would place additional short-and long-term demands on infrastructure at Beale AFB and generate short-term negligible to minor effects, while some projects would provide long-term beneficial improvements. These effects would be additive to the effects of the 15 infrastructure improvement projects under the Proposed Action or any of the action alternatives.

3.11 Hazardous Materials and Waste

3.11.1 Definition of the Resource

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, defines hazardous materials (HAZMAT). HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The ROI for this resource is the proposed project location and its immediate environs, except for radon, which is Yuba County.

3.11.2 Existing Conditions

Hazardous Materials and Waste. Beale AFB maintains a Hazardous Material Management Process (HMMP), pursuant to Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention*. The HMMP applies to all individuals and organizations that procure, maintain, store, use, and dispose of HAZMAT.

The Beale AFB Hazardous Waste Management Plan (HWMP) is used to ensure compliance with federal, state, and local standards for hazardous waste management. It was developed to provide guidance in control and management of hazardous waste from generation, handling, storage, and transportation to its ultimate disposal. The HWMP is required under AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*. The Hazardous Waste Stream Inventory is maintained as part of the Beale HWMP (Beale AFB, 2021e). Active hazardous waste disposal sites are managed under the HWMP. Beale AFB does not have a RCRA Part B Permit; instead, Beale AFB has a Central Accumulation Point at Building 539 to accumulate and consolidate hazardous waste for up to 90 days from Initial Accumulation Point sites throughout the base. The 9 CES, Civil Engineer Installation Environmental Element (9 CES/CEIE) personnel and contractor personnel are responsible for disposal activities. Most hazardous waste on base is disposed of through the Defense Logistics Agency.

Beale AFB is a permitted Large Quantity Generator of hazardous waste. Hazardous wastes generated at Beale AFB include corrosive cleaning compounds, photographic waste, solvents, waste paint-related materials, waste petroleum products, waste generated under the Comprehensive Universal Waste Program, and other miscellaneous wastes (Beale AFB, 2014). All hazardous waste generating, accumulation, and shipping activities, from any area on Beale AFB property, must be coordinated with 9 CES/CEIE personnel. All Hazardous Waste manifests from any location on Beale AFB must be reviewed, certified, and signed by 9 CES/CEIE personnel. Beale AFB generates hazardous wastes primarily from aircraft maintenance, vehicle maintenance, facility maintenance, photograph processing, activities from organizations assigned to Beale AFB, and contract activities (Beale AFB, 2014).

Environmental Restoration Program (ERP) Sites. Environmental remediation and restoration are conducted under the ERP, a component of the Air Force Civil Engineer Center, Environmental Directorate. According to the INRMP, Beale AFB has 189 remediation sites defined in the following categories:

- 49 CERCLA defined ERP sites (33 closed, 13 in study phase, 3 in long-term monitoring).
- 12 RCRA defined sites (5 closed, 2 in study phase, 5 in long-term monitoring).
- 6 leaking underground fuel tank (LUFT) defined sites (4 closed, 1 in study phase, 1 in long-term monitoring).
- 122 Military Munition Response sites (114 closed, 8 in investigation phase) (Beale AFB, 2021a).

The 67 CERCLA/RCRA/LUFT sites include landfills, transformer solvent dumping areas, fuel spill areas, aboveground fuel storage areas, sites associated with photographic processing waste treatment, jet engine test cells, pesticide/herbicide storage and mixing areas, and fire training areas. Twenty-seven of the CERCLA/RCRA/LUFT sites are undergoing active investigation or remediation, and 44 are closed. Closed sites have been cleaned up and are designated as unlimited use with unrestricted exposure. Currently, no further action is expected for seven ERP sites, based on findings of insignificant contamination or the adequacy of completed interim remedial actions (Beale AFB, 2021a). **Table 3-9** lists the ERP sites and groundwater plumes in the vicinity of the Proposed Action.

Table 3-9 Installation Development Plan Project Related ERP Sites and Groundwater Plumes

ERP Site	Site Name	Status	IDP Project	Groundwater Plume	Contaminants of Concert	Remediation Measures
FT003	Fire Protection Training Areas	CERCLA site closed in 2014	8	CG044-003	[1]TCE, PCE, 1,2-DCA, carbon tetrachloride	in situ chemical oxidation via sodium permanganate injection
SD001	Westside Drainage Ditch	CERCLA site closed in 2016	1	CG044-032	[1]TCE, cis-1,2-DCE	in situ chemical oxidation via sodium permanganate injection
SS037	Industrial Waste Pipeline	CERCLA site closed in 2014	11	CG044-032	[1]TCE, cis-1,2-DCE	in situ chemical oxidation via sodium permanganate injection
SD005	Former SR-71 Shelter Area	CERCLA site closed in 2015	16	CG044-032	[1]TCE, cis-1,2-DCE	in situ chemical oxidation via sodium permanganate injection
SD032	Building 1086	Active CERCLA site	11	CG044-032	[1]TCE, cis-1,2-DCE	in situ chemical oxidation via sodium permanganate injection
CG040	Cantonment Area	CERCLA site closed in 2016	8	CG044-040	[1]TCE, PCE, cis-1,2-DCE, VC, 1,1-DCE, carbon tetrachloride	enhanced reductive dechlorination and emulsified vegetable oil injections
TU001	J Street Gas Station	LUFT site closed in 2016	8	CG044-040	[1]TCE, PCE, cis-1,2-DCE, VC, 1,1-DCE, carbon tetrachloride	enhanced reductive dechlorination and emulsified vegetable oil injections

Notes:
Source: Beale AFB, 2016; Beale AFB, 2022a
[1] Primary Contaminant
1,1-DCE = 1,1-dichloroethene; 1,2-DCA = 1,2 dichloroethane; CERCLA = Comprehensive Environmental Response Compensation and Liability Act; cis-1,2-DCE = cis-1,2-dichloroethene; ERP = Environmental Restoration Program;

IDP = Installation Development Plan; LUFT = leaking underground fuel tank; PCE = tetrachloroethylene; TCE = trichloroethene; VC = vinyl chloride

Groundwater. There are three groundwater plumes in the project area (Beale AFB, 2022a). A plume is a body of groundwater that has been affected by the presence of pollutants.

Plume CG044-032 encompasses the southern portion of the Flightline area and extends from the eastern side of the runway to the western Base boundary. The historical direction of groundwater flow has been from northeast (east of the Flightline) to southwest (toward North Beale Road). The primary source of contamination was Building 1086 (SD032), which historically was used for assembly and maintenance that required use and storage of trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA). Four underground storage tanks (USTs) containing these compounding, blending acids, and waste acids were located near the southern corner of Building 1086. The two tanks containing solvents were removed in 1997. Numerous soil sites that had merged in this location have been managed and closed; however, one soil and groundwater site that contains TCE remains open (SD032). A land use control has been implemented at this site to restrict the vapor intrusion exposure pathway.

Plume CG044-003 (Fire Protection Training Areas [FPTAs]) is a 116-acre tract of land located near the intersection of J Street and Doolittle Drive, just east of the southern end of the Flightline. The groundwater flow of this plume is mainly west to southwest. It is the site of a former hospital and FPTAs 1-4 with USTs that formerly contained heating oil and diesel, hydraulic fluid, and waste solvents. The USTs were removed in 1993 and 1995. Chemicals burned during fire training exercises included waste oils, spent solvents, and aviation fuels. The contaminants of concern are carbon tetrachloride, 1,2 dichloroethane (1,2-DCA), tetrachloroethene (PCE), and TCE, with TCE being the primary contaminant. Currently, the TCE plume is estimated to extend to 2,500 feet from an area northwest of FPTAs 3 and 4 to the southwest toward the Flightline. The plume is approximately 850 feet wide near the former dry well and 150 feet wide in its distal portion. Currently, 64 monitoring wells are located at or near this plume, and remediation efforts include land use controls, soil vapor extraction, and in situ chemical oxidation.

Plume CG044-040 is located in the north-central portion of Beale AFB, in the Cantonment Area, and extends west to the base boundary. The groundwater flow of this plume is mainly westward, and aquifer levels have been decreasing as a result of off-base pumping west of the base and decreased recharge rates. The contaminants of concern include TCE, PCE, cis-1,2 dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1-DCE, and carbon tetrachloride, with TCE being the primary contaminant. TCE, PCE, 1,1-DCE, cis-1,2-DCE, and vinyl chloride were the site-related contaminants of concern detected above project screening levels during 2021 groundwater monitoring. TCE concentrations in monitoring wells show the TCE plume is gradually getting deeper and is contained within depths of 150 to 180 feet below ground surface. The primary sources of contamination were from the Building 469 loading dock and railroad track off-loading area (SS043), which is currently not part of a current investigation or remediation efforts. Currently, 68 monitoring wells are located at or near this plume, and remediation efforts include land use controls, enhanced reductive dechlorination, and emulsified vegetable oil injections (Beale AFB, 2022a).

Asbestos and Lead-Based Paint. It can generally be assumed that buildings constructed prior to 1980 have most likely been constructed with asbestos-containing materials (ACM). Additionally, some water mains on the installation consist of PVC, asbestos cement, cast iron, and steel (Beale AFB, 2014).In general, buildings constructed prior to 1978 are presumed to contain lead-based paint (LBP).

Radon. The USEPA radon zone for Yuba County, California, is Zone 2, which is moderate potential with a predicted indoor average level between 2 and 4 picocuries per liter (pCi/L) (USEPA, n.d.). Each zone designation reflects the average short-term radon measurement that can be expected in a building without implementation of radon control methods.

Polychlorinated Biphenyls. Beale AFB has eliminated most polychlorinated biphenyl (PCB)-containing equipment at the installation; however, some PCB-laden oils could be contained in electrical equipment such as large transformers and capacitors (Beale AFB, 2014). The Civil Engineer Electric Shop is the primary organization involved with PCBs, and compliance oversight and support is provided by the 9th Civil Engineer Squadron Installation Management Flight Toxics Program Manager (Beale AFB, 2014). Ballasts and starters from light fixtures could contain PCB-containing material. Disposal of these materials is regulated. If ballasts are not plainly marked as "Non-PCB," the material must be treated as PCB-containing (or be tested and proven to be non-PCB containing). When facility repairs and demolition occur, suspected ballasts would be removed and disposed of appropriately.

3.11.3 Environmental Consequences

Impacts on hazardous materials management would be considered adverse if the Proposed Action resulted in noncompliance with applicable federal, state, and local regulations or increased amounts generated or procured beyond waste management procedures and capacities at Beale AFB. Impacts on ERP sites would be considered adverse if the Proposed Action disturbed or created contaminated sites resulting in adverse effects on human health or the environment.

Proposed Action

All 15 projects would have short-term, negligible adverse effects resulting from the increased use of, or potential exposure to, hazardous materials and waste. Specific effects are described below by category. The demolition project (16) and the repair and renovation projects (11-15) would pose the greatest risk of exposure to hazardous materials and waste. However, hazardous materials could be used during construction projects (1-10). Project 9 is the only project that is unlikely to involve either exposure to, or use of, hazardous materials.

Hazardous Materials and Waste. The Proposed Action would result in a permanent increase in hazardous material usage and hazardous waste generation. This increase is because Project–2 - Construct Addition to Corrosion Control Facility, B1071 – would allow more corrosion control activities on larger equipment and parts to take place at Beale AFB. There would also be a short-term, negligible increase in hazardous materials usage, and resulting hazardous waste, such as paints, solvents, and petroleum products (primarily from construction equipment and vehicles). These materials and wastes would be managed in accordance with federal, state, and local regulations and existing internal processes. Storing, handling, and transporting hazardous materials and waste would comply with Beale AFB's current procedures, detailed in AFMAN 32-7002 and the HWMP. No novel hazardous materials or excessive amounts of hazardous materials are anticipated with implementation of the Proposed Action. There are no known USTs in the vicinity of proposed construction projects; therefore, there would be no impact to USTs.

ERP Sites. There are no known ERP soil sites or Military Munitions Response Program (MMRP) sites within the boundaries of the proposed projects; therefore, there would be no impacts to environmental remediation and restoration sites. There are groundwater sites (plumes) underlying Projects 1, 8, 11, and 16. However, groundwater is greater than 50 feet below ground surface in those areas and therefore is not expected to impact the projects. In addition, the BMPs described in **Appendix C**, specifically CM-37 and CM-38, would be implemented to avoid any adverse impacts.

Specific information pertaining to projects that overlap mapped ERP sites is provided below.

- Project 1 (Construct Airfield Lighting Maintenance Facility) overlaps ERP site SD001 (Westside Drainage Ditch) and overlies groundwater plume CG044-032.

- Project 8 (Construct Fuel Transfer Line Access Road) overlaps ERP sites FT003 (Fire Protection Training Areas), CG040 (Cantonment Area), and TU001 (J Street Gas Station) and overlies groundwater plume CG044-003.
- Project 11 (Repair Consolidated Ops/Mx) overlaps ERP site SD032 (Building 1086) and overlies groundwater plume CG044-032.
- Project 16 (Demolish SR-71 Shelters) overlaps ERP site SD005 (former S-R71 shelter area) and overlies groundwater plume CG044-032.

Asbestos and Lead-Based Paint. Buildings 1086, 1015, 1071, 1057, and 1058 were constructed prior to 1978 and could contain both asbestos and LBP. Buildings 1086, 1057, and 1058 were recently surveyed for asbestos and LBP. Concerns for asbestos and LBP were found at both Buildings 1086 and 1057. No asbestos survey information is available for Buildings 1015 and 1071. According to the Beale AFB Airfield Management and Operations Plans (AM&OP), before any interior renovations or modifications occur to these buildings, a TRIRIGA work request (or e103 for large projects) must be created, and is reviewed by the Work Request Review Board (WRRB). The WRRB requires an asbestos inspection for building materials or sampling where asbestos is suspected, or where no prior sampling information is on file. If asbestos abatement is needed, an asbestos contractor would conduct abatement before the work request would be approved. Removal of Buildings 1057 and 1058 would be a long-term negligible beneficial impact.

Project 12 would replace the water main line from the Fam Camp to the WTP. These water main lines could contain asbestos, but they are planned to be abandoned in place. Therefore, there would be no disturbance to potential asbestos cement in the water main lines from Project 12. If the abandoned water main line needs to be removed, the project manager would contact the Beale AFB Asbestos Program Officer and the 9 CES/CEIE for guidance before planning work.

According to the Beale AFB Logistics, Base Personnel Management, and Operations Plan (LBPM&OP), before any interior renovations or modifications occur to any building, a TRIRIGA work request or e103 (for large projects) must be created that is reviewed by the WRRB. The WRRB requires an LBP inspection of building materials or sampling where LBP is suspected, or where no prior sampling information is on file. If LBP abatement is needed, an LBP contractor would conduct the abatement before the work request would be approved. No ACM or LBP impacts would be expected during renovations and construction with adherence to the AM&OP and the LBPM&OP.

Radon. No impacts associated with radon are anticipated from implementation of the Proposed Action.

Polychlorinated Biphenyls. Removal of any light fixtures has the potential to disturb PCBs. If renovations of any facility require removal of fluorescent lighting fixtures where ballasts and starters could contain PCBs, fixtures would be disposed of in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, and the HWMP. The removal and proper disposal of light fixtures containing PCBs would be a long-term, negligible beneficial impact.

Environmental Protection Measures

Environmental protection measures described in **Appendix C** would be implemented under all of the action alternatives to avoid or minimize the effects of the proposed project activities from use of hazardous materials or generation of hazardous waste. All work would be performed in accordance with the Integrated Contingency Plan. This plan contains instructions for appropriate response to releases of oils or fuels and procedures to prevent releases and ensures conformance with Air Force policies, federal, state, and local regulations.

Project 4 Alternatives

Any of the Project 4 alternatives would result in the same impacts related to hazardous materials and waste as the proposed Project 4.

Project 5 Alternative

The Project 5 Alternative B to install the new fitness center into an unused space in Building 1025 would use less hazardous materials and generate less hazardous wastes than the proposed Project 5. However, this decrease in hazardous materials and wastes would be negligible.

Project 8 Alternative

The Project 8 Alternative B would result in the same impacts related to hazardous materials and waste as the proposed Project 8.

Project 10 Alternative

The Project 10 Alternative B to construct a two-story parking structure would use more hazardous materials and generate more hazardous wastes compared with the proposed Project 10. However, this increase in hazardous materials and wastes would be negligible.

Project 15 Alternative

The Project 15 Alternative would result in the same impacts related to hazardous materials and waste as the proposed Project 15.

No Action Alternative

Under the No Action Alternative, the proposed project would not occur at Beale AFB, and no construction, renovation, or demolition projects would take place. There would be no impacts related to hazardous materials and wastes, ERP sites, or toxic substances at Beale AFB.

Cumulative Effects

Short-term, negligible to minor impacts would result from implementation of the Proposed Action when combined with construction activities associated with other reasonably foreseeable future actions listed in **Appendix E**. Considered cumulatively, construction, renovation, and demolition activities could contribute to an installation-wide increase in the handling and storage of hazardous materials and hazardous waste accumulation. Impacts would be temporary, however, and conducted in accordance with appropriate DoD, local, state, and federal regulations. Therefore, impacts would not be expected to be long term or significant.

3.12 Safety and Health

3.12.1 Definition of the Resource

An analysis of safety and health evaluates whether a Proposed Action would have the potential to affect health, safety, or well-being of workers and the public. The ROI for occupational safety concerns includes the proposed project locations (see **Figures B-1** through **B-7**).

3.12.2 Existing Conditions

Occupational Safety and Health. Worker safety associated with construction and demolition is covered by OSHA regulations and all applicable installation safety requirements; typical construction activities do not pose a safety issue to workers, provided all applicable OSHA and Air Force safety requirements are implemented. Occupational safety and health includes several categories covering ground and industrial operations, operational activities, and motor vehicle use. These standards specify health and safety requirements, the amount and type of training required for industrial workers, the use of personal protective equipment (PPE), and administrative controls, engineering controls, and permissible exposure limits for workplace stressors. These standards also include guidance for entry into areas in which a hazard may exist.

All contractors that would be involved in the Proposed Action are responsible for compliance with all federal and state OSHA regulations. Contractors are responsible for reviewing and being familiar with hazardous workplace operations, the hazardous materials used or generated, and ensuring controls (for example, administrative, engineering, and PPE) are available and used. Day-to-day operations and maintenance conducted by the 9 RW are carried out in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by the Air Force Occupational Safety and Health (AFOSH) requirements

Airfield Safety. Safety zones around airfields that restrict incompatible land uses are designated to reduce exposure to aircraft safety hazards. Open space (undeveloped) and agricultural uses (excluding raising of livestock) are the only uses deemed compatible in a clear zone (CZ). Land use within accident protection zones (APZs) is based on the concept of limiting density, and uses such as residential development, educational facilities, and medical facilities are considered incompatible and are strongly discouraged. At Beale AFB, there is no incompatible land use within the CZs or APZs (Beale AFB, 2015).

Explosive Safety. Defense Explosive Safety Regulation (DESR) 6055.09_DAFMAN 91-201 outlines construction and quantity-distance (Q-D) separation standards required by the DoD and the Air Force for facilities used for storing, handling, and maintaining munitions. Designed to ensure protection to facilities, equipment, and personnel, the Q-D standards consider the type, size, and quantity of munitions at a location, and the type and function of buildings and facilities. Q-D arcs extend outward from its sides and corners for a prescribed distance for each explosive material storage or handling facility.

3.12.3 Environmental Consequences

Impacts related to Safety and Health would be considered significant if federal civilian, military, or contractor personnel did not comply with established OSHA and Air Force safety guidelines.

Proposed Action

All 15 projects would pose similar temporary, minor, adverse effects on Safety and Health during the construction phases and minor to moderate, long-term, beneficial effects by correcting existing deficiencies. Effects that differ by project are described in the following analysis. Adherence to the requirements outlined in 29 CFR §1910 (General Industry), §1926 (Construction), and industrial hygiene directives would minimize hazards associated with construction, renovation, and demolition activities.

Occupational Safety and Health. The proposed construction, renovation, and demolition projects have the potential to affect human health and safety through activities associated with construction and operation of these facilities. Construction poses inherent risks such as falls, electrocution, and collisions with equipment. Similarly, operations of these facilities also come with some specific risks to human safety. Implementing the Proposed Action is not expected to result in substantive adverse impacts to safety, as construction would comply with requirements outlined in 29 CFR §1910 (General Industry) and §1926 (Construction), and industrial hygiene directives. Likewise, operations of facilities would not have adverse effects to safety since the requirements specified in AFI 91-202, and the AFOSH program would be implemented with any Air Force activity. There would be no significant adverse effect to health and safety from implementation of the Proposed Action.

Project 1 would provide long-term beneficial impacts to safety with construction of a permanent lighting vault that provides multiple routes for entry and exit and includes fire detection and notification systems that would increase personnel safety and first responders' response in the event of an emergency. Project 2 would provide long-term beneficial impacts by providing a facility specifically designed for corrosion control and would include all necessary and required safety equipment (such as ventilation, fire suppression, and cleaning and decontamination areas) needed to safety perform tasks and meet operational requirements. Project 11 would provide long-term benefits to safety through overhaul of the electrical system, fire suppression, and mass notification system.

Airfield Safety. The Proposed Action would not change land use around the airfield, and no incompatible uses would be added. While Project 8 (Fuel Transfer Line Access Road) and Project 13 (Runway Overrun Repair) would occur in portions of the CZ and APZ, these projects would be compatible land use within these safety zones. There would be no adverse impacts to airfield safety from implementation of the Proposed Action. Project 13 would provide long-term benefits to airfield safety through repair of degraded runway overruns to meet the requirements specified under UFC 3-260-02.

Explosives Safety. Project 8 would be constructed within existing Q-D arcs; however, it would be only for the purpose of paving existing access and would not violate the Q-D requirements. If required, before construction began, coordination between base civil engineering, fire, health, security, and environmental agencies would take place to update the Explosive Site Plan and licenses as needed. No impacts to explosives safety are anticipated. The road improvement would benefit safety because it would decrease the time needed for the inspections, which would reduce personnel time in the Q-D arc.

Project 4 Alternatives

The potential impacts to health and safety from the three alternative sites for the Wildland Fire Vehicle Storage Facility would be the same as those of the Proposed Action.

Project 5 Alternative

The potential impacts to health and safety from renovation of Building 1025 to add a fitness center would be the same as those of the Proposed Action.

Project 8 Alternative

The potential impact to health and safety from installation of an alternative route for the Fuel Transfer Line Access Road would be the same as those described for the Proposed Action.

Project 10 Alternative

The potential impacts to health and safety from installation of a two-story parking garage would be the same as those described for the Proposed Action.

Project 15 Alternative

The potential impacts to health and safety from installation of 6-foot wingwalls would be the same as those described for the Proposed Action.

No Action Alternative

Under the No Action Alternative, the proposed projects would not occur. The health and safety shortfalls identified in Projects 1, 2, and 11 would not be corrected and deficiencies would continue until other solutions are identified and completed. Similarly, failure to repair runway overruns as proposed in Project 13 would result in increased deterioration of the overrun pavement and continued risk to flight safety.

Cumulative Effects

Adverse impacts on health and safety could result from concurrent implementation of the Proposed Action and other reasonably foreseeable construction, renovation, and demolition projects on Beale AFB (listed in **Appendix E**). These impacts would be short-term (during construction, renovation, and demolition) and minor because use of appropriate safety methods (listed in **Appendix C**) during these activities would minimize the potential for impacts to health and safety.

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APPENDICES

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INTERGOVERNMENTAL AND STAKEHOLDER COORDINATION

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A.1 Introduction

Scoping is an early and open process for developing the breadth of issues to be addressed in an Environmental Assessment (EA) and for identifying significant concerns related to an action. Per requirements of Executive Order (E.O.) 12372, *Intergovernmental Review of Federal Programs*, as amended by E.O. 12416, federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action or alternatives were notified during the development of this EA.

The Intergovernmental Coordination Act and E.O. 12372 require federal agencies to cooperate with and consider state and local views in implementing a federal proposal. Through the coordination process, the 9th Reconnaissance Wing sent letters to potentially interested and affected governmental agencies, government representatives, elected officials, and interested parties potentially affected by the Proposed Action. The recipient mailing list and agency intergovernmental coordination letters and responses are included in this appendix.

A.1.1 Agency Consultation

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the Endangered Species Act (ESA), and implementing regulations (50 Code of Federal Regulations [CFR] Part 402), requires communication with the U.S. Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The primary focus of this coordination is to request a determination of whether any of these species occur in the proposal area. If any protected species are present, a determination would be made of any potential adverse effects on the species. Should no species protected by the ESA be affected by the Proposed Action or alternatives, no additional consultation is required. Letters would be sent to the appropriate USFWS offices and to relevant state agencies informing them of the proposal, requesting data regarding applicable protected species, and subsequently requesting concurrence with the Air Force's determination of no effect to any federally listed species.

Coordination with appropriate California state government agencies and planning districts will occur for review and comment. Compliance with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations (36 CFR Part 800) was accomplished through the State Historic Preservation Officer (SHPO). Similarly, the California Air Resources Board is included for air and water quality, and the California Department of Fish and Wildlife is included in this coordination on habitat and species of concern. All agency correspondence is included within this appendix.

A.1.2 Government-to-Government Consultation

The NHPA and its regulations at 36 CFR Part 800 direct federal agencies to consult with federally recognized tribes when a proposed or alternative action may have an effect on tribal lands or on properties of religious and cultural significance to a tribe. Consistent with the NHPA; DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*; and Department of the Air Force Instruction 90-2002, *Interactions with Federally Recognized Tribes*, federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action and alternatives have been invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from National Environmental Policy Act (NEPA) consultation or the interagency coordination process; and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Beale Air Force Base (AFB) point of contact for Native American tribes is the Installation Commander. The Beale AFB point of contact for consultation with the Tribal Historic Preservation Officer and the

Advisory Council on Historic Preservation is the Cultural Resources Manager. Government-to-government consultation is included within this appendix.

A.2 Public and Agency Review

An Early Public Notice was published in the Marysville, California, *Appeal-Democrat* on January 26, 2023, requesting advance public comments regarding the projects' potential to impact floodplains and wetlands. A Notice of Availability of the Draft EA and Proposed Finding of No Significant Impact (FONSI) and Proposed Finding of No Practicable Alternative (FONPA) was published in the Marysville, California, *Appeal-Democrat* inviting the public to review and comment on the Draft EA during the 30-day review period.

The Draft EA and Proposed FONSI/FONPA were made available for review on the Beale AFB website at https://intelshare.intelink.gov/sites/USAFNEPA/Module/Page.aspx?IID=8 and at the following locations:

- Sutter County Library, 750 Forbes Ave., Yuba City, CA
- Yuba County Library, 303 Second Street, Marysville, CA
- Wheatland City Hall, 111 C Street, Wheatland, CA

Those who were unable to access these documents online were directed to call Public Affairs at 530-634-8887 or e-mail 9rw.pa@us.af.mil to arrange alternative access.

A.3 Intergovernmental and Stakeholder Coordination

A.3.1 Early Public Notice

STATE

Fast-food workers' rights bill on hold until 2024 ballot

A rendering of New Faze Development's tentative subdivision tract map for the proposed Linda Commons development, which was approved by Yuba County on Jan. 10. This gated walkable community is set to include 134 units with both single-family homes and ducts.

LINDA / From A1

CITIZENS / From A1

MUSEUM / From A1

PUBLIC NOTICE

NOTICE OF EARLY PUBLIC REVIEW FOR A PROPOSED ACTION WITHIN WETLANDS AND A 100-YEAR AND 500-YEAR FLOODPLAIN AT BEALE AIR FORCE BASE, CALIFORNIA

To: All Interested Agencies, Groups, and Individuals

The Department of the Air Force (DAF) is proposing to construct new facilities, renovate and/or repair existing facilities, install updated infrastructure, and demolish obsolete facilities to address deficiencies in existing facilities and infrastructure at Beale Air Force Base (AFB), California. The DAF is issuing this notice to advise the public of the proposed development at Beale AFB. The Proposed Action would impact wetlands and both the 100-year and 500-year floodplain. This notice is required by Section 2(b) of Executive Order (EO) 11990, "Protection of Wetlands," and by Section 2(a)(4) of EO 11988, "Floodplain Management," and has been prepared and made available to the public by the DAF in accordance with Title 32, Code of Federal Regulations (CFR), Part 989.24(c) and Air Force Manual 32-7003 for actions proposed in wetlands and floodplains.

The DAF has initiated an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) of 1969, as amended, Council on Environmental Quality NEPA Implementing Regulations (40 CFR Parts 1500-1508), and USAF Environmental Impact Analysis Process (32 CFR Part 989) to consider potential impacts from the proposal to implement 16 projects that were identified as priorities for the improvement of the physical infrastructure and functionality of Beale AFB to meet current and future mission and facility requirements. As part of the EA process, Beale AFB will contact state and federal regulatory agencies, including the U.S. Army Corps of Engineers and the U.S. Fish & Wildlife Service for their input and expertise on the Proposed Action with respect to potential wetland, floodplain, and other impacts.

Under the Proposed Action, 16 installation development projects would be implemented, involving both facilities and infrastructure, including 10 construction projects, five renovation and repair projects, and one demolition project. The proposed projects are estimated to occur over a 5-year period from 2023 through 2028, although some could occur later. The DAF is identifying and evaluating practicable alternatives to minimize potential impacts to the floodplains/wetlands from the Proposed Action.

The DAF requests advance public comment to determine if there are any public concerns regarding the projects' potential to impact floodplains and wetlands. The Proposed Action will be analyzed in the forthcoming EA, which the public will also have opportunity to comment on when the draft is released. Written comments or inquiries may be submitted to: Mr. Chuny Risse, NEPA Program Manager, at (530) 634-0568, chuny.risse.1@us.af.mil, 9 CES/CEIEC, 6125 B Street Bldg. 25390, Beale AFB, CA 95903-1708 within 30 days of this notice.

A.3.2 Sample Scoping Letter to State and Federal Agencies

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH RECONNAISSANCE WING (ACC)
BEALE AIR FORCE BASE, CALIFORNIA

MEMORANDUM FOR U.S. ARMY CORPS OF ENGINEERS

ATTN: Laura Shively
Sacramento District, Regulatory Division
1325 J Street Room 1513
Sacramento, California 95814

FROM: 9 CES/CD
6425 B Street, Bldg.
25390 Beale AFB, CA
95903-1708

SUBJECT: Flightline Installation Development Plan Environmental Assessment on Beale Air Force Base, Yuba County, California

1. The U.S. Air Force (USAF) is in the process of preparing a Draft Environmental Assessment in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; Council on Environmental Quality Regulations (40 Code of Federal Regulations 1500-1508); and USAF Environmental Impact Analysis Process (32 Code of Federal Regulations Part 989).

2. Under the Proposed Action, the USAF would construct new facilities, renovate and/or repair existing facilities, install updated infrastructure, and demolish obsolete facilities to address deficiencies in existing facilities and infrastructure. If these deficiencies are not addressed, they would risk the health and safety personnel and degrade the ability of the installation to meet USAF and DoD current and future mission requirements in compliance with state and federal requirements. The proposed projects are priorities for the improvement of the physical infrastructure and functionality of Beale AFB to meet current and future mission and facility requirements, development constraints and opportunities, and land use planning objectives.

   The USAF is seeking to implement 16 construction, renovation and repair, and demolition projects over a 5-year period from 2023 to 2028. Attachment 1 is a list of the proposed projects, and Attachment 2 is a figure showing the proposed project locations.

3. The Environmental Assessment will assess the environmental consequences of the Proposed Action, alternatives to five of the proposed projects, and the No Action Alternative.

4. The Air Force requests your input on the Proposed Action as part of the consultation process with relevant agencies, property owners, and stakeholders. This process is formally referred to as the Interagency and Intergovernmental Coordination for Environmental Planning process. Through this notice, the USAF is contacting you to notify you of the Proposed Action and to solicit comments.

This is the initial step in the NEPA review process, and a draft of the Environmental Assessment will be released once specific details on each Alternative have been developed.

5. Please address all questions and comments to, Mr. Chantz Risse, NEPA Program Manager, at (530) 634-9568, chantz.risse.1@us.af.mil, 9 CES/CEIEC, 6425 B Street Bldg. 25390, Beale AFB, CA 95903-1708.

CALVIN G. HENDRIX, GS-14, USAF
Deputy Base Civil Engineer,
9th Civil Engineer Squadron

2 Attachments:
1. List of Proposed Installation Development Projects
2. Proposed Installation Development Project Locations

Attachment 1 – List of Proposed Installation Development Projects

Project Number[1]	Project ID and Title	Description
1	BAEY1011908 Construct Airfield Lighting Maintenance Facility, Building 1015	Construct an 880 SF building extension to the Airfield Lighting Vault (Building 1015) to replace two maintenance trailers currently being used for repair of airfield equipment and storage of spare parts.
2	BAEY1073191 Construct Addition to Corrosion Control Facility, Building 1071	Construct a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by the standards outlined in UFC 4-211-02 and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071.
3	BAEY1014475 Add/Alter Storage, Building 1220	Construct an 800 SF addition to Building 1220 to increase storage space for materials and equipment. This increase would be achieved by adding a second-floor mezzanine and constructing a 20-foot extension on the south end of the building to provide approximately 3,200 SF of storage capacity.
4	1056321 Construct Wildland Fire Vehicle Storage Facility	Construct a 2,400 SF (60 ft wide x 40 ft deep x 20 ft high) prefabricated metal building to provide protection from the elements for high-value wildlife fire module equipment.
5	BAEY 1072025 Construct Flightline Fitness Center	Construct an 80,729 SF flightline physical fitness center to meet the Air Force Chairman of the Joint Chiefs of Staff physical fitness requirements.
6	BAEY192006 Multi-Use Corrosion Control Facility	Construct a 36,543 SF multi-bay corrosion control facility with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018.
7	Construct Addition to South Aircraft Parking Apron	Construct approximately 1,185,000 SF of aircraft load-rated pavements south to Firehouse Road to provide additional space for new missions.
8	Construct Fuel Transfer Line Access Road	Construct 1.2 miles (~ 85,000 SF) of access road to 14 existing fuel pits along the fuel transfer line to allow year-round access.

4

Project Number[1]	Project ID and Title	Description
9	WT# 10118487 Construct Coyote Fenceline	Install an apron along the bottom edge of the Flightline fence. The apron would be a 3-foot-wide strip of fence[2] attached to the outside base of the existing fence at a perpendicular angle and placed on top of the ground to avoid conflicts with vernal pools. This project is a Bird/Wildlife Aircraft Strike Hazard requirement to prevent coyotes from accessing the Flightline.
10	Construct Additional POV Parking	Construct a 105,000 SF addition to the POV (privately owned vehicle) parking area for Building 1025 to provide additional spaces needed to support existing and future uses such a beddowns.
11	BAEY221000 Repair Consolidated Ops/Mx, B1086	To correct deficiencies, the project would structurally isolate and include Level-3 renovation of areas of Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished.
12	BAEY211006 Replace Water Main, 18-inch Return Line, Fam Camp to WTP	Project replaces 3.2 miles of severely degraded 18-inch steel water main with 18-inch C-905 PVC from the Family Camp Area (C St/34th St) to the Water Treatment Plant. Adds cross-connect to support Flightline water requirements during construction. Project reroutes water main from environmentally sensitive habitat to an accessible utility corridor. Total SF is ~ 950,000.
13	BAEY1054983 Repair Runway North and South Airfield Overrun, Facility 8280	Reconstruct runway overruns (631,814 SF) to improve their condition and prevent further deterioration.
14	BAEY1081611 Repair Road and Culvert at Doolittle Gate	Repair existing road and add an additional inbound lane and asphalt pullout to increase vehicle throughput capacity and safety at Doolittle Gate. Increase the size of the Reeds Creek culvert to accommodate expansion. Includes replacement of a smaller culvert north of Reeds Creek and a small culvert south of the gate.
15	BAEY1086069 Repair Storm Drainage PSPTS, Building 1029	Construct a trash rack system on the upstream end of the twin culvert pipes that cross underneath Doolittle Drive to reduce risk of flood. Replace the existing headwall with a new headwall that incorporates wing walls, a debris pit, and protective grating to capture large debris.

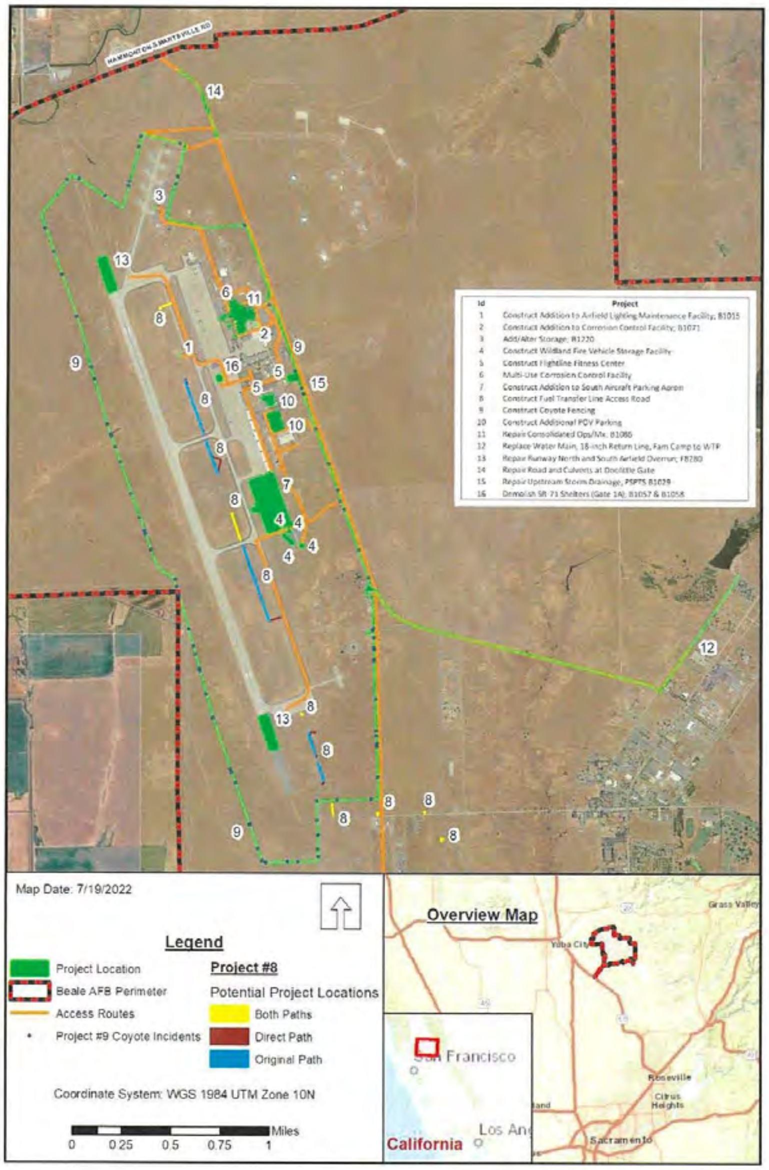
5

Project Number[1]	Project ID and Title	Description
16	BAEY107357 Demolish SR-71 Shelters, Buildings 1057 and 1058 (Gate 1A, 18,121 SF)	Demolish Building 1057 (9,600 SF) and Building 1058 (9,600 SF) to provide additional aircraft parking.

AFI = Air Force Instruction; FS = facilities; LF = linear feet; MG = million gallon; Ops/Mx = Operations/Maintenance; POV = privately owned vehicle; PSPTS = Physiological Support Squadron; SF = square foot; UFC = Unified Facilities Criteria
1. Corresponds to number key on Attachment 2.
2. The U.S. Department of Agriculture allowed deviation from the Air Force Instruction (AFI)91-212 recommendation of a 4-ft apron to a 3-ft apron to minimize vernal pool disturbance and project costs

6

Attachment 2: Proposed Flightline Installation Development Project Locations



A.3.3 Sample Scoping Letter for Government-to-Government Consultation

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 9TH RECONNAISSANCE WING (ACC)
BEALE AIR FORCE BASE, CALIFORNIA

Mr. Calvin G. Hendrix
Deputy Base Civil Engineer
9 CES/CD
6425 B Street, Bldg. 25390
Beale AFB, CA 95903-1616

Francis Steele, Jr.
Chairperson
Berry Creek Rancheria of Maidu Indians
5 Tyme Way
Oroville, CA 95966

Dear Mr. Steele,

The U.S. Air Force (USAF) is in the process of preparing a Draft Environmental Assessment in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; Council on Environmental Quality Regulations (40 Code of Federal Regulations 1500-1508); and USAF Environmental Impact Analysis Process (32 Code of Federal Regulations Part 989).

Under the Proposed Action, the USAF is seeking to construct new facilities, renovate and/or repair existing facilities, install updated infrastructure, and demolish obsolete facilities to address deficiencies in existing facilities and infrastructure. If these deficiencies are not addressed, they would risk the health and safety personnel and degrade the ability of the installation to meet USAF and DoD current and future mission requirements in compliance with state and federal requirements. The proposed projects are priorities for the improvement of the physical infrastructure and functionality of Beale AFB to meet current and future mission and facility requirements, development constraints and opportunities, and land use planning objectives.

The USAF is seeking to implement 16 construction, renovation and repair, and demolition projects over a 5-year period from 2023 to 2028. Attachment 1 is a list of the proposed projects, and Attachment 2 is a figure showing the proposed project locations.

The Environmental Assessment will assess the environmental consequences of the Proposed Action, alternative options for five of the projects and the No Action Alternative.

The Air Force requests your input on the Proposed Action as part of the environmental assessment process with relevant agencies, property owners, and stakeholders. The USAF is contacting you to notify you of the Proposed Action and invites you to provide comments.

This is the initial step in the NEPA review process, and a draft of the Environmental Assessment will be released once specific details on each Alternative have been developed. This is separate from and in addition to government-to-government consultation offered under Section 106 of the National Historic Preservation Act (54 United States Code (U.S.C.) § 306108) and 36 Code of Federal Regulations (CFR) Part 800. The Air Force is in the process of defining the area of potential effects (APE), identifying properties within the APE, and analyzing effects on these properties. We will provide the necessary information to seek input on the project through the Section 106 process.

Please address all questions and comments to Mr. Chantz Risse, at (503) 634-9568, chantz.risse.1@us.af.mil, 9 CES/CEIEC, 6425 B Street, Bldg. 25390, Beale AFB, CA 95903-1708. Thank you in advance for your assistance in this effort.

Sincerely,

CALVIN G. HENDRIX, GS-14, USAF
Deputy Base Civil Engineer,
9th Civil Engineer Squadron

4 Attachments:
1. Beale AFB Vicinity Map
2. List of Proposed Projects
3. Proposed Installation Development Project Locations
4. List of Unevaluated Cultural Resources within the APE

cc: Julianne Polanco, California Office of Historic Preservation

3

Attachment 1: Beale AFB Vicinity Map

Attachment 2: List of Proposed Projects

Project Number[1]	Project ID and Title	Description
1	BAEY1011908 Construct Airfield Lighting Maintenance Facility, Building 1015	Construct an 880 SF building extension to the Airfield Lighting Vault (Building 1015) to replace two maintenance trailers currently being used for repair of airfield equipment and storage of spare parts.
2	BAEY1073191 Construct Addition to Corrosion Control Facility, Building 1071	Construct a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by the standards outlined in UFC 4-211-02 and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071.
3	BAEY1014475 Add/Alter Storage, Building 1220	Construct a 900 SF addition to Building 1220 by adding a second-floor mezzanine and constructing a 20-ft extension on the south end of the building to provide approximately 3,200 SF of storage capacity.
4	BAEY1056321 Construct Wildland Fire Vehicle Storage Facility	Construct a 2,400 SF (60 ft wide x 40 ft deep x 20 ft high) prefabricated metal building to provide protection from the elements for high-value wildlife fire module equipment.
5	BAEY1072025 Construct Flightline Fitness Center	Construct an 80,729 SF flightline physical fitness center to meet the Air Force Chairman of the Joint Chiefs of Staff physical fitness requirements.
6	BAEY192006 Multi-Use Corrosion Control Facility	Construct a 36,543 SF multi-bay corrosion control facility with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018.
7	Construct Addition to South Aircraft Parking Apron	Construct approximately 1,185,000 SF of aircraft load-rated pavements south to Firehouse Road.
8	Construct Fuel Transfer Line Access Road	Construct 1.2 miles (~ 85,000 SF) of access road to 14 existing fuel pits along the fuel transfer line.
9	WT# 10118487 Construct Coyote Fence Line	To be installed along the outer flightline fence. The apron would be a 3-ft-wide strip of fence[2] attached to the outside base of the fence at a perpendicular angle and placed on top of the ground to avoid conflicts with vernal pools. This is a Bird/Wildlife Aircraft Strike Hazard requirement to prevent coyotes from accessing the flightline.
10	Construct Additional POV Parking	Construct a 105,000 SF addition to the private-owned vehicle parking area for Building 1025.
11	BAEY221000 Repair Consolidated Ops/Mx, B1086	Project would structurally isolate and include Level-3 renovation of areas of Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished.

Project Number[1]	Project ID and Title	Description
12	BAEY211006 Repair Water Main, 18-inch Return Line, 3MG Tank to Flightline, Facility 8611	Project replaces 3.2 miles of severely degraded 18-inch steel water main with 18-inch C-905 PVC from the Family Camp Area (C St/34th St) to the Water Treatment Plant. Adds cross-connect to support Flightline water requirements during construction. Project reroutes water main from environmentally sensitive habitat to an accessible utility corridor. Total SF is ~ 950,000.
13	BAEY1054983 Repair Runway North and South Airfield Overrun, Facility 8280	Reconstruct runway overruns (631,814 SF).
14	BAEY1081611 Repair Road and Culvert at Doolittle Gate	Repair existing road and add an additional inbound lane and asphalt pullout to increase vehicle throughput capacity and safety at Doolittle Gate. Increase the size of the culverts under the road to accommodate expansion. Total estimated SF is 27,600.
15	BAEY1086069 Repair Storm Drainage PSPTS, Building 1029	Construct a trash rack system on the upstream end of the twin culvert pipes that cross underneath Doolittle Drive. Replace the existing headwall with a new headwall which incorporates wing walls, a debris pit, and protective grating to capture large debris.
16	BAEY107357 Demolish SR-71 Shelters, Buildings 1057 and 1058 (Gate 1A, 18,121 SF)	Demolish Building 1057 (9,600 SF) and Building 1058 (9,600 SF).

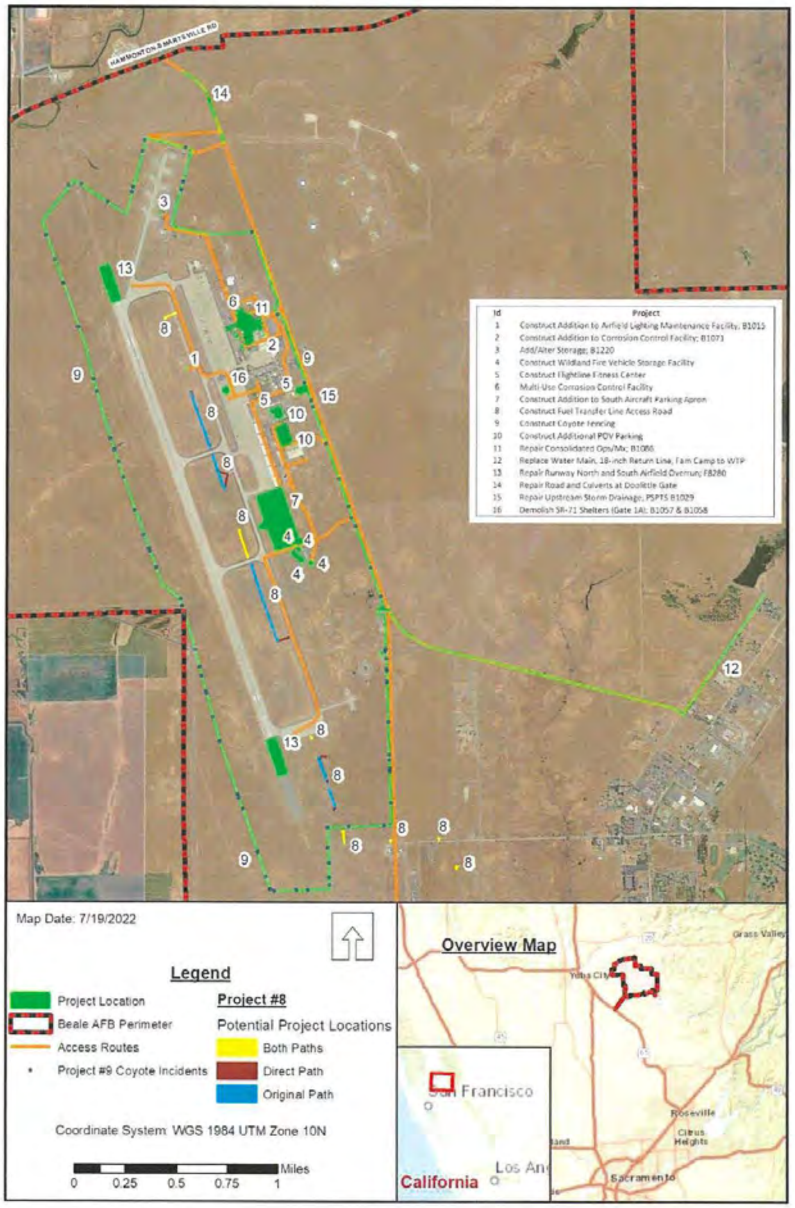
AFI = Air Force Instruction; FS = facilities; ft = foot/feet; HVAC = heating, ventilation, and air conditioning; in = inch/inches; LF = linear feet; MG = million gallon; Ops/Mx = Operations/Maintenance; POV = privately owned vehicle; PSPTS = Physiological Support Squadron; SF = square foot; UFC = Unified Facilities Criteria

1. Corresponds to number key on Attachment 2.

2. The U.S. Department of Agriculture allowed deviation from the Air Force Instruction (AFI) 91-212 recommendation of a 4-ft apron to a 3-ft apron to minimize vernal pool disturbance and project costs.

6

Attachment 3: Proposed Flightline Installation Development Projects



Attachment 4: List of Unevaluated Cultural Resources within the APE

Facility Number	Date of Construction	Description	NRHP Status
8280	1959	Runway Overrun Area, Bituminous Pavement	Not Evaluated
8611	1942	18-inch Water Distribution Main	Not Evaluated

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
650 Capitol Mall, Suite 5-100
Sacramento, California 95814-4700

October 13, 2022

Mr. Chantz Risse
NEPA Program Manager
9CES/CEIEC
6425 B Street, Bldg. 25390
Beale Air Force Base, CA 95903-1708

Dear Mr. Risse:

Thank you for soliciting comments from NOAA's National Marine Fisheries Service (NMFS) for the Flightline Installation Development Plan, Preliminary Draft Environmental Assessment (PDEA) on Beale Air Force Base (AFB), Yuba County, California.

Based on a review of the project description(s) and the impacts on water resources in the action area, we anticipate that adverse impacts to water resources or listed species would not occur from the operation of the facilities associated with the construction, renovation, and repair projects.

Reeds and Hutchinson Creeks and their associated stormwater basins (1,2,3,5) are within the project area. These creeks are intermittent and Endangered Species Act (ESA)-listed salmonids are not expected to occur in these creeks. Both creeks exit Beale AFB to the south and flow through agricultural land before reaching the Bear River. Dry Creek is not within the action area and is the only creek within Beale AFB known to have Chinook salmon (fall-run, not listed) present. Listed steelhead are believed to frequent Dry Creek in high flow years. Dry Creek is contained within stormwater basin 4 and would not be affected by the Development Plan.

The following project-specific conservation measures described in the PDEA would be implemented to avoid impacts. NMFS agrees that these measures and several other general conservation measures included in the PDEA should be sufficient to avoid impacts to listed fish that may seasonally occur in Dry Creek.

- PCM-1 In-Stream/Waterway Erosion Protection
- PCM-2 Seasonal Channels (all work would be conducted during the dry season of June 15-Oct 31)
- PCM-3 In-Stream Work Restrictions
- PCM-4 Equipment Contamination
- PCM-5 Trenchless Installation

Should any part of the proposed action change in a manner that may lead to potential effects to Dry Creek and associated stormwater basin 4, please contact this office to describe proposed changes and/or potential effects.

A.3.4 Scoping Letter Response

2

Thank you for the opportunity to comment on the PDEA for the Beale AFB Flightline Installation Development Plan.

We look forward to seeing the draft Environmental Assessment and may provide additional comments during the designated period.

Please send future correspondence to Ellen McBride, ellen.mcbride@noaa.gov.

Sincerely,

A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator
California Central Valley Office

CC to File: 151422-WCR2022-SA00045

A.4 Stakeholder/Public Distribution List

Ms. Laura Shively
U.S. Army Corps. of Engineers
Sacramento District, Sacramento, CA 95814

Michael Fris
U.S. Department of the Interior
U.S. Fish and Wildlife Services California /
Sacramento Fish & Wildlife Office
Sacramento, CA 95825-1846

Director, Officer of Federal Activities U.S.
Environmental Protection Agency, Region 9
San Francisco, CA 94105

State Clearinghouse
Office of Planning and Research
Sacramento, CA 95812

Air Quality and Transportation Division
California Air Resources Board
Sacramento, CA 95812

California Department of Conservation
Sacramento, CA 95814

Habitat Conservation Planning Branch
California Department of Fish and Wildlife
Sacramento, CA 95811

Ms. Tina Bartlett
Regional Manager
North Central Region
California Department of Fish and Wildlife
Rancho Cordova, CA 95670

Mr. Nadell Gayou
California Department of Water Resources
Environmental Review Section DPLA
Sacramento, CA 95814

California Environmental Protection Agency
Sacramento, CA 95812

California State Lands Commission
Land Management Division
Sacramento, CA 95825

Reclamation District 784
Olivehurst, CA 95961

Mr. Mark Carroll
Spenceville Wildlife Area Manager CDFW
Oroville, CA 95965

Central Valley Flood Protection Board
Sacramento, CA 95821

Quality Control Board
Central Valley Regional Water
Rancho Cordova, CA 95670-6114

Division of Water Quality
State Water Resources Control Board
Sacramento, CA 95812-4025

Mr. Francis Steel, Jr.
Chairperson
Berry Creek Rancheria of Maidu Indians
Oroville, CA 95966

Mr. Ren Reynolds
Chairperson
Butte Tribal Council
Oroville, CA 95966

Ms. Pamela Cubbler
Treasurer
Colfax-Todds Valley Consolidated Tribe
Auburn, CA 95604

Mr. Clyde Prout
Chairperson
Colfax-Todds Valley Consolidated Tribe
Auburn, CA 95605

Mr. Reno Franklin
THPO
Estom Yumeka Maidu Tribe of the Enterprise
Rancheria
Oroville, CA 95966

Ms. Glenda Nelson
Chairperson
Estom Yumeka Maidu Tribe of the Enterprise
Rancheria
Oroville, CA 95966

Sutter Butte Flood Control Agency
Yuba City, CA 95992

Ms. Jessica Lopez
Chairperson
Konkow Valley Band of Maidu
Oroville, CA 95966

Mr. Matthew Hatcher
THPO
Mooretown Rancheria of Maidu Indians
Oroville, CA 95603

Mr. Benjamin Clark
Chairperson
Mooretown Rancheria of Maidu Indians
Oroville, CA 95966

Mr. Scott Dinsmore
Tribal Chair Members
Pakan'yani Maidu of Strawberry Valley Rancheria
Marysville, CA 95902

Ms. Tina Goodwin
Chairperson
Pakan'yani Maidu of Strawberry Valley Rancheria
Marysville, CA 95901

Ms. Regina Cuellar
Chairperson
Shingle Springs Band of Miwok Indians, Shingle Springs Rancheria
Shinglesprings, CA 95682

Mr. Daniel Fonseca
Cultural Resources Director
Shingle Springs Band of Miwok Indians, Shingle Springs Rancheria
Shinglesprings, CA 95682

Ms. Annie Jones
Vice Chairperson
Shingle Springs Band of Miwok Indians, Shingle Springs Rancheria
Shinglesprings, CA 95682

Mr. Gene Whitehouse
Chairperson
United Auburn Indian Community of the Auburn Rancheria
Auburn, CA 95603

Feather River Air Quality Management District
Yuba City, CA 95991

Mr. Richard Thomas
Friends of Spenceville
Nevada City, CA 95959

Ms. Susan Hoek
District 4 Supervisor
Nevada County Board of Supervisors
Eric Rood Administrative Center
Nevada City, CA 95959

Nevada Irrigation District
Grass Valley, CA 95945

Northern Sierra Air Quality Management District
Grass Valley, CA 95945

Mr. F. Dean Webb
Reclamation District No. 2103
Wheatland, CA 95692

Mr. Gary Bradford
District 4 Supervisor
Yuba County Board of Supervisors
Marysville, CA 95901

District 1 Supervisor
Yuba County Board of Supervisors
Marysville, CA 95901

District 5 Supervisor
Yuba County Planning Department
915 8th Street, Suite 123
Marysville, CA 95901

Yuba County Water Agency
1220 F Street
Marysville, CA 95901

Three Rivers Levee Improvement Authority
Marysville, CA 95901

Levee District 1
Yuba City, CA 95991

Reclamation District 1001
Oso, CA 95674

A.5 Biological Assessment

FLIGHTLINE INSTALLATION DEVELOPMENT
AT
BEALE AIR FORCE BASE, YUBA COUNTY, CALIFORNIA

Biological Assessment
(IPaC Project Code #2024-0000964)

APRIL 2025

BEALE AIR FORCE BASE
9 CES/CEIE
6425 B STREET
BEALE AIR FORCE BASE, CA 95903-1712

CONTACT

Tamara Gallentine
tamara.gallentine.2@us.af.mil

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LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFI	Air Force Instruction
AGE	Aerospace ground equipment
AMM	Avoidance and Minimization Measure
BASH	Bird/Wildlife Air Strike Hazard
BA	Biological Assessment
BCRA	Beale Core Recovery Area
CAA	Clean Air Act
CES/CEIE	Civil Engineer Squadron, Installation Environmental
CFR	Code of Federal Regulations
CWA	Clean Water Act
DoD	Department of Defense
eDNA	Environmental DNA
ESA	Endangered Species Act
FR	Federal Register
Ft	Foot/Feet
GIS	Geographic Information System
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
LiDAR	Light Detection and Ranging
MBTA	Migratory Bird Treaty Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRM	Natural Resources Manager
Ops/Mx	Operations/Maintenance
POV	Privately owned vehicle
PSPTS	Physiological Support Squadron
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
9 RW	9th Reconnaissance Wing
SF	Square feet
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
UFC	Unified Facilities Criteria
USFWS	U.S. Fish and Wildlife Service
VELB	Valley elderberry longhorn beetle
VPFS	Vernal pool fairy shrimp
VPTS	Vernal pool tadpole shrimp

CHAPTER 1 INTRODUCTION

1.1 Overview

The U.S. Air Force (Air Force) has prepared this Biological Assessment (BA, IPaC Project Code #2024-0000964) to evaluate potential effects on federally listed threatened and endangered species from the Proposed Action to implement seven proposed flightline installation development activities at Beale Air Force Base (AFB), California. This BA has been prepared pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 United States Code [U.S.C.] 1536). Section 7 of the ESA requires consultation with the U.S. Fish and Wildlife Service (USFWS) to determine if federal actions will affect federally listed threatened or endangered species and to ensure that any action taken will not jeopardize the continued existence of any federally listed threatened or endangered species. This BA also proposes avoidance, minimization, and compensation measures intended to avoid, reduce, or mitigate for potential impacts from the Proposed Action that may otherwise have an adverse effect on federally listed species.

The Proposed Action consists of five construction activities and two infrastructure repair activities, to be implemented over an approximate 5-year period (2023-2028), although some could occur later. The intent of these activities is to provide improvements necessary to support the mission of the 9th Reconnaissance Wing (9 RW) and tenant units at Beale AFB. The proposed activities are identified by Beale AFB as priorities to improve physical infrastructure and functionality at the installation, meet current and future mission requirements, and eliminate unneeded buildings. The Proposed Action is further described in **Chapter 2**.

The Action Area for the Proposed Action includes footprints and associated analysis buffers for 7 separate activities in the vicinity of the Flightline area at Beale AFB. As a result of field reconnaissance and review of previous studies at Beale AFB, it was determined that the Action Area provides habitat suitable to support three federally listed species under USFWS jurisdiction:

- Vernal pool tadpole shrimp (*Lepidurus packardi*) (VPTS) (Endangered)
- Vernal pool fairy shrimp (*Branchinecta lynchi*) (VPFS) (Threatened)
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) (Threatened)

The following species were eliminated from consideration in this BA based on a lack of suitable habitat, as further described in **Chapter 3**:

- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (Threatened)
- Giant garter snake (*Thamnophis gigas*) (Threatened)

Additionally, this consultation analyzes effects on the monarch butterfly (*Danaus plexippus*) which is currently under review for federal listing under the ESA. While the monarch butterfly is not currently listed under the ESA, it warrants inclusion because of the species' current review status and its known occurrence on Beale AFB.

Beale AFB has concluded that, even with implementation of general and species-specific avoidance and minimization measures (AMM's), the Proposed Action is likely to adversely affect VPFS and VPTS. This conclusion was reached after a literature review, field reconnaissance, database searches, and consideration of the proposed activities. Potential effects on these species and the analytical frameworks used to quantify these effects are discussed in Chapter 4. Compensation measures proposed by the Air Force / Beale AFB to mitigate for potential mortality, disturbance, habitat degradation, and other potential adverse effects on VPFS and VPTS are also addressed in this document.

1.2 Location

Beale AFB, located approximately 40 miles north of Sacramento, 8 miles east of Marysville, and 20 miles west of Grass Valley in Yuba County, California (**Figure 1-1**), is a 23,192-acre U.S. Air Force Base within the Air Combat Command. It is headquarters to the 9 RW and is responsible for providing national and worldwide command authorities with timely, reliable, high-quality, high-altitude reconnaissance products.

The Flightline and Action Area where the Proposed Action would be implemented are located in the northwest portion of Beale AFB (**Figure 2-1**). The Action Area is further described in **Chapter 2**. Site photographs are provided in **Appendix A**.

1.3 Purpose and Need for Proposed Action

The purpose of the Proposed Action is to allow the Air Force to build new facilities and improve existing critical facilities and infrastructure on Beale AFB to continue to support strategic communications and reconnaissance missions. The construction of new facilities, renovation and repair of existing facilities, installation of updated infrastructure, and demolition of obsolete facilities would address deficiencies in the capacity of Beale AFB infrastructure to support its mission. Without the proposed improvements, the installation would not be unable to meet Air Force and Department of Defense (DoD) current and future mission requirements relative to state and federal requirements.

Beale AFB needs to provide facilities and infrastructure that are adequate to meet the mission requirements of the 9 RW and its tenant units in a manner that:

- Supports Air Force mission requirements, future mission capabilities requirements, and quality of life of units and Airmen hosted by the installation.
- Meets applicable DoD installation master planning criteria, consistent with Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*, and Air Force comprehensive planning policy and directives.
- Meets all applicable DoD, federal, state, and local laws and regulations, such as, but not limited to, the ESA, National Historic Preservation Act (NHPA), Clean Water Act (CWA), Clean Air Act (CAA), Resource Conservation and Recovery Act (RCRA), and Migratory Bird Treaty Act (MBTA).

Figure 1-1. Regional map of Beale Air Force Base, California.

1.4 Proposed Action

The Proposed Action consists of seven installation development activities involving both facilities and infrastructure, including five construction activities and two infrastructure repair activities. The proposed activities are estimated to occur over a 5-year period from 2024 through 2029, although some could occur later.

Proposed locations for each activity are identified in the next chapter on **Figure 2-1. Table 2-1**, also in the next chapter, presents the activities grouped by action (construction, repair/renovation). The activity numbers correspond to the map locations on **Figure 2-1.**

Five construction activities are proposed. While some of the activities listed may also include renovation or demolition work, construction is the largest component. Construction activities would result in approximately 83,129 square feet (SF) of new buildings or additions to existing buildings and 1,340,000 SF of new pavement, roads, and parking areas, as well as 55,432 SF of gravel access roads.

In addition, two infrastructure repair activities are proposed. Repair activities would improve 107,204 square feet of pavements, replace three culverts, and make needed storm drainage repairs.

CHAPTER 2 DESCRIPTION OF PROPOSED ACTION

2.1 Overview

The Proposed Action consists of 7 installation development activities involving both facilities and infrastructure repair activities (Table 2-1 and Table 2-2). The proposed activities are estimated to occur over a 5-year period from 2024 through 2029. Although Beale AFB might choose to implement all, none, or any combination of these activities, they are considered one project for this analysis.

Proposed locations for each of the activity areas are identified in **Figure 2-1.** The activity numbers correspond to the map locations on **Figure 2-1.** Activities are numbered to be consistent with the Preliminary Draft Environmental Assessment for Flightline IDP at Beale AFB, California. Numbering gaps reflect activities that would not affect threatened or endangered species or will be analyzed at a later date.

Table 2-1. Footprint area (proposed infrastructure), Activity Area (extent of potential ground disturbance), and Action Area (footprint+250-foot buffer) acres for proposed Flightline Installation Development Activities, Beale Air Force Base, California.

Activity Number	Footprint (acres)	Activity Area (acres)	Action Area (acres)
Activity #4	0.06	0.65	8.51
Activity #5	1.58	2.06	11.39
Activity #8	1.27	2.25	113.76
Activity #9	3.48	3.48	577.96
Activity #10	2.41	2.74	15.17
Activity #14	2.23	5.84	34.44
Activity #15	0.02	0.17	5.21
Total	**11.42**	**17.05**	**766.44**

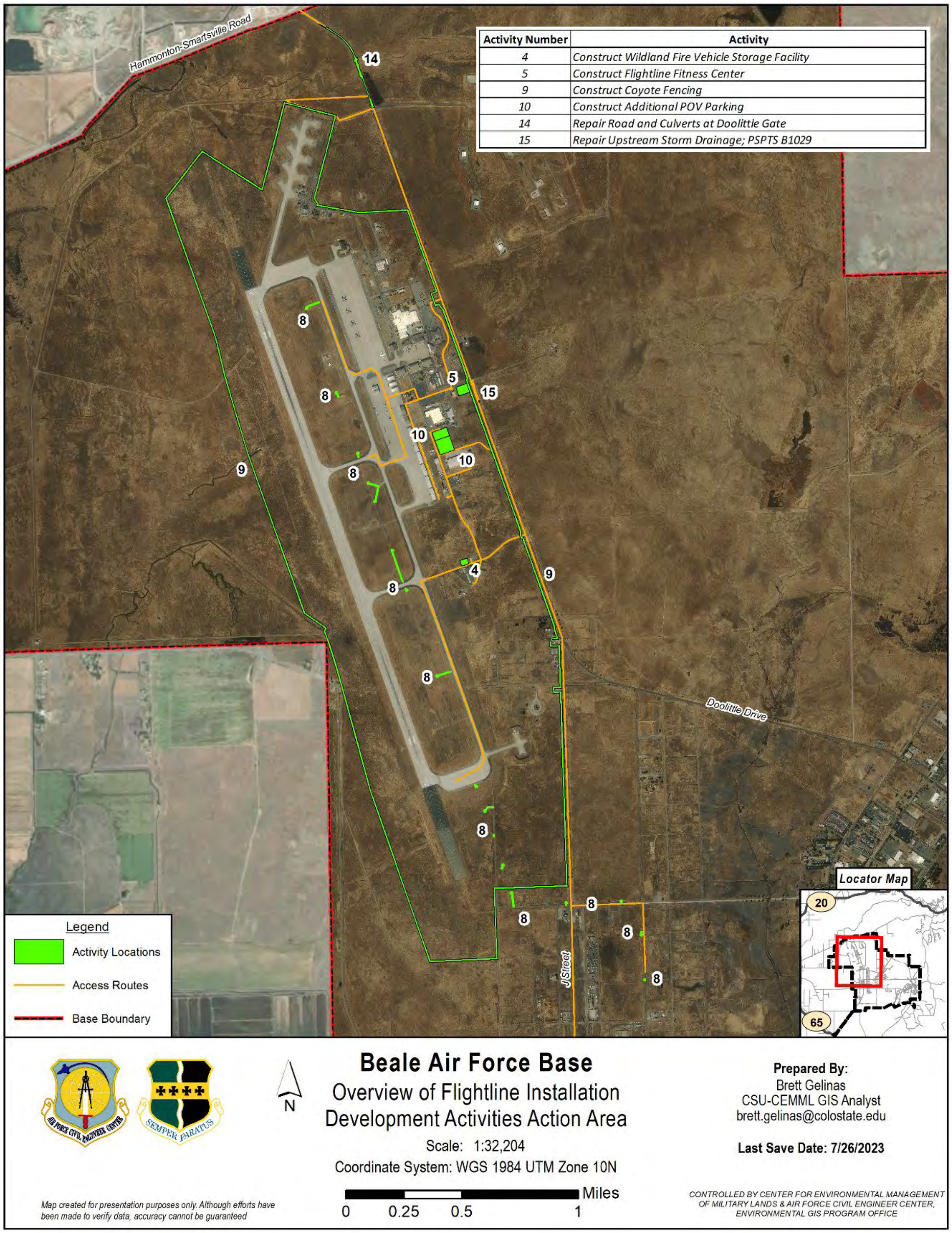

Figure 2-1. Overview of Flightline Installation Development Activities Action Area at Beale Air Force Base, California.

Table 2-2. List of Proposed Flightline Installation Development Plan Activities at Beale Air Force Base, California.

Activity ID and Title	Purpose	Need
Activity 4 – Construct Wildland Fire Vehicle Storage Facility (BAEY1056321)	Construct a 2,400 SF (60 feet wide by 40 feet long) by 20 feet high prefabricated metal building to provide protection from the elements for high-value wildland firefighting equipment and vehicles. Estimated start date: July 2026.	High-value wildland firefighting equipment and vehicles are currently stored outside and is being degraded by the weather.
Activity 5 – Construct Flightline Fitness Center (BAEY1072025)	Construct an 80,729 SF Flightline physical fitness center with a 35,000 SF parking lot to meet AFJCS physical fitness requirements. Estimated start date: June 2025.	Flightline personnel currently commute to existing inadequate facilities at the gym in the Cantonment area. Time constraints make it difficult to meet physical training requirements.
Activity 8 – Construct Fuel Transfer Line Access Road	Construct 0.7 mile of asphalt access road to 14 existing jet propellant 8 (JP-8) fuel pits along the fuel transfer line to allow year-round access. Estimated start date: May 2026.	The road segments are needed to allow monthly inspections (currently not conducted from November to April because of wet conditions) and to repair uneven terrain along the route, which increases the possibility of fuel-contaminated water spills. Access is required so that low points can be drained, which is required monthly. Low points currently cannot be drained at all 14 fuel pits on a monthly basis during the wet season. Fuel vaults 8, 10, 12, and 18 are located on the infield of the airfield, where the ground is saturated and unstable during the wet season.
Activity 9 – Construct Coyote Fenceline (BAEY10118487)	Install an apron along the bottom edge of the Flightline fence. The apron would be a 3-foot-wide strip of fence[2] attached to the outside base of the existing fence at a perpendicular angle and placed on top of the ground to avoid conflicts with vernal pools. This activity is a Bird/Wildlife Aircraft Strike Hazard requirement to prevent coyotes from accessing the Flightline. Estimated start date: May 2025.	Coyotes are digging under the fence and accessing the airfield. The apron is needed to prevent coyotes from digging under the fence. Aircraft and personnel are currently at risk from coyote/aircraft collisions. A 2020 survey identified 73 locations where coyotes were able to gain access to the flightline; in 2021, the number had increased to 87.

Activity ID and Title	Purpose	Need
Activity 10 – Construct Additional Personally Owned Vehicle (POV) Parking	Construct a 105,000 SF addition to the POV (privately owned vehicle) parking area for Building 1025 to provide additional spaces needed to support existing and potential future uses. Estimated start date: May 2026.	Additional parking area is needed as the size of the existing parking area is inadequate, which could hinder future growth.
Activity 14 – Repair Road and Culverts at Doolittle Gate (BAEY1081611)	Repair existing roads and add an additional inbound lane and asphalt pullout to increase vehicle throughput capacity and safety at Doolittle Gate. Increase the size of the Reeds Creek culvert to accommodate expansion. Includes replacement of a smaller culvert north of Reeds Creek and a small culvert south of the gate. Total estimated acreage is 8.07. Estimated start date: June 2026.	The activity is needed because with only one in-bound lane, traffic can become congested on the high-speed Hammonton-Smartsville Road with vehicles waiting to be approved for entry into Beale AFB. This congestion creates a substantial risk for Security Forces and installation security as a whole because Security Forces are not able to adequately survey a congested road. In the event of an attack on the base, this congestion could prove to be a major security flaw. This activity is required to comply with both UFC 4-010-01, *Minimum Antiterrorism Standards for Buildings*, and UFC 4-022-01, *Entry Control Facilities Access Control Points.* Additionally, the height of the Reeds Creek box culvert needs to be raised to keep Doolittle Drive above flood levels.
Activity 15 – Repair Upstream Storm Drainage PSPTS, Building 1029 (BAEY1086069)	Construct a trash rack system on the upstream end of the twin culvert pipes that cross underneath Doolittle Drive to reduce risk of flooding downstream. Replace the existing headwall with a new headwall that incorporates wing walls, a debris pit, and protective grating to capture large debris. Estimated start date: July 2025.	The activity is needed to minimize long-term maintenance from debris clogging and reduce flood risk to buildings, as has happened to the PSPTS facility, during larger rain events.

AFI = Air Force Instruction; ft = foot/feet; Ops/Mx = Operations/Maintenance; POV = privately owned vehicle; PSPTS = Physiological Support Squadron; PVC = polyvinyl chloride; SF = square foot; UFC = Unified Facilities Criteria

1. Corresponds to activity numbers shown in Figures 3-3 through 3-9.

2. The U.S. Department of Agriculture allowed deviation from the AFI 91-212 recommendation, *Bird/wildlife Aircraft Strike Hazard (BASH) Management Program*, of a 4-foot apron to a 3-foot apron to minimize disturbance to the vernal pool and costs

2.2 Construction Activities

Activity 4 – Construct Wildland Fire Vehicle Storage Facility (BAEY1056321)

The Proposed Action would construct a 2,400 SF (60 feet wide by 40 feet long) by 20 feet high prefabricated metal building to protect high-value wildland fire module equipment from the weather. The facility would include a concrete slab and air-conditioned storage area. The total activity area would be 0.65 acres. The structure would include three pull-through vehicle bays. Bollards are required for each bay to protect the structure from damage by vehicles. The facility would also house heavy equipment (transport trucks and dozers) and small equipment (chainsaws, shovels, axes, and hoses). The bays would also include workspace for small tool maintenance.

Activity 5 – Construct Flightline Fitness Center (BAEY1072025)

The Proposed Action would construct a two story 80,729 SF physical fitness center to meet Air Force Joint Chiefs of Staff (AFJCS) physical fitness requirements in the Flightline area with an adjacent 28,400 SF parking lot would also be included. The total activity area would be 2.06 acres.

Activity 8 – Construct Fuel Transfer Line Access Road

The Proposed Action would construct segments of an access road to allow access to the existing JP-8 fuel vaults along the fuel transfer line during the wet season. The segments would connect to the fuel vaults from the nearest existing pavement. The footprint of this activity would be 55,432 SF, with a total activity area of 2.25 acres. This activity would result in impacts to federally listed species.

The road segments would total 0.7 miles long. They would be 10 feet wide and would consist of geotextile fabric with a level 6-inch compacted gravel surface. Most of the road would be constructed within the airfield boundary. There are two locations where the new access roads cross ditches and culverts would be installed to allow water flow. The proposed routes avoid wetlands as much as possible.

The road would allow year-round access to existing fuel vaults so required monthly inspections could occur, and accumulated water could be removed. Inspections are currently not conducted monthly due to environmental restrictions against driving off road during the rainy season. Currently, a waiver from Air Force Petroleum Office allows inspections to be postponed from November through April. In addition, uneven terrain along the route increases the possibility of fuel-contaminated water spills.

Activity 9 – Construct Coyote Fenceline (BAEY10118487)

This activity is a Bird/Wildlife Aircraft Strike Hazard (BASH) requirement to prevent coyotes from accessing the Flightline. This activity would modify the base of 50,525 linear feet of an existing fence using a chain link apron (>20 feet from wetlands) and large animal dig barriers (≤20 feet from wetlands). The apron would be a 3-foot-wide strip of fence attached to the outside base of the existing fence at a perpendicular angle and placed on top of the ground. To minimize potential damage to wetlands, large animal dig barriers would be used in proximity (≤20 feet from) wetlands. Dig barriers come in panels of spikes (approximately 32 inches x 12 inches), which would be driven into the ground at the base of the fence. The total activity area would be 3.48 acres.

The activity area would be accessed via paved or gravel surfaces. Fencing apron panels and dig barriers would be staged along the fence during the dry season using an off-highway vehicle (UTV) or light truck with large tires prior to installation. The vehicle would follow the existing fence line and use weight dispersing mats to traverse wetlands that could not be avoided. Vehicle access would only be done during the dry season, with guidance by a biological monitor. Fencing apron panels would be installed during the dry season and would not involve ground disturbance. Chain link apron fencing and dig barrier installation would be done by hand using a mallet with little ground disturbance. If soil is too hard to install dig barriers without disturbing the soil during the dry season, work would be done during the wet season, and a permitted (Section 10(a)(1)(A) large branchiopod) biologist would accompany the installation crew to ensure minimal impacts to protected species. A USFWS permitted biologist would direct activities within and adjacent to standing water and ensure the appropriate response if impacts were to occur.

Activity 10 – Construct Additional Personally-owned Vehicle (POV) Parking

The Proposed Action would construct a 105,000 SF addition to the parking area for Building 1025. Existing parking in the area is inadequate for current and future parking needs. The total activity area would be 2.74 acres. Development of the proposed parking area would disturb the soil to a depth of 15 inches: 9 inches of soil would be removed, and 6 inches of disturbed soil would be left in place. Parking lot material would extend to a depth of 9 inches. This activity would likely impact federally listed species in a downgradient vernal pool.

2.3 Renovation and Repair Activities

Activity 14 – Repair Road and Culverts at Doolittle Gate (BAEY1081611)

The Proposed Action would repair the existing road, consisting of laying 107,204 SF of asphalt. In addition, an inbound lane (12-foot lane and 4-foot shoulder) would be added on Doolittle Drive for approximately 2,000 LF from Hammonton-Smartsville Road to the existing double lanes at the Doolittle Gate. An approximately 3,600-SF asphalt pullout would also be added on the east side of the road and three culverts would be replaced. The total activity area would be 5.7 acres. The Reeds Creek culverts would be replaced with a larger system to both increase capacity and to span the width of the new road. The smaller culvert north of Reeds Creek, and a small culvert south of Doolittle Gate would be replaced in-kind. Wetlands or other WOTUS would be affected. During construction, Doolittle Drive would be closed from Hammonton-Smartsville to Alert Drive and the Doolittle Gate would be closed during construction. Non-commercial traffic would be transferred to the Schneider Gate and commercial vehicles to the Wheatland Gate (shown on **Figure 1-1**).

Activity 15 – Repair Upstream Storm Drainage PSPTS, Building 1029 (BAEY1086069)

The Proposed Action would repair and modify the existing upstream storm drainage system to the east of Doolittle Drive to correct issues that lead to clogging and subsequent flooding of Building 1029. A metal trash rack would be installed at the intake of the twin 48-inch culvert pipes on the east side of Doolittle Drive and would involve minor demolition associated with existing infrastructure and new concrete placement. The existing culvert headwall would be demolished and replaced with a new headwall that incorporates 8-foot wing walls, a debris pit, and protective grating to capture large debris. Localized grading around the new headwall and trash rack (up to 5 feet) would be required to minimize future erosion and provide positive drainage. This activity would likely impact federally listed species in vernal pool habitat within and adjacent to the project footprint. The total activity area would be 0.17 acres.

This activity would begin in the dry season when soils are dry and unable to be easily compacted (approximately May) and would be completed by October. The staging area would be on and beside Grumman Road, approximately 500 feet north of the culvert headwall. Equipment would access the culvert via a gentle slope running parallel to Doolittle Drive, north of the activity footprint. Maintenance would consist of manual removal of vegetation from the trash racks seasonally, to maintain proper drainage.

2.4 Action Area

The Action Area (**Figure 2-1**) refers to the footprint of each activity, and a 250-foot analysis buffer was included around each activity area, to evaluate the potential for direct and indirect impacts to wetland features associated with project implementation.

2.5 Avoidance and Minimization Measures

This Project will be implemented in accordance with the following Avoidance and Minimization Measures (AMMs) and in coordination with the Beale AFB Natural Resources Manager (NRM) to meet requirements under the ESA and the Integrated Natural Resources Management Plan (INRMP). The assessment of potential impacts of the Proposed Action is based on the implementation of these measures.

Beale AFB and its contractors will implement the following conservation measures to reduce the potential for adverse effects to special status species and their habitat. For the purposes of this consultation, a "qualified biologist," as referenced in this document, refers to an individual who, at a minimum, holds a four-year degree in a relevant biological field and who has demonstrated knowledge and experience with the species and habitat that are potentially affected by the project. The Beale AFB Natural Resources Manager (NRM) will review the resume(s) for sufficiency prior to submitting to the Service. The Service has 5 business days to refuse the submittal.

Note: the following abbreviations will be used throughout the conservation measures tables below.

- U.S. Fish and Wildlife Service (USFWS) – Service
- Beale Air Force Base – Beale AFB
- Endangered Species Act - ESA
- Natural Resources Manager – NRM

2.5.1 General Conservation Measures (MM)

MM-1: Pre-Project Surveys - A qualified biologist will conduct pre-project surveys of all ground disturbance areas in sensitive habitats, two weeks prior to the start of the project to confirm the information in this document is still correct and conditions have not changed. If any sensitive species are found during the pre-project surveys, the qualified biologist will contact the NRM who will coordinate with the Service.

MM-2: Biological Monitor - A qualified biologist will monitor construction activities in or adjacent to sensitive habitats. The contractor will notify the qualified biologist daily when work is planned via email, phone, or text. The qualified biologist will ensure compliance with these conservation measures, required for protected species and their habitats.

a. If protected species are found that are likely to be affected by work activities, the qualified biologist will have the authority to stop any aspect of the proposed action that could result in unauthorized take of a protected species. If the qualified biologist exercises this authority, the biologist will notify the NRM who will then contact the Service by telephone and email within one working day.

b. The qualified biologist will submit weekly reports to the NRM to monitor project impacts in relation to those anticipated and to document compliance and inspection of conservation measures and terms and conditions. A separate memo/report will be prepared and submitted to the NRM immediately should an impact occur outside of the approved project limits.

MM-3: Conservation Measure Review for Project Managers (at project kickoff) - The NRM will provide conservation measure review to contractor project managers, Beale AFB project managers, contracting officers, and key personnel during the pre-construction kickoff meeting. Contractor project managers will acknowledge their review and understanding of conservation measures by signature. These measures will be provided to Beale AFB project managers and Beale AFB contracting officers for inclusion in all contracts.

MM-4: Environmental Awareness Training - Environmental awareness training will be provided by a qualified biologist for all construction and field personnel working on the proposed project. All personnel will participate in training before activities begin and as new workers join the proposed project activities. The program will consist of a briefing on environmental issues related to the proposed project. The training program will include an overview of the legal status, biology, distribution, habitat needs, and compliance requirements for each sensitive species that may occur in the action area. The presentation will also include a discussion of the legal protection for endangered species under the Act, including penalties for violations. A fact sheet conveying this information will be distributed to all personnel who enter the project site. Upon completion of the training, employees will sign a form stating that they attended the program and understand all conservation measures. These forms will be maintained at Beale AFB and will be accessible to the appropriate resource agencies.

MM-5: Limited Operations Period - No work will be conducted between November 1 and May 1This includes all aspects of the proposed project.

MM-6: Rainfall - After a rain event of greater than 0.2-inch, work will occur only after the soil surface has dried sufficiently and no sooner than 12 hours after the rain ends; if a rain event exceeds 0.5-inch, work will only resume once soil conditions have dried sufficiently and not sooner than 48 hours after the rain ends. Soil is sufficiently dried when a clump of soil from the site crumbles when rolled in the palm of the hand.

MM-7: Marking of Access Routes, Work and Staging Areas, and Sensitive Areas - Prior to initiation of the proposed project, boundaries of access routes, work areas, staging areas, and sensitive areas (water features, potential habitat for sensitive species), will be clearly marked with orange construction barrier fencing (or an appropriate alternative method). The NRM will coordinate with the qualified biologist to stake and flag these boundaries which will demarcate exclusion zones where construction activities may not occur and to indicate where to install appropriate boundary and containment materials for the project. The flagging and fencing will be clearly marked as identifying an environmentally sensitive area. The contractor will remove fencing, stakes, and flagging within 60 calendar days of project completion.

MM-8: Location of Work and Staging Area - All materials, vehicle parking and staging areas shall be designated by the Beale AFB Environmental Office and located at least 50 feet away from drainages and wetland features or contained on hardscape surface. Storage of all construction materials and debris will be kept to the designated storage and staging area. The number and size of staging areas and the total area of the activity will be limited to the minimum area necessary to achieve the project goal.

MM-9: Minimization of Off-Road Access Routes - Off-road access routes will be established in upland areas as much as possible, and road length will be the minimum necessary, to reduce adverse effects on wetland features. Where it is necessary for access routes to go through a wetland feature, weight-dispersing mats will be placed over the wetland feature to avoid any potential effects to sensitive species and/or sensitive habitats. Off-pavement access routes will only be used if the soil is dry. Any ruts or furrows caused by operations shall be raked level by hand, compacted and restored to normal grade. Access routes will be restored as closely as possible to preconstruction contours and elevations. This will be done prior to leaving the current area of operation.

MM-10: Additional Access Routes - If a new vehicle access route is required in special status species habitat, the route will be pre-surveyed by a qualified biologist to minimize impacts to sensitive resources and will be reviewed by the NRM. If routes are reused over multiple years, they will be assessed annually to ensure that they are clear of special-status species.

MM-11: Trenches and Holes - Any trenches or holes greater than 6 inches deep that cannot be closed by the end of the day will be covered with plywood, or other material or an egress will be provided in coordination with NRM to prevent trapping animals. Trenched areas and holes will be compacted and restored to normal grade.

MM-12: Revegetation - All upland vegetated areas disturbed by construction will be revegetated with the Beale AFB-approved native seed mix. Exposed soil must be hydro-seeded and depending on slope, covered with a biodegradable geotextile to prevent sediments from entering aquatic habitats. Any straw used for erosion control materials will be “certified weed free.” Reseeded areas will be monitored and maintained by the contractor as needed until there is 70% vegetated ground cover in the seeded area.

MM-13: Suitable Material - No activity may use unsuitable material (e.g., trash, debris, car bodies asphalt, etc.). Material used for construction or discharged must be free from toxic amounts of pollutants.

MM-14: Speed Limits: All vehicle operators will follow the posted speed limit on paved roads and a 15-mile-per-hour speed limit on unpaved roads. Off-road travel, if approved, will follow a 5-mile-per-hour speed limit and must be approved by NRM.

MM-15: Garbage Removal - During construction activities, all trash will be properly contained, removed from the work site daily, and disposed of properly. Following construction, all refuse and construction debris will be removed from work areas. All garbage and construction-related materials in construction areas will be removed immediately following project completion.

MM-16: Green Waste Disposal - All plant debris potentially containing reproductive parts (i.e., seeds or plant fragments for species that reproduce vegetatively) will be disposed of at an off-site landfill or green waste facility. It will be transported in a manner that prevents the spread of invasive plants to other locations. This action may require, but is not limited to, bagging the material before it is transported off-site.

MM-17: Invasive Species - A qualified biologist will monitor and ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive plants found in the action area will be removed using non-chemical methods. Specifically, equipment will be thoroughly cleaned of soil and vegetation before being delivered to the site to minimize the potential for spreading pathogens or exotic/invasive species. Equipment will be inspected by the qualified biologist and may be rejected if the qualified biologist determines that it has not been adequately cleaned.

MM-18: Invasive Species Monitoring - The site will be added to the Annual Invasive Species Management work plan and will be surveyed and maintained with the existing weed program at Beale AFB.

MM-19: Fueling and Servicing in Designated Areas - Motor vehicles and equipment will only be fueled and serviced in designated service areas. These designated areas will be at least 100 feet from any wetland feature, drainage, sensitive habitat, or water body, and will have spill containment. Prior to the onset of work, a plan will be prepared to allow a prompt and effective response to any accidental spills. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

MM-20: Spill Plan - A Spill Prevention Control and Countermeasure Plan will be prepared prior to the project implementation. All machinery will be properly maintained and cleaned to prevent spills and leaks. Any spills or leaks from the equipment/vehicles will be reported and cleaned up in accordance with applicable local, state and federal regulations. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. The spill plan will be submitted to the Beale AFB Environmental Office for approval.

MM-21: Equipment Condition - Prior to use, all equipment will be cleaned to remove external oil, grease, fuels, dirt, or mud. All construction equipment and vehicles must be inspected daily, in good working condition, and showing no signs of leaks. Equipment will be left on site or inspected prior to returning to the area. All equipment will have drip pans placed where potential leaks could occur. All leaks will be repaired off-site or in a suitable location prior to resumption of construction activity.

MM-22 Fire Prevention and Suppression Plan - A fire prevention and suppression plan will be prepared prior to the proposed project implementation. The fire prevention and suppression plan shall be submitted to the NRM for Wildland Fire Chief approval.

MM-23: Erosion Control Systems - Site-specific erosion control measures (i.e., hay bales, silt fencing) will be installed, maintained in effective operating condition, and in place at all times during construction to protect drainage ditches, storm drains, wetlands and water bodies from sedimentation resulting from construction activity. All wetlands, drainages, and vernal pools will have erosion control measures installed when work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction activities and the wetland. All exposed soil and other fills must be permanently stabilized at the earliest practicable date, but no later than 1 November. Erosion control devices will not contain plastic netting and will be “certified weed free” to prevent the spread of invasive species.

MM-24: Dust Control - All unpaved road areas will be watered, or alternative dust control measures will be used during project construction to prevent excessive dust from silting nearby wetlands. No chemical dust control or tackifiers will be used adjacent to vernal pools.

MM-25: Excess Soil Protection - Excess soil temporarily stored on-site during construction must be covered with geotextile stabilization blankets/tarp and wattles/gravel bags/socks to prevent exposure to the elements and to lessen chances of sedimentation due to storm water runoff and wind erosion. All remaining fill material will be removed in its entirety according to disposal requirements and the affected areas will be revegetated.

MM-26: Use of Excavated Soil on Base - If excess materials are to be used on Beale AFB after appropriate testing has been conducted the NRM will contact the Service before hauling the materials to ensure that the disposal site will not affect any sensitive species.

MM-27: Disposal of Excavated Soil - All excess soil excavated during construction will be removed and disposed of at a landfill located off Beale AFB. If soil is contaminated, then Beale AFB Environmental Office will coordinate with the Army Corps of Engineers and/or Sacramento Water Regional Control Board, as appropriate, prior to disposal of excavated soil.

MM-28: Upland Buffers - A 50-foot upland vegetated buffer will be established and maintained around all wetlands.

MM-29: Report Kills/Injuries - Any worker who inadvertently kills or injures a protected species, or finds one injured or trapped, will immediately report the incident to the qualified biologist. The qualified biologist will notify the NRM who will then verbally notify the Service within three business days and will provide written notification via email of the incident within five business days.

2.5.2 Wetland and Vernal Pool Conservation Measures (VP)

VP-1: Wetland Erosion Control - All work conducted within 50 feet of a wetland feature shall have construction boundaries designated with fencing to ensure no equipment will be in the vicinity of a drainage, wetland, or vernal pool. All wetlands, drainages, and vernal pools will have erosion control measures (i.e., straw wattles, hay bales, silt fencing) installed when work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction activities and the wetland feature. Soil erosion and sediment control must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

VP-2: Wetland Pre-Project Vegetation Clearing - Pre-project clearing of vegetation within 50 feet of a wetland feature will be done with hand equipment to ensure no subsurface disturbance occurs in the wetland or below 6 inches near the wetland.

VP-3: Wetland Feature Protection - Intrusive work adjacent to or within branchiopod habitat shall have protection (plastic tarps) covering the aquatic feature to ensure the soil being removed and backfilled during the excavation process does not adversely impact habitat.

VP-4: Road Surfaces and Shoulders - Projects that occur on road surfaces and along road shoulders will avoid direct impacts to wetland habitats, including roadside ditches that act as seasonal wetlands. Roadside herbicide application will avoid ditches and other potential fairy shrimp and tadpole shrimp habitat. Roadside mechanical or hand removal will avoid leaving biomass in ditches and other fairy shrimp and tadpole shrimp habitats.

VP-5: Mowing Vernal Pools - If mowing occurs in or near vernal pools, it will occur only when the soil is not saturated to ensure tracks are not left in or near wetlands. The mower height must be set to avoid the flowering heads of sensitive vernal pool plant species.

VP-6: Compensation – Beale AFB will offset the effects to vernal pool branchiopod habitat through purchase of credits from a Service-approved conservation or mitigation bank or other equivalent method subject to the Service's review and approval. The purchase will be completed prior to initiating each activity. Permanent loss of habitat will be offset by preserving existing vernal pool branchiopod habitat at a ratio of 4 acres of preservation for every 1 acre impacted (4:1) where effects occur within the Beale Core Recovery Area (Core Area; Service 2005) and at a ratio of 3:1 for effects outside of the Core Area. Temporary effects will be offset at a ratio of 1:1. Based on the proposed project designs, a total of 2.52 acres of credits will be purchased to offset 0.42 acres of permanent and 1.22 acres of temporary effects.

2.5.3 Valley Elderberry Longhorn Beetle (VELB)

All projects that occur within 165 feet of elderberry shrubs (*Sambucus spp*.) with stems of 1-inch diameter or more (Eligible Elderberry) will implement the following measures to avoid or minimize disturbances and adverse effects to the species.

VELB-1: Qualified Biologist - A qualified biologist will provide training for all contractors, work crews, and any onsite personnel on the status of the beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.

VELB-2: All activities that occur within 165 feet of an elderberry shrub will be conducted outside of the beetle emergence period (i.e., activities will not occur between March and July).

VELB-3: Pre- and post-project surveys will be conducted to record habitat conditions before the start of the project and after completion of the project for tracking purposes. This may include photos or species surveys and will be used to better manage the species.

2.5.4 Monarch Butterfly (MB)

The following conservation measures are in accordance with the *Monarch Conservation on Department of Defense Lands in the West: Best Management Practices-2021* (McKnight et al., 2021).

Where surveys for milkweed have not been conducted, either pre-project surveys or during-project surveys will identify milkweed stands. Additionally, if milkweeds are identified within the project area, surveys for adult and larval monarchs will be conducted both before and after the project. All projects that occur within 100 feet of milkweed plants or 250 feet from occupied habitat (roosting and breeding sites) will implement the following measures to avoid or minimize disturbances and adverse effects to the species.

MB-1: No herbicides or pre-emergent will be used.

MB-2: All individuals conducting weed/vegetation control activities within the buffer area (100 or 250 feet as defined above) will receive training on the identification of milkweed plants and a description of both adult and larval monarchs in order to identify and avoid milkweed and monarchs during all activities.

MB-3: Milkweed numbers and species would be assessed in project areas where impacts on milkweed may occur.

- The impacts of milkweed removal in known monarch breeding areas would be minimized by planting equivalent milkweed species at a 3:1 ratio. The impacts of milkweed removal in habitats not known to be used by monarchs will be minimized by planting milkweed at a 2:1 ratio.
- All newly planted milkweed will be regionally native and preferably of the same species removed. Milkweed species selection and replanting location will be at the discretion of the NRM.

MB-4: A 2-foot buffer would be maintained around extant milkweed plants during off-road vehicle access, restoration and habitat enhancement planting, and other ground-disturbing activities to protect breeding habitat.

MB-5: Any area within 250 feet of known monarch breeding habitat requiring reseeding will include species beneficial to monarchs, including native milkweed. All seed mixes must be approved by the NRM.

MB-6: Generally, mowing will not be conducted within 100 feet of areas with suitable monarch habitat during the active season (15 March through 31 October).

- If mowing must be conducted (i.e., for habitat restoration projects benefiting Monarchs or other listed species) and vehicle access must be allowed, all milkweed plants would be identified and avoided.

CHAPTER 3 AFFECTED ENVIRONMENT

Beale AFB contains many valuable natural resources, including large expanses of native and non-native annual grassland habitat, and an abundance of aquatic resources, including wetlands, vernal pools, streams, and drainages.

3.1 Description of Vegetation Types

This section describes the vegetation communities in the Action Area shown in **Figure 3-1**. The Flightline area consists of relatively flat grasslands characteristic of Central Valley topography. Most of the activity sites lie within the Flightline developed area where landcover and topography of the grasslands have been modified. Elevation ranges from 89 to 135 feet above sea level. Vernal pools are found in grasslands in areas that have not been significantly altered. Dominant landcover consists of:

- Developed Areas
- Native and non-native annual grasslands
- Vernal pools, other wetlands, and aquatic communities

The descriptions of these communities provided below are excerpted from the Beale AFB INRMP (Beale AFB, 2021). The descriptions also draw on information from a wetland delineation conducted by wetland biologists within the Action Area in April and July 2022 (HT Harvey, 2022). Site photographs of vernal pools, other wetlands, and aquatic communities within the Action Area were obtained during the 2022 field work and are presented in **Appendix A**. Wetland communities in the vicinity of the Action Area are shown on **Figure 3-1**.

3.1.1 Terrestrial Habitats

Developed Areas and Annual Grassland

Turf and landscaped areas at Beale AFB are restricted to improved grounds on Beale AFB, primarily in and around the flightline, Main Base, family housing areas, and along principal transportation corridors. Most landscaping in these areas is turf of a variety of grass species. Shrubs and trees, both native and non-native, have been planted in improved areas. Common landscape trees include fruitless mulberry (*Morus alba*), Fremont's cottonwood, Lombardy poplar (*Populus nigra*), true cedars (*Cedrus* spp.) and pines (*Pinus* spp.).

The most common plant community in the Action Area is grassland/herbaceous (Beale AFB, 2021). This plant community is dominated by non-native annual grasses and a variety of native and non-native forbs. Native annual grasses, occurring in base pastures and roadsides, include Oldfield/Prairie three-awn (*Aristida oligantha*) and Pacific fescue (*Fescua microstachys*). Native perennial bunchgrasses include purple needle grass (*Stipa pulchra*).

Riparian

Reeds Creek and Hutchinson Creek are the only streams in the Action Area and both are intermittent. Reeds Creek begins at an off-base spring above Miller Dam/Reservoir and receives additional water from an irrigation canal on the northwestern side of Beale AFB. Within the Action Area, the creek lacks riparian vegetation and is surrounded by grazed grassland. Farther downstream there is patchy riparian vegetation composed of mostly willow shrublands.

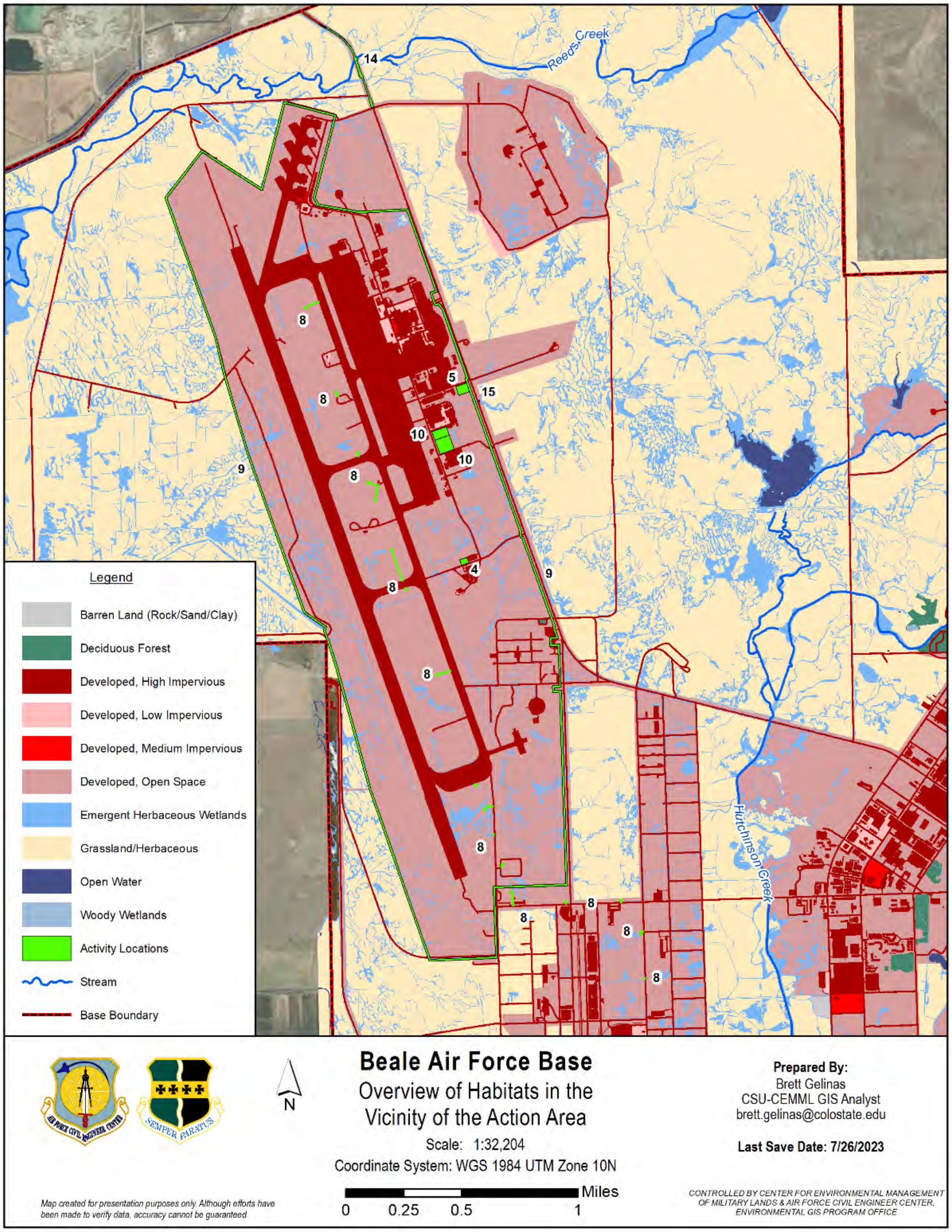

Figure 3-1. Overview of habitats in vicinity of the Action Area on Beale Air Force Base, California.

Hutchinson Creek is fed by on-base impoundments, rain, and small drainages and seeps north of Beale AFB. It is deeply incised/downcut below its natural streambed which may contribute to declining riparian vegetation (Beale AFB, 2021). Riparian woodland vegetation and freshwater marsh vegetation are both present along portions of Hutchinson Creek. Within the Action Area, vegetation along the creek is riparian scrub.

Both creeks exit Beale AFB to the south and flow through cropland before reaching the Bear River.

3.1.2 Aquatic Habitats

Wetland and other aquatic communities present within the Action Area (**Figure 3-2**) at Beale AFB fall into the following categories: vernal pools, swales, wetlands, or deep water/streams. Manmade wetland plant communities present within the Action Area are found in excavated ditches, detention basins, and ponds within and surrounding the golf course. Natural aquatic communities include vernal pools and swales that are not influenced by artificial hydrology during the dry season and exhibit a greater percentage of native vegetation, including species that are endemic to vernal pools.

Wetland Field Verification

During April and July 2022, wetland verification survey of the Action Area was conducted. Areas and features identified during these surveys are shown in **Figures 3-3** through **3-9**. The purpose of the mapping survey was to verify the location and extent of vernal pools and swales previously mapped by Beale AFB using Light Detection and Ranging (LIDAR) (USACE, 2012).

Vernal Pools

Vernal pools are ephemeral pools in shallow topographic depressions that fill with localized surface runoff during the winter and early spring with precipitation sources (Lichvar et al., 2006). Vernal pool communities occur throughout the Central Valley in seasonally flooded depressions. Vernal pool vegetation consists of unique local endemic species. During wet springs, the rims of the pools are encircled by flowers that change in composition as water recedes. Several aquatic invertebrates are restricted to these unique habitats, including the VPFS and VPTS.

Vernal pools form in shallow depressions with a subsurface layer that restricts drainage, allowing precipitation to accumulate during the winter rainy season. Vernal pools support many species of native plants because many of the local non-native species cannot survive the extremes of the rainy season inundation followed by the arid conditions of the dry season. Upland plants cannot tolerate the long periods of flooding and perennial wetland species cannot survive the long periods of drying.

Deep Water/Streams

Impoundment lakes are the only deep-water habitats on Beale AFB. There are only a few large impoundment lakes at Beale AFB and most of them are located along Hutchinson Creek. None of these lakes are located in or proximate to the Action Area.

Stream habitats on Beale AFB consist of ephemeral, intermittent, and perennial drainages. There is a perennial drainage (a channelized stream feature) west of the Action Area boundary. Only ephemeral and intermittent drainages are present within the Action Area. Ephemeral drainages are fed primarily by storm water. They convey flows during and immediately after storm events but may stop flowing or begin to dry if the interval between storms is long enough. Intermittent drainages are fed primarily by groundwater and supplemented by storm water. After the onset of rains, intermittent drainages typically have persistent flows through and past the end of the rainy season.

Eventually, depending on availability of groundwater, these features become dry. Several interconnected ephemeral and intermittent drainages occur in the southeastern portion of the Action Area (**Figure 3-1**). These drainages are connected to an impoundment lake (Miller Lake) approximately 2 miles east of the Action Area, with much of their seasonal hydrology likely originating from lake overflows. During the April 2020 surveys, fishermen were observed catching large fish at this lake. Due to their connectivity to the lake, the ephemeral and intermittent drainages in the southeastern portion of the Action Area likely contain fish when inundated and would therefore not provide suitable habitat for vernal pool branchiopods because these species typically occur in the absence of fish. Presence of fish is a very strong indicator of branchiopod absence and a barrier to dispersal (Cordeiro, 2007).

Ditches

Ditches are man-made features excavated in uplands whose primary function is flood control. Ditches receive seasonal runoff from paved or compacted dirt roads, grassland, and developed open space. Ditches are present throughout the Action Area.

Swales

These features generally are very similar to the edges of vernal pools in terms of plant species composition but occur on landforms that do not pond water and often are connected hydrologically to vernal pools or seasonal wetlands (i.e., the swales convey surface flow into and between groups of adjacent vernal pools and seasonal wetlands).

3.1.3 Critical Habitat and Core Recovery Areas for Vernal Pool Branchiopods

There is no designated critical habitat for federally listed threatened or endangered species on Beale AFB. Beale AFB consults with USFWS on an activity-by-activity basis if suitable habitat for listed species occurs within or near the Action Area. The closest critical habitat unit to the Action Area, referred to as Beale Unit, is outside of and adjacent to the western boundary of Beale AFB near Schneider Gate. Beale Unit is composed of approximately 1,324 acres and includes Unit 11 (VPFS critical habitat) and Unit 7 (VPTS critical habitat). This critical habitat was designated in 2003 (USFWS, 2003).

The northwestern portion of Beale AFB is within the USFWS Beale Core Recovery Area (BCRA) for vernal pool branchiopods, defined in the *USFWS Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS, 2005). The Action Area overlaps with the BCRA (**Figure 3-2**) at the sites of Activities 9 and 14.

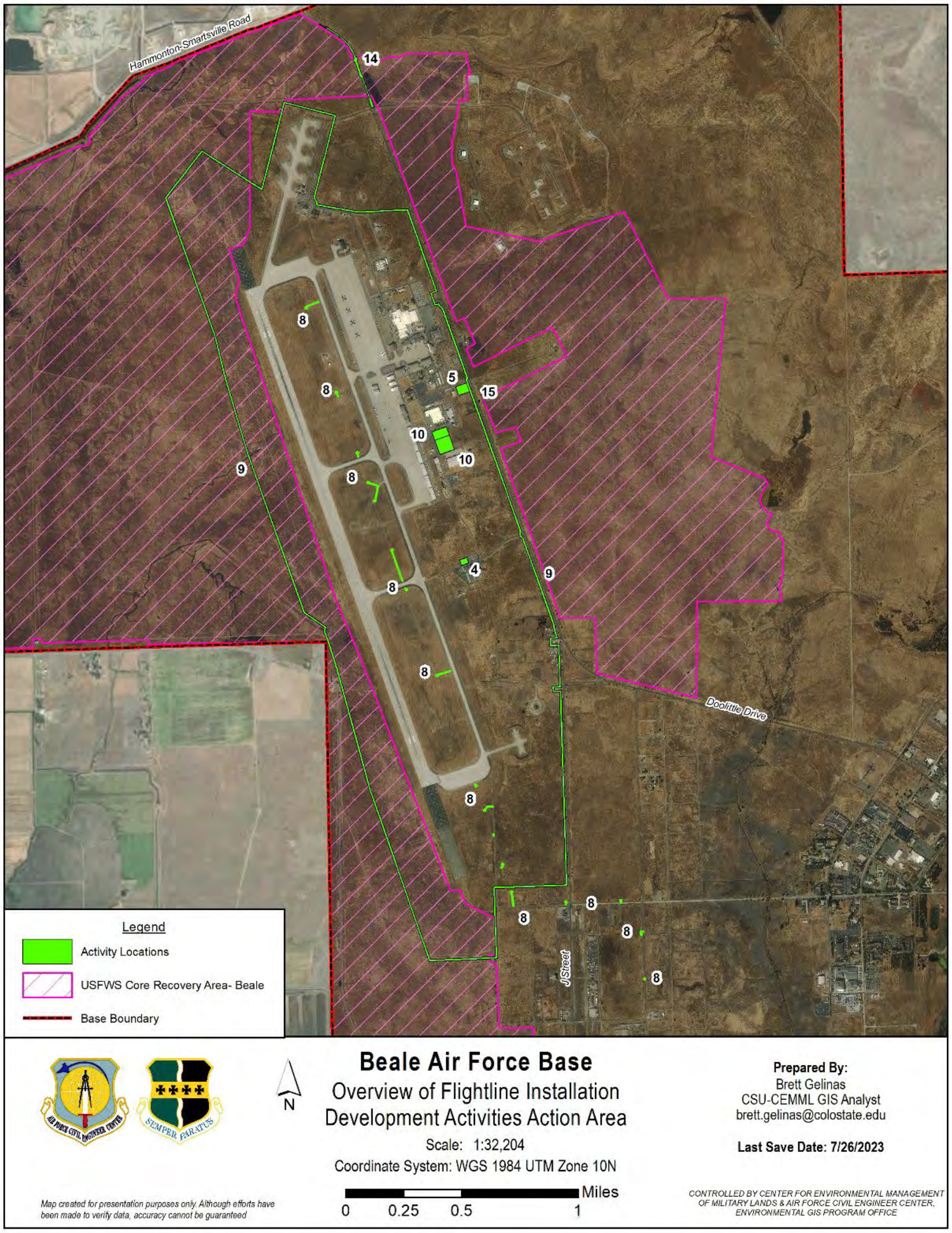

Figure 3-2. Overlap of Activity Areas and Beale Core Recovery Area, Beale Air Force Base, California.

3.2 Threatened and Endangered Species and Habitat Considered

3.2.1 Species Preliminarily Considered

A preliminary list of species (**Table 3-1**) for consideration was compiled from the USFWS Information for Planning and Consultation (IPaC) tool and data from special status species surveys conducted at Beale AFB. Federally listed species with the potential to occur in or near the Action Area were evaluated to determine if the Proposed Action would affect the species or their habitat.

Table 3-1. Federally listed Species with the Potential to Occur in the Action Area.

Common Name	Scientific Name	Federal Status	Known to Occur at Beale AFB	Potential to Occur within Action Area
Giant garter snake	*Thamnophis gigas*	Threatened	No	No
California red-legged frog	*Rana draytonii*	Threatened	No	No
Delta smelt	*Hypomesus transpacificus*	Threatened	No	No
Monarch butterfly	*Danaus plexippus*	Candidate	Yes	Yes
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	No	No
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Yes	Yes
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	Yes	Yes
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	Elderberry shrubs present. Beetle exit holes observed in shrubs along Best Slough and Dry Creek.	Presumed present due to presence of an elderberry shrub large enough to be potential VELB habitat in the action area.

Source: USFWS IPaC Tool April 7, 2022 (USFWS, 2023)

Of the species listed in **Table 3-1**, only VPFS, VPTS, VELB, and monarch butterfly were determined to have the potential to either be present in/near the Action Area or have potential habitat in/near the Action Area and are considered in this document. These species are further discussed in **Section 3.2.2** through **Section 3.2.5**. Although not federally listed, the monarch butterfly is addressed in this BA due to its known and extensive occurrence at Beale AFB and because it is currently under review for federal listing under the ESA. Including it in this analysis allows the Air Force to satisfy requirements for further consultation with the USFWS if it should become listed before the Proposed Action is implemented.

The remaining four species were excluded from further consideration in this BA for the following reasons:

Giant garter snake: multiple trapping surveys for this species conducted in 2005, 2014, and 2015 did not detect the species on Beale AFB, and none have ever been confirmed to occur on Base (Hansen, 2005). Recent environmental DNA (eDNA) testing within Reeds Creek corroborates the negative results of visual and trapping surveys and helps support this conclusion (Hansen, 2019). Therefore, this species was eliminated from further consideration.

California red-legged frog: surveys at Beale AFB have produced no detections and habitat is degraded by the presence of predatory bullfrogs (Beale, 2021). Therefore, this species was eliminated from further consideration.

Delta smelt: this species occurs only in the San Francisco Estuary. The closest habitat is approximately 25 miles from Beale AFB (USFWS, 2022b). Therefore, this species was eliminated from further consideration.

Conservancy fairy shrimp: while Beale AFB contains large areas with vernal pools and seasonal swales that are suitable habitat for this species, none have ever been observed during the numerous surveys conducted for vernal pool branchiopods on Beale AFB dating back to 1996. In addition, there are no California Natural Diversity Database recorded occurrences within a 10- mile radius of Beale AFB property. Therefore, this species was eliminated from further consideration.

3.2.2 Vernal Pool Fairy Shrimp (Federally Threatened Species)

Listing Status

The VPFS was listed as threatened by the USFWS in 1994 (Federal Register [FR] 59:180 and updated in FR 68:151).

Life History

The VPFS is found only in ephemeral freshwater habitats, including alkaline pools, clay flats, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands in California (Helm, 1998). Their range encompasses the Central Valley, Delta, and eastern San Francisco Bay areas. Sacramento County represents important habitat for the VPFS by providing large, nearly contiguous areas of relatively undisturbed, high-quality vernal pool habitat. Threats to these species include habitat loss, fragmentation, and degradation from development and agriculture; predation by nonnative bullfrogs and mosquito fish; non-native plants and grasses; drought, and pesticides (USFWS, 2005).

The VPFS occupies a variety of different vernal pools, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Although the species has been collected from large vernal pools, including one exceeding 25 acres, it tends to occur in small swales, or vernal pools in unplowed grasslands (Eriksen and Belk, 1999). It is most frequently found in vernal pools measuring less than 0.05 acre.

Occurrence and Habitat within Action Area

Many vernal pools at Beale AFB provide suitable habitat for the VPFS. Vernal pools at Beale AFB occur in association with four geologic formations: Laguna, Riverbank, Modesto, and Mehrten formations (Smith and Verrill, 1998). These formations are primarily located in the western two-thirds of Beale AFB, which is where the activity sites are located.

The documented occurrences on Beale AFB and most of the suitable habitat are concentrated within the northwestern portion of Beale AFB that is designated as part of the VPFS core recovery area (**Figure 3-2**), but suitable habitat is widespread on Beale AFB and within the Action Area (Figure 3-3, Table 3-1, Appendix A Photos 1-5).

Table 3-2. Proximity of vernal pool fairy shrimp and vernal pool tadpole shrimp records to Project Activity Areas.

Activity	Nearest Vernal Pool Fairy Shrimp Record (feet)	Nearest Vernal Pool Tadpole Shrimp Record (feet)
Activity 4 – Construct Wildland Fire Vehicle Storage Facility	832	1110
Activity 5 - Construct Flightline Fitness Center	2223	2474
Activity 8 – Construct Fuel Transfer Line Access Road	569	1082
Activity 9 – Construct Coyote Fenceline	10	295
Activity 10 – Construct Additional Personally-owned Vehicle (POV) Parking	1322	1553
Activity 14 – Repair Road and Culverts at Doolittle Gate	81	5813
Activity 15 – Repair Upstream Storm Drainage PSPTS, Building 1029	2316	2542
*** All records come from Beale AFB Conservation Database (Beale AFB 2023)***		

3.2.3 Vernal Pool Tadpole Shrimp (Federally Endangered Species)

Listing Status
The VPTS was listed as endangered by the USFWS in 1994 (FR 59:180).

Life History
The VPTS is endemic to California's Great Central Valley, with most populations in the Sacramento Valley. This species is found mainly in the northern and eastern portions of the Central Valley in vernal pools and swales containing clear to highly turbid water, often in unplowed grasslands. These seasonal pools contain old alluvial soils underlain by hardpan or in sandstone depressions and have very low alkalinity and conductivity.

Occurrence within Action Area
The documented occurrences of VPTS on Beale AFB and most of the suitable habitat are concentrated within the northwestern portion of the Base that is designated as a BCRA (see **Figure 3-2**), but suitable habitat is widespread on Beale AFB and within the Action Area (Figure 3-3, Table 3-1, Appendix A Photos 1-5).

Several other occurrences are scattered throughout the center and most northern portion of Beale AFB. There is likely suitable habitat for this species throughout Beale AFB, and extensive sampling efforts have generally supported this assessment.

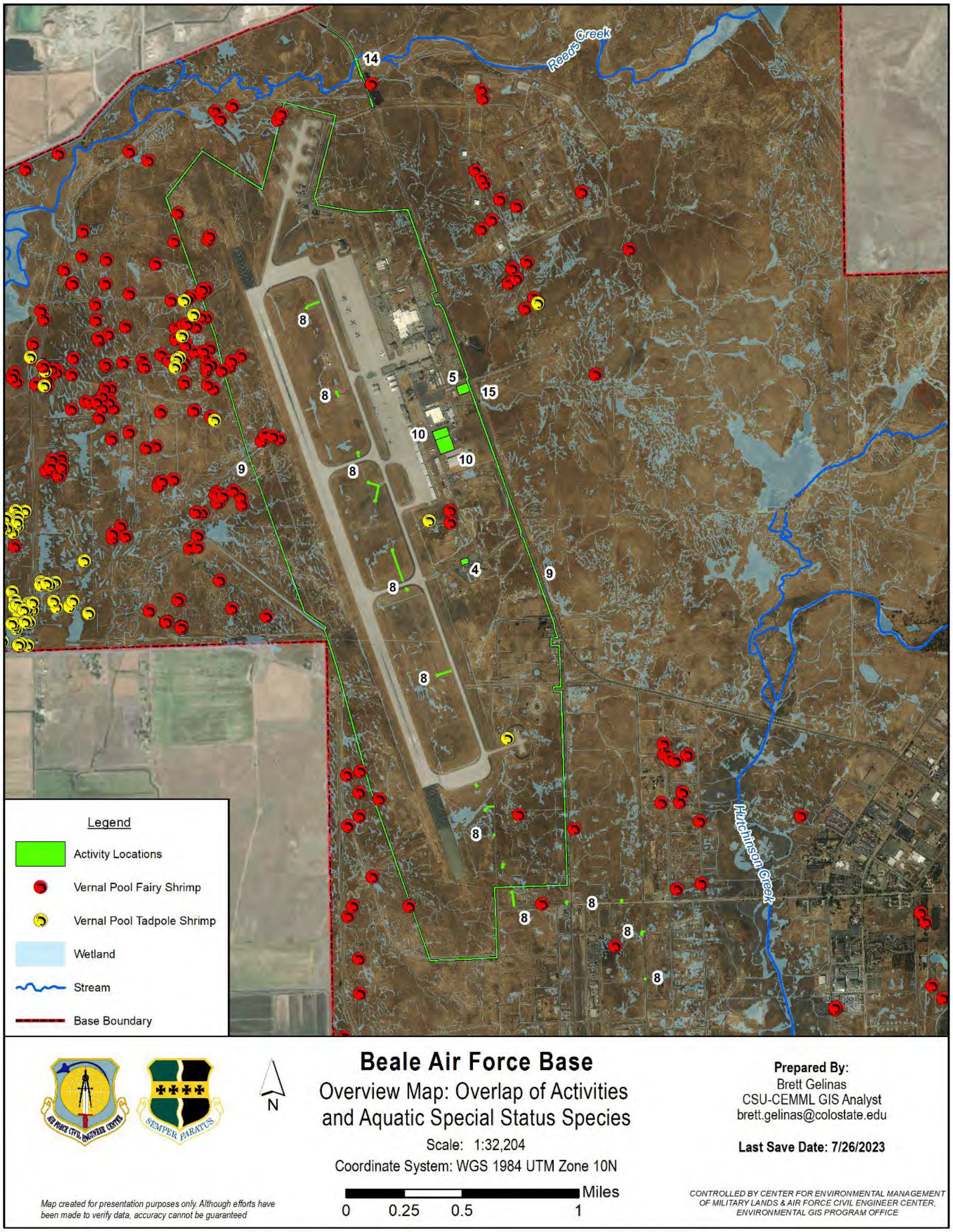

Figure 3-3. Vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*) observations in the vicinity of the Action Area.

3.2.4 Valley Elderberry Longhorn Beetle (Federally Threatened Species)

Listing Status
The VELB was listed as threatened by the USFWS in 1980 (FR 45:155).

Life History
The VELB requires elderberry shrubs (*Sambucus* spp.) for reproduction and survival. VELB are rarely seen because they spend most of their life cycle as larvae within the stems of elderberry shrubs. Often the only evidence of the beetles' presence is exit holes created by larvae just prior to the pupal stage. Adult emergence is from late March through June. During this period, adults mate, lay eggs, and die. The life cycle takes 1 or 2 years to complete.

Occurrence and Habitat within Action Area
Elderberry shrubs are generally found in riparian woodlands on Beale AFB within the Dry Creek watershed riparian conservation area on the east side of base. There are only a few elderberry shrubs on the west side of base.

Two elderberry shrubs were identified in the Action Area, in the vicinity of the Activity 9 fence line (**Figure 3-4**). There is no riparian habitat in the vicinity of the shrub, and the nearest other isolated elderberry bush is more than 2,544 feet away, so it is unlikely that it provides habitat for the VELB (VELB Framework: USFWS 2017).

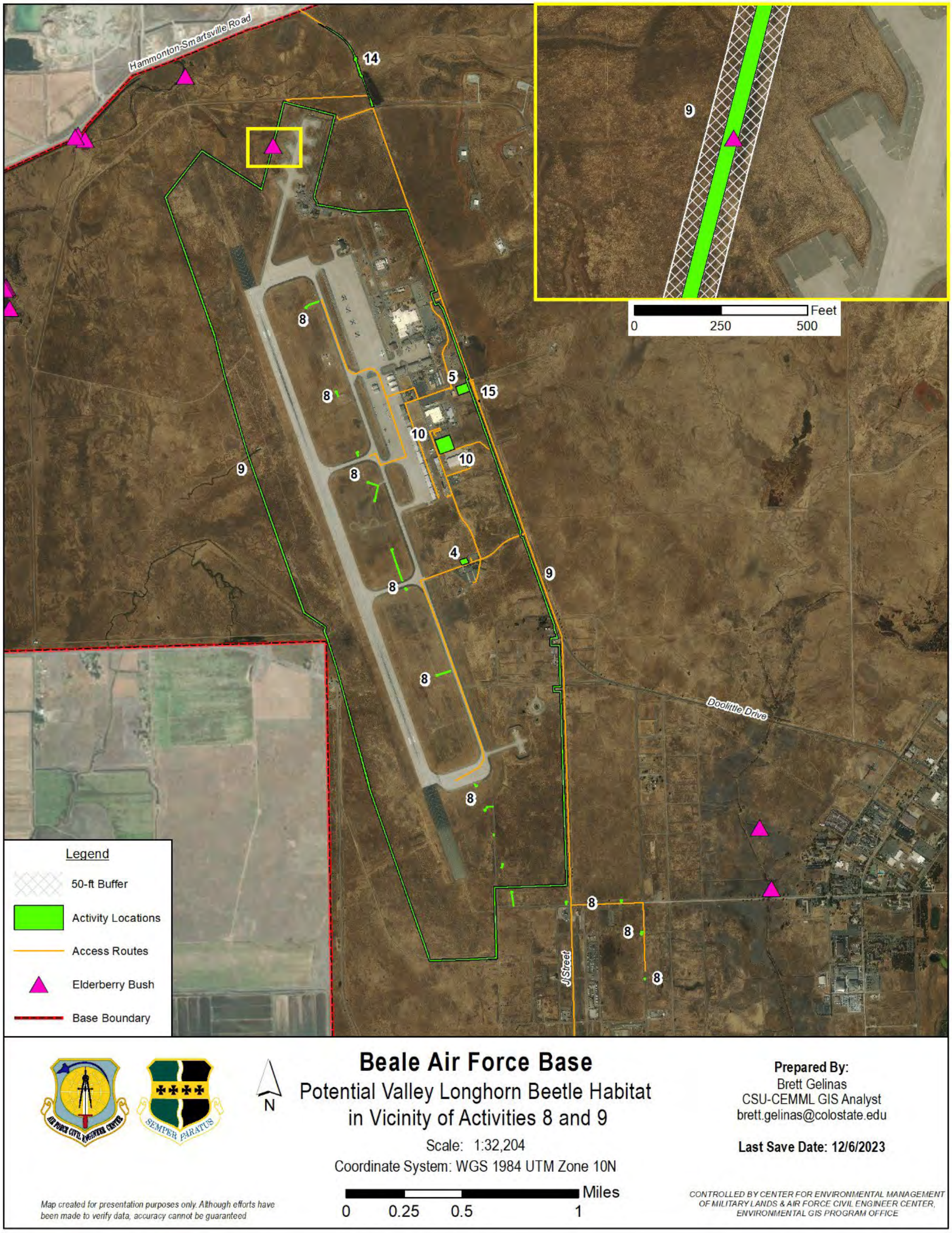

Figure 3-4. Valley Longhorn Beetle (*Desmocerus californicus dimorphus*) habitat in the vicinity of the Action Area.

3.2.5 Monarch Butterfly (Candidate Species)

Listing Status

The monarch butterfly was petitioned for listing under the ESA in 2013. In December 2020, the USFWS announced that listing is warranted but precluded by higher priority listing actions. The monarch is now a candidate under the ESA, and the USFWS will review its status annually until a listing decision is made (USFWS, 2021). Monarchs have experienced dramatic declines across North America, with the western monarch (a geographically distinct population from the more well-known eastern population) showing the greatest population reductions, with a population decrease of approximately 99 percent from its historical populations and may be at risk of quasi-extinction (Pelton et al., 2019).

Life History

Monarch butterflies are unique in that they are the only insects that embark on a multi-generational migration to and from breeding and overwintering areas that span thousands of miles. In early spring, the western population of monarchs travels from overwintering sites along the California coast to breeding ranges in California, Nevada, Oregon, Washington, Arizona, and Idaho, where they lay eggs on newly emerging milkweed plants (*Asclepias* spp.), which serves as the host plant for monarch caterpillars. With the onset of fall, the newest generations of monarchs make the journey back to their overwintering sites. Adult monarchs are generalists and feed on a variety of flowering plants. Spring and summer monarch generations typically have an adult lifespan of 2 to 5 weeks, while overwintering adults live 6 to 9 months (Pelton et al., 2019).

Little is known about the details of western monarch migration routes and breeding phenology, but small, scattered patches of suitable habitat (such as trees for roosting, milkweed stands, and native nectar sources) may provide crucial stopover sites during migration where monarchs may rest and feed before continuing migration (Pelton et al., 2019). While some monarchs are known to overwinter in interior areas, their winter presence has not been recorded at Beale AFB.

Occurrence within the Action Area

Monarchs can be found throughout Beale AFB during the breeding season (approximately March through October), and multiple breeding locations have been observed and recorded by Beale AFB environmental staff (**Figure 3-5**). Between 2017 and 2019, field surveys were conducted at six military installations by the Department of Defense Legacy Resource Management Program (DoD, 2021), including Beale AFB. Monarchs are typically observed near milkweed stands with nearby water sources and roosting sites on Beale AFB. Anecdotally, monarchs tend to be dispersed in the early parts of the dry season and gradually retreat to riparian corridors, lakes, and seasonal drainages (Beale AFB, 2021). Typical locations include the Dry Creek riparian corridor, various ephemeral drainages, and open upland areas with native milkweeds and flowering shrubs. Typical nectar sources that monarchs have been observed using on Beale AFB include narrow-leaf milkweed (*Asclepias fascicularis*), wooly-pod milkweed (*A. eriocarpa*), nude buckwheat (*Eriogonum nudum*), buttonwillow (*Cephalanthus occidentalis*), and coyote bush (*Baccharis pilularis*). No known overwintering occurs on Beale AFB; however, suitable overwintering sites (*Eucalyptus* groves) exist on Base (Beale AFB, 2021). No *Eucalyptus* groves occur in the Action Area

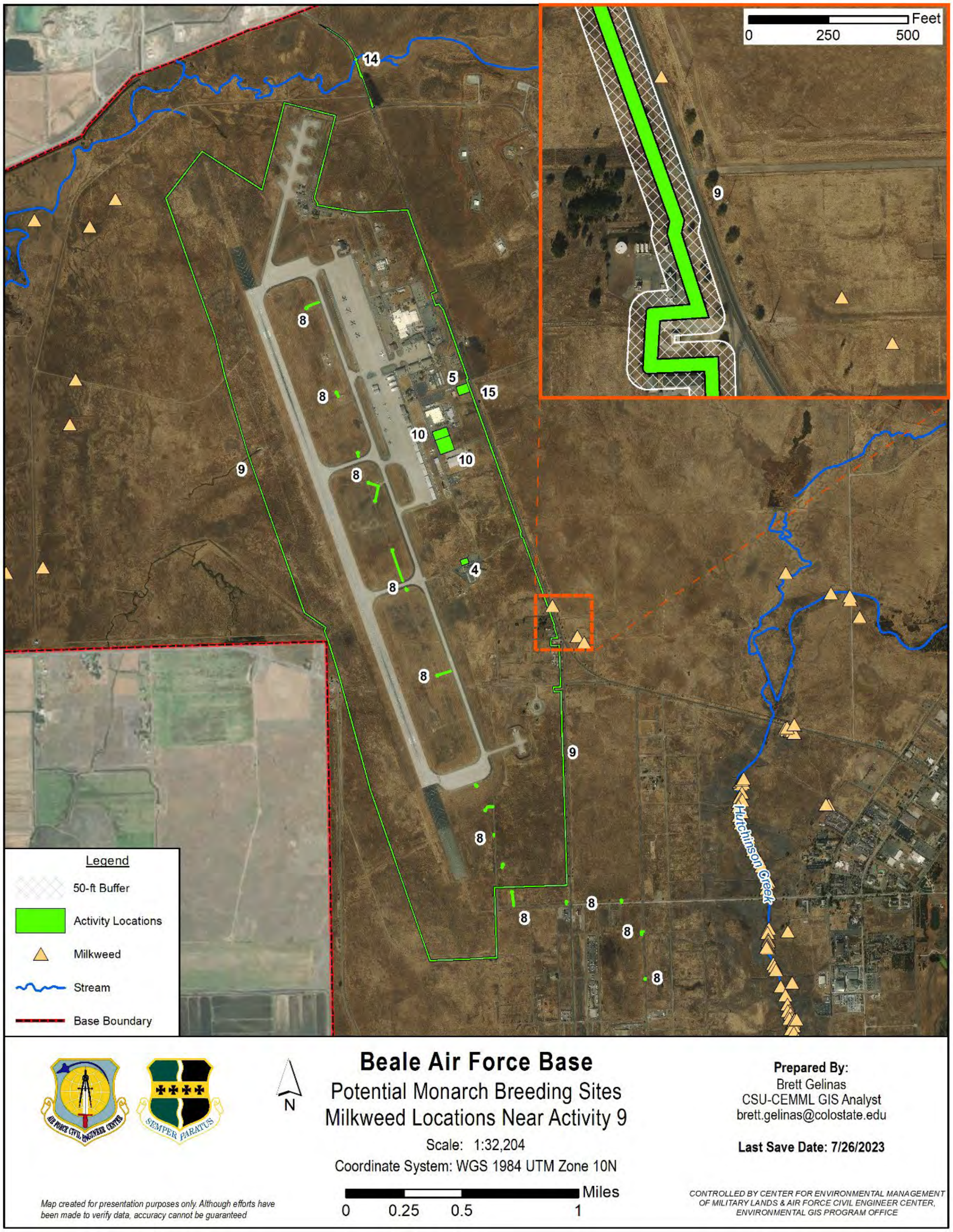

Figure 3-5. Potential monarch (*Danaus plexippus*) breeding sites in the vicinity of the Action Area.

CHAPTER 4 ANALYSIS OF POTENTIAL EFFECTS

Activities associated with implementation of the Proposed Action would involve ground disturbance and vegetation removal in upland areas of Beale AFB as well as waterways and wetlands on the installation. Ground-disturbing activities could include excavating, filling, and grading. Other disturbance could result from off-road access, movement of workers and vehicles, and contamination of waterways and soil from vehicular leaks or improper maintenance. Individually or in combination, these activities would have the potential to result in direct or indirect adverse effects on VPFS, VPTS, monarch butterflies, VELB, and their respective habitat.

Potential effects on these species and the analytical frameworks used to quantify these effects are described further below.

4.1 Monarch Butterfly

The Proposed Action would not jeopardize the continued existence of monarch butterflies because:

- No overwintering habitat would be affected.
- There are no known breeding sites in the Action Area.
- Any impact on monarchs would not be sufficient to preclude both the survival and recovery of the population as a whole.
- Outside of the activity footprints, baseline conditions of the habitat would be maintained.

However, if the monarch becomes listed before the project is complete, a provisional effects determination is provided in **Chapter 5**.

4.2 Valley Elderberry Longhorn Beetle

Impacts to VELB are unlikely because the only elderberry bush in the Action Area that could potentially provide habitat for this species is not located in riparian habitat making VELB presence unlikely. In addition, the shrub would not be adversely affected. The shrub is located along the security fence around the Flightline. Activity 9 – Coyote Fenceline consists of installing coyote exclusion along the bottom edge of the fence and would not include removal of this shrub or any other ground disturbing activities. To minimize potential impacts to the shrub, the dig barriers will be used within 20 feet of the shrubs base. The following Conservation Measures apply to Activity 9, to minimize potential impacts to the elderberry shrub; MM-1 through MM-9, MM-11, MM-13 through MM-17, MM-19 through MM-23, MM-27, MM-28, VP-1 through VP-6, VELB-1 through VELB-3, MB-1 through MB-6.

4.3 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Analysis Framework

VPFS and VPTS (vernal pool branchiopods) may be present in some portions of the Action Area based on observations during focused surveys for these species. Additionally, there is suitable habitat in other areas where vernal pool branchiopods have not been documented, or surveys have not occurred. Therefore, this analysis assumed that all potential habitat (mapped vernal pools, swales, and ditches) is occupied by vernal pool branchiopods, including VPFS and VPTS. Potential direct and indirect effects on vernal pool branchiopods are evaluated based on USFWS definitions; direct effects are those that occur as an immediate result of the Proposed Action; indirect effects, as defined by the ESA, are those that are caused by, or will result from, the Proposed Action and occur later, but are still reasonably certain to occur (50 Code of Federal Regulations [CFR] §402.02).

To assess the potential for impacts, all aquatic features (e.g., vernal pools, swales, seasonal wetlands, ditches, and streams) within 250 feet of the activity footprints (Table 4-1) were mapped (Figures 4-1 through 4-17), and the potential for direct or indirect impacts were analyzed (Table 4-2). For features directly impacted, the potential for impacts on connected habitat downgradient beyond 250 feet was also analyzed. For example, some habitat features located within an activity footprint are connected to a series of other habitat features that extend downgradient beyond 250 feet. A total of 1,103 aquatic features encompassing 200.46 acres were analyzed for potential impacts. These aquatic features include 1,089 ESA habitat features encompassing 159.58 acres.

Table 4-1. Aquatic features within 250 feet of the Action Area.

Wetland Type	# of Features	Acreage
Ditch	181	33.42
Seasonal Wetland	22	6.31
Seep	6	0.58
Streams	11	40.29
Swale	276	15.80
Vernal Pool	613	104.06
TOTAL	**1,103**	**293.28**

Each habitat feature was evaluated for potential habitat and assigned one of three impact categories: Avoided, Direct, or Indirect. Each feature was assigned a single category; for example, if a vernal pool lies partially within an activity footprint, it was categorized as a Direct impact for the entire feature. The assignments were based on the location of the feature relative to the activity footprint, the relative elevations of the feature, and the nature of the activity. Impact categories are described as follows:

<u>Avoided:</u> This category was chosen for features that could be avoided through project design or by using AMM's. Impacts to wetland features more than 50 feet away from the activity footprint are considered avoidable using AMMs if 1) the feature is higher than the proposed ground disturbance, or 2) the feature is lower in elevation, not hydrologically connected to an impacted feature, and ground disturbance would not penetrate the hardpan (≤5 ft). These parameters have been used in many previous consultation documents over the last 20 years.

<u>Direct Impacts:</u> Direct impacts are those that would occur when a feature overlaps with the activity footprint or disturbance cannot be avoided. If any portion of a feature is subject to Direct impacts the entire feature is considered directly impacted.

Transient dust during or after construction is mitigated by air quality construction standards, from the Feather River Air Quality Management District, included in the avoidance and minimization measure MM-23. Also, according to our USFWS permitted wetland delineators have determined some turbidity in the water feature does not impact shrimp. As long as air quality and water quality standards are being met, transient dust is discountable.

<u>Indirect Impacts:</u> Indirect impacts may occur within habitat features that are outside the activity footprint but downgradient or hydrologically connected to features that would be directly affected. These effects would occur later, after ground disturbing activities have ceased, and could include alteration of watershed topography; damage to the impervious soil layer that supports vernal pool hydrology; alteration of the amount, duration, and timing of surface water runoff; introduction of invasive plants or animals that alter the quality of habitat for vernal pool branchiopods; and degradation of water quality. Site-specific analyses were conducted on each activity to determine the extent of potential downgradient indirect effects. Gradients were established using LiDAR contours dated October 2021.

Indirect impacts could also occur on habitat features not hydrologically connected to features intersecting the footprint if the features are downgradient and AMMs could not be used to avoid impacts. All habitat features within a 250-foot buffer, and in some cases beyond, were evaluated to determine potential for direct or indirect effects and whether AMMs could be implemented to avoid or minimize impacts. If any portion of a feature is subject to indirect impacts the entire feature is considered indirectly impacted.

Activity 4 - Construct Wildland Fire Vehicle Storage Facility has 0.87 acres of wetland within 250 feet of the activity footprint (Figure 4-2). This activity will not adversely impact listed species or nearby wetlands. The nearest wetland (Sw2684) is separated from the action area by more than 50 feet of upland vegetation and gently sloped (20%) terrain. Given the distance and slope, erosion control protection (i.e., silt fence) in combination with work being conducted outside of the LOP, would prevent sedimentation from encroaching on Sw2684. All other wetlands are more than 100 feet from the project area and would not be subject to downgradient flow from the project site. Construction fence would be used to define the action area, and erosion control measures (e.g., silt fence and wattles) would be used to minimize movement of sediment from the action area. Trenching for the storage facility foundation would not penetrate the hardpan (≤5 feet deep) and disturbed areas would be re-vegetated using Beale AFB native seed mix prior to removal of sediment control measures. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-6.

Activity 5 – Construct Flightline Fitness Center has 0.49 acres of wetland within 250 feet of the activity footprint (Figure 4-3). This includes five ditches (0.38 acres), one swale (0.07 acres) and one vernal pool (0.04 acres). This activity will not adversely impact listed species or nearby wetlands. Except for two ditches (Di19-HTH and Di577a), all other features are separated from project activities by elevated roadways. The ditches not separated by roadway are 51 feet (Di19-HTH) and 190.8 feet (Di577a) from the proposed activity area. Neither feature contains listed branchiopod habitat, as they are both consistently sloped and do not have the hydrology needed for shrimp reproduction. Both features are separated from the proposed activity area by vegetated uplands and will be protected by physical barriers and/or erosion control measures (e.g., straw wattles and/or silt fence). Trenching for the facility foundation would not penetrate the hardpan (≤5 feet deep) and disturbed areas would be re-vegetated using Beale AFB native seed mix prior to removal of sediment control measures. Wetland protection specifics for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-3, VP5 and VP6.

Activity 8 – Construct Fuel Transfer Line Access Roads has 22.16 acres of wetland within 250 feet of the activity footprint (analysis Figures 4-4 through 4-13, and impacts Figures 4-18 through 4-22). This includes 25 ditches (4.61 acres), two streams (1.27 acres), six swales (0.75 acres), 50 vernal pools (10.12 acres) and six seasonal wetlands (5.41 acres). Project activities are restricted to light grading and adding geotextile fabric with a 6” gravel surface to allow vault access in the winter months; thus, activities will not penetrate the hardpan or alter subsurface hydrology. Access roads will cross small portions of two aquatic features (Di187, Di1207a). Culverts will be placed at each crossing within the feature to maintain the same hydrology and pooling (Figure 4-18 and Figure 4-21). These two features contain vernal branchiopod habitat and project activities will result in direct impacts (0.013 acres). All other features within 100 feet of access roads will be protected using straw wattles and/or silt fence. Eight features (Di1470, Di227, Di290, Di324, VP1359, VP-2-HTH, VP9768, VP2024-5) and portions of Di187 and Di1207a in proximity to proposed access roads will be subject to indirect impacts (1.04 acres) despite implementation of erosion control measures. All other wetlands within 100 feet of this activity are separated from ground disturbance by relatively flat terrain covered with upland vegetation and will be protected from nearby activity and erosion using silt fence and straw wattles. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-6.

Site visit with USFWS was conducted on 14 Feb 2025 to look at the two locations of direct impacts where culverts would be placed.

Activity 9 – Construct Coyote Fenceline has 135.35 acres of wetland within 250 feet of the activity footprint. This includes 128 ditches (25.61 acres), 15 seasonal wetlands (0.89 acres), 5 seeps (0.58 acres), 6 streams (5.22 acres), 254 swales (13.28 acres), and 525 vernal pools (89.76 acres), Although the footprint of this activity intersects substantial branchiopod habitat, impacts from dig barrier placement would be minimal, temporary, and discountable. Dig barriers and chain link fencing would be staged along the fence during the dry season using an off-highway vehicle or light truck with large tires prior to installation. The vehicle would follow the existing fence line and use weight dispersing mats to traverse wetlands that could not be avoided. Vehicle access would only be done during the dry season, with guidance by a biological monitor. Fencing and dig barrier would be installed by hand using a mallet, and result in minimal ground disturbance. Dig barriers come in panels approximately 32 inches x 12 inches) of 1/8” spikes (≥2” gap between spikes) and would be used within 20 feet of wetlands. Except for spikes entering the ground (≤10” deep) at the base of the fence, there would be no other ground disturbance associated with installation. If soils are too hard to install dig barriers during the dry season, work would be done during the wet season and a permitted (Section 10(a)(1)(A) large branchiopod) biologist would accompany the installation crew to ensure impacts to protected species is avoided. Minimal ground disturbance, use of weight dispersing mats while staging dig barriers, and installation of dig barriers by hand will minimize potential for adverse effects to listed branchiopod species. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-9, MM-11, MM-13 through MM-17, MM-19 through MM-23, MM-27, MM-28, VP-1 through VP-6, VELB-1 through VELB-3, MB-1 through MB-6.

Activity 10 – Construct Additional POV Parking has 0.62 acres of wetland within 250 feet of the activity footprint (analysis Figure 4-14 and impacts Figure 4-23). This includes four ditches (0.32 acres), two swales (0.09 acres), and 2 vernal pools (0.21 acres). This activity will directly affect Di577b (0.15 acres), as upgradient portions of the feature will be completely removed. In addition, B-VP88-N could be subject to indirect impacts (0.14 acres), as it is downgradient from, and hydrologically connected to, Di577b. This activity will have minimal impact on the amount of water entering B-VP88-N because the parking area drainage will not be diverted. Parking drainage will be routed to the downstream portion of Di577b, eventually entering B-VP88-N. Compared with the current vegetated condition, the creation of a parking area would slightly increase the amount of flow entering B-VP88N, as the parking area would cover previously permeable upland areas. Straw wattles will be used around the perimeter of the parking lot and left in place for at least six months to minimize potential for asphalt constituent contamination of downgradient wetlands. In addition, potential contamination of B-VP88N from parking lot runoff would be minimal, as the feature is separated from the parking lot by more than 70 feet of gently sloped (14% slope), well vegetated terrain. Water from upstream of Di577b would continue to make it to B-VP88-N, because a culvert would be placed beneath the parking area pavement to maintain hydrological connectivity with Di816. Impacts to all other features will be avoided. Di816 is higher than the action area and separated from the action area by a paved road. The remaining features (B-Di15-N, B-Di14-N, SW4671, SW4672, VP8900) will not be affected, as they are all more than 50 feet from the activity footprint, not hydrologically connected to directly impacted features, upstream of B-VP88N, and activities will not penetrate the hardpan in the area. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-6.

Activity 14 – Repair Road and Culverts at Doolittle Gate has 39.71 acres of wetland within 250 feet of the project footprint (analysis Figures 4-15 and 4-16, and impacts Figures 4-24 and 4-25). This includes 17 ditches (2.29 acres), two streams (33.80 acres), one seasonal wetland (0.01 acres), nine swales (1.38 acres), and 31 vernal pools (2.24 acres). This activity has six features (Di695, Di698, Di7-HTH, Di702, Di803, VP3662) that will be directly impacted (0.25 acres) by the expansion of the road and associated road base, as portions of each feature would be altered or filled. While VP3662 was previously mitigated for indirect impacts as part of a past project (USFWS Consultation #1-1-04-F-0294, USFWS 2004), it will be impacted directly and fully mitigated as part of this activity. Another seven features (Di6-HTH, JM-VP1, VP3544, VP3557, VP3607, VP3667) will be subject to indirect impacts, however four of those features (VP3544, VP3557, VP3607, VP3667) were previously mitigated for direct impacts as part of the ATFP project (USFWS Consultation #1-1-04-F-0294, USFWS 2004). The remaining two features will be subject to mitigation for indirect impacts (0.037 acres) due to potential sedimentation associated with Activity 14. All indirectly impacted features would be protected using erosion control measures (i.e., silt fence); however, they are close to ground disturbing project activities (e.g., road widening) or are hydrologically connected to directly impacted features. Impacts to all other features will be avoided, as they are higher in elevation than project activities, upgradient from potential disturbance, or separated from ground disturbance by upland vegetation and readily protected by physical barriers (e.g., construction fence) and erosion control measures (i.e., silt fence). Apart from directly affected features, all wetlands within 100 feet (including indirectly impacted features) will be protected from sediment using silt fence. Project activities will not penetrate the hardpan or alter subsurface hydrology. Disturbed areas will be re-vegetated using Beale AFB native seed mix prior to removal of sediment control measures. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-6.

Site visit with USFWS was conducted on 29 Jan 2025 to look at the ditch feature Di805 confirming that it is not habitat nor would be impacted.

Activity 15 – Repair Upstream Storm Drainage PSPTS, building 1029 has 1.26 acres of wetland within 250 feet of the activity footprint (analysis Figure 4-17 and impacts Figure 4-26). This includes two ditches (0.21 acres), two swales (0.08 acres), and two vernal pools (0.97 acres). Impacts from this activity include direct effects (0.01 acres) to one aquatic feature (SW3601), as well as temporary effects (0.97 acres) to two features (VP2806 and VP8397). SW3601 contains the storm drain and culvert headwall to be repaired. As such, digging and concrete work would occur within this feature. Temporary effects associated with site access and equipment use, using weight dispersing mats, would potentially also impact VP2807 and VP8397. Both vernal pools are higher than the work to be accomplished at the wing walls and culverts. Although Di577a is downgradient from, and hydrologically connected to, the activity area, it is separated from the project area by a concrete and culverts, a concrete catch basin with a trash rack that was installed and modified between 2016 and 2020 (USFWS, 2014). In addition to the existing infrastructure silt fence and straw wattles will be used in the immediate vicinity of the work, limiting potential for indirect impacts. While SW3653 is hydrologically connected and within 250ft of the activity footprint it is higher in elevation and more than 100 feet from proposed ground disturbance. Specific wetland protections for each feature in proximity to this activity are listed in Table 4-2. The following Conservation Measures apply to this activity; MM-1 through MM-28, VP-1 through VP-6.

Site visit with USFWS was conducted on 29 Jan 2025 to look at the vernal pool features and discuss the project activities and locations confirming the weight dispersing mats for the access route on the vernal pools would be temporary and discountable impacts.

Table 4-2. Wetlands and determination justifications for potentially impacted features within 250 ft of proposed action area. Features only included if hydrologically connected to impacted features, or if impacts are not avoidable as defined in the Analysis Framework.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
Activity 4: Construct Wildland Fire Vehicle Storage Facility						
SW 2684	Swale	54.6	Lower	0.06	Avoided	This feature is separated from the action area by more than 50 feet of upland vegetation and gently sloped terrain. The feature will be protected from sediment using erosion controls. Digging associated with this project will not penetrate the hardpan (≤5 feet).
Activity 5: Construct Flightline Fitness Center						
Di591	Ditch	92.3	Higher	0.04	Avoided	This feature is higher than the project area separated from the work area by a road.
Di19-HTH	Ditch	51	Lower	0.04	Avoided	This feature does not retain water long enough to support listed branchiopods, and is separated from the action area by an existing chain-link fence. No work would occur within 50 feet of this feature.
Activity 8: Construct Fuel Transfer Line Access Road						
Di1207a	Ditch	0	Equal	0.0047	Direct	Culvert portion: Fuel Transfer Access Road will cross this feature. A culvert will be installed to maintain and not change the current hydrological connectivity.
Di1207a	Ditch	0	Equal	0.12	Indirect	Remainder of ditch: Fuel Transfer Access Road will cross this feature. A culvert will be installed to maintain and not change the current hydrological connectivity and pooling.
Di1207b	Ditch	93	Equal	0.13	Avoided	This feature is hydrologically connected to Di1207a, but separated from it by VP9768.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						Sediment will be kept from entering Di1207b by using straw wattles around work in Di1207a, as well as between VP9768 and Di207b.
Di1278	Ditch	95.6	Lower	0.13	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di1470	Ditch	11.2	Lower	0.06	Indirect	All equipment and ground disturbing work will remain greater than 5’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di187	Ditch	0	Equal	0.0078	Direct	Culvert portion: Fuel Transfer Access Road will cross this feature. A culvert will be installed to maintain and not change the hydrological connectivity.
Di187	Ditch	0	Equal	0.4	Indirect	Remainder of ditch: Fuel Transfer Access Road will cross this feature. A culvert will be installed to maintain and not change the current hydrological connectivity.
Di227	Ditch	15.3	Lower	0.11	Indirect	All equipment and ground disturbing work will remain greater than 5’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
Di228	Ditch	42	Higher	0.3	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. A paved road separates this feature from the proposed work.
Di242	Ditch	39.7	Higher	0.55	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di290	Ditch	7.3	Lower	0.17	Indirect	All equipment and ground disturbing work will remain greater than 5’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di324	Ditch	21.5	Lower	0.11	Indirect	All equipment and ground disturbing work will remain greater than 10’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
St103	Stream	71	Equal	0.16	NA	This feature does not contain listed brachiopod habitat.
VP10236	Vernal Pool	58.4	Lower	0.2	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						control measures will remain in place until vegetation is re-established.
VP10928	Vernal Pool	32.8	Lower	0.009	Avoided	This feature is separated from the proposed work by a paved road. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP1359	Vernal Pool	18	Lower	0.04	Indirect	All equipment and ground disturbing work will remain greater than 5’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP1363	Vernal Pool	81.5	Lower	0.04	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP1370	Vernal Pool	39.5	Lower	0.22	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP2-HTH	Vernal Pool	21.6	Lower	0.001	Indirect	All equipment and ground disturbing work will remain greater than 10’ from this feature, however indirect impacts are likely. This feature will be protected from sediment and disturbance

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP5284	Vernal Pool	71.9	Higher	0.01	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP5294	Vernal Pool	38.8	Lower	0.008	Avoided	This feature is separated from proposed work by a paved road. All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP5422	Vernal Pool	44.2	Lower	0.01	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP5425	Vernal Pool	37.4	Equal	0.27	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP5426	Vernal Pool	72.5	Lower	0.25	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP6680	Vernal Pool	48.7	Lower	0.19	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP8438	Vernal Pool	61.2	Lower	0.91	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP8489	Vernal Pool	88.4	Lower	0.01	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP9431	Vernal Pool	51.7	Lower	0.09	Avoided	All equipment and ground disturbing work will remain greater than 25’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP9768	Vernal Pool	38.5	Lower	0.008	Indirect	This feature is connected to a directly impated feature. While all equipment and ground disturbing work will remain greater than 25’

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						from this feature, it is hydrologically connected to a directly impacted feature (Di1207). This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
2024-7	Vernal Pool	52	Lower	0.05	Avoided	This feature is separated from the project area by gently sloped topography and 52 feet of upland vegetation, and will be protected from impacts using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
2024-6	Vernal Pool	51	Lower	0.06	Avoided	This feature is separated from the project area by 51 feet of gently sloped topography and upland vegetation, and will be protected from impacts using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
2024-5	Vernal Pool	24	Lower	0.02	Indirect	This feature will be subject to possi indirect impacts from sedimentation. The feature will be protected from direct impacts by establishing a 15 foot buffer using silt fence and straw wattles. Erosion control measures will remain in place until vegetation is re-established.
2024-3	Vernal Pool	51.5	Lower	0.02	Avoided	This feature is separated from the project area by 51 feet of gently sloped topography and upland vegetation, and will be protected from impacts using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
2024-2	Vernal Pool	92	Higher	0.004	Avoided	This feature is not hydrologically connected and is higher in elevation than the work area.
2024-4	Seasonal Wetland	36	Lower	0.05	NA	This feature is dominated by upland vegetation and does not contain listed branchiopod habitat.
WS115	Seasonal Wetland	46	Equal	5.21	Avoided	This feature is separated from project activities by 46 feet, however water flowing from the project site would have to travel through more than 60 feet of upland vegetation before reaching the feature due to topography. The feature will be protected from potential sedimentation using silt fence and straw wattles. Erosion control measures will remain in place until vegetation is re-established.
WS335	Seasonal Wetland	98	Lower	0.02	NA	This feature does not contain listed brachiopod habitat.
WS337	Seasonal Wetland	91.4	Lower	0.1	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Activity 10: Construct Additional Personally Owned Vehicle Parking						
B-VP88-N	Vernal Pool	73.1	Lower	0.14	Indirect	This feature is hydrologically connected to Di577. As such, changes in hydrology associated with removal of portions of Di577 would alter this feature.
Di577b	Ditch	0	Equal	0.15	Direct	Portions of this feature would be paved over and existing drainage would be re-routed.
Di816	Ditch	29.8	Higher	0.04	Avoided	This feature currently drains through Di577. As this feature is higher in elevation, and is

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						separated from work by a culvert and paved road, re-routing the downgradient drainage has limited potential to impact this features hydrology.
Sw4672	Swale	81.5	Lower	0.04	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP8900	Vernal Pool	58.4	Lower	0.08	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Activity 14: Repair road and Culverts at Doolittle Gate						
Di6-HTH	Ditch	32	Lower	0.007	Indirect	This feature will be protected from sediment using erosion control (i.e., silt fence) however due to proximity to work indirect impacts are likely.
Di677	Ditch	64.6	Lower	0.37	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di689	Ditch	53	Lower	0.01	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di695	Ditch	4.4	Lower	0.05	Direct	Portions of this feature will be filled to accommodate road shoulder.
Di696	Ditch	57.4	Lower	0.1	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di698	Ditch	2.5	Lower	0.11	Direct	Portions of this feature will be filled to accommodate road shoulder.
Di7-HTH	Ditch	0	Equal	0.04	Direct	Portions of this feature will be filled to accommodate road shoulder.
Di702	Ditch	0	Equal	0.01	Direct	Portions of this feature will be filled to accommodate road shoulder.
Di703	Ditch	56	Lower	0.8	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Di742	Ditch	78.5	Lower	0.5	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature is separated from work area by paved roadway.
Di803	Ditch	10.1	Lower	0.01	Direct	Portions of this feature will be filled to accommodate road shoulder.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
Di804	Ditch	15.3	Lower	0.012	NA	This feature was subject to ATFP mitigation (Direct). This feature will be protected from sediment using erosion control (i.e., silt fence) however due to proximity to work indirect impacts are likely.
Di805	Ditch	9.5	Higher	0.008	NA	This feature is not habitat and is a steeply sloped ditch that does not hold water, it is above the road, and is adjacent to pavement surface replacement work, no earthwork.
JM-SW1	Swale	61	Lower	0.006	NA	This feature is both trenched and scoured and does not contain listed branchiopod habitat.
JM-Swale1	Swale	47.3	Lower	0.66	Avoided	All equipment and ground disturbing work will remain greater than 30’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
JM-VP1	Vernal Pool	15.5	Lower	0.03	Indirect	This feature will be protected from sediment using erosion control (i.e., silt fence) however due to proximity to work indirect impacts are likely.
St100	Stream	0	Lower	20.6	NA	This feature is subject to periods of high flow and does not contain listed branchiopod habitat.
St193	Stream	0	Lower	13.2	NA	This feature is subject to periods of high flow and does not contain listed branchiopod habitat.
Sw4546	Swale	83.7	Lower	0.07	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						control measures will remain in place until vegetation is re-established.
Sw4651	Swale	91.1	Lower	0.32	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP1-HTH	Vernal Pool	86	Higher	0.04	Avoided	This feature is higher than the proposed work, not hydrologically connected, and separated from activity area by a chan link fence. No work will occur within 50 feet of this feature.
VP3444	Vernal Pool	52.1	Lower	0.08	Avoided	This feature is connected to an indirectly impacted feature (Di804). Di804 will be protected usind erosion control measures and additional erosion control (e.g., straw wattles) will be placed between VP3444 and Di804.
VP3471	Vernal Pool	83.19	Lower	0.05	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3473	Vernal Pool	60.6	Lower	0.35	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
VP3497	Vernal Pool	56.5	Lower	0.05	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3511	Vernal Pool	49.6	Lower	0.001	Avoided	This feature was subject to ATFP mitigation (Indirect). All equipment and ground disturbing work will remain greater than 30’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3527	Vernal Pool	50.9	Lower	0.04	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3528	Vernal Pool	48.9	Lower	0.008	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 30’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						control measures will remain in place until vegetation is re-established.
VP3544	Vernal Pool	10.6	Lower	0.04	NA	This feature was subject to ATFP mitigation (Direct). This feature will be protected from sediment using erosion control (i.e., silt fence) however due to proximity to work indirect impacts are likely.
VP3557	Vernal Pool	3.3	Lower	0.06	NA	This feature was subject to ATFP mitigation (Direct). Portions of this feature will be filled to accommodate culvert replacement and road shoulder.
VP3607	Vernal Pool	15.6	Lower	0.018	NA	This feature was subject to ATFP mitigation (Direct). Portions of this feature will be filled to accommodate culvert replacement and road shoulder.
VP3662	Vernal Pool	9.1	Lower	0.03	Direct	This feature was subject to ATFP mitigation (Indirect). Portions of this feature will be filled to accommodate road shoulder.
VP3663	Vernal Pool	42.2	Lower	0.02	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 30’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						control measures will remain in place until vegetation is re-established.
VP3664	Vernal Pool	57.7	Lower	0.003	Avoided	This feature was subject to ATFP mitigation (Indirect). All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3665	Vernal Pool	48.4	Lower	0.003	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 30’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3666	Vernal Pool	84.9	Lower	0.01	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3667	Vernal Pool	28.2	Lower	0.01	NA	This feature was subject to ATFP mitigation (Direct). Portions of this feature will be filled to accommodate road shoulder. Remaining portions of the feature will be protected using

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
						erosion control measures (e.g., silt fence and straw wattles).
VP3668	Vernal Pool	33.7	Lower	0.07	NA	This feature was subject to ATFP mitigation (Direct). All equipment and ground disturbing work will remain greater than 30' from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP3899	Vernal Pool	35.9	Lower	0.27	Avoided	All equipment and ground disturbing work will remain greater than 30' from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
VP8626	Vernal Pool	32.7	Higher	0.44	Avoided	All equipment and ground disturbing work will remain greater than 30' from this feature. This feature will be protected from sediment and disturbance using silt fence and wattles. Erosion control measures will remain in place until vegetation is re-established.
Activity 15: Repair Upstream Storm Drain PSPTS, Building 1029						
Sw3601	Swale	0	Equal	0.01	Direct	This feature would be subject to direct impacts as it is within activity footprint. This feature contains the storm drain to be retrofitted.
VP2806	Vernal Pool	11.5	Higher	0.10	Temporary/discountable	This feature is adjacent to the activity footprint within the buffer and within the access route. It will be protected from impacts using weight dispersing mats and construction fence.

ID	Feature Type	Distance to Activity (feet)	Elevation Relative to Activity footprint	Acreage	Impact Type	Rationale for Impact Type
VP8397	Vernal Pool	12	Higher	0.87	Temporary/discountable	This feature is only 12 feet from the activity footprint and may be within the access route for equipment, but will be protected from impacts using weight dispersing mats and construction fence.
Di577	Ditch	40.6	Lower	0.17	Avoided	All equipment and ground disturbing work will remain greater than 50’ from this feature. Although this feature is hydrologically connected and downgradient from the activity area, it is separated from the project area by a concrete underpass, a concrete catch basin, and a trash rack. In addition to the existing infrastructure silt fence and straw wattles will be used in the immediate vicinty of the work.

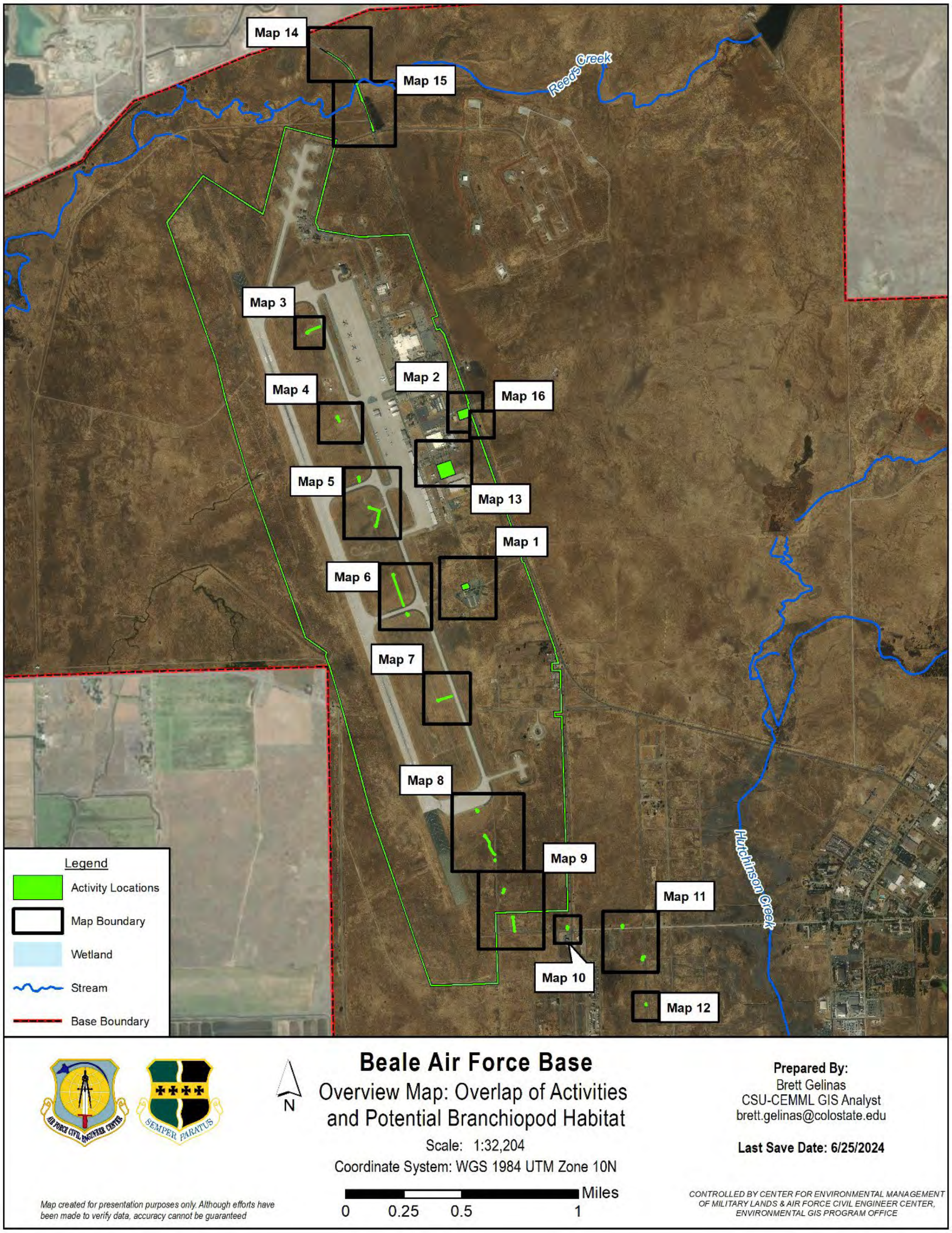

Figure 4-1. Overview map of project activities and potential branchiopod habitat at Beale Air Force, California.

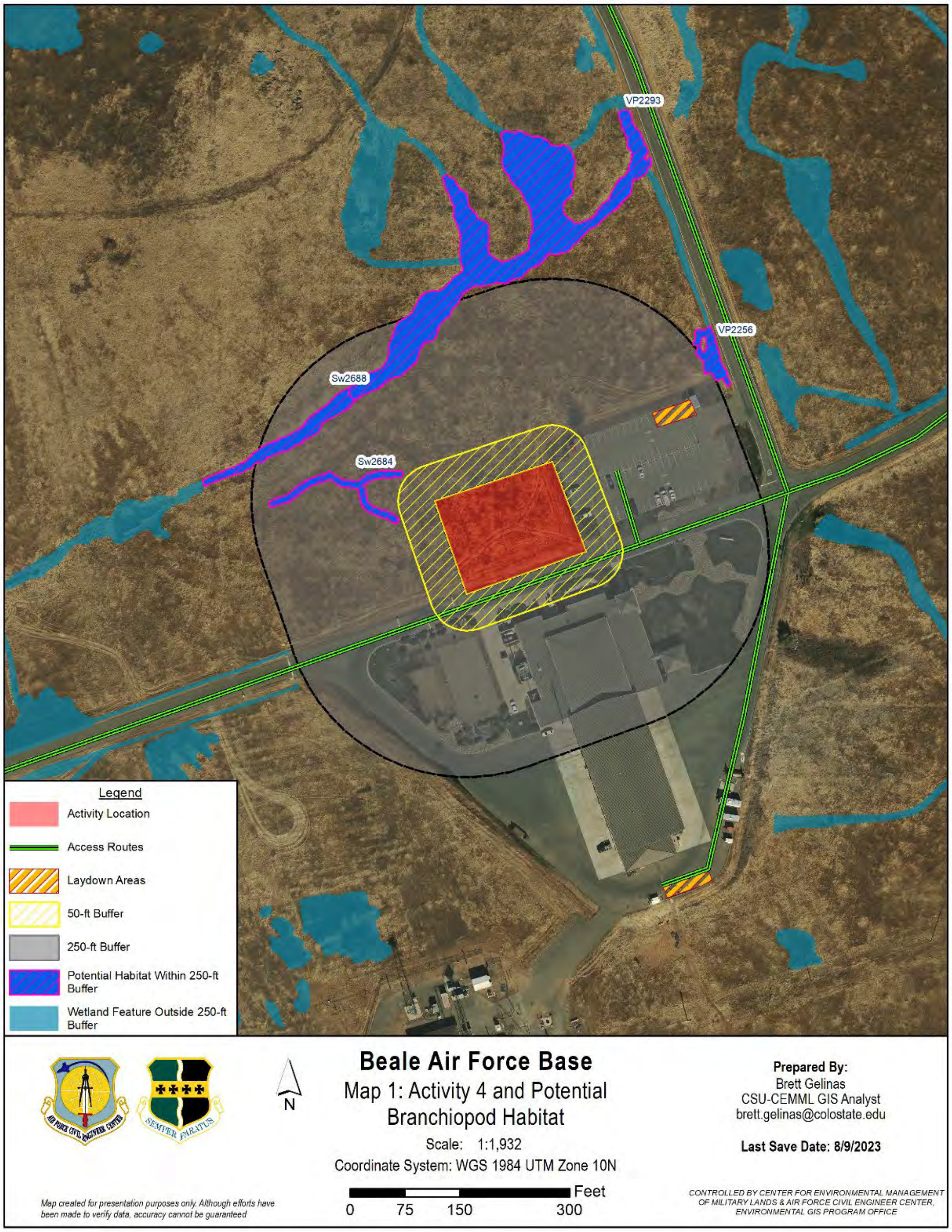

Figure 4-2. Branchiopod habitat in the vicinity of Activity 4 (Map 1).

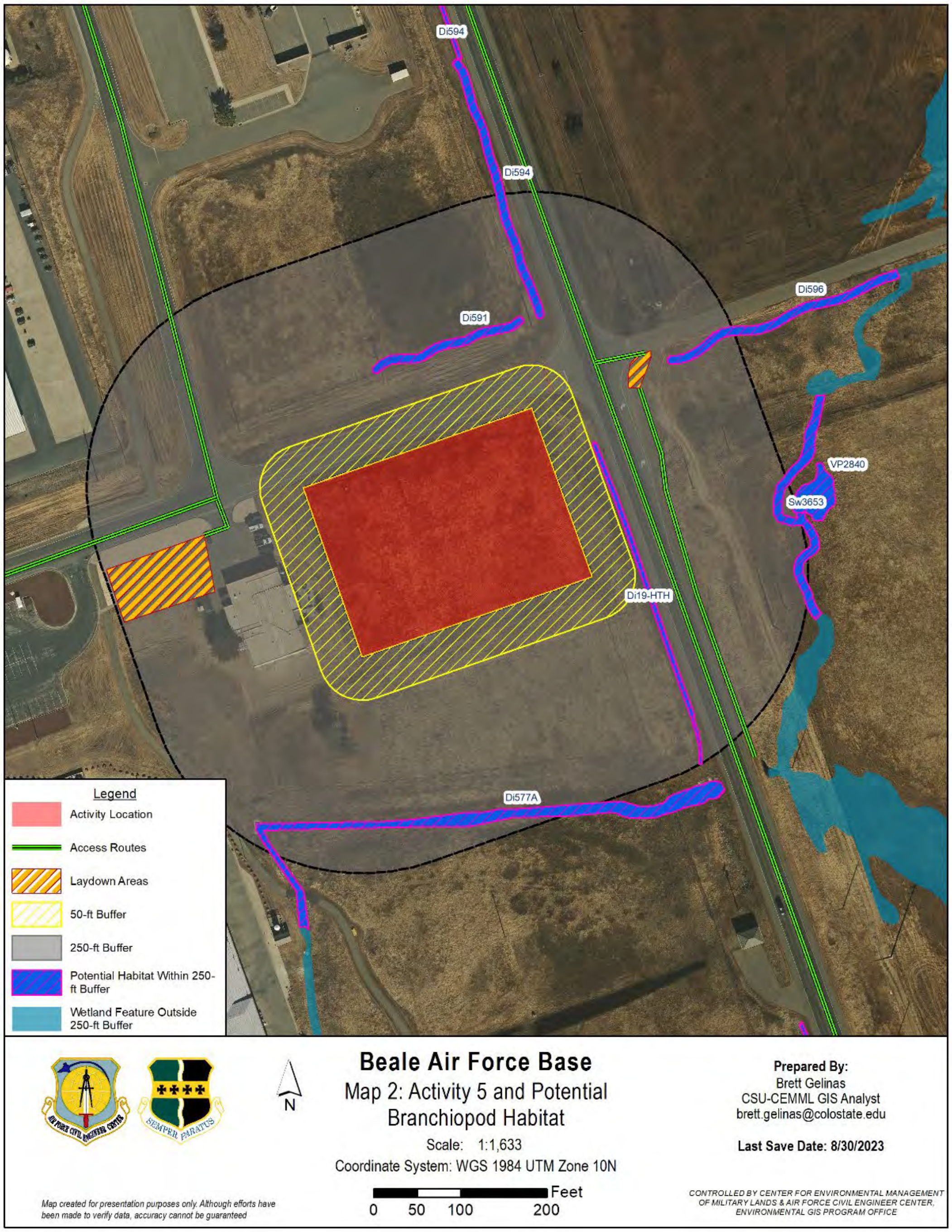

Figure 4-3. Branchiopod habitat in the vicinity of Activity 5 (Map 2).

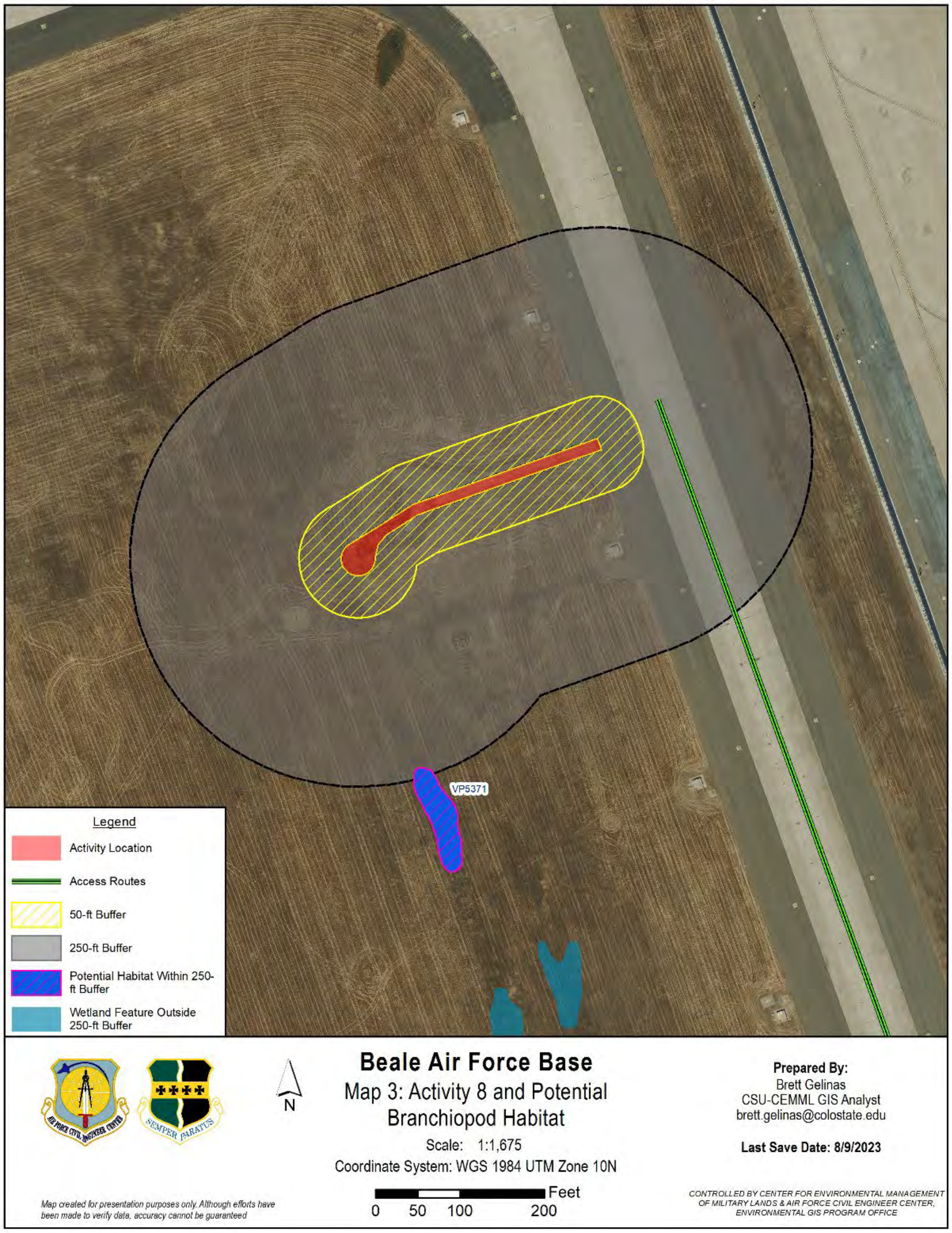

Figure 4-4. Branchiopod habitat in the vicinity of Activity 8 (Map 3).

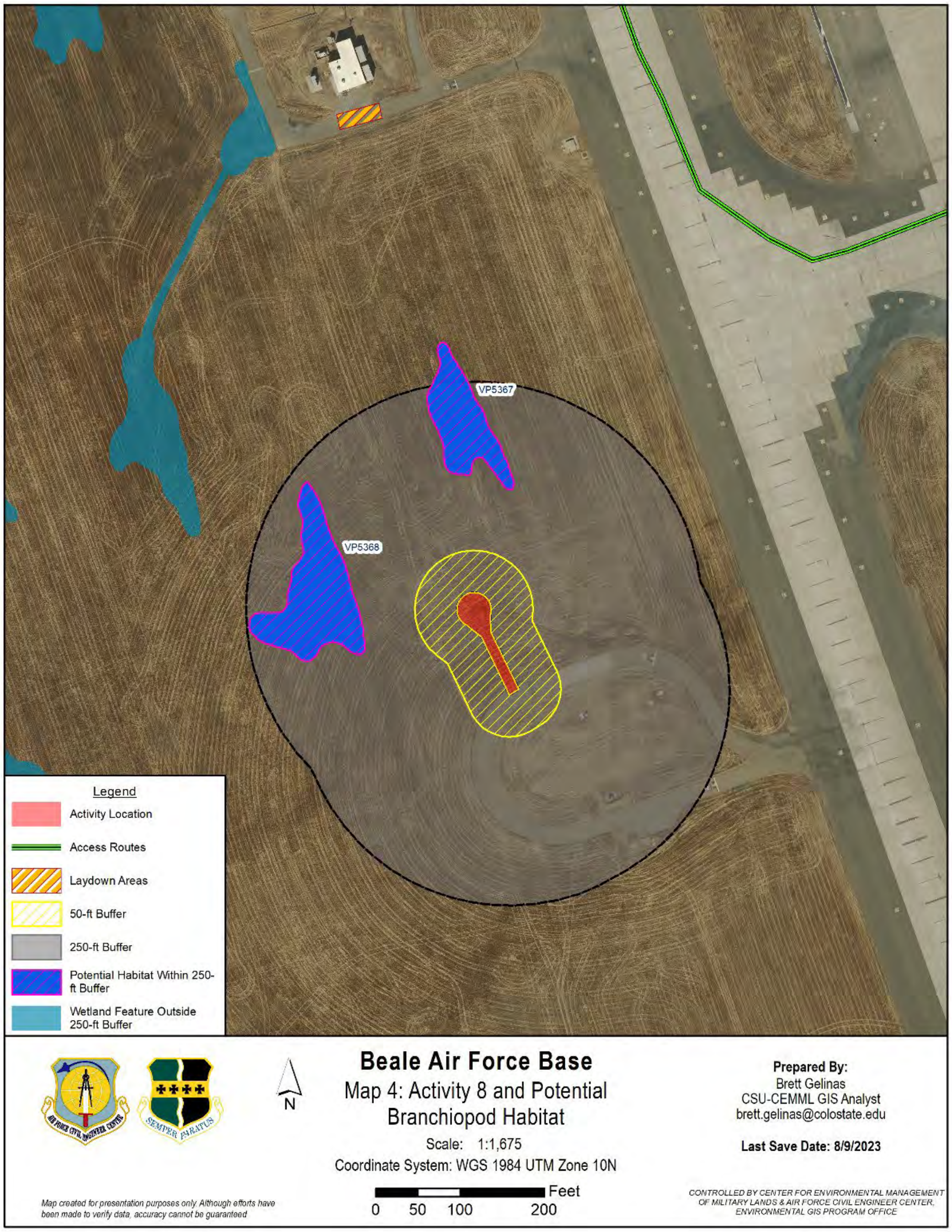

Figure 4-5. Branchiopod habitat in the vicinity of Activity 8 (Map 4).

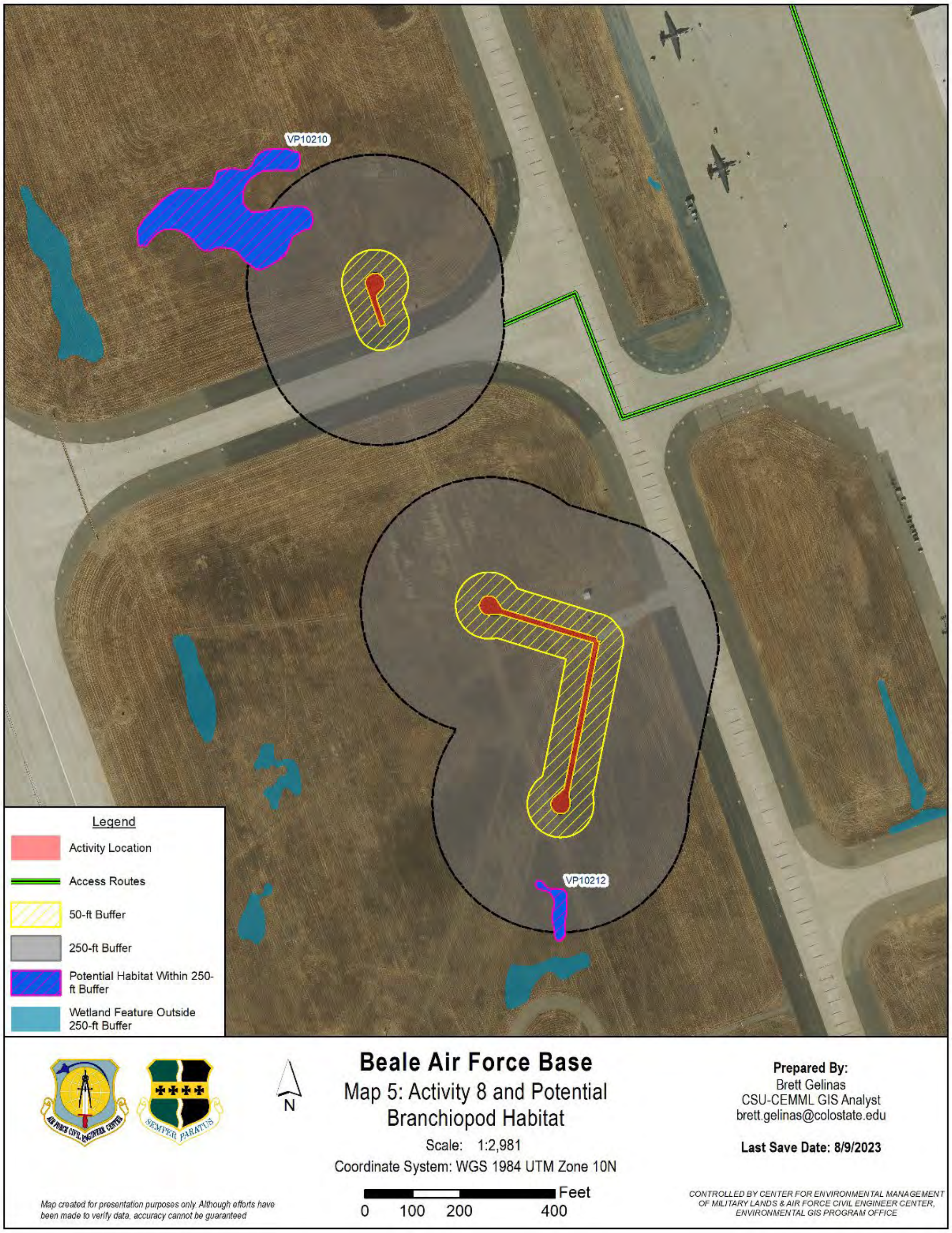

Figure 4-6. Branchiopod habitat in the vicinity of Activity 8 (Map 5).

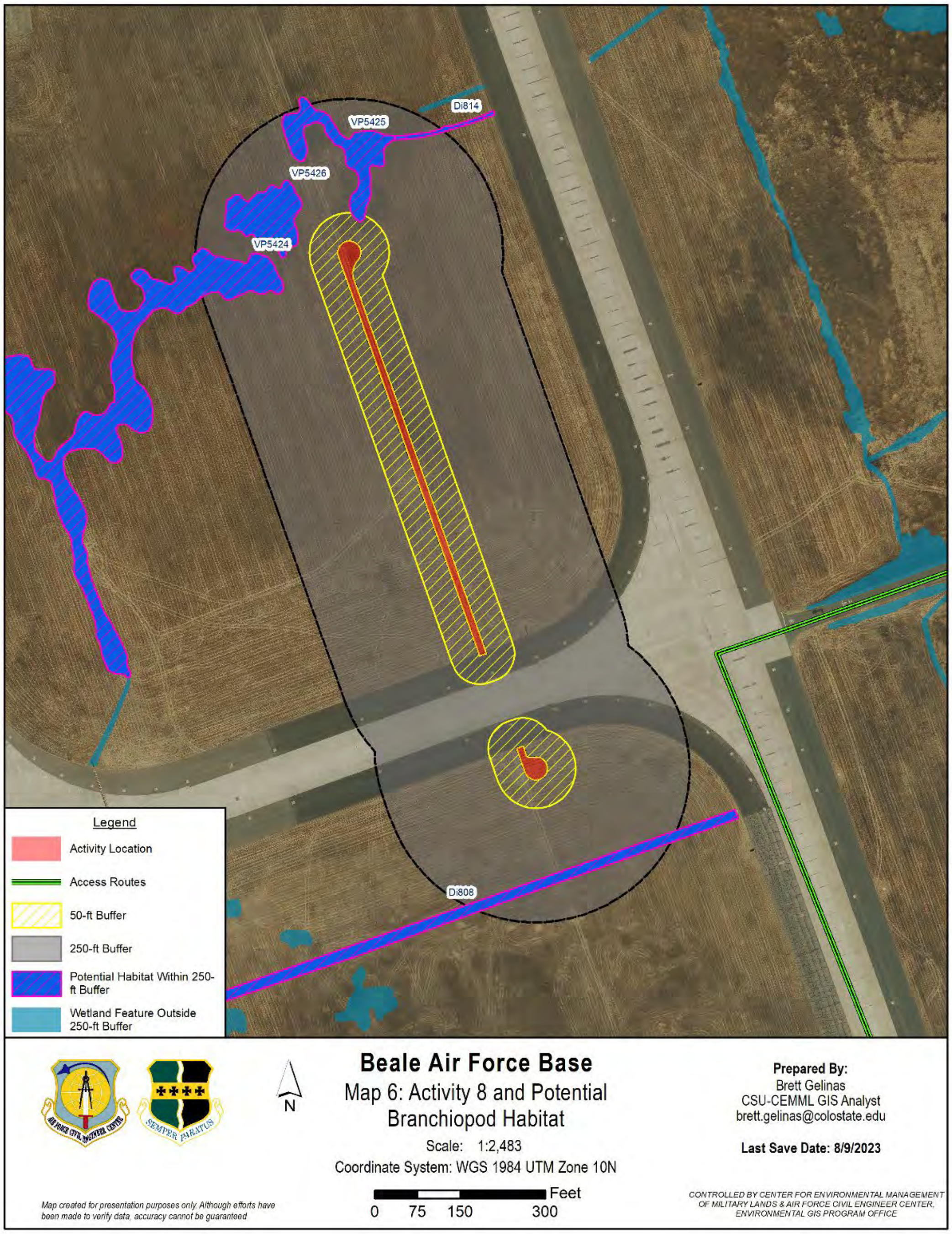

Figure 4-7. Branchiopod habitat in the vicinity of Activity 8 (Map 6).

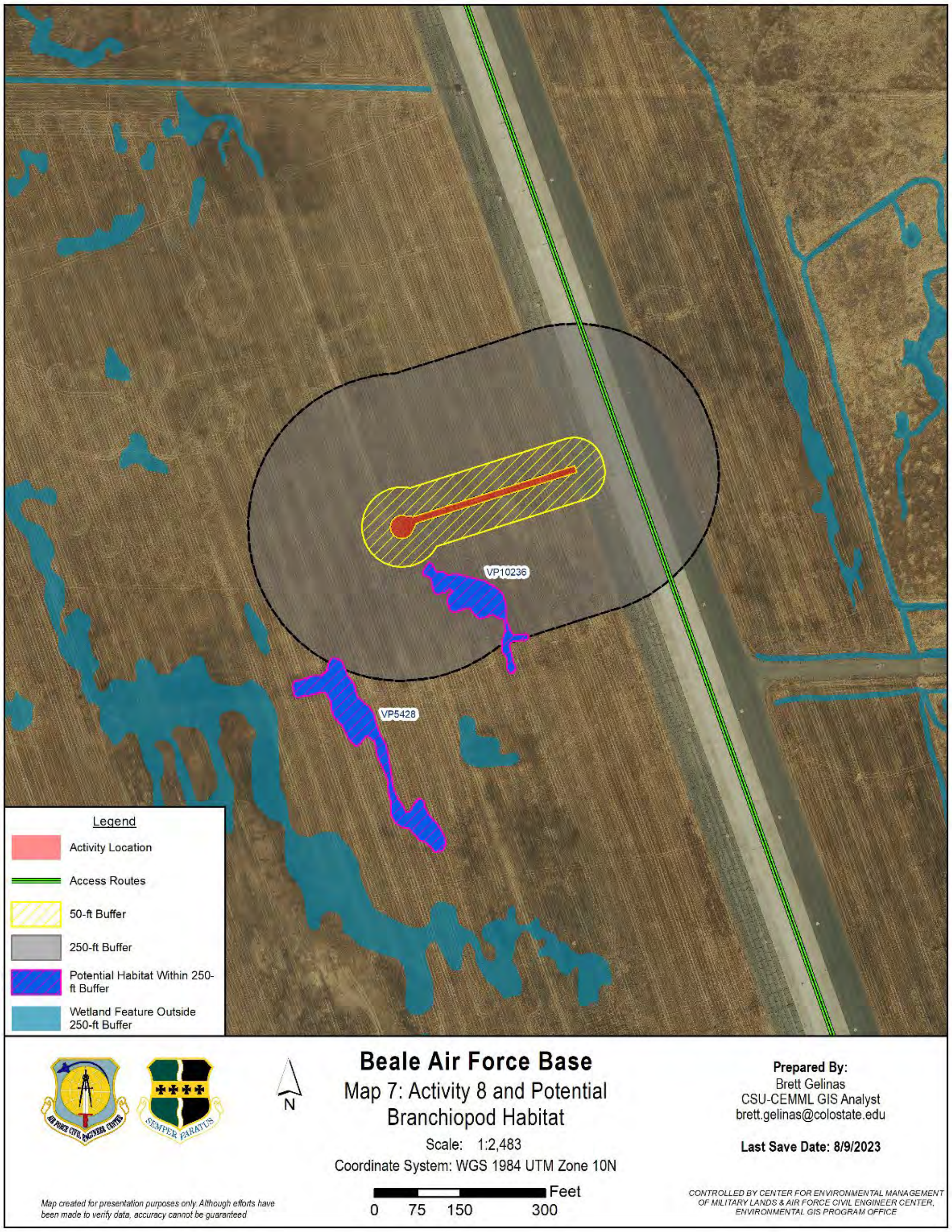

Figure 4-8. Branchiopod habitat in the vicinity of Activity 8 (Map 7).

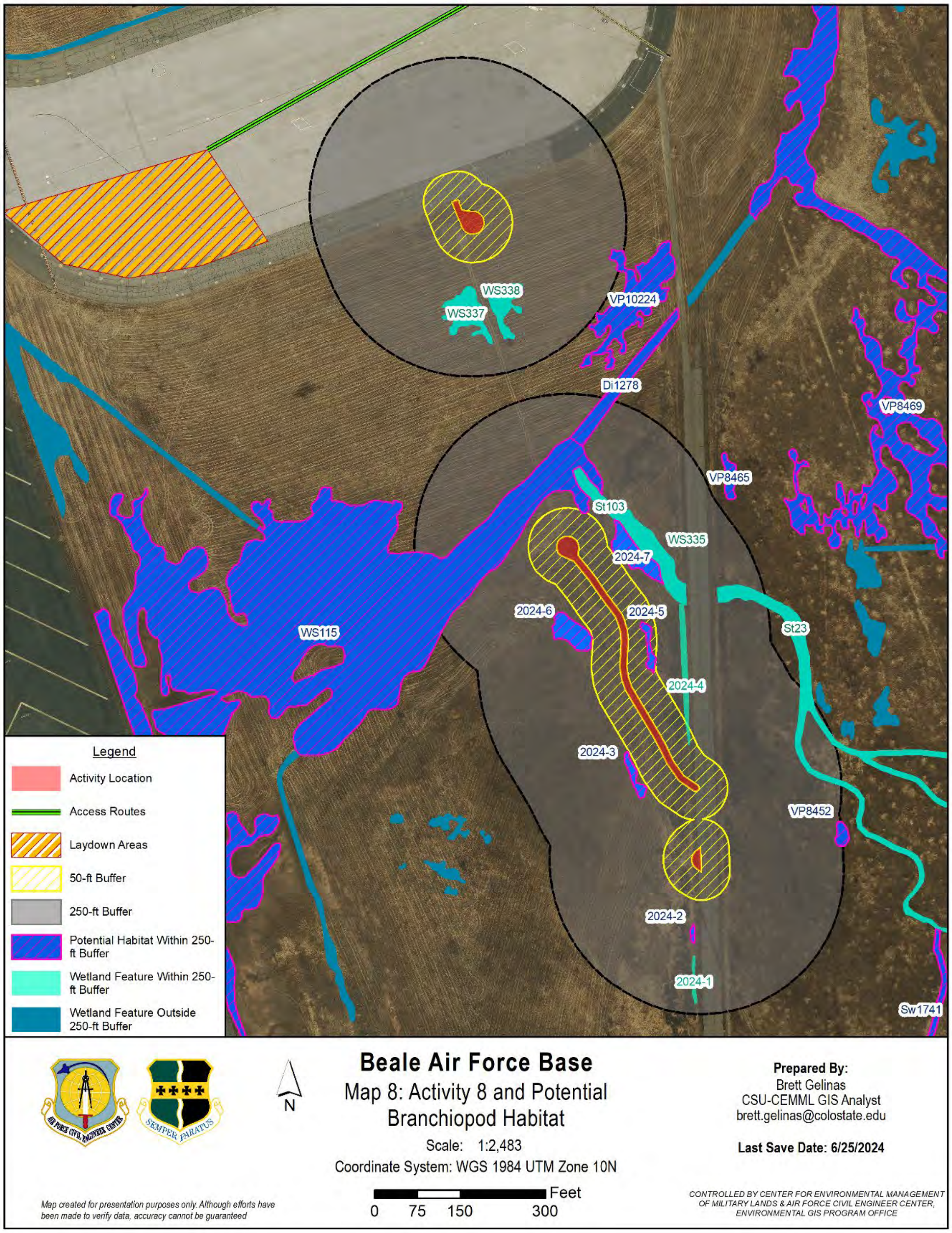

Figure 4-9. Branchiopod habitat in the vicinity of Activity 8 (Map 8).

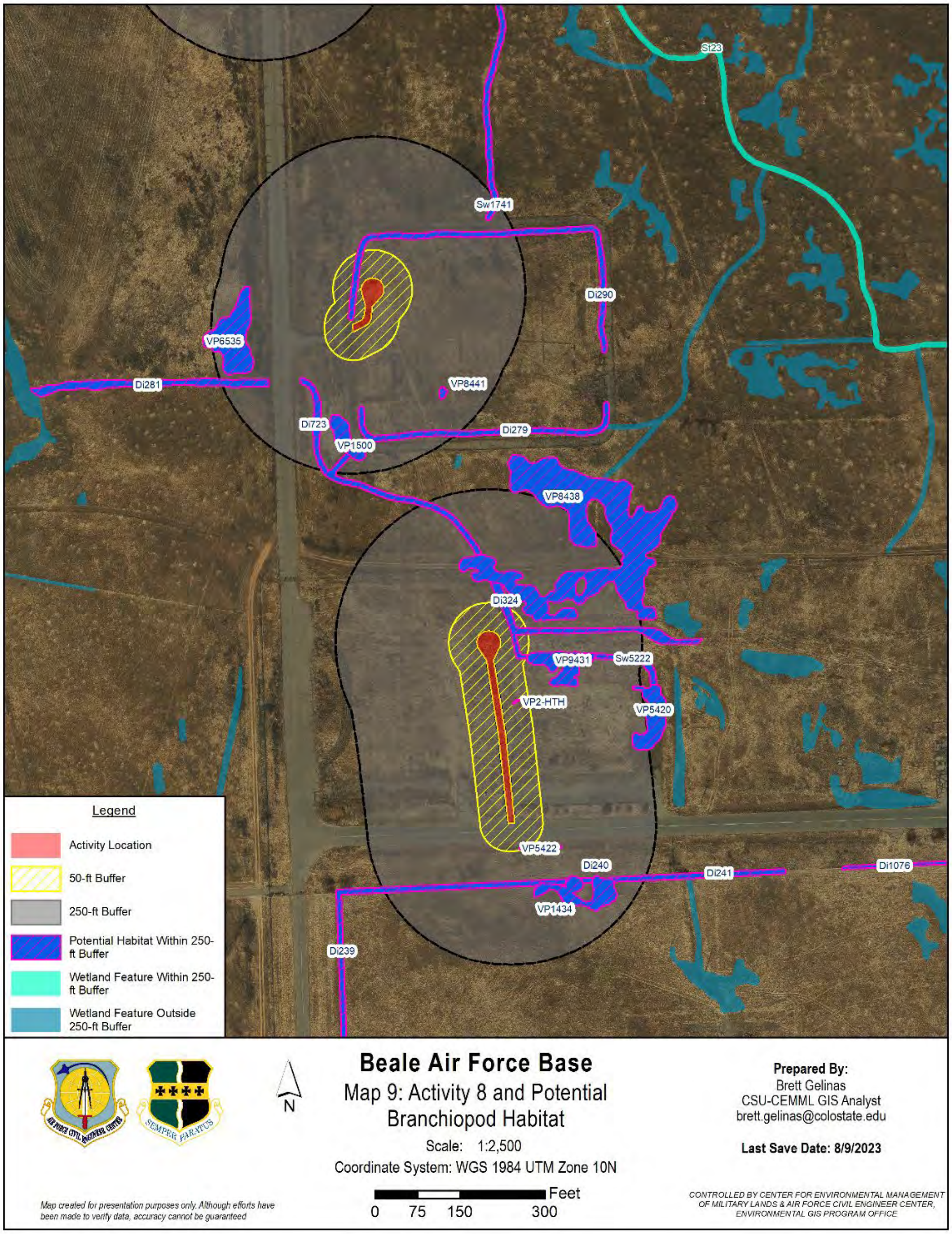

Figure 4-10. Branchiopod habitat in the vicinity of Activity 8 (Map 9).

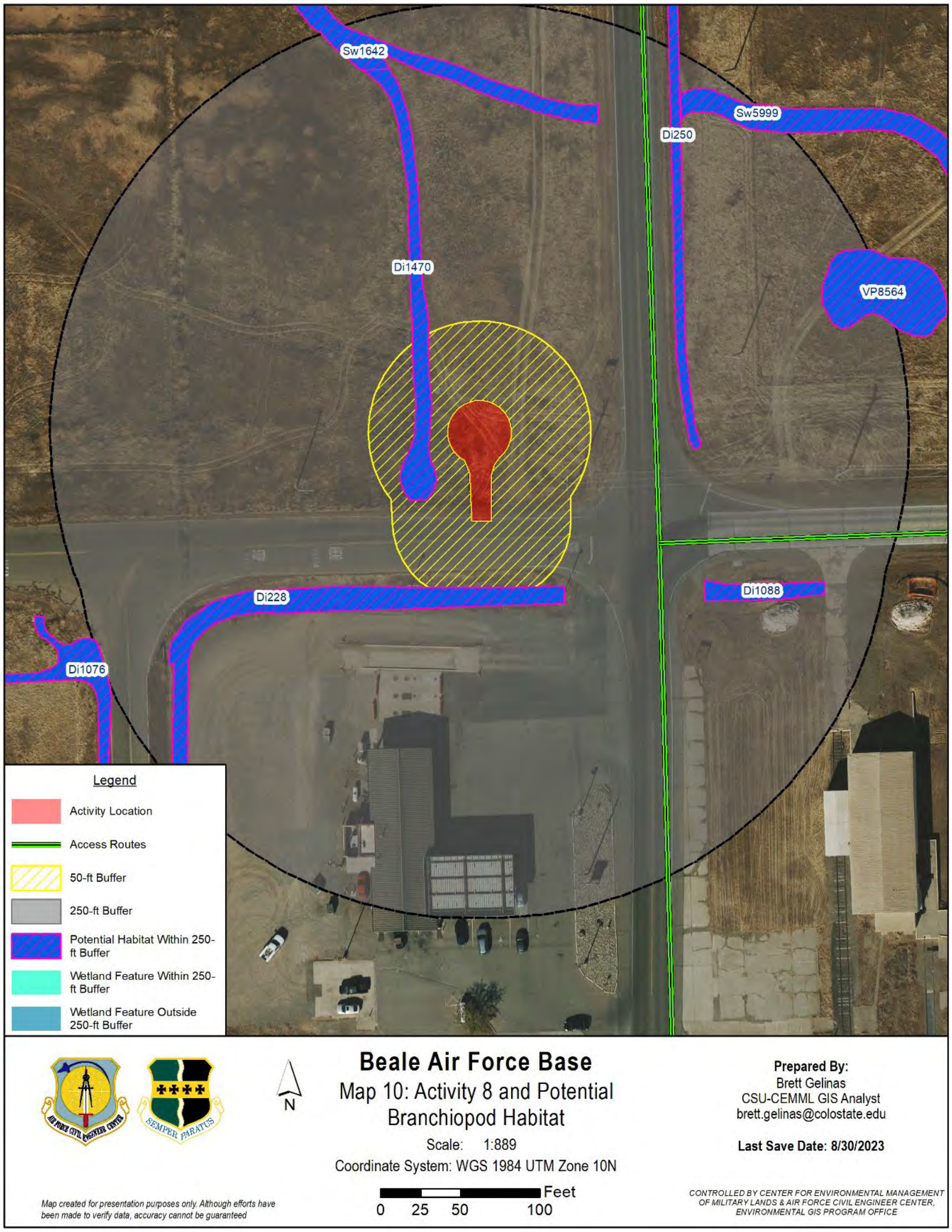

Figure 4-11. Branchiopod habitat in vicinity of Activity 8 (Map 10).

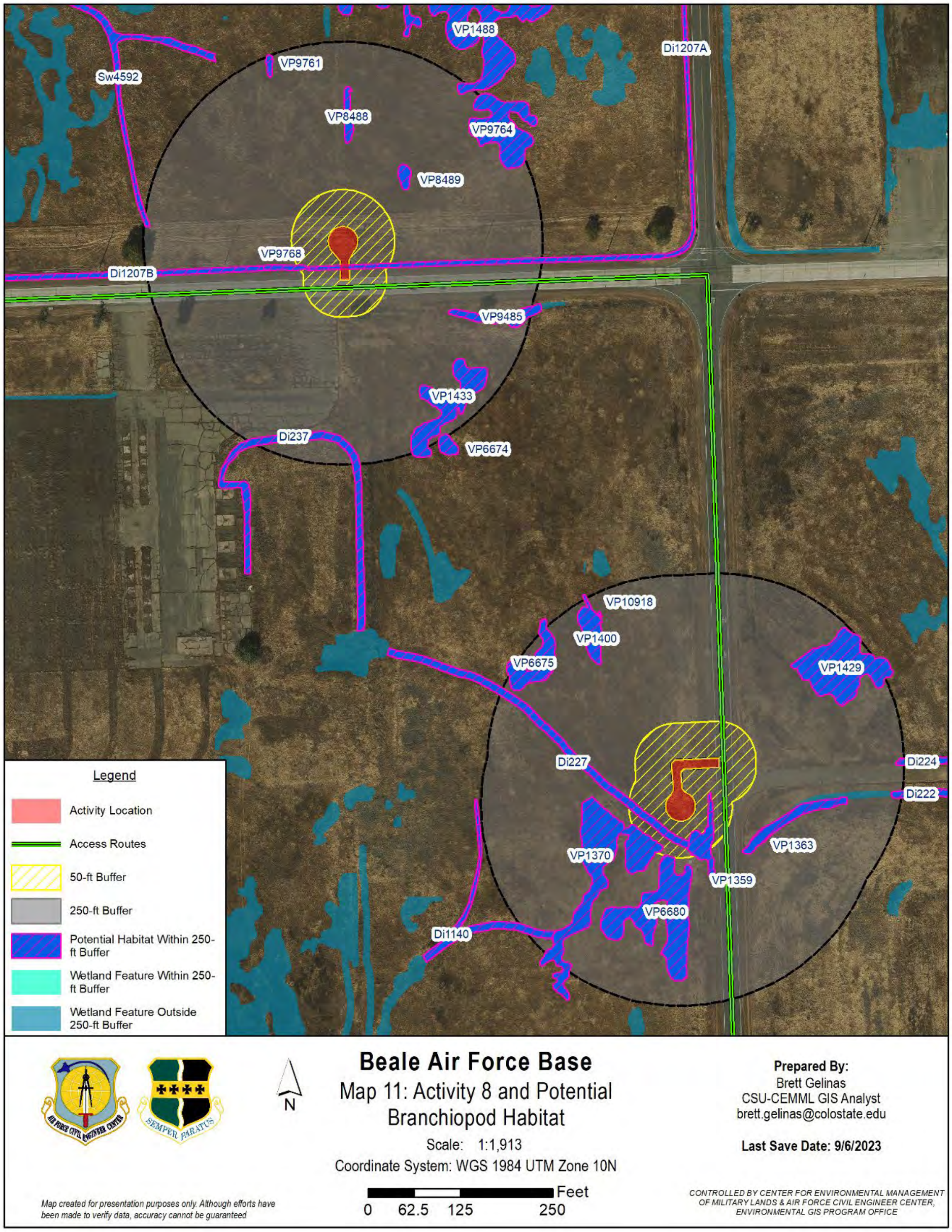

Figure 4-12. Branchiopod habitat in the vicinity of Activity 8 (Map 11).

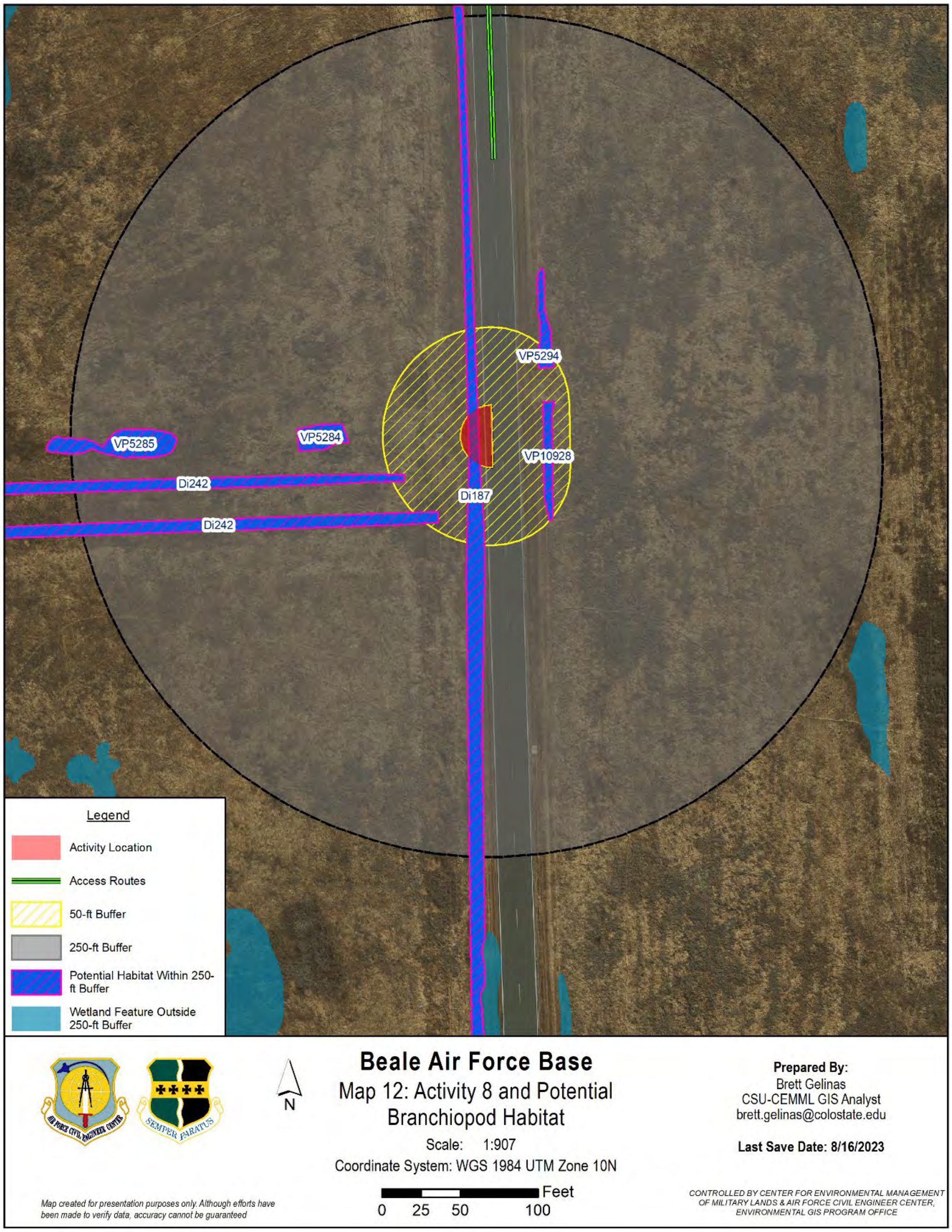

Figure 4-13. Branchiopod habitat in the vicinity of Activity 8 (Map 12).

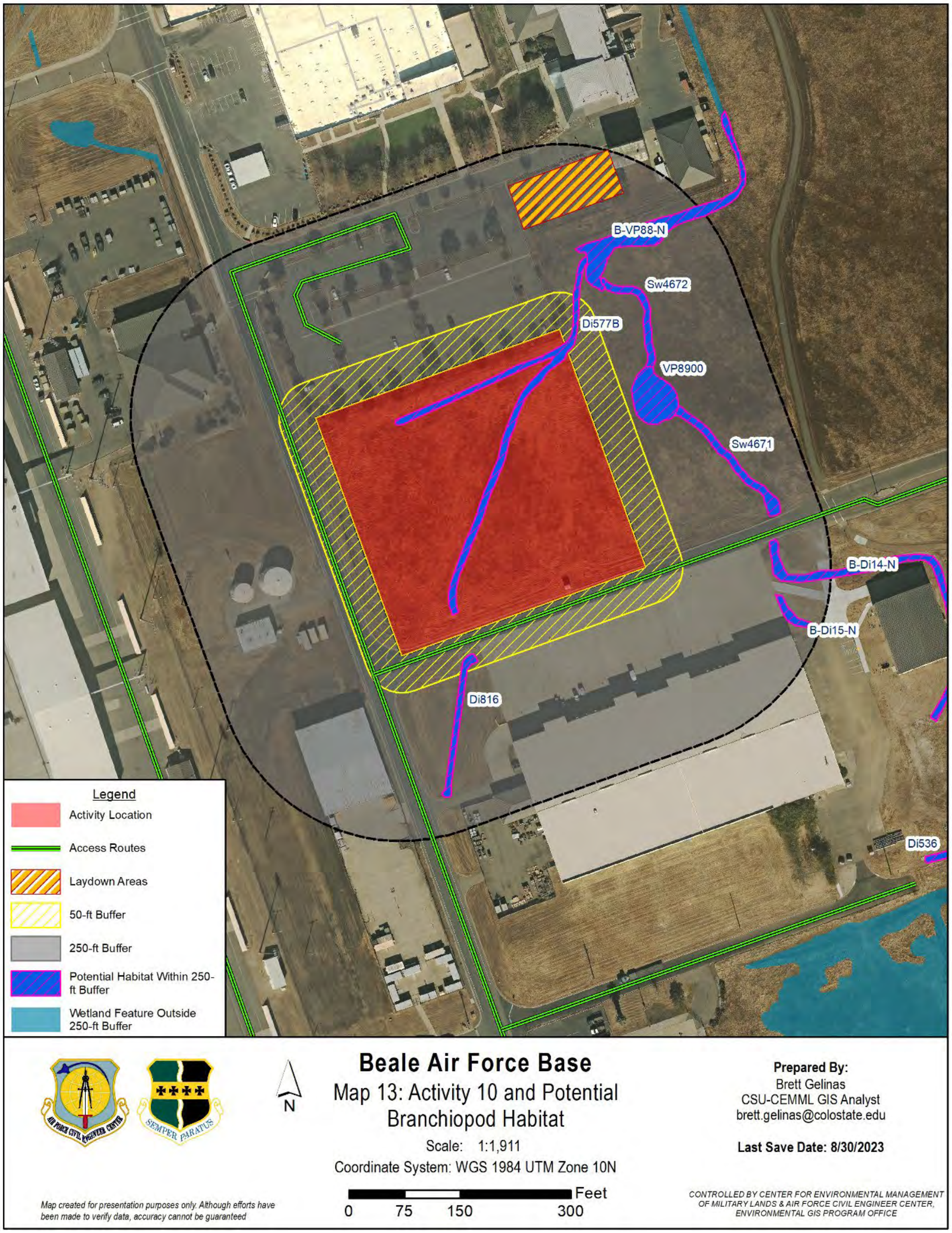

Figure 4-14. Branchiopod habitat in the vicinity of Activity 10 (Map 13).

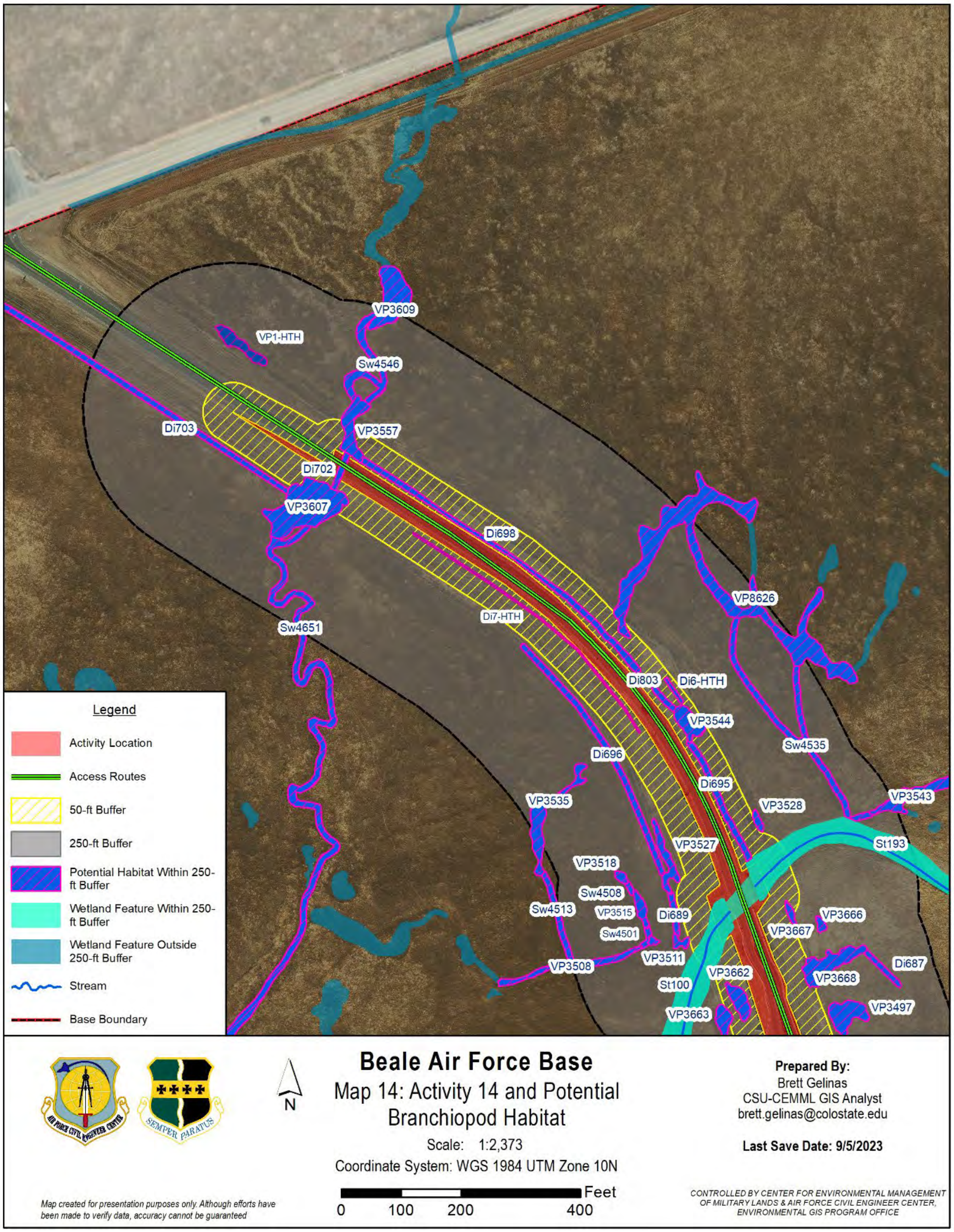

Figure 4-15. Branchiopod habitat in the vicinity of Activity 14 (Map 14).

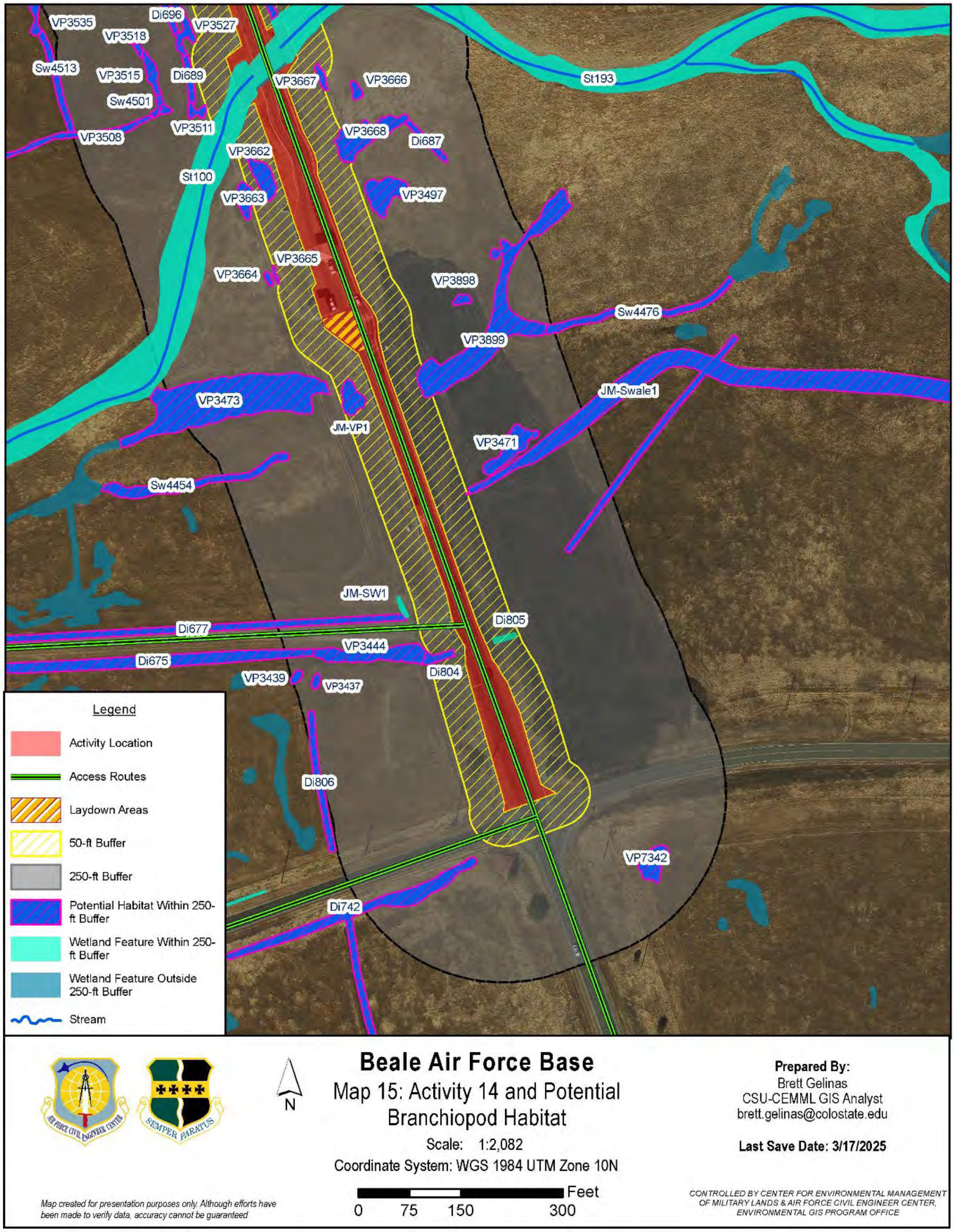

Figure 4-16. Branchiopod habitat in the vicinity of Activity 14 (Map 15).

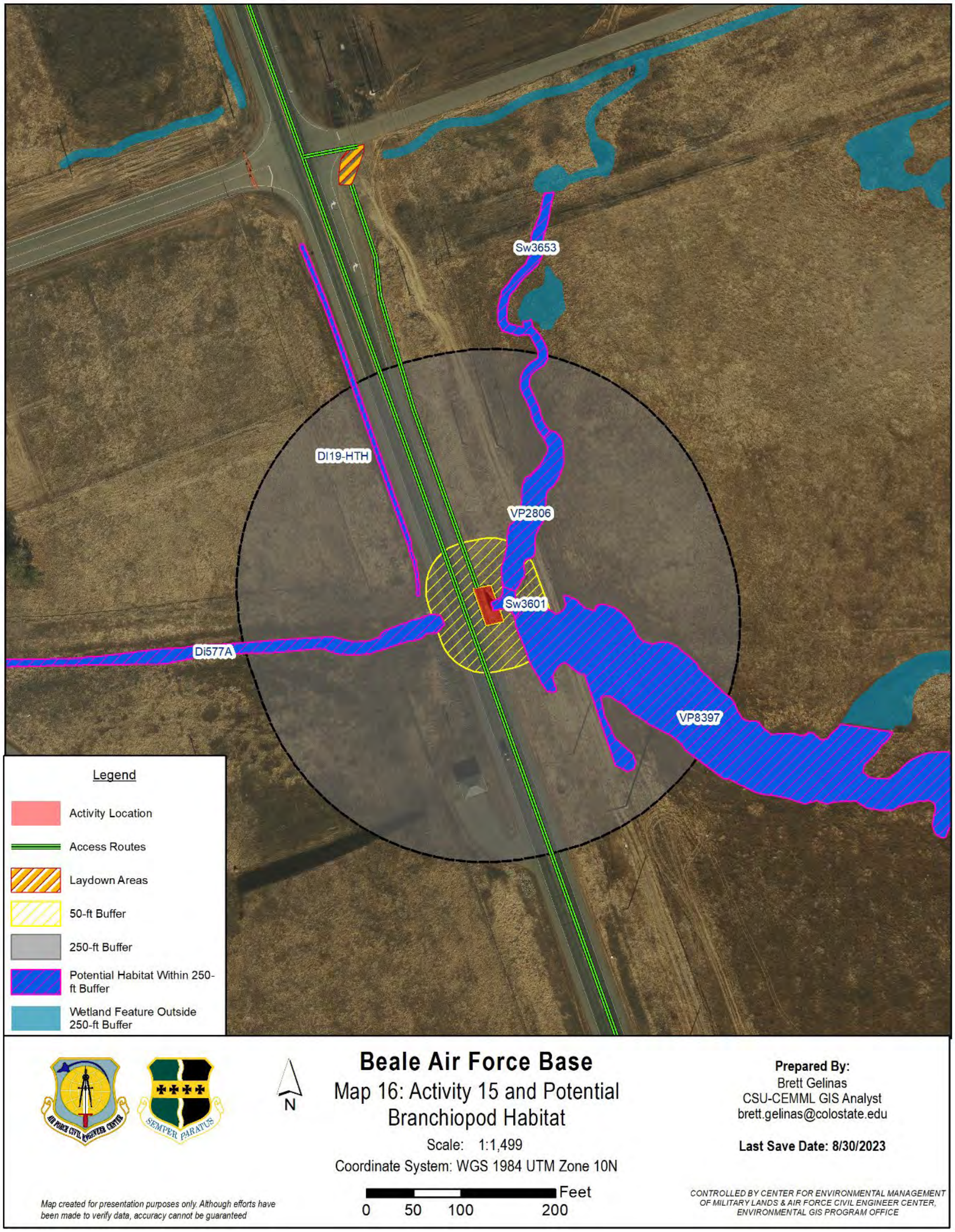

Figure 4-17. Branchiopod habitat in the vicinity of Activity 15 (Map 16).

4.3.1 Direct and Indirect Effects on Vernal Pool Fairy and Tadpole Shrimp

Direct effects on VPFS and VPTS will result from project activities that occur in suitable habitat. Of the seven proposed activities, four would occur in or adjacent to suitable habitat resulting in direct and/or indirect impacts to vernal pool branchiopods through ground-disturbing activities, such as excavation, filling, vegetation clearing, grading, and soil compaction. Direct effects are expected when suitable habitat is lost or otherwise disturbed (for example, filled or graded) such that the soil (hardpan or claypan, for example), topographic, or hydrologic conditions required to support vernal pool branchiopod habitat are eliminated and cannot (or would not) be restored after the activity is complete. Indirect impacts will occur within habitat features that are outside the activity footprint but downgradient or hydrologically connected to areas of soil disturbance, where placement of AMM's cannot prevent sedimentation. A total of 0.423 acres of direct effects and 1.212 acres of indirect effects would result from the Proposed Action (**Table 4-3, Figures 4-18 to 4-26**).

Table 4-3. Listed branchiopod habitat activity determinations for wetland features within 250 feet of Project Area, Beale Air Force Base, California.

Activity	[1]Avoided or NA	Direct Impacts	Indirect Impacts	Total Impacts	Determination	Justification
4 - Construct Wildland Fire Vehicle Storage Facility	0.87	0	0	0	NLAA	No wetlands are found within the activity footprint. Ground disturbing activities would not penetrate the hardpan. All wetland features within 250 feet of the activity footprint are either 1) higher than the proposed ground disturbance, or 2) lower in elevation and not hydrologically connected to impacted features. AMMs will be used to protect nearby wetlands.
5 – Construct Flightline Fitness Center	0.49	0	0	0	NLAA	No wetlands are found within the activity footprint. Ground disturbing activities would not penetrate the hardpan. All wetland features within 250 feet of the activity footprint are either 1) higher than the proposed ground disturbance, or 2) lower in elevation and not hydrologically connected to impacted features. AMMs will be used to protect nearby wetlands.
8 – Construct Fuel Transfer Line Access Road – Proposed Action	21.11	0.013	1.035	1.048	LAA	Two features (portions of Di187 and Di1207a) will be subject to direct impacts (0.013 acres) to listed branchiopods. In addition, eight features (Di1470, Di227, Di290, Di324, VP1359, VP-2-HTH, VP9768, VP2024-5 and portions of Di187 and Di1207a) in proximity to proposed access roads will be subject to indirect impacts (1.035 acres).
9 – Construct Coyote Fenceline (BAEY10118487)	135.35	0	0	0	NLAA	Minimal ground disturbance, use of weight dispersing mats while staging dig barriers, and installation of dig barriers by hand will minimize potential for adverse effects to listed branchiopod species.

Activity	[1]Avoided or NA	Direct Impacts	Indirect Impacts	Total Impacts	Determination	Justification
10 – Construct Additional POV Parking	0.33	0.15	0.14	0.29	LAA	This activity will directly affect Di577b (0.15 acres), as upgradient portions of the feature will be completely removed. In addition, B-VP88-N will be subject to indirect impacts (0.14 acres), as it is downgradient from, and hydrologically connected to, Di577b.
14 – Repair Road and Culverts at Doolittle Gate and Doolittle Drive Pullout	39.42	0.25	0.037	0.287	LAA	This activity has six features (Di695, Di698, Di7-HTH, Di702, Di803, VP3662) that will be directly impacted (0.25 acres) by the expansion of the road and associated road base. Note that VP3662 is within the Beale Core Recovery Area. Another two features (Di6-HTH, JM-VP1) will be indirectly impacted (0.037 acres).
15 – Repair Upstream Storm Drainage PSPTS, Bldg. 1029	1.25	0.01	0	0.01	LAA	Impacts from this activity include direct effects (0.01 acres) to one aquatic feature (SW3601), with temporary/discountable effects to small portions of two features (0.97 acres) (VP2806 and VP8397).
Totals	**198.82**	**0.423**	**1.212**	**1.635**		

[1] This column includes features meeting one or more of the following criteria: 1) impacts will be avoided, 2) features previously mitigated for, 3) features do not contain habitat that could support listed branchiopod species.

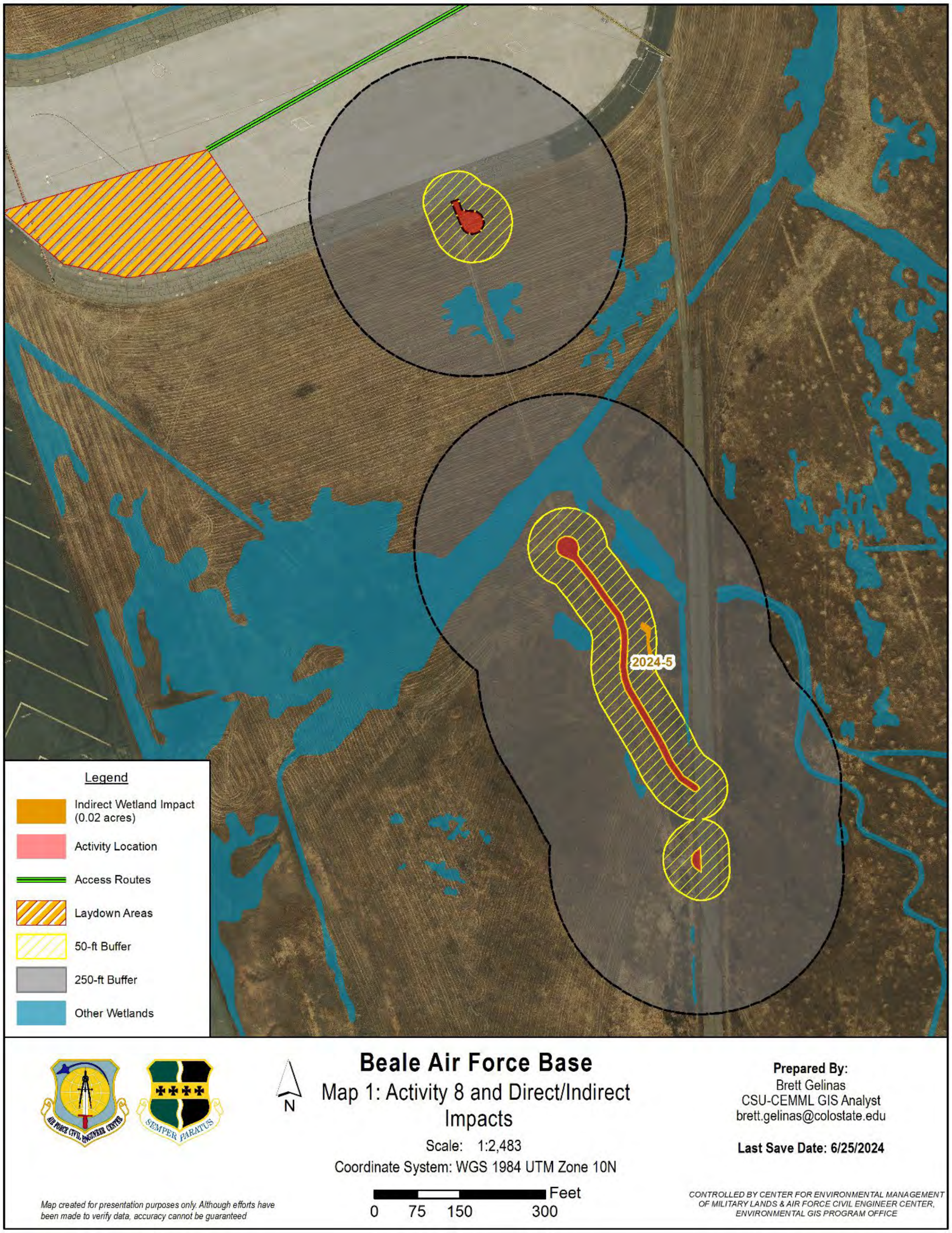

Figure 4-18. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 8 Action Area (Map 1).

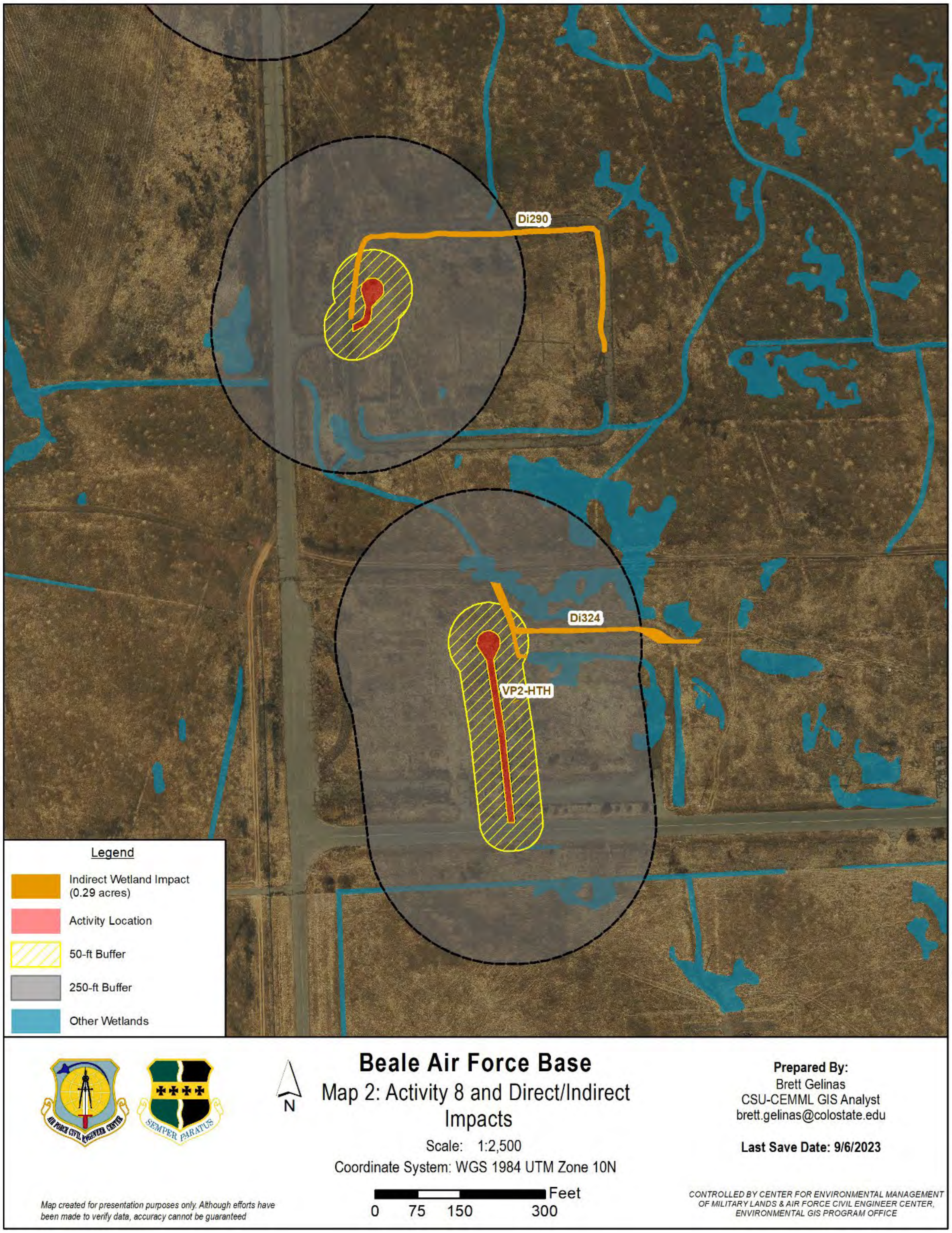

Figure 4-19. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 8 Action Area (Map 2).

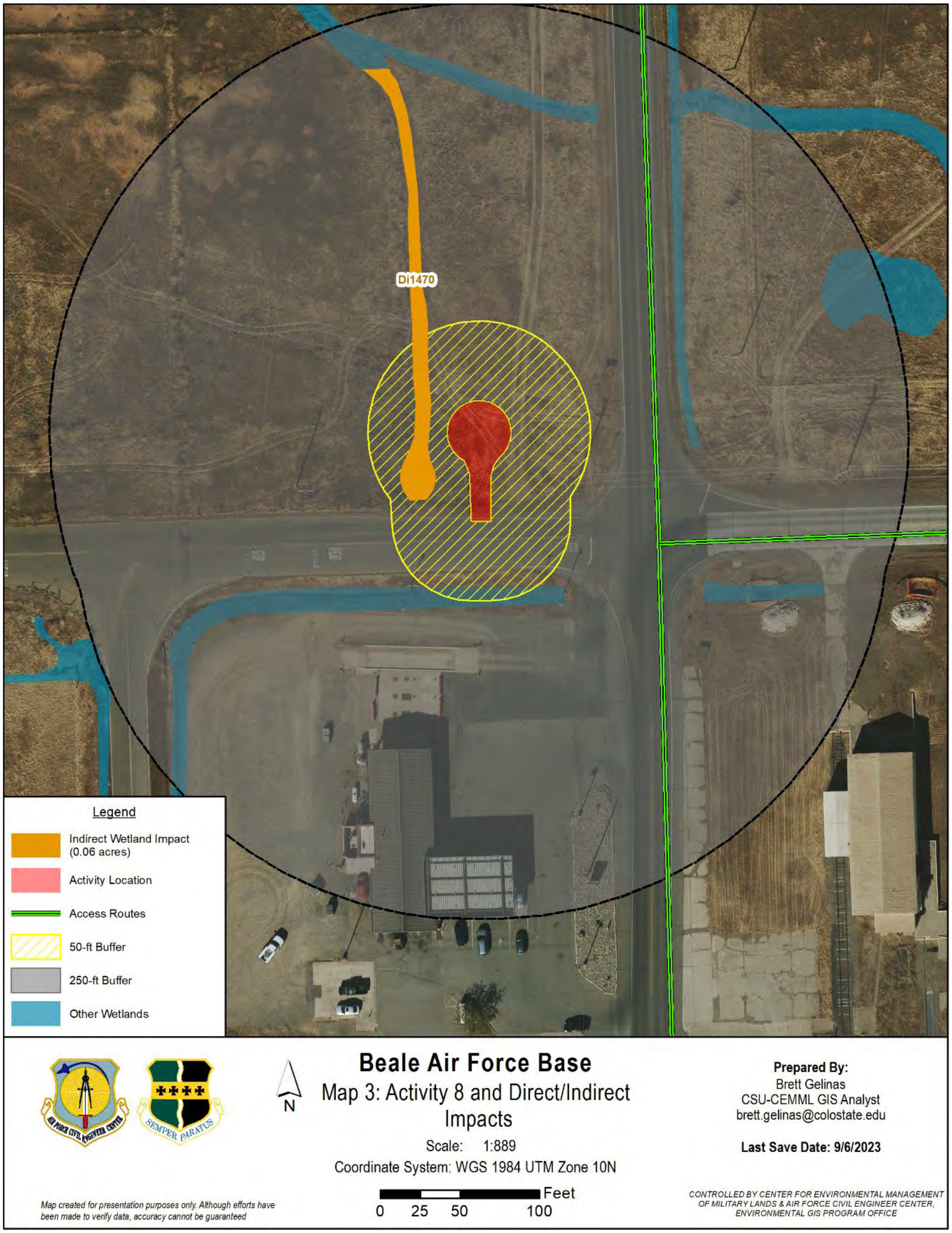

Figure 4-20. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 8 Action Area (Map 3).

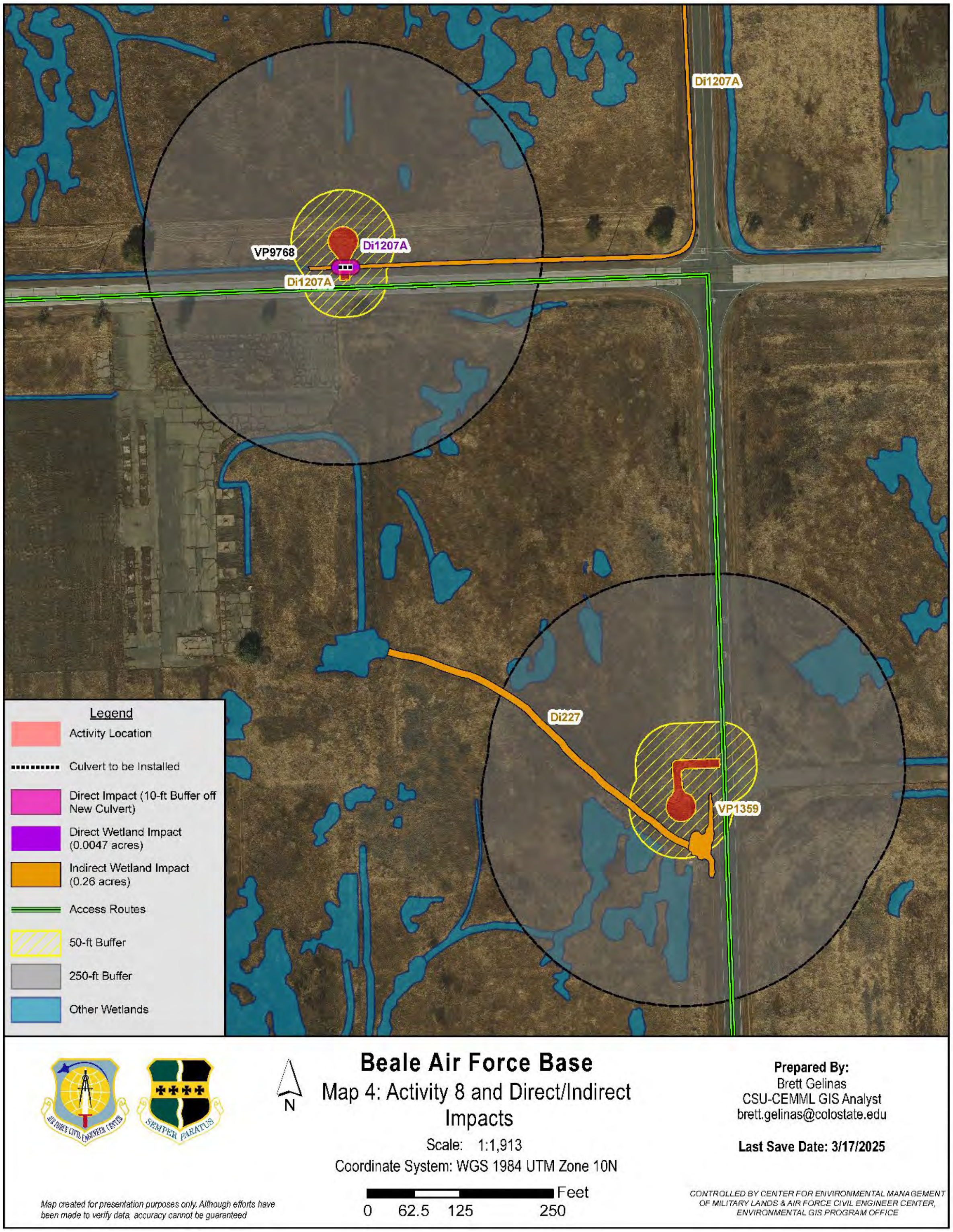

Figure 4-21. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 8 Action Area (Map 4).

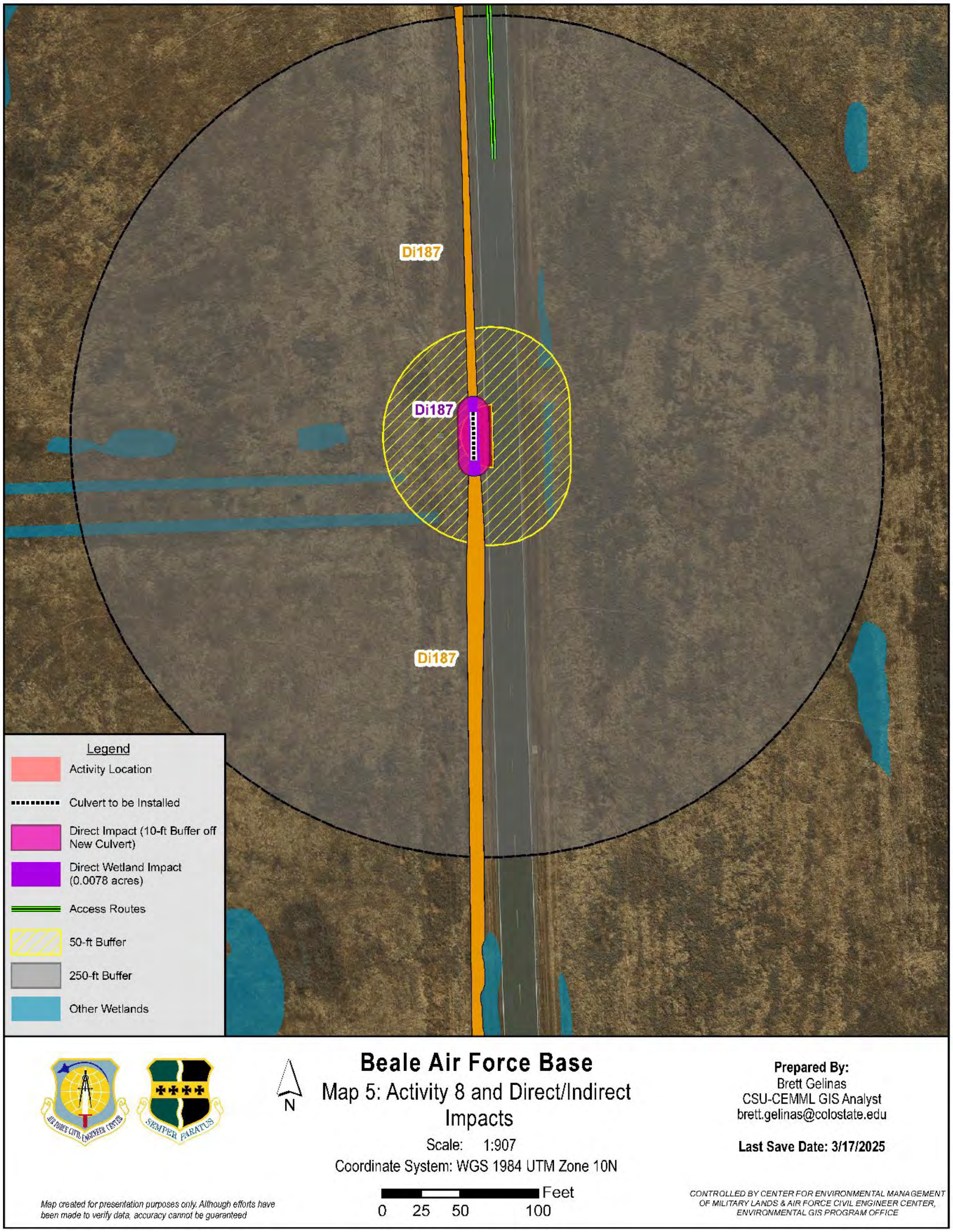

Figure 4-22. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 8 Action Area (Map 5).

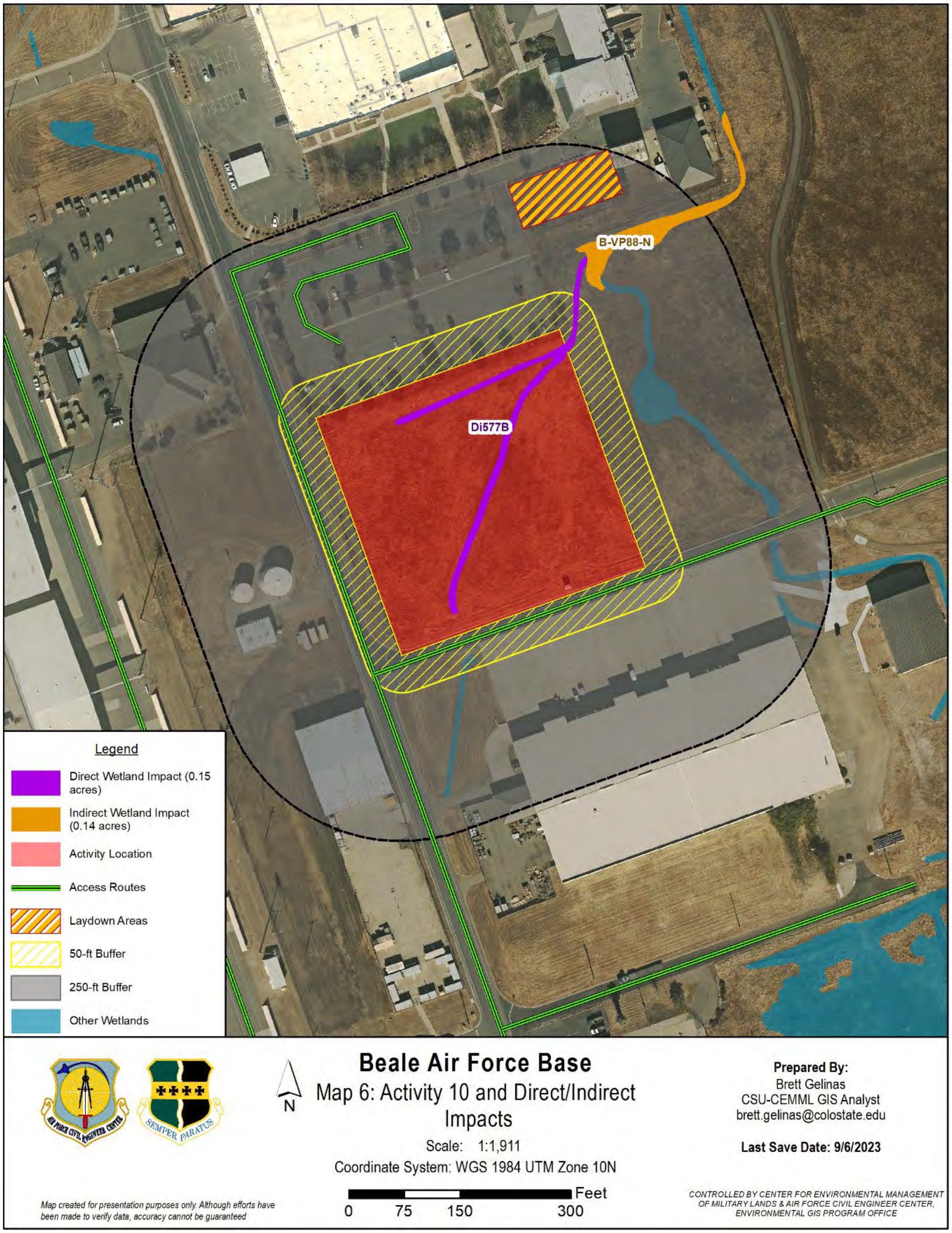

Figure 4-23. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 10 Action Area (Map 6).

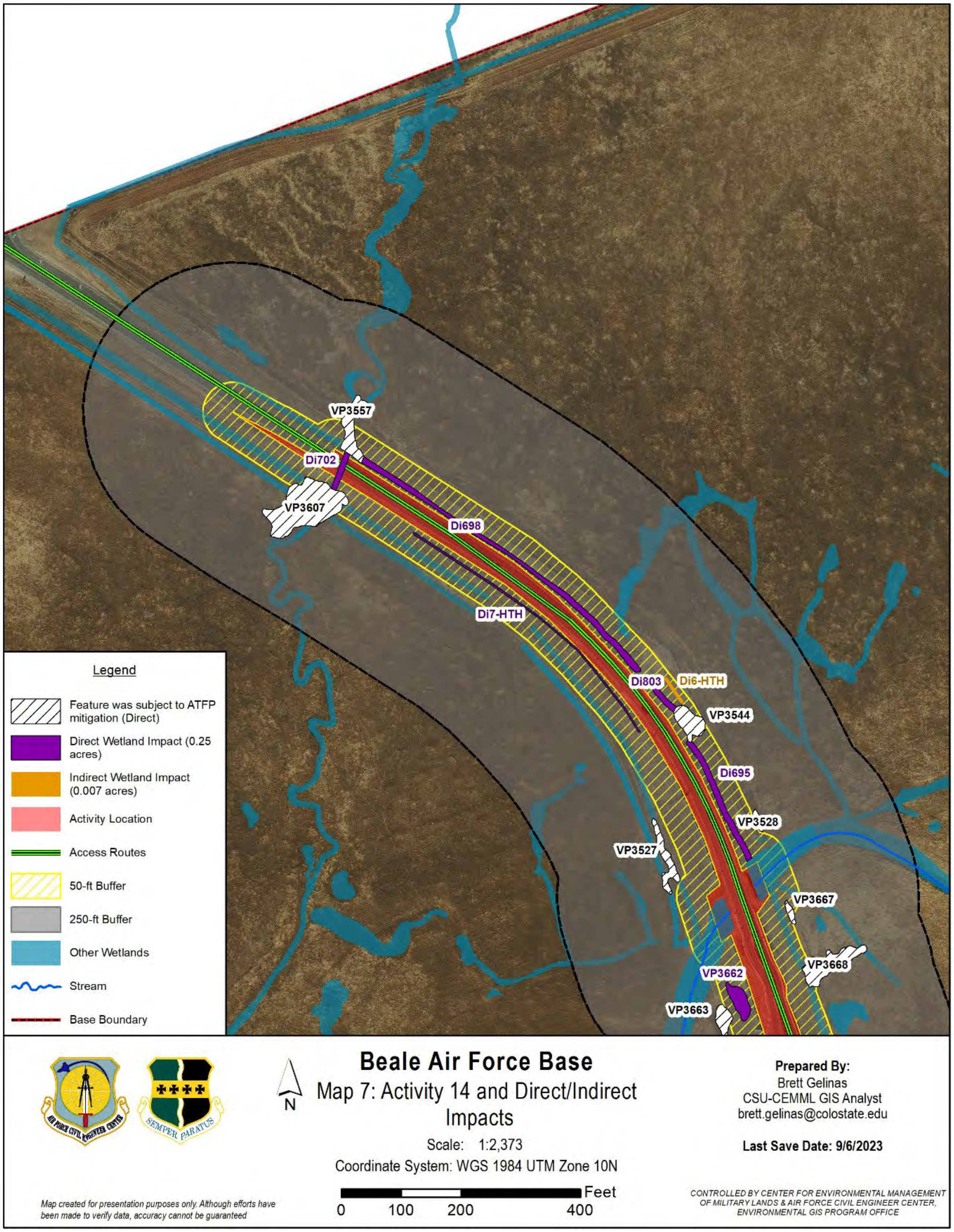

Figure 4-24. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 14 Action Area (Map 7).

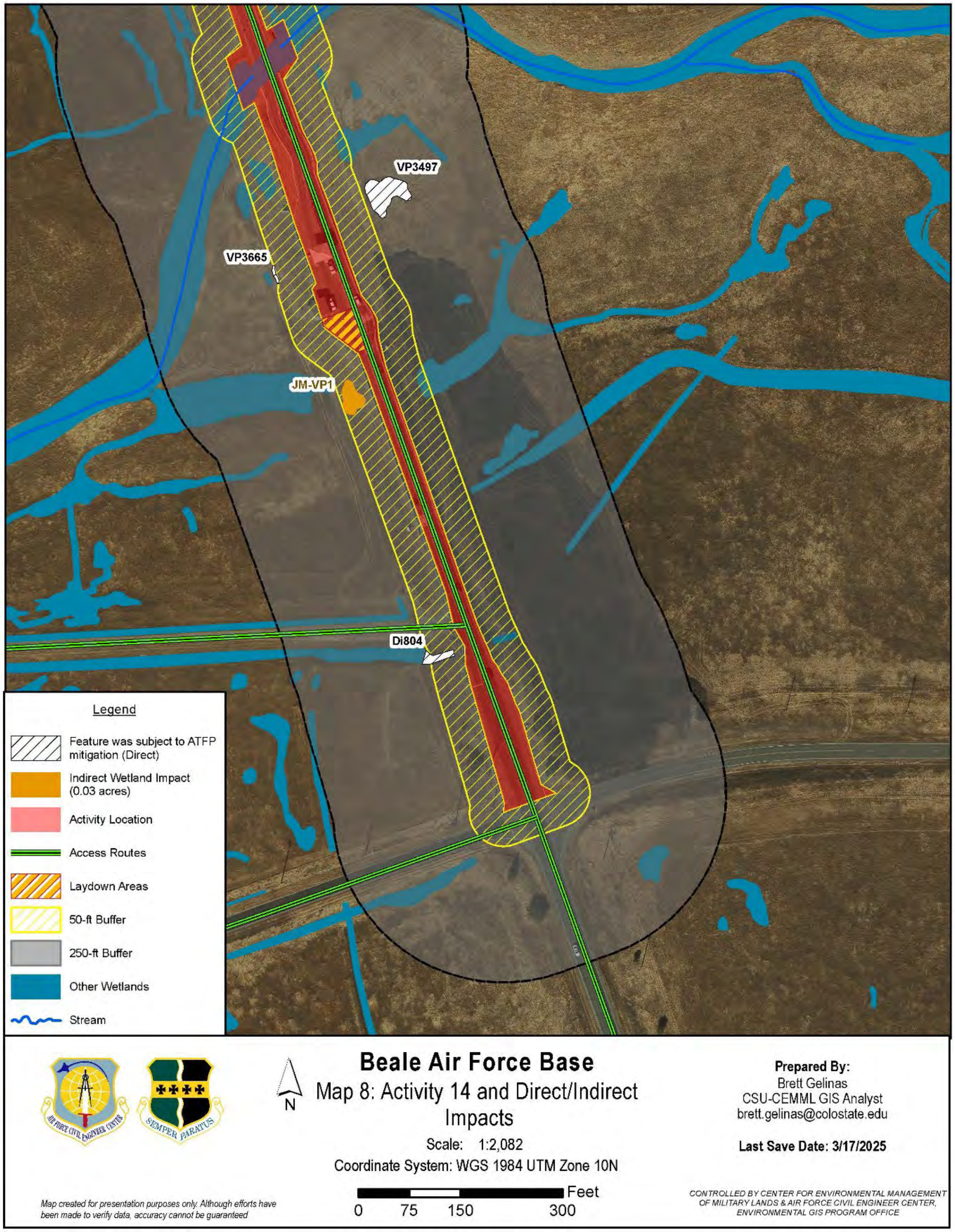

Figure 4-25. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 14 Action Area (Map 8).

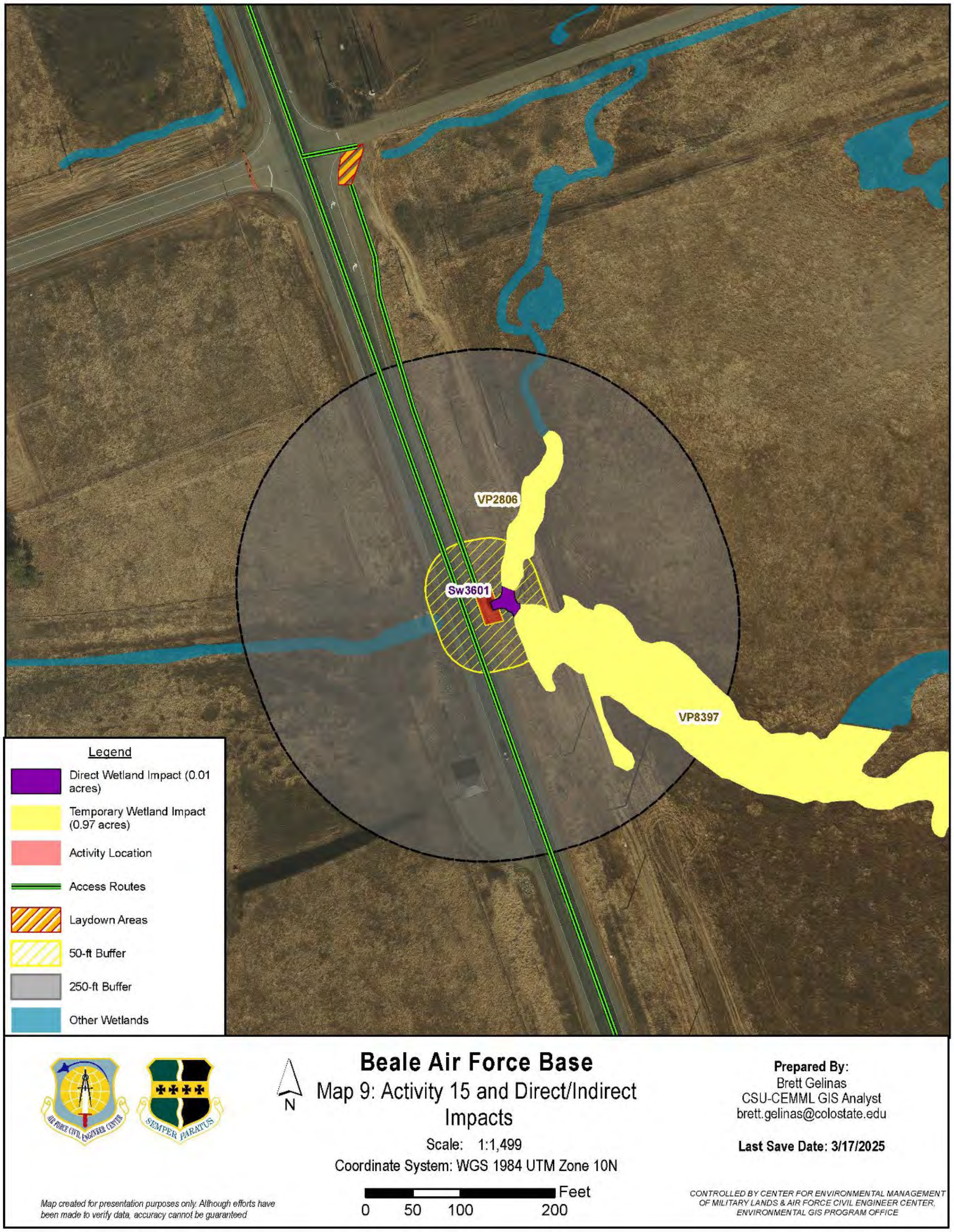

Figure 4-26. Vernal Pool Fairy and Tadpole Shrimp impacts within Activity 15 Action Area (Map 9).

4.4 Cumulative Impacts

Under the ESA, cumulative effects are defined as those effects of future private, state, and tribal activities in addition to the current project effects, not involving federal activities under these projects, which are reasonably certain to occur in the Action Area of the federal action subject to consultation (50 CFR §402.02). This definition applies only to Section 7 analyses and should not apply to the consideration of cumulative effects in the context of documents prepared in compliance with the National Environmental Policy Act or other environmental laws. Future federal actions that are unrelated to the Proposed Action would require separate consultation pursuant to Section 7 of the ESA. Since all actions occurring on Beale AFB are federal actions and are analyzed separately for impacts on threatened and endangered species, no cumulative effects would occur.

4.5 Compensation Measures

Beale AFB and USFWS agreed to compensation ratios for adverse effects on vernal pool branchiopods and their habitat during previous informal consultations for these species. These compensation ratios are presented in **Table 4-4**. These ratios depend on whether effects are direct or indirect, and whether the impact occurs in the BCRA. Portions of Activity 14 occur inside the BCRA, while the other activities are located outside the BCRA.

Table 4-4. Proposed Compensation Ratios for Effects to Vernal Pool Branchiopod Habitat

Location	Direct Effects	Indirect Effects
BCRA (Zone 2)	4:1 Preservation of existing vernal pool branchipod habitat[1]	1:1 Preservation of existing vernal pool branchiopod habitat
Outside BCRA	3:1 Preservation of existing vernal pool branchipod habitat[1]	1:1 Preservation of existing vernal pool branchiopod habitat

BCRA = Beale Core Recovery Area
Notes: 1. The USACE may require additional mitigation to fulfill no net loss of wetlands.

Prior to initiation of each activity, the relevant compensation will be provided via mitigation credits purchased from a USFWS-approved conservation bank or equivalent method of habitat compensation, subject to prior USFWS review and approval. The mitigation bank would be established prior to any actions and bank “debits” would be recorded as activities are implemented. **Table 4-5** summarizes the compensation that Beale AFB would provide for each type of habitat impact based on the impact assumptions outlined in this BA and compensation ratios are listed in **Table 4-4**.

Table 4-5. Summary of Impacts on Potential Branchiopod Habitat and Proposed Compensation

Activity	Implementation Date	In BCRA?	Direct Impacts on Suitable Habitat (acres)	Proposed Compensation for Direct Impacts	Indirect Impacts on Suitable Habitat (acres)	Proposed Compensation for Indirect Impacts	Total Proposed Compensation (acres)
				Preservation at 4:1 (if in BCRA) or 3:1 ratio if not		Preservation at 1:1 ratio	
Activity 8 – Construct Fuel Transfer Line Access Road	May 2026	No	0.013 (outside BCRA)	0.013 x 3 = 0.039 (outside BCRA)	1.035	1.035	1.074
Activity 10 – Add POV Parking	May 2026	No	0.15 (outside BCRA)	0.15 x 3 = 0.45 (outside BCRA)	0.14	0.14	0.59
Activity 14 – Repair Road and Culvert at Doolittle Gate	June 2026	Partly	0.03 (*inside BCRA) 0.22 (outside BCRA) 0.25 total	0.03 x 4 = 0.12 (*inside BCRA) 0.22 x 3 = 0.66 (outside BCRA) 0.78 total	0.037	0.037	0.817
Activity 15 – Repair Storm Drainage, B1029	July 2024	Partly	0.01 (outside BCRA)	0.01 x 3 = 0.03 (outside BCRA)	0	0	0.03
		Totals	**0.423**	**1.299**	**1.212**	**1.212**	**2.511**

* VP3662 is within Beale Core Recovery Area.

4.6 Conclusion

Based on this analysis, the Proposed Action as described in would not jeopardize the continued existence of the monarch butterfly and would have no impacts on VELB. Potential adverse impacts on individual monarch butterflies or their habitat would be avoided or minimized through adherence to the AMMs listed in **Section 2.5.4**.

The Proposed Action would have direct, indirect, and temporary adverse effects on up to 1.635 acres of listed vernal pool branchiopod habitat. Of that area, 0.423 acres would be directly affected, and 1.212 acres would be indirectly affected. The Action Area would be restored to pre-project conditions to the extent feasible in accordance with the AMMs listed in **Section 2.5.** Additionally, future maintenance would conform to the AMMs listed in **Section 2.5**. The assessment of potential effects of the Proposed Action on federally listed species and their habitats considers implementation of these measures. Compensatory mitigation would be required for both direct and indirect effects, as described in **Section 4.5.**

CHAPTER 5 SUMMARY OF DETERMINATIONS

The information and analysis presented in this document formed the basis for the effects determinations in **Table 5-1**. Beale AFB has determined that portions of the Proposed Action may adversely affect federally listed species that occur, or have the potential to occur, within the Action Area.

Table 5-1. Summary of ESA Determinations

Species	Endangered Species Act Determination of Effect on the Species
Vernal pool fairy shrimp	May Affect, Likely to Adversely Affect
Vernal pool tadpole shrimp	May Affect, Likely to Adversely Affect
Valley elderberry longhorn beetle	Not Likely to Adversely Affect
Monarch butterfly	May Affect, Not Likely to Adversely Affect

CHAPTER 6 REFERENCES

AuxilliAll. 2016. Endangered Species Act Compliance Report for Fence-to-Fence Environmental Services at Beale Air Force, California. Contract N. W91238-14-C-0044, Mod. P00008. Option Year 1. Prepared for USAF Beale AFB and Travis ISS. Denver, CO, USA.

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APPENDIX A - SITE PHOTOGRAPHS

Photograph 1: Activity 8 – Fuel Transfer Line Access Road. Photo of existing stream and vernal pool in the vicinity of vaults 8 and 9, characterized by vernal pool popcorn flower (*Plagiobothrys stipitatus)* and Fremont's goldfields (*Lasthenia fremontii*). Photo taken on April 7, 2022. Photo direction = northwest.

Photograph 2: Location of a portion of Activity 9 – Coyote Fenceline

Photograph 3: Activity 14 – Repair Road and Culvert at Doolittle Gate. Photo of Reeds Creek culverts from west side of Doolittle Drive looking northeast, taken August 17, 2021.

Photograph 4: Location of Activity 15 – Repair Storm Drainage, B1029. Drainage that feeds into the eastern side of the B1029 storm drainage system. Photo taken August 17, 2021, from Doolittle Road looking east.

A.6 Biological Opinion

United States Department of the Interior

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In Reply Refer to:
2024-0000964-S7-001

September 15, 2025
Sent Electronically

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Subject: Formal Consultation on the on the Flightline Installation Development Plan at Beale Air Force Base, Yuba County, California

Dear Blaze Baker:

This letter is in response to the Beale Air Force Base (Beale AFB) October 16, 2023, request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Flightline Installation Development Plan (proposed project), at Beale AFB in Yuba County, California. Your request was received October 17, 2023. All information necessary to initiate formal consultation was received on July 22, 2025. At issue are the proposed project's effects on the federally threatened valley elderberry longhorn beetle *(Desmocerus californicus dimorphus*; beetle) and vernal pool fairy shrimp (*Branchinecta lynchi*; fairy shrimp), and the federally endangered vernal pool tadpole shrimp (*Lepidurus packardi*; tadpole shrimp). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act) and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action on which we are consulting is the development of multiple flightline installation activities that will be implemented over an approximately 5-year period. Pursuant to 50 CFR 402.12(j), you submitted a revised biological assessment and other documents for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect and is likely to adversely affect the fairy shrimp and tadpole shrimp (vernal pool branchiopods). Additionally, these findings conclude that the proposed project may affect but is not likely to adversely affect the beetle. The proposed project is not within designated or proposed critical habitat for any federally listed species; therefore, critical habitat will not be affected.

In considering your request, we based our evaluation on the following: (1) the consultation request letter, dated October 16, 2023; (2) the *Flightline installation development at Beale Air Force Base, Yuba County, California* (revised biological assessment), dated April 2025 (Beale AFB 2025); (3) email and telephone correspondence between the Service and Beale AFB between December 2022 and August 2025; and (4) other information available to the Service.

Valley Elderberry Longhorn Beetle

The beetle is dependent on elderberry shrubs (*Sambucus* spp.) as the host plant to complete its larval cycle. Most elderberry shrubs on Beale AFB are located in the Dry Creek watershed on the east side of the base; however, a few isolated shrubs have been mapped on the west side. Two elderberry shrubs are located near one another along the fence associated with the proposed activity to install a barrier to stop coyotes from digging under the fence. These shrubs are isolated and located 2,456 feet from the nearest elderberry shrub, which is also isolated. Isolated, non-riparian elderberry shrubs are less likely to be occupied or become colonized by the beetle and those more than 2,526 feet from the nearest elderberry shrubs are increasingly less likely to be occupied because of the beetle's poor flying ability (Service 2017).

Beale AFB has proposed the following measures to minimize effects to the beetle. For the purposes of this consultation, a "qualified biologist," as referenced in this document, refers to an individual who, at a minimum, holds a four-year degree in a relevant biological field and who has demonstrated knowledge and experience with the beetle, fairy shrimp, tadpole shrimp, and their habitats.

VELB-1. A qualified biologist will provide training for all contractors, work crews, and any onsite personnel on the status of the beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.

VELB-2. All activities that occur within 165 feet of an elderberry shrub will be conducted outside of the beetle emergence period (i.e., activities will not occur between March and July).

VELB-3. Pre- and post-project surveys will be conducted to record habitat conditions before the start of the project and after completion of the project for tracking purposes. This may include photos or species surveys and will be used to better manage the species.

The Service concurs with your findings that the proposed project may affect but is not likely to adversely affect the beetle because: (1) the two elderberry shrubs within the proposed project area will not be trimmed or removed; (2) the shrubs are far from any other shrub and the nearest one is also isolated; and (3) any proposed project activity within 165 feet of an elderberry shrub will occur outside of the beetle's emergence period. Therefore, any potential adverse effects to the beetle in the action area are extremely unlikely to occur and are, thus, considered discountable for purposes of this consultation.

The remainder of this document provides our biological opinion on the effects of the proposed project on the fairy shrimp and the tadpole shrimp.

Consultation History

October 17, 2023:	The Service received a letter from Beale AFB requesting initiation of formal consultation on the Flightline Installation Development Plan at Beale AFB.
February 2024:	Beale AFB requested that Service pause the consultation while they conducted surveys and evaluated proposed project effects.
July 10, 2024:	The Service received an updated biological assessment from Beale AFB.
September 6, 2024:	The Service met with Beale AFB and requested additional information.
September 13, 2024:	Beale AFB provided the requested additional information.
November 6, 2024:	The consultation was paused at the request of Beale AFB while they reviewed and refined the proposed project description.
January 29 and February 14, 2025:	Biologists from the Service and Beale AFB met onsite to evaluate the proposed project's possible effects to specific wetland features to assist in finalizing the revised biological assessment.
April 9, 2025:	The Service received a revised biological assessment from Beale AFB.
June 3, 2025:	The Service submitted a request for additional information to Beale AFB to clarify the proposed project description and anticipated impacts.
July 22, 2025:	Beale AFB responded with the requested clarifications. This is the date the Service received all information required to initiate formal consultation.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed project consists of five construction activities and two infrastructure repair activities (Table 1) to provide improvements and support the mission of the 9th Reconnaissance Wing and tenant units at Beale AFB. An additional nine activities are proposed that Beale AFB has determined will have no effect on listed species; thus, those activities are not included in this analysis. Beale AFB has prioritized the proposed activities to improve physical infrastructure and functionality, meet current and future mission requirements, and eliminate unneeded buildings. The five construction activities will result in 1.91 acres of new buildings or additions to existing buildings. They will also construct approximately 30 acres of new pavement, roads, and parking areas and 1.27 acres of gravel access roads. The infrastructure repair activities will improve 2.46 acres of pavement, replace three culverts, and make needed storm drain repairs. These activities will result in a total of 13.71 acres of ground disturbance, including permanent footprints that equal 5.76 acres. The proposed activities are estimated to occur over a 5-year period; however, they could occur later.

Table 1. Proposed activity footprints and anticipated ground disturbance required for construction of the Flightline Installation Development Plan on Beale AFB, California.

Proposed Activity	Permanent Footprint (acres)	Total Ground Disturbance (acres)
Wildland fire vehicle storage facility	0.06	0.65
Flightline fitness center	1.58	2.06
Fuel transfer line access road	1.27	2.25
Coyote fence line	0.00	0.00
Additional personally owned vehicle parking	2.41	2.74
Repair road and culverts at Doolittle Gate	0.42	5.84
Repair upstream storm drainage, Building 1029	0.02	0.17
Total	**5.76**	**13.71**

Wildland Fire Vehicle Storage Facility

Beale AFB proposes construction of a 60-foot-wide by 40-foot-long prefabricated metal building to protect high-value wildland fire module equipment from the weather. The facility will include a concrete slab, air-conditioned storage area, and three pull-through vehicle bays. Bollards are required for each bay to protect the structure from damage by vehicles. The facility will house heavy equipment, such as transport trucks and dozers, and small equipment. The bays will also include workspace for small tool maintenance. The total footprint for this activity is 0.65 acre, which includes all components of construction including the permanent footprint, area of ground disturbance, and staging.

Flightline Fitness Center

This portion of the proposed project will construct a two-story physical fitness center with an adjacent parking lot on 1.58 acres. Construction will result in 2.06 acres of ground disturbance, which includes the facility footprint and associated utilities.

Fuel Transfer Line Access Road

This part of the proposed project will construct 1.27 acres of road segments for access during the wet season from the nearest existing pavement to the JP-8 fuel vaults along the fuel transfer line. Most of the road will be constructed within the airfield boundary. The proposed road segments will be 10 feet wide and will consist of geotextile fabric with a leveled 6-inch compacted gravel surface; combined, the segments will total 0.7 mile long. In two locations the proposed roads cross existing ditches and culverts will be installed to allow water flow. The proposed routes are sited to avoid wetlands as much as possible. The total footprint of this activity is 2.25 acres.

Coyote Fence Line

The proposed activity will modify 50,525 linear feet of an existing fence by adding a chain link apron where the fence is greater than 20 feet from wetlands. To minimize potential damage to wetlands, large animal dig barriers will be used where the fence is within 20 feet of wetlands. The apron will be a 3-foot-wide strip of fence attached to the base of the existing fence at a perpendicular angle and placed on top of the ground. Dig barriers come in panels of spikes (32 inches wide, 12 inches deep), which will be driven into the ground at the base of the fence.

The fence line will be accessed via paved or gravel surfaces. Fencing apron panels and dig barriers will be staged along the fence during the dry season using an off-highway vehicle or light truck with large tires prior to installation. Vehicle access will only occur during the dry season, with guidance by a qualified biologist. Fencing apron panels will be installed during the dry season and will not involve ground disturbance. Dig barrier installation will be done by hand using a mallet with little ground disturbance in the specific locations where the spikes are inserted. Weight dispersing mats will be used when vehicles cannot avoid wetland features (MM-9) to minimize soil disturbance.

Construct Additional Personally Owned Vehicle (POV) Parking

This proposed project activity will add 2.41 acres to the parking area for Building 1025 to address current and future parking needs. Development of the proposed parking area will disturb the soil to a depth of 15 inches: 9 inches of soil will be removed, and 6 inches of disturbed soil will be left in place. Parking lot material will extend to a depth of 9 inches. Construction of the proposed parking lot will result in 2.74 acres of ground disturbance. Following construction, straw wattles used for erosion control will be left in place for at least six months to minimize the risk of contamination from any asphalt paving residues leaving the site.

Road and Culverts at Doolittle Gate

Beale AFB proposes to expand Doolittle Drive between the Doolittle Gate and Hammonton-Smartsville Road by constructing new inbound and outbound lanes resulting in 0.33 acre of new impervious surface. The existing road will be repaved with a new layer of asphalt. The widened road requires replacement of one culvert with a larger diameter to increase capacity and span the width of the road; the other two culverts will be replaced in-kind. The increased size of one culvert will result in 0.089 acre of permanent loss from the drainage. A total of 5.84 acres of ground disturbance are anticipated from both the permanent footprint and temporary staging areas and equipment access during construction.

Upstream Storm Drainage, Building 1029

The existing upstream storm drainage system to the east of Doolittle Drive will be repaired and modified to reduce clogging and subsequent flooding of Building 1029. A metal trash rack will be installed at the intake of the twin 48-inch culvert pipes on the east side of Doolittle Drive and will require minor demolition associated with existing infrastructure and new concrete placement. The existing culvert headwall will be demolished and replaced with a new headwall that incorporates 8-foot wing walls, a debris pit, and protective grating to capture large debris. Localized grading up to 5 feet around the new headwall and trash rack will be required to minimize future erosion and provide positive drainage. Beale AFB will maintain the trash rack seasonally to maintain drainage. Construction will occur in the dry season between May and October when soils are dry and unable to be easily compacted. The total footprint for this activity is 0.17 acre, which includes the permanent footprint, temporary ground disturbance, staging, and equipment access.

Conservation Measures

The following conservation measures are a part of the proposed project description and will be implemented by Beale AFB and its contractors to reduce the potential for adverse effects to fairy shrimp, tadpole shrimp, and their habitat. For the purposes of this consultation, a "qualified biologist," as referenced in this document, refers to an individual who, at a minimum, holds a four-year degree in a relevant biological field and who has demonstrated knowledge and experience with fairy shrimp, tadpole shrimp, and vernal pool habitat. The qualified biologist will be authorized to stop work immediately for any proposed project activities that are not in compliance with the conservation measures. The qualified biologist will report any non-compliance issues to the Beale AFB Natural Resource Manager (NRM) within 24 hours of its occurrence, who will then confer with the Service to ensure the proper implementation of species and habitat protection measures.

General Conservation Measures (MM)

MM-1: Pre-Project Surveys - A qualified biologist will conduct pre-project surveys of all ground disturbance areas in sensitive habitats two weeks prior to the start of the project to confirm the information in this document is still correct and conditions have not changed. If any sensitive species are found during the pre-project surveys, the qualified biologist will contact the NRM who will coordinate with the Service.

MM-2: Biological Monitor - A qualified biologist will monitor construction activities in or adjacent to sensitive habitats. The contractor will notify the qualified biologist daily when work is planned via email, phone, or text. The qualified biologist will ensure compliance with these conservation measures, which are required for protected species and their habitats.

a. If protected species are found that are likely to be affected by work activities, the qualified biologist will have the authority to stop any aspect of the proposed action that could result in unauthorized take of a protected species. If the qualified biologist exercises this authority, the biologist will notify the NRM who will then contact the Service by telephone and email within one working day.

b. The qualified biologist will submit weekly reports to the NRM to monitor project impacts in relation to those anticipated and to document compliance and inspection of conservation measures and terms and conditions. A separate memo/report will be prepared and submitted to the NRM immediately should an impact occur outside of the approved project limits.

MM-3: Conservation Measure Review for Project Managers (at project kickoff) - The NRM will provide conservation measure review to contractor project managers, Beale AFB project managers, contracting officers, and key personnel during the pre-construction kickoff meeting.

Contractor project managers will acknowledge their review and understanding of conservation measures by signature. These measures will be provided to Beale AFB project managers and Beale AFB contracting officers for inclusion in all contracts.

MM-4: Environmental Awareness Training - Environmental awareness training will be provided by the qualified biologist for all construction and field personnel working on the proposed project. All personnel will participate in training before activities begin and as new workers join the proposed project activities. The program will consist of a briefing on environmental issues related to the proposed project. The training program will include an overview of the legal status, biology, distribution, habitat needs, and compliance requirements for each sensitive species that may occur in the action area. The presentation will also include a discussion of the legal protection for endangered species under the Act, including penalties for violations. A fact sheet conveying this information will be distributed to all personnel who enter the project site. Upon completion of the training, employees will sign a form stating that they attended the program and understand all conservation measures. These forms will be maintained at Beale AFB and will be accessible to the appropriate resource agencies.

MM-5: Limited Operations Period - No work will be conducted between November 1 and May 1. This includes all aspects of the proposed project.

MM-6: Rainfall - After a rain event of greater than 0.2 inch, work will occur only after the soil surface has dried sufficiently and no sooner than 12 hours after the rain ends; if a rain event exceeds 0.5 inch, work will only resume once soil conditions have dried sufficiently and not sooner than 48 hours after the rain ends. Soil is sufficiently dried when a clump of soil from the site crumbles when rolled in the palm of the hand.

MM-7: Marking of Access Routes, Work and Staging Areas, and Sensitive Areas - Prior to initiation of the proposed project, boundaries of access routes, work areas, staging areas, and sensitive areas (water features, potential habitat for sensitive species), will be clearly marked with orange construction barrier fencing (or an appropriate alternative method). The NRM will coordinate with the qualified biologist to stake and flag these boundaries, which will demarcate exclusion zones where construction activities may not occur and to indicate where to install appropriate boundary and containment materials for the project. The flagging and fencing will be clearly marked as identifying an environmentally sensitive area. The contractor will remove fencing, stakes, and flagging within 60 calendar days of project completion.

MM-8: Location of Work and Staging Area - All materials, vehicle parking and staging areas will be designated by the Beale AFB Environmental Office and located at least 50 feet away from drainages and wetland features or contained on hardscape surface. Storage of all construction material and debris will be kept to the designated storage and staging area. The number and size of staging areas and the total area of the activity will be limited to the minimum area necessary to achieve the project goal.

MM-9: Minimization of Off-Road Access Routes - Off-road access routes will be established in upland areas as much as possible, and road length will be the minimum necessary to reduce adverse effects on wetland features. Where it is necessary for access routes to go through a wetland feature, weight-dispersing mats will be placed over the wetland feature to avoid any potential effects to sensitive species and/or sensitive habitats. Off-pavement access routes will only be used if the soil is dry. Any ruts or furrows caused by operations will be raked level by hand, compacted, and restored to normal grade. Access routes will be restored as closely as possible to preconstruction contours and elevations. This will be done prior to leaving the current area of operation.

MM-10: Additional Access Routes - If a new vehicle access route is required in special status species habitat, the route will be pre-surveyed by a qualified biologist to minimize impacts to sensitive resources and will be reviewed by the NRM. If routes will be reused over multiple years, they will be assessed annually to ensure that they are clear of special-status species.

MM-11: Trenches and Holes - Any trenches or holes greater than 6 inches deep that cannot be closed by the end of the day will be covered with plywood, or other material or an egress will be provided in coordination with NRM to prevent trapping animals. Trenched areas and holes will be compacted and restored to normal grade.

MM-12: Revegetation - All upland vegetated areas disturbed by construction will be revegetated with the Beale AFB-approved native seed mix. Exposed soil must be hydro-seeded and depending on slope, covered with a biodegradable geotextile to prevent sediments from entering aquatic habitats. Any straw used for erosion control materials will be "certified weed free." Reseeded areas will be monitored and maintained by the contractor as needed until there is 70% vegetated ground cover in the seeded area.

MM-13: Suitable Material - No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic amounts of pollutants.

MM-14: Speed Limits: All vehicle operators will follow the posted speed limit on paved roads and a 15-mile-per-hour speed limit on unpaved roads. Off-road travel, if approved, will follow a 5-mile-per-hour speed limit and must be approved by NRM.

MM-15: Garbage Removal - During construction activities, all trash will be properly contained, removed from the work site daily, and disposed of properly. Following construction, all refuse and construction debris will be removed from work areas. All garbage and construction-related materials in construction areas will be removed immediately following project completion.

MM-16: Green Waste Disposal - All plant debris potentially containing reproductive parts (i.e., seeds or plant fragments for species that reproduce vegetatively) will be disposed of at an off-site landfill or green waste facility. It will be transported in a manner that prevents the spread of invasive plants to other locations. This action may require, but is not limited to, bagging the material before it is transported off-site.

MM-17: Invasive Species - A qualified biologist will monitor and ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive plants found in the action area will be removed using non-chemical methods. Specifically, equipment will be thoroughly cleaned of soil and vegetation before being delivered to the site to minimize the potential for spreading pathogens or exotic/invasive species.

Equipment will be inspected by the qualified biologist and may be rejected if the qualified biologist determines that it has not been adequately cleaned.

MM-18: Invasive Species Monitoring - The site will be added to the Annual Invasive Species Management work plan and will be surveyed and maintained with the existing weed program at Beale AFB.

MM-19: Fueling and Servicing in Designated Areas - Motor vehicles and equipment will only be fueled and serviced in designated service areas. These designated areas will be at least 100 feet from any wetland feature, drainage, sensitive habitat, or water body, and will have spill containment. Prior to the onset of work, a plan will be prepared to allow a prompt and effective response to any accidental spills. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

MM-20: Spill Plan - A Spill Prevention Control and Countermeasure Plan will be prepared prior to proposed project implementation. All machinery will be properly maintained and cleaned to prevent spills and leaks. Any spills or leaks from the equipment/vehicles will be reported and cleaned up in accordance with applicable local, state and federal regulations. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. The spill plan will be submitted to the Beale AFB Environmental Office for approval.

MM-21: Equipment Condition - Prior to use, all equipment will be cleaned to remove external oil, grease, fuels, dirt, or mud. All construction equipment and vehicles must be inspected daily, in good working condition, and showing no signs of leaks. Equipment will be left on site or inspected prior to returning to the area. All equipment will have drip pans placed where potential leaks could occur. All leaks will be repaired off-site or in a suitable location prior to resumption of construction activity.

MM-22: Fire Prevention and Suppression Plan - A fire prevention and suppression plan will be prepared prior to proposed project implementation. The fire prevention and suppression plan will be submitted to the NRM for Wildland Fire Chief approval.

MM-23: Erosion Control Systems - Site-specific erosion control measures (i.e., hay bales, silt fencing) will be installed, maintained in effective operating condition, and in place at all times during construction to protect drainage ditches, storm drains, wetlands, and water bodies from sedimentation resulting from construction activity. All wetlands, drainages, and vernal pools will have erosion control measures installed when work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction activities and the wetland. All exposed soil and other fills must be permanently stabilized at the earliest practicable date, but no later than November 1. Erosion control devices will not contain plastic netting and will be "certified weed free" to prevent the spread of invasive species.

MM-24: Dust Control - All unpaved road areas will be watered, or alternative dust control measures will be used, during project construction to prevent excessive dust from silting nearby wetlands. No chemical dust control or tackifiers will be used adjacent to vernal pools.

MM-25: Excess Soil Protection - Excess soil temporarily stored on-site during construction must be covered with geotextile stabilization blankets/tarp and wattles/gravel bags/socks to prevent exposure to the elements and to lessen chances of sedimentation due to storm water runoff and wind erosion. All remaining fill material will be removed in its entirety according to disposal requirements and the affected areas will be revegetated.

MM-26: Use of Excavated Soil on Base - If excess materials are to be used on Beale AFB after appropriate testing has been conducted, the NRM will contact the Service before hauling the materials to ensure that the disposal site will not affect any sensitive species.

MM-27: Disposal of Excavated Soil - All excess soil excavated during construction will be removed and disposed of at a landfill located off Beale AFB. If soil is contaminated, then the Beale AFB Environmental Office will coordinate with the Army Corps of Engineers and/or Sacramento Water Regional Control Board, as appropriate, prior to disposal of excavated soil.

MM-28: Upland Buffers - A 50-foot upland vegetated buffer will be established and maintained around all wetlands.

MM-29: Report Kills/Injuries - Any worker who inadvertently kills or injures a protected species, or finds one injured or trapped, will immediately report the incident to the qualified biologist. The qualified biologist will notify Beale AFB NRM who will then verbally notify the Service within three business days and will provide written notification via email of the incident within five business days.

<u>Wetland and Vernal Pool Conservation Measures (VP)</u>

VP-1: Wetland Erosion Control - All work conducted within 50 feet of a wetland feature will have construction boundaries designated with fencing to ensure no equipment will be in the vicinity of a drainage, wetland, or vernal pool. All wetlands, drainages, and vernal pools will have erosion control measures (i.e., straw wattles, hay bales, silt fencing) installed when work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction activities and the wetland feature. Soil erosion and sediment control must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

VP-2: Wetland Pre-Project Vegetation Clearing - Pre-project clearing of vegetation within 50 feet of a wetland feature will be done with hand equipment to ensure no subsurface disturbance occurs in the wetland or below 6 inches near the wetland.

VP-3: Wetland Feature Protection - Intrusive work adjacent to or within vernal pool branchiopod habitat will have protection (plastic tarps) covering the aquatic feature to ensure the soil being removed and backfilled during the excavation process does not adversely impact habitat.

VP-4: Road Surfaces and Shoulders - Projects that occur on road surfaces and along road shoulders will avoid direct impacts to wetland habitats, including roadside ditches that act as seasonal wetlands. Roadside herbicide application will avoid ditches and other potential vernal pool branchiopod habitat. Roadside mechanical or hand removal will avoid leaving biomass in ditches and other vernal pool branchiopod habitats.

VP-5: Mowing Vernal Pools - If mowing occurs in or near vernal pools, it will occur only when the soil is not saturated to ensure tracks are not left in or near wetlands. The mower height must be set to avoid the flowering heads of sensitive vernal pool plant species.

VP-6: Compensation – Beale AFB will offset the effects to vernal pool branchiopod habitat through purchase of credits from a Service-approved conservation or mitigation bank or other equivalent method subject to the Service's review and approval. The purchase will be completed prior to initiating each activity. Permanent loss of habitat will be offset by preserving existing vernal pool branchiopod habitat at a ratio of 4 acres of preservation for every 1 acre permanently lost (4:1) where effects occur within the Beale Core Recovery Area (Core Area; Service 2005) and at a ratio of 3:1 for permanent habitat loss outside of the Core Area. Habitat degradation will be offset at a ratio of 1:1. Based on the proposed project designs, a total of 2.52 acres of credits will be purchased to offset 0.42 acre of permanent habitat loss and 1.22 acres of habitat degradation.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." The proposed project is located on Beale AFB approximately 40 miles north of Sacramento, 8 miles east of Marysville and 20 miles west of Grass Valley in Yuba County, California. Proposed project activities will be conducted near the flightline, which is in the northwest portion of the base. For the proposed project, the action area encompasses 766.44 acres, which includes the 5.76 acres of permanent impacts to construct the individual activities included within the 13.71 acres of total ground disturbance that will be affected during construction, and a 250-foot-wide buffer around each activity to include potential indirect and downstream effects to the surrounding uplands.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and considering the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Status of the Species

Vernal Pool Branchiopods

For the most recent comprehensive assessment of the range-wide status of the fairy shrimp and tadpole shrimp, please refer to the *Vernal Pool Fairy Shrimp (*Branchinecta lynchi*), Vernal Pool Tadpole Shrimp (*Lepidurus packardi*), Conservancy Fairy Shrimp (*Branchinecta conservatio*) 5-Year Review: Summary and Evaluation* (Service 2024). No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on these species since the review was finalized, with loss of vernal pool habitat being the most significant effect. Urbanization and the construction of associated roads and infrastructure has contributed greatly to the loss and fragmentation of vernal pool habitat and the distribution of vernal pool obligate species such as the fairy shrimp and tadpole shrimp. The alteration and destruction of habitat disrupts the physical processes conducive to functional vernal pool ecosystems and generally poses irreversible damage to these systems. Further, vernal pool hydrology may be altered by changes to the patterns of surface and subsurface flow from runoff associated with development and infrastructure.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from federal agency activities or existing federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The proposed project area is in the northwest portion of Beale AFB near the flightline and away from the main base area. Land use in this area is centered around flightline activities. Past land use practices and grading activities associated with the original airfield and cantonment construction leveled and graded much of the characteristic vernal pool topography in those areas. Some human-made ditches have features and characteristics of seasonal wetlands and vernal pools. Other areas on Beale AFB have classic mima-mound topography that support surface flow hydrology of vernal pools. Soils in the proposed project area are primarily mapped as gravelly loams underlain with clay and duripan at depths between 20 to 40 inches (Agriculture 2025). Beale AFB conducted a soil study to determine claypan depth. Results from this study indicate a high degree of variation with an average depth greater than 47 inches (URS 2008). The primary vegetation community present within the proposed project area is grassland. This plant community is dominated by non-native annual grasses and a variety of native and non-native forbs. Native annual grasses, occurring in base pastures and roadsides, include oldfield three-awn

(*Aristida oligantha*) and Pacific fescue (*Festuca microstachys*). Native perennial bunchgrasses include purple needle grass (*Stipa pulchra*).

Vernal Pool Branchiopods

A portion of the action area is in the Beale Core Recovery Area of the Southeastern Sacramento Valley Vernal Pool Region, as described in the Recovery Plan (Service 2005). The Southeastern Sacramento Valley Vernal Pool Region contains almost 15% of the remaining vernal pool grasslands in the State of California (Keeler-Wolf et al. 1998). Vernal pools at Beale AFB occur in association with four geologic formations: Laguna, Riverbank, Modesto, and Mehrten formations (Smith and Verrill 1998). These formations are primarily located in the western two-thirds of Beale AFB. There are 1,089 wetland features equaling 159.58 acres of vernal pool branchiopod habitat within the action area.

Fairy shrimp and tadpole shrimp are known to occur in the action area. Vernal pool surveys occur annually base-wide for fairy shrimp and tadpole shrimp, generally focused in areas identified for future projects. On average 100 pools are surveyed each year including two reference pools within the Core Area on the westside of the flight line. Construction of a portion of the coyote fence barrier and expansion of Doolittle Drive will both occur within 100 feet of vernal pools known to be occupied by fairy shrimp and their cysts (eggs) (Table 2). All activities will remain at least 250 feet from vernal pools known to be occupied by tadpole shrimp, with the nearest known occurrence 295 feet from the proposed coyote fence line activities (Beale AFB 2023). Not all wetland features have been surveyed to determine if they are occupied by listed species. However, consistent with past project analyses, Beale AFB assumes that all potential habitat consisting of mapped vernal pools, swales, and ditches (collectively, wetland features) is occupied by the vernal pool branchiopods. Because the proposed project is within the range of the fairy shrimp and tadpole shrimp, suitable vernal pool habitat for the two species exists within the action area, and the species are known to occur nearby and within the action area, it is reasonably likely that the fairy shrimp and tadpole shrimp are present within the action area.

Table 2. Distance of each proposed activity to the nearest wetland feature occupied by the vernal pool branchiopods.

Activity	Nearest Vernal Pool Branchiopod Record (feet)
Fire vehicle storage	832
Fitness center	2223
Fuel transfer access roads	569
Coyote fence line barrier	10
POV parking	1322
Doolittle Road and culverts	81
Upstream storm drainage	2316

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action but are not part of the action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Most of the 159.58 acres of vernal pool branchiopod habitat within 250 feet of the proposed footprints will be avoided. A portion of three of the proposed activities will occur within the Core Area (Table 3); however, only a portion of the construction on Doolittle Road will have permanent effects within the Core Area (0.03 acre). Consistent with past analyses, wetland features more than 50 feet from proposed activities are considered avoidable if the feature is located upslope from the proposed ground disturbance or the feature is not hydrologically connected downslope and ground disturbance will not penetrate the claypan layer.

Table 3. Permanent habitat loss, habitat degradation, and proposed compensation to offset effects to vernal pool branchiopod habitat resulting from proposed activities.

Activity	Core Area	Permanent Loss (acres)	Degradation (acres)	Permanent Offset (acres)	Total Offset (acres)
Fire vehicle storage	No	0.000	0.000	0.000	0.000
Fitness center	No	0.000	0.000	0.000	0.000
Fuel transfer access roads	No	0.013	1.039	0.039	1.078
Coyote fence line barrier	Partial	0.000	0.000	0.000	0.000
POV parking	No	0.150	0.140	0.450	0.590
Doolittle Road and culverts	Partial	0.250	0.037	0.780	0.817
Upstream storm drainage	Partial	0.010	0.000	0.030	0.030
Total		**0.423**	**1.216**	**1.299**	**2.515**

Wildland Fire Vehicle Storage Facility

There are three wetland features equaling 0.87 acre of vernal pool branchiopod habitat within 250 feet of the proposed footprint. The nearest is a swale 54 feet downslope of the footprint and the other two are more than 100 feet away. No wetlands will be adversely affected by construction of this portion of the proposed project. Ground disturbance for the building foundation will not penetrate the claypan layer. The surrounding area is gently sloped (20%) and vegetated, which will protect the wetland feature from sedimentation resulting from the minor increase in impervious surface from the new facility. In addition, fencing and erosion control measures will be used during construction to further minimize movement of sediment outside of the proposed footprint (MM-7, MM-23). Disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Flightline Fitness Center

There are five ditches, a swale, and a vernal pool equaling 0.49 acre of vernal pool branchiopod habitat within 250 feet of the proposed footprint. All of the wetland features except two ditches are separated from the proposed work area by roads. These two ditches are 51 feet and 191 feet downslope of the proposed work area. Neither of them holds water long enough to support listed vernal pool branchiopods and they will not be adversely affected by construction. The nearest ditch is protected from the proposed work area by a chain-link fence, which will ensure that proposed project activities do not inadvertently enter the ditch. As with the Wildland Fire Vehicle Storage Facility, the adjacent vegetated uplands will protect the wetland features from sedimentation and fencing and erosion control measures will be used during construction to further minimize movement of sediment outside of the proposed footprint (MM-7, MM-23). Disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Fuel Transfer Line Access Road

There are 87 wetland features equaling 20.89 acres of vernal pool branchiopod habitat within 250 feet of the proposed footprints for the individual road segments, most of which will be avoided. Proposed project activities will be limited to light grading that will not penetrate the claypan layer or alter hydrology in the surrounding area. Two of the proposed access roads will cross portions of two different ditches. Overall function of hydrology and pooling in the two ditches will be maintained by installing culverts at the crossings, but there will be 0.013 acre of permanently lost ponded area. Any vernal pool branchiopod cysts located within this area will be destroyed or damaged. The remaining 0.520 acre of these features will also be affected by minor increases in sedimentation from the construction of the culverts, which has the potential to reduce the survival or reproduction of vernal pool branchiopods.

An additional eight wetland features that occupy 0.519 acre are located downslope and within 50 feet of the proposed footprint. Due to their proximity to the construction area, these may also experience minor changes in hydrology, contaminants, and sedimentation despite the use of measures to minimize erosion and sedimentation (MM-7, MM-23, VP-1). While these changes may reduce the number of cysts that hatch in the year after construction, they will not change the ability of the wetland features to hold water and support the lifecycle of the fairy shrimp or tadpole shrimp.

All other wetland features are more than 100 feet from the proposed footprints in areas that are relatively flat and vegetated and will not be affected by the proposed project. All disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Coyote Fence Line

Numerous ditches, swales, and vernal pools equaling 129.54 acres of vernal pool branchiopod habitat are within 250 feet of the fence line where the coyote barrier will be placed at the base and the fence line passes through portions of several wetland features. The placement of chain link apron panels on the surface and spiked dig barriers penetrating no more than 10 inches is anticipated to have a negligible effect on hydrology since no soil will be removed and ground disturbance will not penetrate the claypan layer. Proposed project activities are planned to occur when wetland features are dry (MM-5, VP-1); however, if soils are too hard to install dig barriers during the dry season, work will be done during the wet season under the guidance of a Service-permitted vernal pool branchiopod biologist who would direct activities within and adjacent to standing water to minimize ground disturbance and possible crushing of vernal pool branchiopods or cysts in the ponded areas. Cysts may also be damaged during placement of dig barriers during the dry season where they are placed within a wetland feature. Weight dispersing mats will be used when vehicles cannot avoid wetland features (MM-9) to minimize soil disturbance.

Construct Additional Personally Owned Vehicle (POV) Parking

Eight wetland features equaling 0.62 acre of vernal pool branchiopod habitat are within 250 feet of the proposed footprint. Two of these are ditches within 50 feet of the proposed parking area; all others are more than 50 feet away. One ditch is 29.8 feet upslope from the proposed parking and is separated by a paved road. The other ditch totals 0.15 acre and portions will be paved. The total area of the ditch is considered a permanent loss of fairy shrimp and tadpole shrimp habitat due to the lost surface area and loss of hydrological function. Any vernal pool branchiopod cysts located within this area will be destroyed or damaged. The lost surface area of the ditch along with the increased paved surface area of the proposed parking will increase flow to a hydrologically connected vernal pool located 73 feet downslope. This increased inflow may initially contain contaminants from the asphalt surface. Reduced water quality from contaminants over the first year following construction may contribute to reduced numbers of vernal pool branchiopods in the 0.14-acre pool. Erosion control measures (MM-23, VP-1) will be used during construction and left in place at least six months to minimize any contamination from the asphalt paving reaching the downslope wetland features. Disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Road and Culverts at Doolittle Gate

There are 58 wetland features equaling 5.91 acres of vernal pool branchiopod habitat within 250 feet of the proposed footprint, 23 of these are within 50 feet and downslope of the proposed road and culvert footprints. Portions of five ditches and one vernal pool will be filled to accommodate the shoulder of the expanded road resulting in permanent habitat loss of 0.25 acre and crushing or damage of cysts within this area. The vernal pool (0.03 acre) is located within the Core Area.

Six additional wetland features will be degraded by minor increases in sedimentation due to their proximity to the ground disturbance and hydrological connection to features that will be filled. This has the potential to reduce the survival or reproduction of vernal pool branchiopods. Four of these wetland features were previously mitigated for as direct effects resulting from the Anti-terrorism/Force Protection Upgrades project (Service 2004) and additional mitigation is not proposed under this project. The remaining two wetland features that will be affected, a ditch and a vernal pool, total 0.037 acre and are located 32 feet and 15.5 feet downslope of the proposed footprint. Contaminant inflow from the additional paved surface is expected to be negligible when considered along with the existing roadway. To minimize the potential for increased sedimentation and contamination, all wetland features within 100 feet of the proposed footprint will be protected with fencing and erosion control measures (MM-7, MM-23). In addition, all disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Upstream Storm Drainage, Building 1029

A ditch, a swale, and two vernal pools equaling 1.26 acres of vernal pool branchiopod habitat are within 50 feet of the proposed footprint; two other wetland features, a ditch and a swale, are within 250 feet. Repairs to the storm drain and culvert headwall will result in fill and minor loss of surface area (0.01 acre) from the swale, which is outside the Core Area. Any cysts within this area will be crushed or damaged. Adverse effects to the ditch will be avoided because it is separated from the proposed footprint by a concrete underpass and catch basin. The two vernal pools are upslope from the proposed activities; however, they are both within the access route for equipment. Ground disturbance within the vernal pools will be minimized through the use of weight dispersing mats (MM-9) and construction fencing (MM-7, VP-1). Disturbed areas will be reseeded using a native seed mix prior to removal of erosion control measures (MM-12).

Compensatory Mitigation

Construction of all portions of the proposed project will result in a total of 0.423 acre of permanent habitat loss (including 0.03 acre in the Core Area) and 1.216 acres of disturbed and degraded habitat. As noted previously in the *Description of the Proposed Action*, Beale AFB has proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the proposed project's effects on the fairy shrimp and tadpole shrimp that will result from the permanent loss of vernal pool branchiopod habitat and the minor effects of increased sedimentation and reduced water quality as described above. The proposed compensatory habitat will be in the form of 2.52 acres of vernal pool preservation credits for fairy shrimp and tadpole shrimp at a Service-approved conservation or mitigation bank. This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory land will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost from the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future non-federal actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of the fairy shrimp and tadpole shrimp, the environmental baseline for the action area, the effects of the proposed Flightline Installation Development Plan, and the cumulative effects, it is the Service's biological opinion that the Flightline Installation

Development Plan, as proposed, is not likely to jeopardize the continued existence of the fairy shrimp and tadpole shrimp. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following:

1) The fairy shrimp and tadpole shrimp habitat affected by the proposed project represents a small portion of the habitat available to these species on Beale AFB;

2) Beale AFB has included as part of the proposed project a commitment to offset the proposed project effects with the purchase of 2.52 acres of fairy shrimp and tadpole shrimp preservation credits at a Service-approved vernal pool conservation or mitigation bank that will be protected in perpetuity;

3) Proposed project activities during sensitive time periods for the fairy shrimp and tadpole shrimp will be minimized by conducting most work when wetland features are dry; and

4) All conservation and minimization measures will be implemented.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act if such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be undertaken by Beale AFB so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. Beale AFB has a continuing duty to regulate the activity covered by this incidental take statement. If Beale AFB (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Beale AFB must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 CFR §402.14(i)(3)).

Amount or Extent of Take

Vernal Pool Branchiopods

The Service anticipates that incidental take of fairy shrimp and tadpole shrimp will be difficult to detect since it is not possible to know how many cysts are in the soil of each wetland feature without a microscopic analysis. In instances in which the total number of individuals that may be taken cannot be determined, the Service may quantify take in the amount of lost, disturbed, or degraded habitat as a result of the project action. Since take is expected to result from these effects to habitat, the quantification of habitat becomes a direct surrogate for the species that will be taken. Therefore, the Service anticipates that within the action area, all cysts occupying the 0.423 acre of wetland features that will be permanently removed and the 1.216 acres that will be disturbed and degraded from increased sedimentation and contaminants may be subject to incidental take in the form of injury, mortality, and harm. In addition, the Service anticipates injury, mortality, and harm to a portion of the adult shrimps and cysts in the wetland features located on the fence line during installation of dig barriers during the dry and wet seasons. Although it is infeasible to quantify the exact number of shrimps and cysts that may be incidentally taken, the Service anticipates that the number will be relatively small compared with the total number of cysts available based on the fact that proposed project activities will avoid most wetland features and implementation of the proposed conservation measures, such as installation of construction fencing and the use of erosion control measures, will further reduce the likelihood of potential injury, mortality, and harm to fairy shrimp and tadpole shrimp.

Upon implementation of the following reasonable and prudent measure, incidental take of fairy shrimp and tadpole shrimp associated with the proposed project will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the fairy shrimp and tadpole shrimp.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the vernal pool branchiopods resulting from implementation of this proposed project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the fairy shrimp and tadpole shrimp:

1) All conservation measures, as described in the biological assessment and restated here in the *Description of the Proposed Action* section of this biological opinion, shall be fully implemented, and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, Beale AFB must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1) Beale AFB will fully implement and adhere to the proposed project description and conservation measures as a condition of any permit or contract issued for the proposed project. Beale AFB shall require that all personnel associated with this proposed project are made aware of the conservation measures and the responsibility to implement them fully.

2) In order to monitor whether the amount or extent of incidental take anticipated from implementation of the proposed project is approached or exceeded, Beale AFB shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Beale AFB must immediately reinitiate formal consultation, as per 50 CFR §402.16.

   a. For those components of the action where the amount of habitat lost or disturbed is used as a direct surrogate for incidental take of a species, Beale AFB shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction. This report shall also include any information about changes in project implementation that result in habitat disturbance not described in the *Description of the Proposed Action* and not analyzed in this biological opinion.

   b. Beale AFB shall immediately contact the Service's Sacramento Fish and Wildlife Office (SFWO) at (916) 414-6675 to report direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harm, injury, or death occurs. If the encounter occurs after normal working hours, Beale AFB shall contact the SFWO at the earliest possible opportunity the next working day.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) Beale AFB should work with the Service to assist in meeting the goals of the Recovery Plan for the fairy shrimp and the tadpole shrimp (Service 2005).

2) Beale AFB should work with the Service to implement Beale AFB's Integrated Natural Resource Management Plan (Beale AFB 2019).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the Flightline Installation Development Plan at Beale AFB. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;
2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or
4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion for the proposed Flightline Installation Development Plan, please contact Wendy Pearson (wendy_pearson@fws.gov) at (916) 414-6675 or Megan Cook (megan_cook@fws.gov) at (916) 414-6492, or at the letterhead address.

Sincerely,

AMBER AGUILERA Digitally signed by AMBER AGUILERA Date: 2025.09.15 11:12:34 -07'00'

Amber Aguilera
Acting Field Supervisor

cc:
Tamara Gallentine, Department of the Air Force, Beale Air Force Base, California

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APPENDIX B
ADDITIONAL PROJECT INFORMATION

B.1 Project Purpose and Need

Table B-1 Purpose and Need for Proposed Flightline Installation Development Plan Projects at Beale Air Force Base

Project Number[1]	Project ID and Title	Purpose	Need
1	BAEY1011908 Construct Airfield Lighting Maintenance Facility, Building 1015	Construct an 880 SF building extension to Airfield Lighting Vault (Building 1015) to replace two maintenance trailers currently being used for repair of airfield equipment and storage of spare parts.	The two maintenance trailers are beyond their service life, do not have adequate space or climate control, and do not have secondary fire/safety egress as required for personnel safety. The lighting vault also does not have fire detection or notification systems, posing a risk to both personnel and high-value equipment.
2	BAEY1073191 Construct Addition to Corrosion Control Facility, Building 1071	Construct a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by standards outlined in UFC 4-211-02, *Aircraft Corrosion Control and Paint Facilities*, and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071.	The facility currently being used for this function was not designed to support corrosion control operations and does not comply with Occupational Safety and Health Administration requirements. The existing facility is limited to painting small aircraft components; larger components must be containerized and shipped off-station for repair at a significant cost and detrimental impact to mission readiness. Workflow is currently segmented and inefficient because of the layout of the buildings, which creates a risk of contamination because personnel repeatedly travel between buildings without proper transitory stages (such as showers and decontamination areas).
3	BAEY1014475 Add/Alter Storage Building 1220	Construct an 800 SF addition to Building 1220 to increase storage space for materials and equipment. This increase would be achieved by adding a second-floor mezzanine and constructing a 20-foot extension on the south end of the building to provide approximately 3,200 SF of storage capacity.	Currently, storage space is insufficient for materials and equipment. Mobile containers are being used to provide additional storage space as a temporary solution.
4	BAEY 212014 Construct Wildland Fire Vehicle Storage Facility	Construct a 2,400 SF (60 feet wide by 40 feet long) by 20 feet high prefabricated metal building to provide protection from the elements for high-value wildland fire fighting equipment and vehicles.	High-value wildland fire fighting equipment and vehicles are currently stored outside and is being degraded by the weather.

Table B-1 Purpose and Need for Proposed Flightline Installation Development Plan Projects at Beale Air Force Base

Project Number[1]	Project ID and Title	Purpose	Need
5	BAEY1072025 Construct Flightline Fitness Center	Construct a 40,365 SF Flightline Fitness Center (80,729 SF internally) with a 28,400 SF parking lot to meet Air Force Joint Chiefs of Staff physical fitness requirements.	Flightline personnel currently commute to existing inadequate facilities at the gym in the Cantonment area. Time constraints make it difficult to meet physical training requirements.
6	BAEY192006 Multi-Use Corrosion Control Facility	Construct a 36,543 SF multi-bay corrosion control facility to allow large-scale painting at Beale AFB. The facility would include full paint capabilities, all associated mechanical and electrical systems, and support spaces to meet requirements of UFC 4-211-02 and comply with International Building Code 2018. Includes 175,000 SF of airfield paving.	Beale AFB lacks composite repair capabilities and has extremely limited corrosion control capabilities for aircraft and ground equipment. The 9 Maintenance Group is unable to accomplish large-scale KC-135, T-38, or U-2 aircraft or aerospace ground equipment painting at Beale AFB in accordance with UFC 4-211-02NF.
7	*Construct Addition to South Aircraft Parking Apron*	*Beale AFB has decided not to implement this project at this time.*	NA
8	Construct Fuel Transfer Line Access Road	Construct 0.7 miles of asphalt access road to 14 existing jet propellant 8 (JP-8) fuel pits along the fuel transfer line to allow year-round access.	The road segments are needed to allow monthly inspections (currently not conducted from November to April because of wet conditions) and to repair uneven terrain along the route, which increases the possibility of fuel-contaminated water spills. Access is required so that low points can be drained, which is required monthly. Low points currently cannot be drained at all 14 fuel pits on a monthly basis during the wet season. Fuel vaults 8, 10, 12, and 18 are located on the infield of the airfield, where the ground is saturated and unstable during the wet season.
9	BAEY10118487 Construct Coyote Fenceline	Install an apron along the bottom edge of the Flightline fence. The apron would be a 3-foot-wide strip of fence[2] attached to the outside base of the existing fence at a perpendicular angle and placed on top of the ground to avoid conflicts with vernal pools. This project is a Bird/Wildlife Aircraft Strike Hazard requirement to prevent coyotes from accessing the Flightline.	Coyotes are digging under the fence and accessing the airfield. The apron is needed to prevent coyotes from digging under the fence. Aircraft and personnel are currently at risk from coyote/aircraft collisions. A 2020 survey identified 73 locations where coyotes are able to gain access; in 2021, the number has increased to 87. These locations are shown in **Figure 2-6.**

Table B-1 Purpose and Need for Proposed Flightline Installation Development Plan Projects at Beale Air Force Base

Project Number[1]	Project ID and Title	Purpose	Need
10	Construct Additional POV Parking	Construct a 105,000 SF addition to the POV parking area for Building 1025 to provide additional spaces needed to support existing and potential future uses.	The parking area addition is needed as the size of the existing parking area is inadequate, which could hinder future growth.
11	BAEY221000 Repair Consolidated Ops/Mx, Building 1086	The project would include renovation of two areas of Building 1086 that are in better condition than others (90,123 SF) and possibly demolishing the east keeper space (39,333 SF). Also included would be new parking areas totaling 80 parking stalls (55,000 SF).	The project is needed because Building 1086 exhibits many life, health, and safety deficiencies, including unsafe areas, and is an inefficient facility.
12	BAEY211006 Replace Water Main, 18-inch Return Line, Fam Camp to WTP	Project replaces 3.2 miles of severely degraded 18-inch steel water main with 2.4 miles of 18-inch C-905 PVC from the Family Camp Area (C St/34th St) to the Water Treatment Plant. Adds cross-connect to support Flightline water requirements during construction. Project reroutes water main from environmentally sensitive habitat to an accessible utility corridor.	Replacement of the water main is needed because the existing 18-inch steel return line was originally installed in 1944 and has exceeded its useful life by 36 years. There have been six leaks in the return line since 2017, including an emergency repair in 2018 for a leak near Hutchinson Creek that impacted WOTUS. Water outages caused by this line are prolonged due to remote locations– usually lasting from 24 to 96 hours.
13	BAEY1054983 Repair Runway North and South Airfield Overrun, Facility 8280	Reconstruct runway overruns (631,814 SF) to improve their condition and prevent further deterioration.	The project is needed because the runway overruns are in a poor condition and continue to deteriorate, reducing flight safety.

Table B-1 Purpose and Need for Proposed Flightline Installation Development Plan Projects at Beale Air Force Base

Project Number[1]	Project ID and Title	Purpose	Need
14	BAEY1081611 Repair Road and Culverts at Doolittle Gate	Repair existing road and add an additional inbound lane and asphalt pullout to increase vehicle throughput capacity and safety at Doolittle Gate. Increase the size of the Reeds Creek culvert to accommodate expansion. Includes replacement of a smaller culvert north of Reeds Creek and a small culvert south of the gate. Total estimated SF is 97,139.	The project is needed because with only one in-bound lane, traffic can become congested on the high-speed Hammonton-Smartsville Road with vehicles waiting to be approved for entry into Beale AFB. This congestion creates a substantial risk for Security Forces and installation security as a whole because Security Forces are not able to adequately survey a congested road. In the event of an attack on the base, this congestion could prove to be a major security flaw. This project is required to comply with both UFC 4-010-01, *Minimum Antiterrorism Standards for Buildings*, and UFC 4-022-01, *Entry Control Facilities Access Control Points.* Additionally, the height of the Reeds Creek box culvert needs to be raised to keep Doolittle Drive above flood levels.
15	BAEY1086069 Repair Upstream Storm Drainage PSPTS, Building 1029	Construct a trash rack system on the upstream end of the twin culvert pipes that cross underneath Doolittle Drive to reduce risk of flooding downstream. Replace the existing headwall with a new headwall that incorporates wing walls, a debris pit, and protective grating to capture large debris.	The project is needed to minimize long-term maintenance from debris clogging and reduce flood risk to buildings, as has happened to the PSPTS facility, during larger rain events.
16	BAEY107357 Demolish SR-71 Shelters, Buildings 1057 and 1058	Demolish Building 1057 (9,600 SF) and Building 1058 (9,600 SF) to provide additional aircraft parking. *Project 16 would not be implemented until after consultation with the State Historic Preservation Office under Section 106 of the National Historic Preservation Act is complete.*	The project is needed to meet requirements to eliminate unneeded buildings, and because the area of aircraft load-rated concrete underneath the shelters is needed to provide crucial aircraft parking.

Notes:

[1] Corresponds to number key on Figures 2-1 through Figures 2-7. Project 7 was removed due to its potential environmental impacts.

[2] The U.S. Department of Agriculture allowed deviation from the Air Force Instruction 91-212 recommendation, Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program, of a 4-foot apron to a 3-foot apron to minimize disturbance to the vernal pool and reduce project costs.

LF = linear feet; MG = million gallon; Ops/Mx = Operations/Maintenance; POV = privately owned vehicle; PSPTS = Physiological Support Squadron; PVC = polyvinyl chloride; SF = square foot; UFC = Unified Facilities Criteria; WOTUS = waters of the U.S.

B.2 Alternatives Considered but Eliminated from Further Analysis

Project 1 – Construct Addition to Airfield Lighting Maintenance Facility, Building 1015

Constructing a separate facility away from the runway was eliminated because the Airfield Lighting Vault is linked to existing infrastructure (for example, the communication lines for the Flightline are routed there) and would therefore not meet the project-specific selection standard to be immediately adjacent to the Airfield Lighting Maintenance Facility. The runway lights or other infrastructure could be down for an extended period of time with a separate facility and therefore would not meet the project-specific standard to be immediately adjacent to Building 1015. Repairing or replacing the trailers were both eliminated because they would not resolve the safety and space concerns, and thus would not meet Universal Selection Standards 2 (Health and Safety) and 4 (Base Asset Management Principles).

Project 2 – Construct Addition to Corrosion Control Facility, Building 1071

Demolishing the existing building and constructing a new facility, either at the same site or elsewhere, was eliminated because new construction would be too time-consuming, based on Military Construction planning and funding process, which starts with submitting proposals to the Future Year Defense Program (FYDP). The FYDP is a projection of the forces, resources, and programs needed to support DoD operations over a 5-year span. Once in the FYDP, a proposed project competes for priority with proposals submitted by other Air Force installations and DoD agencies. Generally, it takes 5 to 10 years — if ever — to reach a high enough priority to be funded. Construction time is estimated at between 18 months and 3 years. Therefore, new construction would not meet Universal Selection Standard 5 (Timeframe and Feasibility). Leasing a building was eliminated because all leasing options would be off base, which would require transporting equipment for treatment to and from the facility. This transportation would substantially increase costs and time and raise security concerns and therefore would not meet Universal Selection Standard 3 (Protection and Security Compliance).

Project 3 – Add/Alter Storage Building, Building 1220

Constructing a new storage facility or implementing the Proposed Action plus adding a connecting area to Building 1214 were both eliminated. They could not be implemented within the desired 5-year timeframe based on Military Construction planning and funding process, which starts by submitting proposals to the FYDP. The FYDP is a projection of the forces, resources, and programs needed to support DoD operations over a 5-year span. Once in the FYDP, the proposed project competes for priority with proposals submitted by other Air Force installations and DoD agencies. Generally, it takes 5 to 10 years — if ever — to reach a high enough priority to be funded. Construction time is estimated at between 18 months and 3 years. Therefore, new construction would not meet Universal Selection Standard 5 (Timeframe and Feasibility).

Project 4 – Construct Wildland Fire Vehicle Storage Facility

Alternatives considered included using the existing fire station, which was dismissed because it is at capacity and would therefore not meet Standard 4 (Base Asset Management Principles) to ensure flexibility for future growth. Adding an addition to the fire station would require that the driveway to another building be rerouted through an environmentally sensitive area, and thus would not meet Universal Selection Standard 6 (Presence of Special Environmental Resources). In addition, orientation of the fire station would have to be changed because of an environmentally sensitive area near the fire station. Relocation would not be possible in the desired timeframe and therefore would not meet Universal Selection Standard 5 (Timeframe and Feasibility). Alternative locations near the fire station were dismissed based on the presence of surface waters, which would not meet Universal Selection Standard 6 (Presence of Special Environmental Resources).

Project 5 – Construct Flightline Fitness Center

Continued use of the existing Harris Fitness Center was dismissed because it is undersized if it is required to continue serving Flightline personnel in addition to the originally intended number of personnel from the remainder of the base. Moreover, it is located too far from the Flightline area to allow time-constrained Operations and Maintenance personnel to use it. It therefore does not meet Universal Selection Standards 2 (Health and Safety) and 4 (Base Asset Management Principles).

Project 6 – Construct Multi-Use Corrosion Control Facility

Addition to or alteration of existing buildings were considered but eliminated because they would not meet the project-specific selection standard to consolidate facilities with their functional areas. Two other locations were considered. Option 1 would construct new hangars in a horseshoe configuration with corrosion control at the east end, metals tech, and aerospace ground equipment. This option was eliminated because it would require demolition of several buildings or facilities to have enough room for pavement to accommodate KC-135 aircraft, and would thus not meet Universal Selection Standard 4 (Base Asset Management Principles). Option 2 is to re-use Dock 7 (Building 1242) as a joint-use asset corrosion control facility with a paint booth. This option was eliminated because the building is not large enough to accommodate the desired aircraft and would require a second corrosion control facility; it would thus not meet Universal Selection Standard 4 (Base Asset Management Principles).

Project 8 – Construct Fuel Transfer Line Access Road

Use of gravel as roadway material was considered but dismissed because it could create a Foreign Object Debris hazard on the runways, and thus would not meet Universal Selection Standard 2 (Health and Safety). Changing the location of the road was not considered because it must provide access to existing fuel vaults and would therefore not meet Universal Selection Standard 1 (Planning Constraints) and Universal Selection Standard 5 (Base Asset Management Principles), which includes the goal to minimize operational inefficiencies.

Project 9 – Construct Coyote Fenceline

Construction of a new fence line was eliminated as an alternative because the existing fence line is in good condition and is adequately fulfilling its primary purpose of enforcing Flightline security and deterring unauthorized entry. It only requires an addition to prevent coyotes from accessing the Flightline. A new fence line would not meet Universal Selection Standard 5 (Timeframe and Feasibility) because it would not be economically practicable based on the high cost of replacement.

Project 11 – Repair Consolidated Operations and Maintenance (Ops/Mx), Building 1086

One alternative considered correcting code deficiencies in the entire building; this alternative was dismissed because it would not correct inefficient space use or provide new services. In addition, space would be needed for personnel during repairs and, therefore, this alternative did not meet Universal Selection Standards 1 (Planning Constraints) and 4 (Base Asset Management Principles). Another alternative considered was replacement of Building 1086; this alternative was dismissed because it could not be implemented within the 5-year timeframe, it would consolidate unlike functions in one building, and space would be needed for personnel during construction. It, therefore, did not meet Universal Selection Standards 1 (Planning Constraints), 4 (Base Asset Management Principles), and 5 (Timeframe and Feasibility).

Project 12 – Replace Water Main, 18-inch Return Line, Fam Camp to WTP

Three alternatives were considered but eliminated. Repair by slip-lining with a new access road was dismissed because it would require constructing a new road and bridges through an environmentally sensitive area and would result in a non-standard 16-inch-diameter inner pipe. It would therefore not meet Universal Selection Standards 1 (Planning Constraints) and 6 (Presence of Special Environmental

Resources). Repair by pipe bursting and repair by open trench were both dismissed because they would require a new access road, including bridges through an environmentally sensitive area, and would therefore not meet Universal Selection Standard 6 (Presence of Special Environmental Resources). In addition, none of these alternatives would allow winter access.

Project 13 – Repair Runway North and South Airfield Overrun, Facility 8280

Constructing new runway overruns was dismissed because it could not be implemented in the 5-year timeframe based on military construction planning and funding process, which starts with submitting proposals to the FYDP. The FYDP is a projection of the forces, resources, and programs needed to support DoD operations over a 5-year span. Once in the FYDP, a proposed project competes for priority with proposals submitted by other Air Force installations and DoD agencies. Generally, it takes 5 to 10 years — if ever — to reach a high enough priority to be funded. Construction time is estimated at between 18 months and 3 years. Therefore, new construction would not meet Universal Selection Standard 5 (Timeframe and Feasibility). Different paving materials cannot be used because the overruns must comply with Unified Facilities Criteria 3-260-02, which specifies hot-mix asphalt for flexible pavement.

Project 14 – Repair Road and Culverts at Doolittle Gate

Constructing a new entry control point was dismissed because, based on military construction planning and funding process, which starts with submitting proposals to the FYDP. The FYDP is a projection of the forces, resources, and programs needed to support DoD operations over a 5-year span. Once in the FYDP, a proposed project competes for priority with proposals submitted by other Air Force installations and DoD agencies. Generally, it takes 5 to 10 years — if ever — to reach a high enough priority to be funded. Construction time is estimated at between 18 months and 3 years. Therefore, new construction would not meet Universal Selection Standard 5 (Timeframe and Feasibility). Adding an inbound lane on the opposite side of the existing road was dismissed because it would also affect Waters of the United States and require reconfiguration to existing infrastructure and would therefore not meet Universal Selection Standard 1 (Planning Constraints) and Universal Selection Standard 4 (Base Asset Management Principles).

Project 15 – Repair Upstream Storm Drainage, Physiological Support Training Squadron (PSPTS), Building 1029

Constructing an entirely new storm drain was dismissed because it would not meet Universal Selection Standard 5 (Timeframe and Feasibility).

Project 16 – Demolish SR-71 Shelters, Buildings 1057 and 1058

Retaining but not using the buildings was dismissed because the site is needed for other uses; therefore, this alternative would not meet Universal Selection Standard 4 (Base Asset Management). Re-using the buildings was dismissed because they are too narrow to accommodate the base’s primary assigned aircraft. Furthermore, reports indicate the presence of lead and asbestos that would require abatement, and the costs to maintain the buildings exceed their usefulness, as there are no other projects that could use these buildings if abatement was accomplished. For these reasons, the alternative would not meet Universal Selection Standard 4 (Base Asset Management).

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APPENDIX C
ENVIRONMENTAL PROTECTION MEASURES

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C.1 Environmental Design Criteria (EDCs)

Limited Operations Period

No work will be conducted between November 1 and May 1. This limitation includes all aspects of the proposed project. In addition, all projects must have proper erosion and management controls in place at all times. These controls include, but are not limited to:

- Wattles properly installed (staked and keyed in) around projects boundaries, slopes and drainages
- All soil, sand, and debris piles completely tarped to prevent erosion from wind and rain
- Sites hydroseeded/mulched with approved mixes at the proper seed rate
- Jute netting, geotextile, or other erosion material properly placed on slopes and other sensitive areas
- Silt fencing properly staked in and in good working order
- Excavations properly covered

If the project requires Section 7 of the Endangered Species Act (ESA) consultation, then the Avoidance and Mitigation Measures (AMMs) within the Section 7 consultation will supersede the previous EDCs. Generally speaking, most ground disturbing projects in undeveloped areas will need a consultation, because of the high numbers of vernal pools on the installation.

No earth-disturbing work will be conducted in the vicinity of suitable vernal pool species' habitat between 1 November and 1 May. Permission to work outdoors outside of the 1 November and 1 May timeframe may be granted from the Natural Resource Manager (NRM) in coordination with the U.S. Fish and Wildlife Service (USFWS), if weather continues to be fair. Work continuation depends on prevailing conditions, forecasted weather, and whether activities will damage soil or vegetative cover. The only outdoor work allowed 12 hours before or after a storm event is inspection, installation, or maintenance of erosions control Best Management Practices (BMPs). The NRM must be contacted to obtain permission to work after each storm event.

Permission to work after November 1 will not be granted once wetlands are activated (standing water present).

C.2 General Conservation Measures (CMs)

CM-1: Standard erosion control means (silt fencing, sediment traps, application of water sprays, and revegetation at disturbed areas) would be used.

CM-2: To minimize compaction, no equipment will be allowed to travel over or park on the salvaged soil stockpiles. Subsoil will be buried in the uplands adjacent to the sites or hauled to an appropriate location on Beale Air Force Base (AFB). If excess subsoils are deposited on site, the topsoil at the deposition location will be salvaged and placed over the subsoil to promote rapid recolonization of vegetation.

CM-3: Adhere to the Beale AFB Integrated Solid Waste Management Plan (ISWMP). The overall goal of the SMP is to safeguard the base populace, protect real property, and ameliorate damage to the environment (Beale AFB, 2011a). The ISWMP provides guidance and procedures to eliminate the illicit dumping of soils, comply with applicable environmental regulations, ensure proper off-site disposal of soil and solid waste, and minimize the risk of receiving a Notice of Violation through improper soil management. The ISWMP provides specific BMPs for stockpile management, solid waste management (such as vegetation, packing material, and construction/domestic wastes), wind erosion control, and preservation of existing vegetation (Beale AFB, 2011a).

CM-4: If any project site is within 50 feet of a drainage/wetland not proposed for expansion, the preconstruction clearing of vegetation would be done with hand equipment to ensure no subsurface disturbance below 6 inches occurs in or near the drainage/wetland.

CM-5: Motor vehicles and equipment will be fueled and serviced only in designated service areas. These designated areas will be at least 100 feet from any wetland feature, drainage, sensitive habitat, or water body, and will have spill containment. Before work begins, a plan will be prepared to allow a prompt and effective response to any accidental spills. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

CM-6 Marking of Access Routes, Work and Staging Areas, and Sensitive Areas: Before the proposed project is initiated, boundaries of access routes, work areas, staging areas, and sensitive areas (water features and potential habitat for sensitive species), will be clearly demarcated with orange construction barrier fencing (or an appropriate alternative method). The NRM will coordinate with the qualified biologist to stake and flag these boundaries , which will demarcate exclusion zones where construction activities may not occur and to indicate where to install appropriate boundary and containment materials for the project. The flagging and fencing will be clearly marked as identifying an environmentally sensitive area. The contractor will remove fencing, stakes, and flagging within 60 calendar days after the project is complete.

CM-7 Equipment Condition: Prior to use, all equipment will be cleaned to remove external oil, grease, fuels, dirt, or mud. All construction equipment and vehicles must be inspected daily, in good working condition, and showing no signs of leaks. Equipment will be left on site or inspected before they return to the area. All equipment will have drip pans placed where potential leaks could occur. All leaks will be repaired off site or in a suitable location before construction resumes.

CM-8 Minimization of Off-Road Access Routes: Off-road access routes will be established in upland areas as much as possible, and road length will be the minimum necessary to reduce adverse effects on wetland features. Where it is necessary for access routes to pass through a wetland feature, weight-dispersing mats will be placed over the wetland feature to avoid any potential effects to sensitive species and sensitive habitats. Off-pavement access routes will be used only if the soil is dry. Any ruts or furrows caused by operations will be raked level by hand, compacted, and restored to normal grade. Access routes will be restored as closely as possible to preconstruction contours and elevations before crews leave the current area of operation.

CM-9 Additional Access Routes: If a new vehicle access route is required in special status species habitat, the route will be pre-surveyed by a Qualified Biologist to minimize impacts to sensitive resources and will be reviewed by the NRM. If routes will be reused over multiple years, they will be assessed annually to ensure that they are clear of special-status species.

CM-10 Trenches and Holes: Any trenches or holes greater than 6 inches deep that cannot be closed by the end of the day will be covered with plywood or other material, or an egress will be provided in coordination with NRM to prevent trapping animals. Trenched areas and holes will be compacted and restored to normal grade.

CM-11 Revegetation: All upland vegetated areas disturbed by construction will be revegetated with the Beale AFB-approved native seed mix. Exposed soil must be hydro-seeded and, depending on slope, covered with a biodegradable geotextile to prevent sediments from entering aquatic habitats. Any straw used for erosion control materials will be "certified weed free." Reseeded areas will be monitored and maintained by the contractor as needed until there is 70 percent vegetated ground cover in the seeded area.

CM-12 Seed Mixes to Support Native Pollinators: Include in seed mixes annual and short-lived perennial native forb species; these seeds will bloom in the first year and provide forage for native bees. Native wildflower mixes that bloom during different times of the year and in different flower colors will be given the highest preference.

CM-13 Suitable Material: No activity may use unsuitable material (for example, trash, debris, car bodies, or asphalt). Material used for construction or discharged must be free from toxic amounts of pollutants.

CM-14 Speed Limits: All vehicle operators will follow the posted speed limit on paved roads and a 15 mile-per-hour speed limit on unpaved roads. Off-road travel, if approved, will follow a 5-mile-per-hour speed limit and must be approved by NRM.

CM-15 Pets/Firearms: No pets or nonmilitary firearms will be allowed in the project area during proposed project implementation.

CM-16 Garbage Removal: During construction activities, all trash will be properly contained, removed from the work site daily, and disposed of properly. Following construction, all refuse and construction debris will be removed from work areas. All garbage and construction-related materials in construction areas will be removed immediately following project completion. Garbage and construction and demolition (C&D) debris-related material must be disposed of separately in properly marked containers. C&D materials are tracked differently and cannot be contaminated with garbage per Department of the Air Force Manual (DAFMAN) 32-7002.

CM-17 Green Waste Disposal**:** All plant debris potentially containing reproductive parts (seeds or plant fragments for species that reproduce vegetatively) will be disposed of at an off-site landfill or green waste facility. It will be transported in a manner that prevents the spread of invasive plants to other locations. This action may require, but is not limited to, bagging the material before it is transported off site.

CM-18 Invasive Species: A Qualified Biologist will monitor and ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive plants found in the action area will be removed using non-chemical methods. Specifically, equipment will be thoroughly cleaned of soil and vegetation before it is delivered to the site to minimize the potential for spreading pathogens or exotic/invasive species. Equipment will be inspected by the Qualified Biologist and may be rejected if the Qualified Biologist determines that it is has not been adequately cleaned.

CM-19 Invasive Species Monitoring: The project construction sites will be added to the Annual Invasive Species Management work plan and will be surveyed and maintained with the existing weed program at Beale AFB.

CM-20 Fueling and Servicing in Designated Areas: Motor vehicles and equipment will be fueled and serviced only in designated service areas. These designated areas will be at least 100 feet from any wetland feature, drainage, sensitive habitat, or water body, and will have spill containment. Before work begins, a plan will be prepared to allow a prompt and effective response to any accidental spills. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

CM-21 Spill Plan: A Spill Prevention Control and Countermeasure Plan will be prepared before the project is implemented. All machinery will be properly maintained and cleaned to prevent spills and leaks. Any spills or leaks from the equipment/vehicles will be reported and cleaned up in accordance with applicable local, state, and federal regulations. Workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur. The spill plan will be submitted to the Beale AFB Environmental Office for approval.

CM-22 Equipment Condition: Before it is used, all equipment will be cleaned to remove external oil, grease, fuels, dirt, or mud. All construction equipment and vehicles must be inspected daily, in good working condition, and showing no signs of leaks. Equipment will be left on site, or inspected before it returns to the area. All equipment will have drip pans placed where potential leaks could occur. All leaks will be repaired off site or in a suitable location before construction resumes.

CM-23 Fire Prevention and Suppression Plan: A fire prevention and suppression plan will be prepared before the proposed project is implemented. The fire prevention and suppression plan must be submitted to the Beale AFB NRM for Wildland Fire Chief approval.

CM-24 Erosion Control Systems: Site-specific erosion control measures (such as hay bales and silt fencing) will be installed, maintained in effective operating condition, and in place at all times during construction to protect drainage ditches, storm drains, wetlands and water bodies from sedimentation resulting from construction. Erosion control measures will be installed at all wetlands, drainages, and vernal pools when work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction and the wetland. All exposed soil and other fills must be permanently stabilized at the earliest practicable date, but no later than 1 November. Erosion control devices will not contain plastic netting and will be "certified weed free" to prevent the spread of invasive species.

CM-25 Dust Control: All unpaved road areas will be watered, or alternative dust control measures will be used, during project construction to prevent excessive dust from silting nearby vernal pools. No chemical dust control or tackifiers will be used adjacent to vernal pools.

CM-26 Excess Soil Protection: Excess soil temporarily stored on site during construction must be covered with geotextile stabilization blankets or tarp and wattles, gravel bags, or socks to prevent exposure to the elements and to lessen chances of sedimentation caused by storm water runoff and wind erosion. All remaining fill material will be removed in its entirety according to disposal requirements, and the affected areas will be revegetated.

CM-27 Use of Excavated Soil on Base: If excess materials are to be used at Beale AFB after appropriate testing has been conducted, the NRM will contact USFWS before hauling the materials to ensure that the disposal site will not affect any sensitive species.

CM-28 Disposal of Excavated Soil: All excess soil excavated during construction will be removed and disposed of at a landfill located off Beale AFB. If soil is contaminated, then the Beale AFB Environmental Office will coordinate with the U.S. Army Corps of Engineers or Sacramento Water Regional Control Board, as appropriate, prior to disposal of excavated soil.

CM-29 Upland Buffers: A 50-foot upland vegetated buffer will be established and maintained around all wetlands.

CM-30 Report Kills/Injuries: Any worker who inadvertently kills or injures a protected species, or finds one injured or trapped, will immediately report the incident to the biological monitor. The Qualified Biologist will notify the Beale AFB NRM, who will then verbally notify USFWS within 3 business days and will provide written notification via email of the incident within 5 business days.

CM-31 Trenching Controls: In unimproved areas, the top 6 to 12 inches of the trench or hole will be backfilled with topsoil from the trench.

CM-32 Pesticides: If Air Force-approved pesticides (herbicides or insecticides) are used at the project site, they may only be applied by a DoD or California certified/licensed applicator. Any pesticide usage must be reported to the 9 CES/CEOIE Pest Management section for record keeping.

CM-33 Temporary Fills: Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated as appropriate.

CM-34 Riprap: The placement of riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure.

CM-35 Fills within 100-year Floodplains: The activity must comply with applicable Federal Emergency Management Agency -approved state or local floodplain management requirements.

CM-36 Hazardous Materials Storage: Hazardous materials storage and equipment staging and storage would occur at least 150 feet away from sensitive habitats.

CM- 37 Environmental Remediation Program (ERP) Sites: Current site-specific information about contamination, underground storage tank sites, and ERP infrastructure on and around each project site would be obtained before construction or demolition. Project planning would include protection of ERP infrastructure such as monitoring wells, treatment systems, and conveyance pipes to avoid disruption of cleanup activities. Implementation of BMPs would reduce the potential for an accidental release of hazardous and petroleum wastes.

CM-38 Contamination: During digging operations, if unknown contamination is discovered or unearthed, the construction contractor would immediately stop work, contact the appropriate installation personnel, and implement the appropriate safety measures. Sampling and analysis would be conducted, as necessary, and construction would not resume until the concern is investigated and resolved. Any soils determined to be contaminated or hazardous would be managed or disposed of in accordance with applicable federal, state, and local laws and regulations and the Beale AFB Soils Management Plan.

CM-39 Storm Drainage: Every effort would be made to preserve or restore the pre-project local hydrology to minimize the adverse impacts of increased storm water volume or velocity. These measures include realigning existing swales and drainage ditches, minimizing impervious and compacted surfaces, landscaping, and creating new drainage features to mitigate storm water flow.

CM-40 Noise: Measures to minimize noise would include limiting operation of heavy equipment and noisy operations during daylight hours when possible, ensuring noise muffling devices are installed on equipment, locating staging areas as far from noise sensitive areas as possible, and limiting the unnecessary idling of equipment.

CM-41 Conservation Measure Review for Project Managers (at project kickoff): Beale AFB NRM will provide Conservation Measure review to contractor project managers, Beale AFB project managers, the contracting officer, and key personnel during a pre-construction kickoff meeting. Contractor project managers will acknowledge review and understanding of conservation measures by signature. These measures will be provided to Beale AFB project managers and contracting officers for inclusion in all contracts.

CM-42 Environmental Awareness Training: Environmental awareness training will be provided for all construction/field personnel working on the proposed project by the Qualified Biologist/monitor. All personnel will participate in training before activities begin and as new workers join the proposed project. The program will consist of a briefing on environmental issues related to the proposed project. The training program will include an overview of the legal status, biology, distribution, habitat needs, and compliance requirements for each sensitive species that may occur in the action area. The presentation will also include a discussion of the legal protection for endangered species under the ESA, including penalties for violations. A fact sheet conveying this information will be distributed to all personnel who enter the project site. When the orientation has been completed, employees will sign a form stating that they attended the program and understand all Conservation Measures. These forms will be maintained at Beale AFB and will be accessible to the appropriate resource agencies.

CM-43 Location of Work and Staging Area: All materials, vehicle parking, and staging areas must be designated by the Beale Environmental Office and located at least 50 feet away from drainages and wetland features, or contained on hardscape surface. Storage of all construction material/debris will be kept to the designated storage/staging area. The number and size of staging areas and the total area of the activity will be limited to the minimum area necessary to achieve the project goal.

C.3 Wetland and Vernal Pool Conservation Measures (WCM)

WCM-1 Wetland Limited Operations Period: No work will be conducted within 100 feet of streams or wetland features between 1 November and 1 May, unless specifically approved by the Beale AFB NRM and the USFWS. Permission to work will not be granted once wetlands are activated (standing water is present).

WCM-2 Wetland Erosion Control: Construction boundaries around all work conducted within 50 feet of a wetland feature must be designated with fencing to ensure no equipment will be in the vicinity of a drainage, wetland, or vernal pool. Erosion control measures (straw wattles, hay bales, or silt fencing) will be installed at all wetlands, drainages, and vernal pools work is within 50 feet of a wetland feature or where hydrological continuity exists between the construction and the wetland feature. Soil erosion and sediment control must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

WCM-3 Wetland Pre-Project Vegetation Clearing: If the project site is within 50 feet of a wetland feature, the pre-project clearing of vegetation will be done with hand equipment to ensure no subsurface disturbance occurs in the wetland or below 6 inches near the wetland.

WCM-4 Topsoil Stockpile: For intrusive actions/investigations in branchiopod habitat, the topsoil to a depth of approximately 1 inch will be saved and set aside or containerized to be returned to the excavated site to minimize the number of vernal pool crustacean cysts damaged. All material below the topsoil that is excavated will be removed from the habitat feature and retained or containerized. Once work is completed, holes will be backfilled with the same soil to the original grade and compacted once removal is complete. These locations will not be seeded. Stockpiled soils will be covered and surrounded by straw wattles at all times.

WCM-5 Wetland Feature Protection: Protection (plastic tarps) will cover the aquatic feature for intrusive work adjacent to or within vernal pool branchiopod habitat to ensure the soil being removed and backfilled during the excavation process does not adversely impact habitat.

WCM-6 Road Surfaces and Shoulders: Projects that occur on road surfaces and along road shoulders will avoid direct impacts to wetland habitats, including roadside ditches that act as seasonal wetlands. Roadside herbicide application will avoid ditches and other potential vernal pool brachiopod habitat. Roadside mechanical or hand removal will avoid leaving biomass in ditches and other vernal pool branchiopod habitats.

WCM-7 Rainfall: After a rain event of greater than 0.2 inches work will occur only after the soil surface has dried sufficiently and no sooner than 12 hours after the rain ends; if a rain event exceeds 0.5 inches, work will resume only once soil conditions have dried sufficiently and not sooner than 48 hours.

VP-2: Mowing in and around vernal pool habitat after seed set but during the dry season (May 1 to October 15) is considered a beneficial effect. Mowing conducted earlier in the season may be desirable to maintain appropriate conditions for vernal pool species. If mowing occurs in or near vernal pools, it will occur only when the soil is not saturated to ensure tracks are not left in or near wetlands. The mower height will be set to avoid the flowering heads of sensitive vernal pool plant species.

VP-3: Projects that occur on road surfaces and along road shoulders will avoid direct impacts on wetland habitats, including roadside ditches that act as seasonal wetlands. Roadside herbicide application, which requires CEIE approval annually, will avoid ditches and other potential fairy shrimp and tadpole shrimp habitat. Roadside mechanical or hand removal will avoid leaving biomass in ditches or other fairy shrimp and tadpole shrimp habitat.

VP-4: If access routes crossing vernal pool habitats cannot be avoided, ground protection mats will be used to disperse the weight of vehicles and equipment so as to not harm any existing cysts. These can be used in both dry and wet seasons.

VP-5: Mowing Vernal Pools: If mowing occurs in or near vernal pools, it will occur only when the soil is not saturated to ensure tracks are not left in or near wetlands. The mower height must be set to avoid the flowering heads of sensitive vernal pool plant species.

VP-6: Compensation: Beale AFB will offset the effects to vernal pool branchiopod habitat through purchase of credits from a USFWS-approved conservation or mitigation bank or other equivalent method subject to USFWS review and approval. The purchase will be completed before each activity is initiated. Permanent loss of habitat will be offset by preserving existing vernal pool branchiopod habitat at a ratio of 4 acres of preservation for every 1 acre permanently lost (4:1) where effects occur within the Beale Core Recovery Area (Core Area; USFWS 2005) and at a ratio of 3:1 for permanent habitat loss outside of the Core Area. Habitat degradation will be offset at a ratio of 1:1. Based on the proposed project designs, a total of 2.52 acres of credits will be purchased to offset 0.42 acres of permanent habitat loss and 1.22 acres of habitat degradation.

VP-7: A USFWS-approved Biologist will conduct environmental awareness training for construction crews before and during project implementation. The education program will briefly cover threatened and endangered species and their habitats that might be encountered during construction or be within close proximity of the Action Area. Awareness training will cover all restrictions and guidelines that must be implemented by construction/project crews to avoid or minimize impacts on threatened and endangered species and their habitat. Environmental awareness training will be conducted before the project begins, when crews are about to enter potentially sensitive areas, and when new personnel join the project.

VP-8: Dust control measures will be utilized during project construction to prevent excessive dust from silting nearby vernal pools. The type of dust control measure used will take into account potential to impact proximal vernal pool landscape and thus will not impact nearby pools.

VP-9: If herbicide spraying is required within and near vernal pool species' habitat, only herbicide without toxic surfactants, approved for use in aquatic environments, will be used, and approval will be obtained from CEIE.

VP-10: All equipment used in projects requiring access to sites within vernal pool species' habitat will be staged outside of vernal pool habitat and will be on paved or gravel surfaces wherever possible. If paved or gravel surfaces are not available, construction mats and or drip pans will be placed under vehicles to minimize impacts. To further minimize adverse effects, the following measures will be implemented at these project sites near vernal pools:

a. No work will occur within vernal pool habitat when water is present.
b. Ground disturbances, such as trenching, and permanent disturbances, such as pole installation, will avoid hydrologically connected areas.
c. As necessary, a USFWS-approved biologist will be present during access and project work within vernal pool habitat to monitor activities.

d. For projects adjacent to (within 10 meters) vernal pool species' habitat or hydrologically connected to the habitat, silt fencing or other appropriate BMPs to prevent siltation must be implemented prior to work within that area. A USFWS-approved biologist will flag areas where silt fencing or BMPs must be implemented. BMPs may include sandbags and weed-free straw bales or straw wattles.
e. Spill containment kits will be present at all sites where petroleum-fueled equipment is used.

VP-11: If project activities encroach within the perimeter of a pool, the following measures will be implemented:

a. Protective mats should be used as a first resort. If this is not possible, equipment with pneumatic tires should be used over tracked equipment.
b. Non-wetlands present within adjacent habitat will be used as an equipment-parking platform. Alternatively, ground protection mats, boards, or plates will be used to distribute the weight of construction equipment for access. Drip pans will also be placed under vehicles parked on non-wetland vegetation.
c. Project will be implemented during the dry season only when the pool is dry.

VP-12: A Qualified Biologist will conduct pre-project surveys of all ground disturbance areas in sensitive habitats 2 weeks prior to the start of the project to confirm the information in this document is still correct and conditions have not changed. If any sensitive species are found during the pre-project surveys, the Qualified Biologist will contact the Beale AFB NRM, who will coordinate with USFWS. No project activities will begin until proponents have received written approval from USFWS that the biologist is qualified to conduct the work.

VP-13: Biological Monitor: A Qualified Biologist will monitor construction in or adjacent to sensitive habitats. The contractor will notify daily when work is planned via e-mail, phone, or text. The biological monitor will ensure compliance with these conservation measures, required for protected species and their habitats. If protected species are found that are likely to be affected by work, the Qualified Biologist will have the authority to stop any aspect of the proposed action that could result in unauthorized take of a protected species. If the Qualified Biologist exercises this authority, the biologist will notify the Beale AFB NRM, who will then contact USFWS by telephone and e-mail within 1 working day.

VP-14: A USFWS-approved biologist will flag vernal pool species habitat and a reasonable buffer to be avoided. The area will be protected by placing construction fencing or other appropriate protective fencing around the pools, including a buffer. Fencing will be used in locations where project equipment or personnel will be situated adjacent to or in the near vicinity of suitable vernal pool species habitat.

C.4 Monarch Butterfly

The following conservation measures are in accordance with the Monarch Conservation on Department of Defense Lands in the West: Best Management Practices-2021 (McKnight et al., 2021).

Where surveys for milkweed have not been conducted, either pre-project surveys or during-project surveys will identify milkweed stands. Additionally, if milkweeds are identified within the project area, surveys for adult and larval monarchs will be conducted both before and after the project. All projects that occur within 100 feet of milkweed plants or 250 feet from occupied habitat (roosting and breeding sites) will implement the following measures to avoid or minimize disturbances and adverse effects to the species.

AMM 33: No herbicides or pre-emergents will be used.

AMM 34: All individuals conducting weed and vegetation control within the buffer area (100 or 250 feet as defined above) will receive training on identification of milkweed plants and a description of both adult and larval monarchs to identify and avoid milkweed and monarchs during all activities.

AMM 35: Milkweed numbers and species would be assessed in project areas where impacts on milkweed may occur through activities such as ATV access.

- The impacts of milkweed removal in known monarch breeding areas would be minimized by planting equivalent milkweed species at a 3:1 ratio. The impacts of milkweed removal in habitat not known to be used by monarchs will be minimized by planting milkweed at a 2:1 ratio.
- All newly planted milkweed will be regionally native and preferably of the same species removed. Milkweed species selection and replanting location will be at the discretion of the NRM.

AMM 36: A 2-foot buffer would be maintained around extant milkweed plants during off-road vehicle access, restoration and habitat enhancement planting, and other ground-disturbing activities to protect breeding habitat.

AMM 37: Within occupied habitat, willows, and other trees suitable for roosting that are known to be or with potential to be used as roosting sites, will be preserved.

AMM 38: No trimming of trees used by monarchs as roosting sites will occur during the active season (15 March through 31 October).

AMM 39: Any areas within 250 feet of known monarch breeding habitat requiring reseeding will include species beneficial to monarchs, including native milkweed. All seed mixes must be approved by the NRM.

AMM 40: Mowing projects during the summer will be conducted during the morning to avoid injuring resting monarchs.

AMM 41: Generally, mowing will not be conducted within 100 feet of areas with suitable monarch habitat during the active season (15 March through 31 October).

- If mowing must be conducted (for habitat restoration projects benefiting Monarchs or other listed species) and vehicle access must be allowed, all milkweed plants would be identified and avoided.

AMM 42: Conservation measures will be adjusted if additional guidelines are released by the USFWS, and the USFWS will be notified at that time.

C.5 Valley Elderberry Longhorn Beetle

VELB-1: A qualified biologist will provide training for all contractors, work crews, and any on-site personnel on the status of the beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.

VELB-2: All activities that occur within 165 feet of an elderberry shrub will be conducted outside of the beetle emergence period (so that activities will not occur between March and July).

VELB-3: Pre- and post-project surveys will be conducted to record habitat conditions before the start of the project and after the project is complete for tracking purposes. These surveys may include photos or species surveys and will be used to better manage the species.

C.6 Cultural Conservation Measures (CCMs)

CCM-1 Cultural Resources Awareness Training: All construction personnel would receive cultural resources awareness training by the Beale AFB Environmental Office regarding the appropriate work practices necessary to protect cultural resources before they start work. Training would be provided at the start of the construction project and before any new workers arrive on the project. This training would address federal, state, and local laws regarding cultural resources; the importance of these resources and the purpose and necessity of protecting them; and the appropriate methods for reporting and protecting inadvertently discovered cultural resources. After the orientation is complete, employees would sign a form stating that they attended the program and understand all mitigation measures. These forms would be filed at Beale AFB offices and would be accessible to the appropriate resource agencies. It is the construction contractor's responsibility to seek training from the Beale AFB Environmental Office for personnel as they join the project.

CCM-2 Inadvertent Discovery of Archaeological and Tribal Cultural Resources: In the event that human remains, artifacts, or other archaeological materials or suspected Tribal Cultural Resources are discovered during the course of any action or activity associated with the project, all ground-disturbing activity at the point of discovery, and within a 100-foot exclusionary area, must be halted, and the Beale AFB Cultural Resource Manager (CRM) notified. Any inadvertent discovery would be initially assumed potentially eligible for the National Register of Historic Places (NRHP) and afforded appropriate protection until it is determined otherwise. The Beale AFB CRM would notify the Beale AFB Wing Commander, the State Historic Preservation Office (SHPO), and the consulting tribal partners, if discovery is a suspected Tribal Cultural Resource. In the case of a suspected Tribal Cultural Resource, a tribal representative of the consulting tribal partners is invited to determine if the find is a Tribal Cultural Resource and make recommendations regarding treatment. Treatment measures determined to be necessary and feasible by the Beale AFB CRM would be implemented. If the find proves to be human remains, additional legal responsibilities are instituted and the appropriate county coroner and Beale AFB Wing Commander would be notified by the Beale AFB CRM (Beale AFB, 2020b: SOP 7.4). If the county coroner identifies the remains as Native American, they are required to notify the California Native American Heritage Commission (NAHC) within 24 hours in accordance with California Health & Safety Code 7050.5(c). The NAHC would then identify the most likely descendants.

C.7 Air Quality Conservation Measures

The following air quality mitigation measures would need to be implemented under all of the action alternatives to avoid or minimize the effects of the proposed project activities.

FRAQMD Regulation III, Rule 3.0, Visible Emissions: Construction equipment exhaust emissions must meet the visible emission limitation of 40 percent opacity or Ringelmann 2.0.

FRAQMD Regulation III, Rule 3.16, Fugitive Dust Emissions: Every reasonable precaution is required to be taken so that emissions of fugitive dust will not become airborne beyond the property line where the emission originates, from any construction, handling, or storage activity, or any wrecking, excavation, grading, clearing of land, or solid waste disposal operation. Reasonable precautions include use of water or chemicals for control of dust in demolition of existing buildings or structures, construction operations, construction of roadways, or clearing of land; application of asphalt, oil, water, or suitable chemicals on dirt roads, material stockpiles, and other surfaces that can give rise to airborne dust; and other approved measures. In addition, fugitive dust-control measures as specified by the Feather River Air Quality Management District (FRAQMD) in Indirect Source Review Guidelines: A Technical Guide to Assess the Air Quality Impact of Land Use Projects under the California Environmental Quality Act (FRAQMD, 2010) must be reviewed and followed, as applicable.

Title 13, California Code of Regulations (CCR), Section 2485, Idling Emissions: Diesel-fuel commercial vehicle subject to this requirement may not idle for more than 5 consecutive minutes at any location. This requirement applies to commercial vehicles greater than 10,000 pounds in gross vehicle weight ratings. In addition, FRAQMD requires that construction equipment that operates on site must be properly tuned and maintained prior to and for the duration of the operation.

California Air Resources Board (CARB) - Portable Equipment Registration Program: Any portable engines and any portable engine-driven equipment used at the project worksite, such as portable diesel generators, may need to be registered under the CARB Statewide Portable Equipment Registration Program to operate the equipment without having to obtain individual permits from local air districts.

C.8 Project-Specific Conservation Measures (PCMs)

C.8.1 For Projects 9, 12, and 14

PCM-1 In-Stream/Waterway Erosion Protection: Site-specific effective erosion control measures would be installed, maintained in effective operating condition, and in place at all times during construction. Construction would not start until all temporary control devices (such as straw bales with sterile, weed-free straw, silt fences) are in place downslope or downstream of project site within the riparian area. The devices would be properly installed at all locations where the likelihood of sediment input exists. These devices would be in place during and after construction for minimizing fine sediment and sediment/water slurry input to flowing water and detaining sediment-laden water on site. If continued erosion is likely to occur after construction is complete, then appropriate erosion prevention measures would be implemented and maintained until erosion has subsided. Erosion control devices would not contain plastic netting and would be “certified weed free” to prevent the spread of invasive species. The contractor/applicant to the Program is required to inspect, maintain, or repair all erosion control devices prior to and after any storm event, at 24-hour intervals during extended storm events, and a minimum of every 2 weeks until all erosion control measures have been completed.

PCM-2 Seasonal Channels: If a stream channel is seasonally dry between June 15 and October 31, construction will occur only during this dry period. Debris, soil, silt, excessive bark, rubbish, creosote-treated wood, raw cement/concrete, or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life, resulting from project related activities, must be prevented from contaminating the soil or entering Waters of the United States. Any of these materials, placed within or where they may enter a stream or lake, by the applicant or any party working under contract, or with permission of the applicant, must be removed immediately. During project activities, all trash will be properly contained, removed from the work site, and disposed of daily. Where feasible, construction must occur from the bank, or on a temporary pad underlain with filter fabric. Erosion control measures (such as straw waddles or silt fencing) will be installed where work is within 25 feet of a drainage. A Qualified Biologist will determine if the type of erosion control measures to be utilized, weighing the potential for impacts to other species.

PCM-3 In-Stream Work Restrictions: All in-stream work, such as culvert replacement or installation, bank re-contouring, or placement of bank protection below the high-water line, will be conducted during no-flow or low-flow conditions and in a manner to avoid impacts to water flow, and will be restricted to the minimum area necessary for completing the work.

PCM-4 Equipment Contamination: All equipment used below the ordinary high-water mark will be free of exterior contamination.

C.8.2 For Project 12 - Replace Water Main, Fam Camp to WTP

PCM-5 Trenchless Installation: During installation of the water distribution line (Project 12), trenchless installation must be used below major road crossings, creek crossings, and designated environmental areas. Open trench installation can be used in all other locations.

PCM-6 Disposal of Materials: If hazardous materials exist, they must be disposed of appropriately. Recyclable materials, such as concrete, asphalt, wood, glass, and other C&D debris-type materials, must be recycled off base at an appropriate recycling facility. Scrap metal resulting from C&D operations must be recycled through Beale AFB's Qualified Recycling Program.

C.8.3 For Project 16 - Demolish SR-71 Shelters, Buildings 1057 and 1058

PCM-6 Disposal of Materials: If hazardous materials exist, they must be disposed of appropriately. All scrap metal will be recycled through the use of Beale AFB's Qualified Recycling Program to minimize the impact on local landfills whenever possible All other recyclable materials, such as concrete, asphalt, plastic, cardboard, and glass, will be recycled off base. All other non-recyclable construction waste will be disposed of off base.

PCM-7 Toxic Substances: Prior to renovation and construction, inspections for toxic substances including ACM, LBP, and PCBs would take place, if inspection information is not already available. If toxic substances are encountered, abatement or removal in accordance with Air Force procedures and regulations would occur.

C.9 References

Beale Air Force Base (AFB). 2011a. Soils Management Plan, Beale AFB, CA.

Beale AFB. 2020b. U.S. Air Force Integrated Cultural Resources Management Plan.

Feather River Air Quality Management District (FRAQMD). 2010. FRAQMD Indirect Source Review Guidelines: A Technical Guide to Assess the Air Quality Impact of Land Use Projects under the California Environmental Quality Act. 7 June 2010. <<FINAL+version+ISR+Amendments.pdf (fraqmd.org)>>. Accessed August 22, 2022.

McKnight, S. Pelton, E., Fallon, C. Code, A., Hopwood, J. Hoyle, S. Jepsen, S. Black. S.H., Crone, E., and C. Schultz. 2021. Monarch Conservation on Department of Defense Lands in the West; Best Management Practices. Project: NR 19-001. May 2021.2021.

APPENDIX D
MITIGATION AND MONITORING PLAN

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D.1 Wetlands

Mitigation is required for impacts of the project on surface waters because there is no practicable alternative for the Beale Air Force Base (AFB) Flightline Installation Development Plan projects. The project cannot avoid directly impacting surface waters because several projects are located within existing surface waters. As part of the U.S. Army Corps of Engineers permitting process, compensatory mitigation would be provided for the unavoidable loss of jurisdictional surface waters to ensure the project would not result in a net loss of surface waters. Mitigation would be in the form of a purchase of credits from an off-site mitigation bank at a minimum of a 1:1 ratio.

D.2 Federally Listed Species

As described in the project Biological Opinion **(Appendix A.6)**, Beale AFB will offset the effects to vernal pool branchiopod habitat through purchase of credits from a U.S. Fish and Wildlife Service (USFWS)-approved conservation or mitigation bank or other equivalent method subject to the USFWS's review and approval. The purchase will be completed before each activity is initiated. Permanent loss of habitat will be offset by preserving existing vernal pool branchiopod habitat at a ratio of 4 acres of preservation for every 1 acre permanently lost (4:1) where effects occur within the Beale Core Recovery Area and at a ratio of 3:1 for permanent habitat loss outside of the Core Area. Habitat degradation will be offset at a ratio of 1:1. Based on the proposed project designs, a total of 2.52 acres of credits will be purchased to offset 0.42 acre of permanent habitat loss and 1.22 acres of habitat degradation. **Table D-1** summarizes this compensation by project.

Table D-1 Summary of Impacts on Potential Branchipod Habitat and Proposed Compensation

Project	In BCRA?	Direct Permanent Impacts on Suitable Habitat (acres)	Proposed Compensation for Direct Permanent Impacts Preservation at 4:1 (if in BCRA) or 3:1 ratio if not	Indirect Impacts on Suitable Habitat (acres)	Proposed Compensation for Indirect Impacts Preservation at 1:1 ratio	Total Proposed Compensation
Project 8 – Construct Fuel Transfer Line Access Road[1]	No	0.013 (outside BCRA)	0.013 x 3 = 0.04 (outside BCRA)	1.04	1.04	1.07
Project 10 – Add POV Parking[1]	No	0.15 (outside BCRA)	0.15 x 3 = 0.45 (outside BCRA)	0.14	0.14	0.59
Project 14 – Repair Road and Culvert at Doolittle Gate	Partly	0.03 (inside BCRA[2]) 0.22 (outside BCRA) 0.25 total	0.03 x 4 = 0.12 (*inside BCRA) 0.22 x 3 = 0.66 (outside BCRA) 0.78 total	0.04	0.04	0.82
Project 15 – Repair Storm Drainage, B1029[1]	No	0.10 (outside BCRA)	0.01 x 3 = 0.03 (outside BCRA)	0	0	0.03
		0.423	**1.299**	**1.212**	**1.212**	**2.511**

Notes:
[1] While alternatives to projects 8, 10, and 15 were analyzed, this table includes only the impact acreages for the proposed action.
[2] VP3662 is within Beale Core Recovery Area

APPENDIX E
REASONABLY FORESEEABLE FUTURE ACTIONS AT BEALE AFB

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Table E-1 Reasonably Foreseeable Future Actions at Beale AFB

Scheduled Project	Implementation Date	Relevance to Proposed Action	Interaction with Resources and EA Section
Flood Control Measures	2026-2028	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Water Resources 3.5, Geological Resources 2.6, Wetlands 3.7, Biological 3.8, Cultural 3.9, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Habitat Restoration for the Tricolored Blackbird – Phase I	2025-2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Water Resources 3.5, Geological Resources 2.6, Wetlands 3.7, Biological 3.8, Cultural 3.9, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Repair Vassar Lake Spillway	2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Water Resources 3.5, Geological Resources 2.6, Wetlands 3.7, Biological 3.8, Cultural 3.9, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Demolish Hospital Pond Dam and Broskey Dam	2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Water Resources 3.5, Geological Resources 2.6, Wetlands 3.7, Biological 3.8, Cultural 3.9, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Expand A Street treated wastewater storage pond	TBD	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Water Resources 3.5, Geological Resources 2.6, Wetlands 3.7, Biological 3.8, Cultural 3.9, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Remove island in Pond 4 to increase capacity	2026	Potential construction timing overlap with proposed action.	Geological 3.6, Wetlands 3.7, Biological 3.8, and Infrastructure 3.10
Construct 60 kilovolt circuit from Grass Valley substation to east switch yard	2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Biological 3.8, Wetlands 3.7, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.

Table E-1 Reasonably Foreseeable Future Actions at Beale AFB

Scheduled Project	Implementation Date	Relevance to Proposed Action	Interaction with Resources and EA Section
Repair 12 kilovolt to Gold Country Inn; Facilities 24110, 24114, 24109, 24112; plus 5 pad transformers	2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.6, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Demolish Building 355	2026	Potential construction timing overlap with proposed action.	Infrastructure 3.10 and Hazardous Materials and Waste 3.11.
Construct asphalt pads for Security Forces at Schneider entry gate	TBD	Same area as Project 14	Noise 3.3, Air Quality 3.4, Geological 3.6, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Construct Intelligence Surveillance and Reconnaissance Campus parking lot	2027	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.6, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Repair Hutchinson Creek	2026-2027	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.6, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Construct Installation Resilience Operations Center Addition, Building 25390	2026	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Methane Power Interconnection project	2027	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Wheatland ECP Reconstruction	2027	Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.

Table E-1 Reasonably Foreseeable Future Actions at Beale AFB

Scheduled Project	Implementation Date	Relevance to Proposed Action	Interaction with Resources and EA Section
Multi-Domain Operations Complex	2026-2027	Proximity to project 10. Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.
Multi-Bay Hangar (Dock 11)	2024-2026	Proximity to project 10. Potential construction timing overlap with proposed action.	Noise 3.3, Air Quality 3.4, Geological 3.5, Wetlands 3.7, Biological 3.8, Infrastructure 3.10, Hazardous Materials and Waste 3.11, and Safety and Health 3.12.

Notes:
ECP = entry control point; TBD = to be determined; PAVE PAWS = Precision Acquisition Vehicle Entry Phased Array Warning System

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APPENDIX F
DEFINITION OF RESOURCES

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F.1 Noise

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 A-weighted decibels (dBA) over an 8-hour period. The highest allowable sound level workers can be constantly exposed to is 115 A-weighted decibels, and exposure to this level must not exceed 15 minutes within an 8-hour period (see **Table F-1** for other examples). These standards limit instantaneous exposure, such as impact noise, to 140 A-weighted decibels. If noise levels exceed these standards, employers are required to provide hearing protection equipment to reduce sound levels to acceptable limits.

Table F-1 Typical Sound Levels from Example Activities

Noise Level (A-weighted decibels)	Common Sounds	Effect[1]	T_{Max}[2]
10	Just audible	Negligible	n/a
30	Soft whisper (15 feet)	Very quiet	n/a
50	Light auto traffic (100 feet)	Quiet	n/a
60	Air conditioning unit (20 feet)	Intrusive	n/a
70	Noisy restaurant or freeway traffic	Telephone use difficult	n/a
80	Alarm clock (2 feet)	Annoying	n/a
90	Heavy truck (50 feet) or city traffic	Very annoying	8 hours
100	Garbage truck	Very annoying	2 hours
110	Pile drivers	Strained vocal effort	30 minutes
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort	7.5 minutes
140	Carrier deck jet operation	Painfully loud	28 seconds

Notes:
[1] Source: USEPA, 1981
[2] Source: OSHA, 2017
n/a = not applicable; T_{Max} = maximum time of exposure prior to hearing damage

The average day/night sound level (DNL) metric is a measure of the total community noise environment. DNL is the average A-weighted sound level over a 24-hour period, with a 10-decibel adjustment added to the environmental night levels (between 10:00 p.m. and 7:00 a.m.). This adjustment accounts for increased human sensitivity to environmental noise events at night. The DNL metric was adopted by the U.S. Department of Housing and Urban Development, Federal Aviation Administration, U.S. Environmental Protection Agency (USEPA), and DoD as the common standard for assessing noise levels for compatibility with land use, health and human safety, and effects on wildlife.

A variety of sounds are emitted from loaders, trucks, graders, and other common construction equipment. **Table F-2** presents noise levels associated with common types of construction equipment, which can exceed ambient sound levels by 20 to 25 dBA in an urban environment. Unobstructed sound pressure levels decrease according to the inverse square law, or approximately 6 dB for every doubling of distance from the source of noise; therefore, as seen in **Table F-2**, impacts from construction noise are typically confined to within 0.5 miles of a project area.

Table F-2 Estimated Noise Levels for Common Construction Equipment

Construction Equipment	L_{max}[1] 50 feet (dBA)	L_{max}[2] 100 feet (dBA)	L_{max}[2] 250 feet (dBA)	L_{max}[2] 500 feet (dBA)	L_{max}[2] 1,000 feet (dBA)	L_{max}[2] 1,500 feet (dBA)	L_{max}[2] 0.5 miles (dBA)
Backhoe	78	72	64	58	52	48	44
Chain Saw	84	78	70	64	58	54	50
Ground Compactor	83	77	69	63	57	53	49
Concrete Mixer Truck	79	73	65	59	53	49	45
Concrete Pump Truck	81	75	67	61	55	51	47
Crane	81	75	67	61	55	51	47
Dozer	82	76	68	62	56	52	48
Excavator	81	75	67	61	55	51	47
Front End Loader	79	73	65	59	53	49	45
Grapple (Backhoe)	87	81	73	67	61	57	53
Jackhammer	89	83	75	69	63	59	55
Pneumatic Tools	85	79	71	65	59	55	51
Vacuum Excavator	85	79	71	65	59	55	51

Notes:
[1]Source: U.S. Department of Transportation, 2006
[2]Derived values utilizing the inverse square law $\left\{L_{p2} = L_{p1} + 20log_{10}\left(\frac{r_1}{r_2}\right)\right\}$ and published values at $L_{p1}=L_{50}$.
dBA = A-weighted decibels; L_{max} = maximum sound level

F.2 Air Quality

See Appendix G.

F.3 Water Resources

Water resources are natural and constructed sources of water that are available for use and benefit of humans and the natural environment. Water resources relevant to the Proposed Action include stormwater and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes and ensures compliance with the Clean Water Act (CWA) of 1972 (33 United States Code [U.S.C.] § 1251 et seq.).

F.4 Geological Resources

Geological resources are defined as the physiography, topography, geology, and soils of a given area. Physiography and topography pertain to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Geology is the study of Earth's composition and provides information on structure and configuration of surface and subsurface features. Soils are unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with certain types of military activities or land use.

F.5 Surface Waters

Surface water includes natural, modified, and constructed water confinement and conveyance features above groundwater. These features may or may not have a defined channel and discernable water flow and are generally classified as streams, springs, wetlands, natural and artificial impoundments (such as ponds and lakes), and constructed drainage canals and ditches.

The CWA regulates discharges of pollutants into surface Waters of the United States (WOTUS). Jurisdictional waters, including surface water resources as defined in 40 Code of Federal Regulations (CFR) 230.3(s), are regulated under § 303(c), 303(d), 311, 401, 402 and 404 of the CWA, and § 9 and 10 of the Rivers and Harbors Act. Constructed features not directly associated with a natural drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters. The CWA establishes federal limits, through the National Pollutant Discharge Elimination System permit process, for regulating point (end of pipe) and nonpoint (for example, stormwater) discharges of pollutants into WOTUS and quality standards for surface waters. The term WOTUS has a broad meaning under the CWA and incorporates deep water aquatic habitats and special aquatic habitats (including wetlands). In August 2023, the U,S, Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers issued a final rule to amend the final "Revised Definition of 'Waters of the United States"' rule, published in the Federal Register on January 18, 2023. This final (current) rule, effective on September 8, 2023, conforms the definition to the U.S. Supreme Court's May 25, 2023, decision in the case of Sackett v. EPA. This definition removes the significant nexus standard and amends the definition of "adjacent."

The Central Valley Regional Water Quality Control Board (CVRWQCB) regulates activities in Yuba County pursuant to Section 401 of the CWA. An applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into WOTUS must obtain certification from the state where the discharge originates as required by Section 401 of the CWA (33 U.S.C. Section 1341). The CVRWQCB also reviews water quality and wetland issues, including avoidance and minimization of impacts.

F.6 Biological Resources

See Appendix H

F.7 Cultural Resources

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and Executive orders.

Cultural Resources include the following subcategories:

- Archaeological (prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Architectural (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (resources of traditional, religious, or cultural significance to Native American tribes and other communities).

Significant cultural resources are called historic properties and are listed on the National Register of Historic Places (NRHP) or have been determined to be eligible for listing. A historic property is defined in 36 CFR § 800.16 as any prehistoric or historic district, site, building, structure, traditional cultural property, or object included in, or eligible for inclusion on, the NRHP. To be eligible for the NRHP, historic properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance, and meet at least one of four criteria (National Park Service, 1997):

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- Associated with the lives of persons significant in our past (Criterion B);
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); or,
- Have yielded or be likely to yield information important in prehistory or history (Criterion D)

Properties that are less than 50 years old can be considered eligible for the NRHP under Criterion Consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP Criteria for Evaluation (Criterion A, B, C, or D). The term “Historic Property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources. An eligible property has the same protections as property listed in the register.

Federal laws protecting cultural resources include the Archaeological and Historic Preservation Act of 1960 as amended, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to deciding or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the Section 106 consultation process, as set forth in 36 CFR Part 800. Section 106 of the NHPA also requires agencies to consult with federally recognized Indian tribes with a vested interest in the undertaking.

Section 106 of the NHPA requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects on historic properties (36 CFR § 800.1[a]). The Area of Potential Effects (APE) is used as the Region of Influence (ROI) for cultural resource analysis. The APE is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist,” (36 CFR § 800.16[d]) and thereby diminish their historic integrity.

F.8 Infrastructure

Infrastructure consists of the fundamental systems that enable a population in an area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. Infrastructure includes transportation, power supply, water supply, fire suppression, sewer and wastewater systems, stormwater management, natural gas supply, liquid fuel supply, and communications. Most infrastructure maintenance at Beale AFB is supervised by the 9th Civil Engineer Squadron, although Beale AFB also partners with local private utility systems.

F.9 Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (SARA), defines hazardous materials (HAZMAT).

HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. OSHA is responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also regulates HAZMAT in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes the policy that the Air Force is committed to:

- Cleaning up environmental damage resulting from its past activities;
- Meeting all environmental standards applicable to its present operations;
- Planning its future activities to minimize environmental impacts;
- Responsibly managing the irreplaceable natural and cultural resources it holds in public trust; and
- Eliminating pollution from its activities wherever possible.

Department of the Air Force Manual (DAFMAN) 32-1067, *Water and Fuel Systems*, implements AFPD 32-70 and identifies compliance requirements for underground storage tanks (USTs), aboveground storage tanks (ASTs), and associated piping that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs and storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and well-being of wildlife species, wildlife habitats, soil systems, and water resources. In the event of release of HAZMAT or hazardous wastes, the extent of contamination varies based on type of soil, topography, weather conditions, and water resources.

DAFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force and contractor personnel who authorize, procure, issue, use, or dispose of HAZMAT and to those who manage, monitor, or track any of those activities.

Through the Environmental Restoration Program (ERP) initiated in 1980, a subcomponent of the Defense ERP that became law under SARA (formerly the Installation Restoration Program), each DoD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendment of 1984 under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (so that, for example, activities that depend on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health but are not regulated as contaminants under hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a Proposed Action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

Asbestos. Air Force Instruction (AFI) 32-1001, *Civil Engineer Operations*, provides direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR, Part 1926.1101, Asbestos. AFI 32-1001 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. § 669 et seq. Section 112 of the Clean Air Act regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-Based Paint. Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law 101-608, as implemented by 16 CFR Part 1303), the Consumer Product Safety Commission lowered the allowable lead level in paint to 0.06 percent (600 parts per million [ppm]). The act also restricted use of LBP in nonindustrial facilities. DoD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon. The U.S. Surgeon General defines radon as an invisible, odorless, and tasteless gas, that poses no immediate health symptoms, that comes from breakdown of naturally occurring uranium inside the earth. Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the Surgeon General have evaluated radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the United States until they were banned in 1979. Disposal of PCBs is regulated under the federal TSCA (15 U.S.C. § 2601, et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per Air Force policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and Air Force policy, both of which regulate all PCB articles, which are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment

TSCA regulates and USEPA enforces removal and disposal of all sources of PCBs containing 50 ppm or more; regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

F.10 Safety and Health

An analysis of safety and health evaluates whether a Proposed Action would have the potential to affect health, safety, or well-being of workers and the public. Safety and health concerns are associated with renovation, repair, demolition, and construction under the Proposed Action. Occupational safety and health include several categories encompassing ground and industrial operations and motor vehicle use. Ground mishaps can occur from use of equipment or materials and maintenance functions. Day-to-day operations and maintenance conducted by the 9th Reconnaissance Wing are carried out in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by the Air Force Occupational Safety and Health (AFOSH) program. The ROI for occupational safety concerns includes the proposed project locations (see **Figures B-1** through **B-7**).

OSHA Standards (29 CFR) govern general safety requirements relating to general industry practices (§ 1910), construction (§ 1926), and elements for federal employees (§ 1960). These standards include guidance for entry into areas where a hazard may exist. Air Force Occupational Safety and Health requirements are identified within AFI 91-202, *The US Air Force Mishap Prevention Program,* and DAFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*. The AFOSH program's purpose is to minimize loss of Air Force resources and protect Air Force personnel from occupational deaths, injuries, or illnesses by managing risks and ensuring all Air Force workplaces meet OSHA requirements.

Safety zones, which include Clear Zones (CZs) and Accident Potential Zones (APZs) around the airfield, restrict the public's exposure to areas where there is a higher accident potential. Standards for CZs and APZs are established by DoD Instruction 4165.57, *Air Installations Compatible Use Zones*. The CZs are areas immediately beyond the ends of a runway and APZ I and APZ II, which are areas beyond the CZs.

Explosives safety relates to the management and safe use of ordnance and munitions. Defense Explosives Safety Regulation (DESR) 6055.09_DAFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures dealing with munition storage and handling.

F.11 References

National Park Service. 1997. National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation. https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf. Accessed July 2022.

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APPENDIX G
AIR QUALITY

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G.1 Air Quality and Air Conformity Applicability Analysis

This appendix presents an overview of the Clean Air Act (CAA) and California air quality regulations/standards. Air quality modeling and calculations, including the assumptions used for the air quality analyses presented in **Section 3.4** are also included.

G.1.1 Definition of the Resource

Air quality in various areas of the country is affected by air pollutants emitted by numerous sources, including natural and anthropogenic. Weather conditions and topography further influence the amounts and types of pollutants that are present in ambient air.

To manage pollutant emission levels in ambient air, the U.S. Environmental Protection Agency (USEPA) was mandated under the federal CAA to set standards for select pollutants that are known to affect human health and the environment. These standards, known as National Ambient Air Quality Standards (NAAQS), are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$PM_{2.5}$], and lead [Pb]). In addition, the California Air Resources Board (CARB) regulates air quality for the State of California and has established its own standards, known as California Ambient Air Quality Standards (CAAQS) for regulating air pollutants. Pollutants for which CAAQS were established include PM_{10}, $PM_{2.5}$, ozone, nitrogen dioxide, sulfate, carbon monoxide, sulfur dioxide, visibility reducing particles, lead, hydrogen sulfide, and vinyl chloride. California law continues to mandate CAAQS, although attainment of the NAAQS takes precedence over attainment of the CAAQS.

The USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the NAAQS. NAAQS are currently established for six criteria air pollutants: O_3, CO, NO_2, SO_2, respirable particulate matter (including PM_{10} and $PM_{2.5}$), and Pb. Each AQCR includes regulatory areas that are designated as an attainment area or nonattainment area for each of the criteria pollutants, depending on whether it meets or exceeds the NAAQS. The proposed project at Beale Air Force Base (AFB) is in Yuba County, which is located within the Sacramento Valley Intrastate AQCR (40 CFR § 81.163).

Federal actions in NAAQS nonattainment areas are also required to comply with USEPA's General Conformity Rule. These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS.

Greenhouse gases (GHGs) are gases, occurring from natural processes and human activities, that trap heat in the atmosphere. Accumulation of GHGs in the atmosphere helps regulate the earth's temperature. USEPA regulates GHG emissions via permitting and reporting requirements that are applicable mainly to large stationary sources of emissions.

The ROI for air quality analysis is the Sacramento Valley Intrastate AQCR airshed, within which Beale AFB, and the Proposed Action is located.

Criteria Pollutants

In accordance with CAA requirements, the air quality in each region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million or in units of micrograms per cubic meter. Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area and surface topography, the size of the "air basin," and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, NAAQS, for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: O_3, CO, NO_2, SO_2, respirable particulate matter (including PM_{10} and $PM_{2.5}$), and Pb. The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. The primary and secondary NAAQS are presented in **Table G-1**.

Table G-1 National Ambient Air Quality Standards

Pollutant	Standard Value[6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m^3)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(137 µg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average[3]	-	0.15 µg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]	-	150 µg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]	-	12 µg/m^3	Primary
Annual arithmetic mean[4]	-	15 µg/m^3	Secondary
24-hour average[4]	-	35 µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m^3)	Primary
3-hour average[5]	0.5 ppm	(1,300 µg/m^3)	Secondary

Notes:
Source: USEPA, 2018, 2020a
[1] In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
[2] In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas. A 1-hour standard no longer exists.
[3] In November 2008, USEPA revised the primary Pb standard to 0.15 µg/m^3. USEPA revised the averaging time to a rolling 3-month average.
[4] In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m^3. In 2012, USEPA split standards for primary & secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.
[5] In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 parts per billion, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.
[6] Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.
µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; ppm = part(s) per million; USEPA = U.S. Environmental Protection Agency

California also has ambient air quality standards (CAAQS) that was initially set by the Department of Public Health and were subsequently adopted by CARB. California law continues to mandate CAAQS, although attainment of the NAAQS as presented in **Table G-1** takes precedence over attainment of the CAAQS. California law does not require that CAAQS be met by specified dates as is the case with NAAQS. Rather, it requires incremental progress toward attainment (CARB, 2021).

The criteria pollutant O_3 is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides and volatile organic compounds that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies limit atmospheric O_3 concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

The USEPA has recognized that particulate matter emissions can have different health effects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust or liquid mist or formed secondarily in the atmosphere as condensable particulate matter, typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending on the predominant emission sources located there and thus which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies.

Each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. When a region or area fails to meet a NAAQS for a pollutant, that region is classified as "non-attainment" for that pollutant. In such cases, the affected state must develop a State Implementation Plan (SIP) that is subject to USEPA review and approval. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (such as new regulations, emissions budgets, or controls) must be incorporated into the SIP and approved by USEPA.

The Air Quality Monitoring Program within each state monitors ambient air throughout the state. The purpose is to monitor, assess, and provide information on statewide ambient air quality conditions and trends as specified by the state and federal CAA. The Air Quality Monitoring Program works in conjunction with local air pollution agencies and some industries, measuring air quality throughout the states. The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth. The USEPA has set specific requirements for a minimum number of monitoring sites, known as National Air Monitoring Sites. Most states augment these with additional sites to provide additional air quality data. Locations of these monitoring sites are determined by factors such as emissions sources, population density, permitting needs, modeling results, and site accessibility.

Under Title I of the CAA Amendments of 1990, the federal government develops the technical guidance that states need to control stationary sources of pollutants. Title I also allow the USEPA to define boundaries of nonattainment areas. Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant in an attainment area.

Although Titles I and V of the CAA Amendments of 1990 apply to Beale AFB, most compliance requirements under the relevant regulations would not apply to the Proposed Action alternatives. They do not apply because virtually all of the emissions increase from the Proposed Action would occur from mobile sources from construction, which are not governed by Titles I and V; only stationary sources are subject to requirements under Title I and V. However, permit requirements contained in Feather River Air Quality Management District Regulations should be reviewed for any new stationary fuel-burning equipment, such as boilers and generators, that are planned for installation and operation as part of the Proposed Action alternative to ensure that permitting requirements for new non-major sources are not triggered and they qualify for an exemption from the requirement to obtain a permit.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons/year based on the source's industrial category. These thresholds are applicable to stationary sources. The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before construction can commence. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase as specified in the regulations. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. Beale AFB and the activities associated with the Proposed Action are not located near any designated Class I area.

Greenhouse Gases

GHGs are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. Accumulation of GHGs in the atmosphere helps regulate the earth's. GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has been assigned an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. The GWP for CO_2 is 1 and is, therefore, the standard by which all other GHGs are measured. Potential impacts associated with GHG emissions are discussed in **Section 3.4.3.**

In California, the USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from stationary sources. Since virtually all of the emissions increase from the Proposed Action would occur from mobile sources, this rule would not apply here. In addition to the GHG Tailoring Rule, in 2009, the USEPA promulgated a rule requiring sources to report their GHG emissions if they emit 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2[a][2]). Again, this rule applies only to stationary sources of emissions.

G.1.2 Methodology

Air Conformity Applicability Analysis

The CAA required the USEPA to draft general conformity regulations that are applicable in nonattainment areas, or in designated maintenance areas (attainment areas that were reclassified from a previous nonattainment status, which are required to prepare a maintenance plan for air quality). These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations found in 40 Code of Federal Regulations (CFR) Part 93 exempt certain federal actions from conformity determinations (for example, contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in **Table G-2**. Demonstration of conformity can be shown if Proposed Action emissions are within the State- or Tribe-approved budget of the facility as part of the SIP or Tribal Implementation Plan (USEPA, 2010).

Direct emissions are those that occur as a direct result of the action. For example, emissions from new equipment that are a permanent component of the completed action (such as boilers, heaters, generators, or paint booths) are considered direct emissions. Indirect emissions are those that occur at a later time or at a distance from the Proposed Action. For example, increased vehicular/commuter traffic because of the action is considered an indirect emission. As shown in **Table G-2**, the threshold levels (in tons of pollutant per year) depend on the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them with the *de minimis* thresholds.

Table G-2 General Conformity Rule De Minimis Emission Thresholds

Pollutant	Attainment Classification	Tons per year
Ozone (VOC and NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
Carbon Monoxide, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC and ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Lead	All nonattainment and maintenance	25

Notes
Source: USEPA, 2017
NO_2 = nitrogen dioxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulates equal to or less than 2.5 microns in diameter; PM_{10} = particulates equal to or less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

Assumptions

The following assumptions were used in the air quality analysis for the Proposed Action:

1. The Air Conformity Applicability Model (ACAM) was completed for all relevant activities associated with the 15 proposed Flightline projects, as described in **Table B-1**.
2. For air quality analysis, the proposed construction projects are assumed to occur within a single calendar year to provide a conservative estimate of emissions. The duration of the construction project is assumed to be 12 months from the assumed start date of January 2024. For operational emissions, the start date is assumed to be the beginning of the year after construction is complete (January 2025) and would occur indefinitely.
3. The calculations assumed there were no controls used to reduce fugitive emissions. It is assumed that reasonable mitigation measures would be used during construction and demolition to reduce particulate matter emissions.
4. Construction phase emissions for the Proposed Action Alternative 1 are included for demolition, grading, trenching, construction, architectural coating, and paving. Operational emissions are for comfort heating, emergency generators, painting/surface coating, and degreasing that are proposed for installation at the new facilities. No distinction has been made between new construction and renovation/addition.
5. In the absence of square footage data for demolition, an estimate of the area proposed for demolition was derived from design diagrams and online maps or were estimated based on an engineering judgment.
6. If the square footage for construction, renovation, or land disturbance was available, then it was used for ACAM modeling. In the absence of square footage data for construction, an estimate of the area proposed for construction was derived from design diagrams and online maps.
7. Duration of construction phase activities was estimated based on the area proposed for construction or renovation. The duration of the project provided by the facility was taken into consideration for estimating the timeline for construction for each phase.
8. Typically, area proposed for grading was assumed to be 10 percent of total area proposed for construction or renovation.
9. For grading, if data on the amount of material hauled in and hauled out (in cubic yards) were provided by the facility, then they were used in ACAM. In the absence of this data, it has been estimated using the assumed depth and graded area. Fill depth for gravel and grading depth is assumed based on the type of project.
10. In the absence of trenching data, trenching in linear feet for utility was derived based on the size of the project. An estimated trench depth and trench width is assumed based on the nature of the project.
11. Emissions from personnel commute are not calculated, as no new personnel will be working at the new facilities when construction of this project is complete.

Significance Indicators and Evaluation Criteria

The CAA Section 176(c), *General Conformity*, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIP for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. Under the National Environmental Policy Act, significance is analyzed based on the potentially affected environment and degree of the effects of the action (40 CFR. § 1501.3[b]). Significance varies with the setting of the proposed action, and the analysis includes both short-and long-term effects and both beneficial and adverse effects, and effects that would violate federal, state, tribal, or local law protecting the environment.

Based on guidance in Chapter 4 of the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments*, for air quality impact analysis, project criteria pollutant emissions were compared against the insignificance indicator of 250 tons per year for PSD major source permitting threshold for actions occurring in areas that are in attainment for all criteria pollutants (25 tons per year for lead). These "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 NAAQSs. These insignificance 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 emissions that exceed one or more NAAQSs. Although PSD and Title V are not applicable to mobile sources, the PSD major source thresholds provide a benchmark to compare air emissions against and to determine project impacts.

For proposed action alternatives that would occur in nonattainment/maintenance areas, the net-change emissions estimated for the relevant criteria pollutant or pollutants are compared against General Conformity *de minimis* values to perform a General Conformity evaluation. If the estimated annual net emissions for each relevant pollutant from the Proposed Action alternative are below the corresponding *de minimis* threshold values, General Conformity Rule requirements would not be applicable.

Emissions from the Proposed Action in the ROI were assessed in **Section 3.4** and compared with applicable *de minimis* thresholds or insignificance indicators.

G.1.3 References

California Air Resources Board (CARB). 2021. California Ambient Air Quality Standards (CAAQS). <California Ambient Air Quality Standards California Air Resources Board/>. Accessed July 2021.

U.S. Environmental Protection Agency (USEPA). 2010. 40 CFR Parts 51 and 93, Revisions to the General Conformity Regulations. 75 Federal Register 14283, EPA-HQ-OAR-2006-0669; FRL-9131-7. 24 March.

USEPA. 2017. General Conformity: De Minimis Tables. <https://www.epa.gov/general-conformity/de-minimis-tables>. 04 August.

USEPA. 2018. NAAQS Table. <https://www.epa.gov/ground-level-ozone-pollution/table-historical-ozone-national-ambient-air-quality-standards-naaqs>. 20 February.

USEPA. 2020a. *NAAQS Table*. <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. 07 March.

G.1.4 Detail Air Conformity Applicability Model Report and Record of Conformity Analysis (ROCA)

1. General Information

- Action Location

Base: BEALE AFB
State: California
County(s): Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Action Title: Flightline Installation Development at Beale AFB

- Project Number/s (if applicable): N/A

- Projected Action Start Date: 1 / 2024

- Action Purpose and Need:

The intent of the ongoing process of installation development at Beale AFB is to provide infrastructure improvements necessary to support the mission of the 9th Reconnaissance Wing (RW) and tenant units. The goals for base development are to ensure successful base operations, adequate support capacity, and continued ability of the base to support its assigned mission sets.

- Action Description:

The 15 projects considered in this Environmental Assessment (EA) were identified as priorities for installation development. These plans identify requirements for improvement of the physical infrastructure and functionality of Beale AFB, including current and future mission and facility requirements, development constraints and opportunities, and land use relationships. The projects include facility and infrastructure construction, demolition, and renovation.

- Point of Contact

Name: Rahul Chettri
Title: Contractor
Organization: Versar, Inc.
Email: rchettri@versar.com
Phone Number: (757) 557-0810

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	BAEY1011908: Construct Airfield Lighting Maintenance Facility, Building 1015
3.	Heating	BAEY1011908: Heating for New Airfield Lighting Maintenance Facility, Building 1015
4.	Construction / Demolition	BAEY1073191: Construct Addition to Corrosion Control Facility, Building 1071
5.	Heating	BAEY1073191: Heating for New Addition to Corrosion Control Facility, Building 1071
6.	Construction / Demolition	BAEY1073191: Construct Addition to Corrosion Control Facility, Building 1071
7.	Construction / Demolition	BAEY1014475: Add/Alter Storage, Building 1220

8.	Heating	BAEY1014475: Heating for New/Altered Storage, Building 1220
9.	Construction / Demolition	BAEY 1056321: Construct Wildland Fire Vehicle Storage Facility
10.	Construction / Demolition	BAEY 1072025: Construct Flightline Fitness Center
11.	Heating	BAEY 1072025: Heating for New Flightline Fitness Center
12.	Construction / Demolition	BAEY192006: Multi-Use Corrosion Control Facility
13.	Heating	BAEY192006: Heating for Multi-Use Corrosion Control Facility
14.	Paint Booth	BAEY192006: Paint Booth for Multi-Use Corrosion Control Facility
15.	Degreaser	BAEY192006: Degreaser for Multi-Use Corrosion Control Facility
16.	Construction / Demolition	Construct Fuel Transfer Line Access Road
17.	Construction / Demolition	Construct Additional POV Parking
18.	Construction / Demolition	BAEY221000: Repair Consolidated Ops/Mx, Building 1086
19.	Construction / Demolition	BAEY211006: Repair Water Main, 18-inch Return Line, 3MG Tank to Flightline, Facility 8611
20.	Construction / Demolition	BAEY1054983: Repair Runway North and South Airfield Overrun, Facility 8280
21.	Construction / Demolition	BAEY1081611: Repair Road and Culvert at Doolittle Gate
22.	Construction / Demolition	BAEY1086069: Repair Upstream Storm Drainage PSPTS, Building 1029
23.	Construction / Demolition	BAEY107357: Demolish SR-71 Shelters, Buildings 1057 and 1058
24.	Emergency Generator	BAEY221000: Emergency Generator at Building 1086. Repair Consolidated Ops/Mx, Building 1086
25.	Emergency Generator	BAEY221000: Emergency Generator at Building 1086. Project to Repair Consolidated Ops/Mx, Building 1086
26.	Heating	BAEY221000: Heating at Building 1086. Repair Consolidated Ops/Mx, Building 1086

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: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1011908: Construct Airfield Lighting Maintenance Facility, Building 1015

- Activity Description:
Construct an 880 SF building extension to the Airfield Lighting Vault (Building 1015) to replace two maintenance trailers currently being used for repair of airfield equipment and storage of spare parts. Estimated start date: 2024.

- Activity Start Date
Start Month: 1

Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.066093
SO_x	0.001119
NO_x	0.297239
CO	0.430832
PM 10	0.022523

Pollutant	Total Emissions (TONs)
PM 2.5	0.010771
Pb	0.000000
NH_3	0.000258
CO_2e	106.8

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 640
Height of Building to be demolished (ft): 9

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1600
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 480
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 11

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8

Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 880
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.4.4 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

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 880
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

2.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1011908: Heating for New Airfield Lighting Maintenance Facility, Building 1015

- Activity Description:
Heating for a 880 SF building extension to the Airfield Lighting Vault (Building 1015) to replace two maintenance trailers currently being used for repair of airfield equipment and storage of spare parts. Estimated construction start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000186
SO_x	0.000020
NO_x	0.003378
CO	0.002837
PM 10	0.000257

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000257
Pb	0.000000
NH_3	0.000000
CO_2e	4.1

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 880
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0806

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1073191: Construct Addition to Corrosion Control Facility, Building 1071

- Activity Description:

Construct a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by the standards outlined in UFC 4-211-02, Aircraft Corrosion Control and Paint Facilities, and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071. Estimated start date: February 2025.

[Note: Building repairs analyzed separately.]

- Activity Start Date

Start Month: 2
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.043334
SO_x	0.000613
NO_x	0.151079
CO	0.236336
PM 10	0.005373

Pollutant	Total Emissions (TONs)
PM 2.5	0.005161
Pb	0.000000
NH_3	0.000174
CO_2e	58.1

4.1 Building Construction Phase

4.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 3
Number of Days: 0

4.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 1200
Height of Building (ft): 9
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

4.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857

HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

4.1.4 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
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

4.2 Architectural Coatings Phase

4.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

4.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1200
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

4.2.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1073191: Heating for New Addition to Corrosion Control Facility, Building 1071

- Activity Description:

Heating for a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by the standards outlined in UFC 4-211-02, Aircraft Corrosion Control and Paint Facilities, and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071. Estimated construction start date: February 2025.

- Activity Start Date

Start Month: 1
Start Year: 2025

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000253
SO_x	0.000028
NO_x	0.004606
CO	0.003869
PM 10	0.000350

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000350
Pb	0.000000
NH_3	0.000000
CO_2e	5.5

5.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft^2): 1200
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0806

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

5.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1073191: Construct Addition to Corrosion Control Facility, Building 1071

- Activity Description:

Construct a 1,200 SF addition to combine Building 1071 and Building 1079 into one facility to improve workflow and to ensure the corrosion control facility abides by the standards outlined in UFC 4-211-02, Aircraft Corrosion Control and Paint Facilities, and the Air Force Corrosion Control Facility Reference Guide. Also includes repair of Building 1071. Estimated start date: February 2025.

[Note: This portion of the analysis only covers the building repair aspect of the project. In the absence of a building repair module in ACAM we have assumed construction of a new facility.]

- Activity Start Date
Start Month: 2
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)

VOC	0.029553		PM 2.5	0.005245
SO_x	0.000623		Pb	0.000000
NO_x	0.154515		NH_3	0.000194
CO	0.237148		CO_2e	59.2
PM 10	0.005524			

6.1 Building Construction Phase

6.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

6.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5712
Height of Building (ft): 9
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

6.1.4 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

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1014475: Add/Alter Storage, Building 1220

- Activity Description:
Construct a 800 SF new addition to Building 1220 to increase storage space for materials and equipment. This would be accomplished by adding a second-floor mezzanine and constructing a 20-foot extension on the south end of the building to provide approximately 3,200 SF (800 SF + 2,400 SF) of storage capacity. Estimated start date: May 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.093154
SO_x	0.001130
NO_x	0.300920
CO	0.431701
PM 10	0.030304

Pollutant	Total Emissions (TONs)
PM 2.5	0.010861
Pb	0.000000
NH_3	0.000280
CO_2e	108.0

7.1 Demolition Phase

7.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

7.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1600
Height of Building to be demolished (ft): 9

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

7.2 Site Grading Phase

7.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

7.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 800
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

7.3 Trenching/Excavating Phase

7.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

7.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2460
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

7.4 Building Construction Phase

7.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

7.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 3200
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.4.4 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
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

7.5 Architectural Coatings Phase

7.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

7.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 3200
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

7.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

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

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8. Heating

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1014475: Heating for New/Altered Storage, Building 1220

- Activity Description:
Heating for a 800 SF new addition to Building 1220 to increase storage space for materials and equipment. This would be accomplished by adding a second-floor mezzanine and constructing a 20-foot extension on the south end of the building to provide approximately 3,200 SF (800 SF + 2,400 SF) of storage capacity. Estimated construction start date: May 2024. Heating is for the additional floorspace of 800 SF.

- Activity Start Date
Start Month: 1

Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000169
SO_x	0.000018
NO_x	0.003070
CO	0.002579
PM 10	0.000233

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000233
Pb	0.000000
NH_3	0.000000
CO_2e	3.7

8.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 800
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0806

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

8.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

8.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY 1056321: Construct Wildland Fire Vehicle Storage Facility

- Activity Description:
Construct a 2,400 SF (60 feet wide x 40 feet long x 20 feet high) prefabricated metal building to provide protection from the elements for high-value wildlife fire module equipment. Estimated start date: 2024.

[Note: Disturbance area is 3 acres according to DOPAA. No grading assumed. But fugitive dust will occur due to vehicular movement in disturbance area. Only fugitive dust is included in ACAM; vehicles have been zeroed out.]

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.039636
SO_x	0.000836
NO_x	0.203187
CO	0.316831
PM 10	1.308839

Pollutant	Total Emissions (TONs)
PM 2.5	0.007058
Pb	0.000000
NH_3	0.000220
CO_2e	79.1

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1

Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 130680
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
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

9.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

9.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

9.2 Trenching/Excavating Phase

9.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

9.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 300
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

9.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

9.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

9.3 Building Construction Phase

9.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

9.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 2400
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

9.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

9.3.4 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

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY 1072025: Construct Flightline Fitness Center

- Activity Description:
Construct an 80,729 SF Flightline physical fitness center to meet the Air Force Chairman of the Joint Chiefs of Staff physical fitness requirements. Estimated start date: [Assumed to be April 2024]

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.191468
SO_x	0.004741
NO_x	1.564977
CO	1.928473
PM 10	1.042547

Pollutant	Total Emissions (TONs)
PM 2.5	0.060219
Pb	0.000000
NH_3	0.002072
CO_2e	453.1

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 196458
Amount of Material to be Hauled On-Site (yd^3): 364
Amount of Material to be Hauled Off-Site (yd^3): 364

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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

Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

10.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

10.2 Trenching/Excavating Phase

10.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

10.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2400
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

10.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

10.3 Building Construction Phase

10.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 9
Number of Days: 0

10.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 80729
Height of Building (ft): 40
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

10.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
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
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

10.3.4 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

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
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

$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
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

10.4 Architectural Coatings Phase

10.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

10.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80729
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

10.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

10.5 Paving Phase

10.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

10.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 35000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

10.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

10.5.4 Paving 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

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)

PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

11. Heating

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY 1072025: Heating for New Flightline Fitness Center

- Activity Description:
Heatinf for a 80,729 SF Flightline physical fitness center to meet the Air Force Chairman of the Joint Chiefs of Staff physical fitness requirements. Estimated start date: [Construction Start Date Assumed to be April 2024]

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.014293
SO_x	0.001559
NO_x	0.259870
CO	0.218291
PM 10	0.019750

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.019750
Pb	0.000000
NH_3	0.000000
CO_2e	312.9

11.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 80729
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0676

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

11.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

11.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY192006: Multi-Use Corrosion Control Facility

- Activity Description:
Construct a 36,543 SF multi-bay corrosion control facility to allow large scale painting at Beale AFB. The facility will include with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018. Also includes airfield paving activity and assumed painting and solvent cleaning activity. Estimated start date: 2024.

- Activity Start Date

Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.679802
SO_x	0.005345
NO_x	1.773437
CO	1.978022
PM 10	1.606810

Pollutant	Total Emissions (TONs)
PM 2.5	0.063331
Pb	0.000000
NH_3	0.003528
CO_2e	524.0

12.1 Demolition Phase

12.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

12.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 104592
Height of Building to be demolished (ft): 40

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

12.2 Site Grading Phase

12.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

12.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 128086
Amount of Material to be Hauled On-Site (yd^3): 237
Amount of Material to be Hauled Off-Site (yd^3): 237

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

12.3 Trenching/Excavating Phase

12.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 0
Number of Days: 15

12.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft^2): 5200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

12.4 Building Construction Phase

12.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

12.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 36543
Height of Building (ft): 60
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

12.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
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
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.4.4 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
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

12.5 Architectural Coatings Phase

12.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

12.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 36543
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

12.6 Paving Phase

12.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 27

12.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 175621

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6

Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

12.6.4 Paving 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

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase

VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

13. Heating

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY192006: Heating for Multi-Use Corrosion Control Facility

- Activity Description:
Heating for a 36,543 SF multi-bay corrosion control facility to allow large scale painting at Beale AFB. The facility will include with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018. Also includes airfield paving activity and assumed painting and solvent cleaning activity. Estimated construction start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.007967
SO_x	0.000869
NO_x	0.144857
CO	0.121680
PM 10	0.011009

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.011009
Pb	0.000000
NH_3	0.000000
CO_2e	174.4

13.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 3.38
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

13.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

13.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year
$FC_{RC} = OT * RC / HV / 1000000$

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
$HE_{POL} = FC * EF_{POL} / 2000$

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

14. Paint Booth

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY192006: Paint Booth for Multi-Use Corrosion Control Facility

- Activity Description:
Paint Booth for a 36,543 SF multi-bay corrosion control facility to allow large scale painting at Beale AFB. The facility will include with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018. Also includes airfield paving activity and assumed painting and solvent cleaning activity. Estimated construction start date: 2024.

- Activity Start Date
Start Month: 1

Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.766256
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

14.2 Paint Booth Assumptions

- Paint Booth
Coating throughput (gallons/year): 360

- Default Settings Used: No

- Paint Booth Consumption
Coating used: Quick Dry Enamel
Specific gravity of coating: 1.18
Coating VOC content by weight (%): 43.20486815
Efficiency of control device (%): 0

14.3 Paint Booth Formula(s)

- Paint Booth Emissions per Year

PBE_{VOC}= (VOC / 100) * CT * SG * 8.35 * (1 - (CD / 100)) / 2000

PBE_{VOC}: Paint Booth VOC Emissions (TONs per Year)
VOC: Coating VOC content by weight (%)
(VOC / 100): Conversion Factor percent to decimal
CT: Coating throughput (gallons/year)
SG: Specific gravity of coating
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

15. Degreaser

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY192006: Degreaser for Multi-Use Corrosion Control Facility

- Activity Description:
Degreaser for a 36,543 SF multi-bay corrosion control facility to allow large scale painting at Beale AFB. The facility will include with full paint capabilities with all associated mechanical and electrical systems and support spaces to meet the requirements of UFC 4-211-02 and comply with International Building Code 2018. Also includes airfield paving activity and assumed painting and solvent cleaning activity. Estimated construction start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.563120
SO_x	0.000000
NO_x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

15.2 Degreaser Assumptions

- Degreaser
Net solvent usage (total less recycle) (gallons/year): 480

- Default Settings Used: No

- Degreaser Consumption
Solvent used: Mineral Spirits CAS#64475-85-0
Specific gravity of solvent: 0.78
Solvent VOC content (%): 100
Efficiency of control device (%): 0

15.3 Degreaser Formula(s)

- Degreaser Emissions per Year
DE_{VOC}= (VOC / 100) * NS * SG * 8.35 * (1 - (CD / 100)) / 2000

DE_{VOC}: Degreaser VOC Emissions (TONs per Year)

VOC: Solvent VOC content (%)
(VOC / 100): Conversion Factor percent to decimal
NS: Net solvent usage (total less recycle) (gallons/year)
SG: Specific gravity of solvent
8.35: Conversion Factor the density of water
CD: Efficiency of control device (%)
(1 - (CD / 100)): Conversion Factor percent to decimal (Not effected by control device)
2000: Conversion Factor pounds to tons

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: Construct Fuel Transfer Line Access Road

- Activity Description:
Construct 1.2 miles (~85,000 SF) of access road to 14 existing fuel pits along the fuel transfer line to allow year-round access. Estimated start date: TBD.

[Note: Beale AFB provided updated data on July 14, 2022: "... correct length should be 3,570 LF or 0.67 miles ..." The description above is taken from the Preliminary Final DOPAA (dated April 2022) and has not been updated with the new data sent by Beale AFB.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.019983
SO_x	0.000320
NO_x	0.113410
CO	0.124121
PM 10	0.189949

Pollutant	Total Emissions (TONs)
PM 2.5	0.004889
Pb	0.000000
NH_3	0.000104
CO_2e	31.3

16.1 Site Grading Phase

16.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

16.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 37579
Amount of Material to be Hauled On-Site (yd^3): 696
Amount of Material to be Hauled Off-Site (yd^3): 116

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**

Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

16.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

16.2 Paving Phase

16.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 11

16.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 35700

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day

Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

16.2.4 Paving 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
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)

PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: Construct Additional POV Parking

- Activity Description:
Construct a 105,000 SF addition to the POV parking area for Building 1025 to provide additional spaces needed to support existing and future uses. Estimated start date: TBD.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.097363
SO_x	0.001456
NO_x	0.543725
CO	0.670084
PM 10	0.575461

Pollutant	Total Emissions (TONs)
PM 2.5	0.026277
Pb	0.000000
NH_3	0.000566
CO_2e	139.9

17.1 Site Grading Phase

17.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

17.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 110250
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 3063

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

17.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

17.2 Trenching/Excavating Phase

17.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

17.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

17.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

17.3 Paving Phase

17.3.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 2
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

17.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 105000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47

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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

17.3.4 Paving 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

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre$)^2$ / acre)

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY221000: Repair Consolidated Ops/Mx, B1086

- Activity Description:
To correct deficiencies, the project would structurally isolate and include Level-3 renovation of areas in Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished. Estimated start date: 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.362793

Pollutant	Total Emissions (TONs)
PM 2.5	0.089821

SO_x	0.006569		Pb	0.000000
NO_x	2.256857		NH_3	0.003135
CO	2.842727		CO_2e	631.7
PM 10	0.533892			

18.1 Demolition Phase

18.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

18.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 148877
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

18.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

18.2 Building Construction Phase

18.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 9
Number of Days: 0

18.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 90123

Height of Building (ft): 14
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

18.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
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
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

18.2.4 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

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

18.3 Paving Phase

18.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 4
Number of Days: 0

18.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 124860

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- 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	000.240	000.004	000.179	002.019	000.047	000.020		000.034	00349.301
LDGT	000.529	000.004	000.390	003.951	000.049	000.022		000.034	00438.299
HDGV	001.133	000.012	002.177	017.401	000.185	000.079		000.045	01175.364
LDDV	000.057	000.003	000.387	000.455	000.084	000.055		000.008	00322.805
LDDT	000.127	000.004	000.747	000.768	000.138	000.107		000.008	00404.546
HDDV	000.429	000.015	008.814	001.758	000.338	000.240		000.029	01587.930
MC	004.838	000.002	001.285	028.044	000.019	000.009		000.050	00181.592

18.3.4 Paving 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

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY211006: Repair Water Main, 18-inch Return Line, 3MG Tank to Flightline, Facility 8611

- Activity Description:
Project replaces approx. 2.4 miles of severely degraded 18-inch steel water main with 18-inch C-905 PVC from the Family Camp Area (C St/34th St) to the Water Treatment Plant. Adds cross-connect to support Flightline water requirements during construction. Project reroutes water main from environmentally sensitive habitat to an accessible utility corridor. Total SF is ~ 51,875. Estimated start date: March 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.021695
SO_x	0.000431
NO_x	0.119924
CO	0.151116
PM 10	0.515065

Pollutant	Total Emissions (TONs)
PM 2.5	0.004538
Pb	0.000000
NH_3	0.000080
CO_2e	41.5

19.1 Site Grading Phase

19.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

19.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 51875
Amount of Material to be Hauled On-Site (yd^3): 0

Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468

LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

19.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

19.2 Trenching/Excavating Phase

19.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

19.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 51875
Amount of Material to be Hauled On-Site (yd^3): 576
Amount of Material to be Hauled Off-Site (yd^3): 230

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

19.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1054983: Repair Runway North and South Airfield Overrun, Facility 8280

- Activity Description:
Reconstruct runway overruns (approx. 622,025 SF) to improve their condition and prevent further deterioration. Estimated start date: June 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.898080
SO_x	0.009343
NO_x	3.342510
CO	3.512107
PM 10	15.838179

Pollutant	Total Emissions (TONs)
PM 2.5	0.144600
Pb	0.000000
NH_3	0.001508
CO_2e	908.4

20.1 Demolition Phase

20.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

20.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 622025
Height of Building to be demolished (ft): 0.5

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	3	8
Rubber Tired Dozers Composite	2	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47

- 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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

20.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

20.2 Site Grading Phase

20.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

20.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 622025
Amount of Material to be Hauled On-Site (yd^3): 864
Amount of Material to be Hauled Off-Site (yd^3): 864

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71

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
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

20.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

20.3 Trenching/Excavating Phase

20.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

20.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 326700

Amount of Material to be Hauled On-Site (yd^3): 454
Amount of Material to be Hauled Off-Site (yd^3): 454

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

20.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

20.4 Architectural Coatings Phase

20.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

20.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 26458
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.240	000.004	000.179	002.019	000.047	000.020		000.034	00349.301
LDGT	000.529	000.004	000.390	003.951	000.049	000.022		000.034	00438.299
HDGV	001.133	000.012	002.177	017.401	000.185	000.079		000.045	01175.364
LDDV	000.057	000.003	000.387	000.455	000.084	000.055		000.008	00322.805
LDDT	000.127	000.004	000.747	000.768	000.138	000.107		000.008	00404.546
HDDV	000.429	000.015	008.814	001.758	000.338	000.240		000.029	01587.930
MC	004.838	000.002	001.285	028.044	000.019	000.009		000.050	00181.592

20.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

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

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

20.5 Paving Phase

20.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

20.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 622025

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0584	0.0013	0.2523	0.5090	0.0100	0.0100	0.0052	119.71
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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1564	0.0026	0.9241	0.7301	0.0368	0.0368	0.0141	262.83
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

20.5.4 Paving 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

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre $(43560 \text{ ft2} / \text{acre})^2$ / acre)

21. Construction / Demolition

21.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1081611: Repair Road and Culvert at Doolittle Gate

- Activity Description:
Repair existing road and add an additional inbound lane and asphalt pullout to increase vehicle throughput capacity and safety at Doolittle Gate. Increase the size of the culvert under the road to accommodate expansion. Total estimated SF is 27,600. Estimated start date: 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.066500
SO_x	0.001247

Pollutant	Total Emissions (TONs)
PM 2.5	0.013388
Pb	0.000000

NO_x	0.349730		NH_3	0.000340
CO	0.491245		CO_2e	119.2
PM 10	0.204978			

21.1 Demolition Phase

21.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

21.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 5245
Height of Building to be demolished (ft): 2

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

21.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)

0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

21.2 Site Grading Phase

21.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

21.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 33300
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718

LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

21.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

21.3 Trenching/Excavating Phase

21.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

21.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 5100
Amount of Material to be Hauled On-Site (yd^3): 246
Amount of Material to be Hauled Off-Site (yd^3): 14

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

21.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

21.4 Building Construction Phase

21.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3

Number of Days: 0

21.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 4072
Height of Building (ft): 5.5
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

21.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

21.4.4 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

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

21.5 Paving Phase

21.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 11

21.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 72000

- Paving Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

21.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

21.5.4 Paving 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

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY1086069: Repair Upstream Storm Drainage PSPTS, Building 1029

- Activity Description:
Construct a trash rack system on the upstream end of the twin culvert pipes that cross underneath Doolittle Drive to reduce flood risk. Replace the existing headwall with a new headwall that incorporates wing walls, a debris pit, and protective grating to capture large debris.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.026916
SO_x	0.000515
NO_x	0.148321
CO	0.198093
PM 10	0.006875

Pollutant	Total Emissions (TONs)
PM 2.5	0.005685
Pb	0.000000
NH_3	0.000086
CO_2e	49.6

22.1 Demolition Phase

22.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

22.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 9
Height of Building to be demolished (ft): 2

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

22.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

22.2 Site Grading Phase

22.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

22.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 180
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

22.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

22.3 Trenching/Excavating Phase

22.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 15

22.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 41
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 2

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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
Other Construction Equipment Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

22.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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_{VE}: 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

22.4 Building Construction Phase

22.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 0
Number of Days: 1

22.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 62
Height of Building (ft): 2
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- 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 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

22.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699

MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

22.4.4 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
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
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} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
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

23. Construction / Demolition

23.1 General Information & Timeline Assumptions

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY107357: Demolish SR-71 Shelters, Buildings 1057 and 1058

- Activity Description:
Demolish Building 1057 (9,600 SF) and Building 1058 (9,600 SF) to provide additional aircraft parking. Estimated start date: May 2024.

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.011398
SO_x	0.000279
NO_x	0.096106
CO	0.097893
PM 10	0.153148

Pollutant	Total Emissions (TONs)
PM 2.5	0.003218
Pb	0.000000
NH_3	0.000259
CO_2e	28.2

23.1 Demolition Phase

23.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

23.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 19200
Height of Building to be demolished (ft): 37

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- 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 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

23.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544

Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
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	000.114	000.003	000.084	000.992	000.047	000.020		000.023	00298.845
LDGT	000.288	000.004	000.178	001.871	000.048	000.021		000.024	00379.038
HDGV	000.600	000.011	001.339	008.875	000.183	000.078		000.045	01128.468
LDDV	000.026	000.003	000.125	000.281	000.060	000.032		000.008	00271.718
LDDT	000.094	000.003	000.533	000.594	000.112	000.082		000.008	00364.857
HDDV	000.194	000.014	004.796	001.133	000.211	000.117		000.028	01514.699
MC	004.452	000.002	001.252	023.791	000.019	000.009		000.054	00187.891

23.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- 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

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
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: Vehicle Exhaust 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

24. Emergency Generator

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY221000: Emergency Generator at B1086. Repair Consolidated Ops/Mx, B1086

- Activity Description:
Emergency Generator at facility. Repair project to correct deficiencies, the project would structurally isolate and include Level-3 renovation of areas in Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished. Estimated start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.348750
SO_x	0.293750
NO_x	1.437500
CO	0.960000
PM 10	0.313750

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.313750
Pb	0.000000
NH_3	0.000000
CO_2e	166.3

24.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 500
Average Operating Hours Per Year (hours): 500

24.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

24.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

25. Emergency Generator

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY221000: Emergency Generator at B1086. Project to Repair Consolidated Ops/Mx, B1086

- Activity Description:
Emergency Generator at facility. To correct deficiencies, the repair project would structurally isolate and include Level-3 renovation of areas in Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished. Estimated repair start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.209250
SO_x	0.176250
NO_x	0.862500
CO	0.576000
PM 10	0.188250

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.188250
Pb	0.000000
NH_3	0.000000
CO_2e	99.8

25.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 300
Average Operating Hours Per Year (hours): 500

25.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

25.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

26. Heating

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

- Activity Title: BAEY221000: Heating at B1086. Repair Consolidated Ops/Mx, B1086

- Activity Description:
Heating at facility. To correct deficiencies, the project would structurally isolate and include Level-3 renovation of areas in Building 1086 that are in better condition than the rest of the building (90,123 SF); remainder of facility (148,877 SF) would be demolished. Estimated repair start date: 2024.

- Activity Start Date
Start Month: 1
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.024986
SO_x	0.002726
NO_x	0.454286
CO	0.381600
PM 10	0.034526

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.034526
Pb	0.000000
NH_3	0.000000
CO_2e	546.9

26.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method

Rated Capacity of boiler/furnance (MM Btu): 10.6
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

26.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

26.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

Air Conformity Applicability Model - Record of Conformity Analysis (ROCA), Beale AFB IDP EA

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 DAF 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: BEALE AFB
State: California
County(s): Yuba
Regulatory Area(s): Yuba City-Marysville, CA; NOT IN A REGULATORY AREA

b. Action Title: Flightline Installation Development at Beale AFB

c. Project Number/s (if applicable): N/A

d. Projected Action Start Date: 1 / 2024

e. Action Description:

The 15 projects considered in this EA were identified as priorities for installation development. These plans identify requirements for improvement of the physical infrastructure and functionality of Beale AFB, including current and future mission and facility requirements, development constraints and opportunities, and land use relationships. The projects include facility and infrastructure construction, demolition, and renovation.

f. Point of Contact:
Name: Rahul Chettri
Title: Contractor
Organization: Versar, Inc.
Email: rchettri@versar.com
Phone Number: (757) 557-0810

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Yuba City-Marysville, CA			

VOC	3.648	100	No
NOx	11.416	100	No
CO	13.647		
Sox	0.035	100	No
PM 10	22.039		
PM 2.5	0.455	100	No
Pb	0.000		
NH3	0.013	100	No
CO2e	3338.1		
NOT IN A REGULATORY AREA			
VOC	3.648		
NOx	11.416		
CO	13.647		
SOx	0.035		
PM 10	22.039		
PM 2.5	0.455		
Pb	0.000		
NH3	0.013		
CO2e	3338.1		

2025

Pollutant	**Action Emissions (ton/yr)**	**GENERAL CONFORMITY**	
		Threshold (ton/yr)	**Exceedance (Yes or No)**
Yuba City-Marysville, CA			
VOC	2.935	100	No
NOx	3.170	100	No
CO	2.267		
SOx	0.475	100	No
PM 10	0.568		
PM 2.5	0.568	100	No
Pb	0.000		
NH3	0.000	100	No
CO2e	1313.5		
NOT IN A REGULATORY AREA			
VOC	2.935		
NOx	3.170		
CO	2.267		
SOx	0.475		
PM 10	0.568		
PM 2.5	0.568		
Pb	0.000		
NH3	0.000		
CO2e	1313.5		

2026 - (Steady State)

Pollutant	**Action Emissions (ton/yr)**	**GENERAL CONFORMITY**	
		Threshold (ton/yr)	**Exceedance (Yes or No)**
Yuba City-Marysville, CA			

VOC	2.935	100	No
NOx	3.170	100	No
CO	2.267		
SOx	0.475	100	No
PM 10	0.568		
PM 2.5	0.568	100	No
Pb	0.000		
NH3	0.000	100	No
CO2e	1313.5		
NOT IN A REGULATORY AREA			
VOC	2.935		
NOx	3.170		
CO	2.267		
SOx	0.475		
PM 10	0.568		
PM 2.5	0.568		
Pb	0.000		
NH3	0.000		
CO2e	1313.5		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Rahul Chettri

12/11/2023

Rahul Chettri, Contractor DATE

APPENDIX H
BIOLOGICAL RESOURCES

H.1 Definition of Resource

Biological resources include native or naturalized plants and animals, along with the biotic communities, such as wetlands and grasslands, where they exist. Sensitive and protected biological resources include species listed as threatened or endangered by the federal government or state agency. Migratory birds are protected under the Migratory Bird Treaty Act. Sensitive habitats include designated critical habitat protected by the Endangered Species Act and sensitive ecological areas designated by state or other federal rulings. Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (such as migration routes, breeding areas, and crucial summer and winter habitats). Wildlife, vegetation, and wetland resources provide aesthetic, recreational, and socioeconomic benefits to society. Game animals are regulated by the California Department of Fish and Wildlife.

H.2 Sensitive Species List

Table H-1 provides a list of the federal and state-listed species that are known to occur at Beale Air Force Base (AFB) and may be present in the project area.

Table H-1 Federal and State Listed Species Known to Occur at Beale AFB with Potential to Occur in the Project Area

Common Name	Scientific Name	Federal Status	State Status[1]	Documented at Beale AFB	Potential to Occur in the Project Area[2]
Monarch butterfly	*Danaus plexippus*	Candidate Threatened	None	Yes	Low. Butterflies and caterpillars have been observed adjacent to drainages and within the pollinator garden near the base clinic. There are no documented milkweed plants within the project area.
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	None	Yes	Presumed Present. Documented at several locations, and suitable habitat exists in the project area.
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	None	Yes	Presumed Present. Documented at several locations, and suitable habitat exists within and adjacent to the project area.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	None	Beetle exit holes observed in shrubs outside project area.	Presumed Present based on the presence of an elderberry shrub large enough to be potential VELB habitat in the project area.
Swainson's hawk	*Buteo swainsoni*	None	Threatened	Yes	Presumed Present. Confirmed breeder.
Bank swallow	*Riparia*	None	Threatened	Yes	Low to Moderate. Limited suitable habitat in the project area, but was observed by a Bird/Wildlife Aircraft Strike Hazard employee near the Flightline (Laughlin, 2017)
Crotch's bumble bee	*Bombus crotchii*	None	Candidate Endangered	Yes	Moderate. Detected on 6/21/2021 during pollinator surveys.
Dwarf downingia	*Downingia pusilla*	None	CRPR 2B.2	Yes	Moderate. Detected regularly in four vernal pools.
Legenere	*Legenere limosa*	None	CRPR 1B.1	Yes	Moderate. Small populations detected regularly in two vernal pools.

Notes:
1 = Status Legend:
California Rare Plant Ranks (CRPR):
1B – Plants rare, threatened, or endangered in California and elsewhere
2B – Plants rare, threatened, or endangered in California, but more common elsewhere
CRPR Threat Code Extensions:.1 – Seriously endangered in California;.2 – Fairly endangered in California
2 = Source: Beale AFB, 2021a

H.3 Additional Environmental Consequences

Direct impacts to wildlife that may be present prior to construction, including small mammals, reptiles or amphibians, and birds, could occur in the form of direct harm or mortality caused by construction equipment or human activities that could crush or remove animals from vegetation. Adverse impacts could also be caused by abandonment of dens or nests, which would leave eggs and chicks vulnerable to predation or without provisions. Active nests could be destroyed during vegetation removal or grading. Indirect impacts to native nesting birds on the site could include disturbance during construction caused by noise, dust, and increased human presence in the vicinity of active nests. Preconstruction surveys would be conducted, including nesting bird surveys, for state-listed species before construction begins. Active native bird nests within proposed project sites would be mapped and avoided until they are no longer active, as determined by a qualified biologist. Native bird nests that contain eggs, chicks, or fledglings are considered active nests.

The purpose of Project 8 – Construct Fuel Transfer Line Access Road is to allow year-round access to fuel pits without damage to vegetation, and to reduce risk from fuel-contaminated water spills. While construction would temporarily disturb any wildlife in the vicinity, long-term effects on wildlife would be beneficial.

The purpose of Project 9 – Construct Coyote Fenceline – is to prevent coyotes from accessing the Flightline, where they are at risk of collisions with aircraft and ground vehicles. Implementation of the project, while causing short-term disturbance, would have the long-term benefit of eliminating risk of collisions. Other smaller mammals that may also access the Flightline through current gaps in the fence, such as foxes, bobcats, raccoons, and skunks, would also benefit.

Project 12 – Replace Water Main, 18-inch Return Line, Fam Camp to WTP – would re-route the water main from environmentally sensitive habitat to an accessible utility corridor. This project would eliminate the need to disturb these habitats each time maintenance on the water main is required. Excavation of the 2.4-mile-long trench for the new water line, 6 feet deep and 24 to 30 inches wide, would temporarily disturb wildlife in the area. Environmental conservation measure PCM-6, which requires trenchless installation to be used below the Hutchinson Creek crossing and designated environmental areas, would reduce risk of adverse effects on wildlife or their habitat. Implementation of the project, while causing short-term disturbance, would have the long-term benefit of eliminating disturbance of sensitive habitat.

Project 14 – Repair Road and Culverts at Doolittle Gate – would include replacement of two culverts carrying Reeds Creek and a tributary underneath Doolittle Road. The existing culverts are undersized for winter high flows, so their replacement with larger culverts would restore a more natural stream channel and reduce flooding and erosion. This would benefit aquatic and riparian wildlife by creating more habitat. Environmental protection measures PCM-1 through PCM-4 would ensure work within the channel of Reeds Creek would not adversely affect wildlife.

Project 8 – Fuel Transfer Line Access Road. Under the Proposed Action, there are three options to cross a small intermittent waterway for access to Vault 8: construction of a bridge, installation of a culvert, or via a low-water crossing. While any of the options would have minor adverse impacts on biological resources, construction of a bridge would have the lowest magnitude of impacts because direct impacts to the waterway would be avoided, and construction effects would be temporary. Installation of culvert would require disturbance within the waterway but would also be temporary. A low-water crossing would result in long-term disturbance and potential loss of vegetation.

Monarch Butterfly (Candidate). Direct impacts to monarchs could occur through crushing of eggs that are laid on milkweed plants, caterpillars feeding on milkweed plants, monarch chrysalis, or adults resting on vegetation within the project footprints, or along access roads to the sites. No milkweed plants were observed in the project areas during the wetland survey; therefore, there is no habitat for monarchs to lay eggs on, or for larvae. Any monarchs present on vegetation to be removed would likely move before they could be harmed. There is an abundance of grassland habitat in the area surrounding the project sites.

No impacts are expected to occur to monarchs because of their ability to avoid construction activities, lack of milkweed plant observations, and implementation of CM-25.

Vernal Pool Tadpole Shrimp (Endangered) and Vernal Pool Fairy Shrimp (Threatened). As described in more detail in the Biological Assessment for this project **(Appendix A.5)**, the Proposed Action is likely to adversely affect potential habitat for vernal pool branchiopods. Both direct and indirect effects are expected. The majority of habitat directly affected would be temporarily affected by vehicles and equipment during staging and construction, while a small area would be permanently affected by the project footprints.

Indirect impacts could also occur from changes in subsurface hydrology or runoff and siltation from construction activities affecting water quality of wetlands and vernal pools in the project area. Implementation of Wetland Conservation Measures 1-11 and adherence to the limited operations period described in **Appendix D**, would minimize impacts on vernal pools as much as possible, but major, short- and long-term adverse impacts could occur.

Approximately 0.42 acres of potential vernal pool shrimp habitat would be directly affected as a result of the Proposed Action. Approximately 1.22 acres may be indirectly affected.

Because adverse impacts would occur, direct and indirect impacts to listed shrimp species habitat would be compensated for through purchase of credits at a U.S. Fish and Wildlife Services-approved conservation or mitigation bank **(Appendix D)**. This mitigation would reduce the level of impact to less than significant.

Valley Elderberry Longhorn Beetle (VELB) (Threatened). Impacts to VELB are unlikely because the one elderberry bush (VELB habitat) in the project area that could provide habitat for this species is not located in riparian habitat, and the nearest other isolated elderberry bush is more than 2,544 feet away, making VELB presence unlikely. In addition, the shrub would not be adversely affected. The shrub is located along the security fence around the Flightline. Project 9 – Coyote Fenceline – consists of installing a chain link apron along the bottom edge of the fence, would not include any ground disturbing activities, and would therefore have no effect on the shrub or any beetles. To minimize potential impacts to the shrub, the dig barriers will be used within 20 feet of the shrubs base. The conservation measures that would be implemented to avoid impacts to the VELB are described in **Appendix C.5**.

Impacts to State-Listed Species

Direct impacts to Crotch’s bumble bee (candidate) could occur from crushing of adults or eggs during grading. Indirect impacts to foraging or nesting Crotch’s bumble bees could occur from noise and vibration that could disturb nesting bees, and dust from project activities that could accumulate on floral resources and prevent foraging. With implementation of environmental protection measures listed in **Appendix C**, no significant impacts to Crotch’s bumblebee would occur under the Proposed Action. Impacts to state-listed bird species would be the same as those described above in impacts to general wildlife.

Direct impacts may occur to the two special-status plant species under the Proposed Action as a result of unavoidable impact to vernal pool habitat. Indirect impacts to *dwarf downingia* (rare) and *legenere* (rare) in the form of runoff and siltation cause by construction would be avoided by WCM-2, which requires installation of erosion control measures around vernal pools in the project area before construction begins. Implementation of these protection measures would minimize impacts to state special-status plant species under the Proposed Action.

H.4 References

Beale Air Force Base (AFB). 2021a. U. S. Air Force Integrated Natural Resources Management Plan Beale Air Force Base & Lincoln Receiver Site.

Laughlin, J.A. 2017. Bird Aircraft Strike Hazard Annual B.A.S.H. Report. Prepared for Beale AFB by U.S. Department of Agriculture Animal and Plant Health Inspection Service, Beale AFB, CA, USA.

APPENDIX I
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