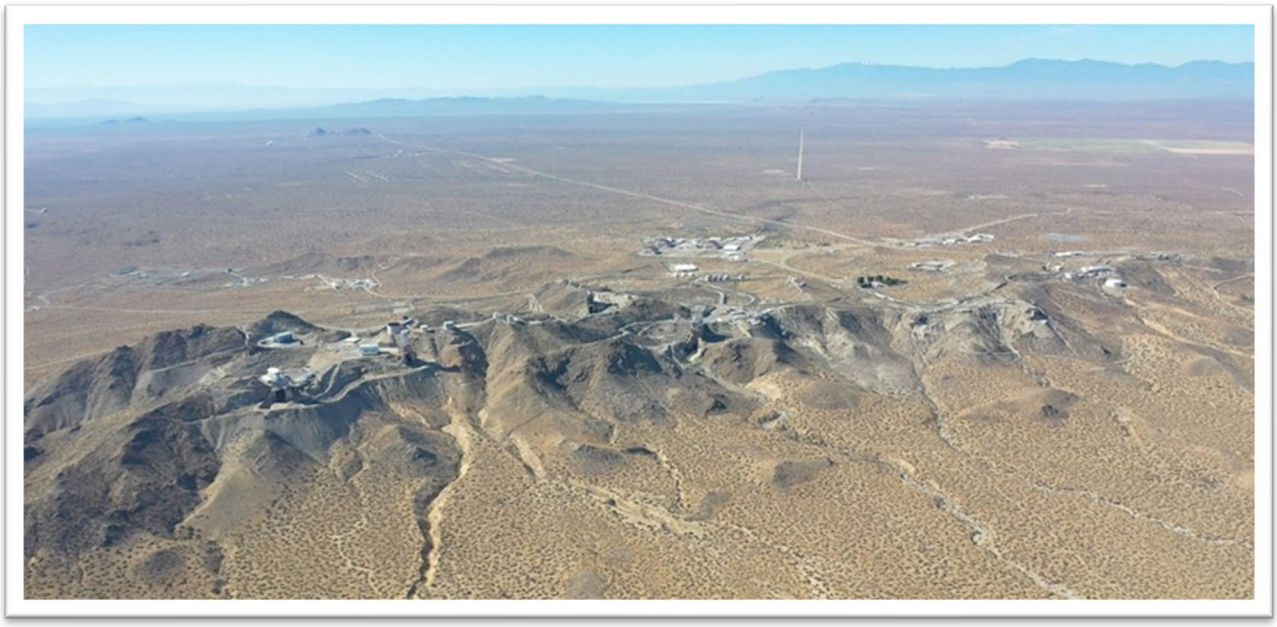
Final
Environmental Assessment for
Air Force Research Laboratory District Plan
Edwards Air Force Base, California

February 2026

Prepared for:
Department of the Air Force
Edwards Air Force Base, California



PRIVACY ADVISORY

The Department of the Air Force (DAF) prepared an environmental assessment (EA) to analyze the effects associated with implementation of the Air Force Research Laboratory District Plan at Edwards AFB, California. This EA is written in compliance with the *National Environmental Policy Act* (NEPA) as amended by the *Fiscal Responsibility Act of 2023* (42 USC § 4321 et seq.), as well as the Department of Defense (DoD) NEPA Implementing Procedures.

COMPLIANCE

In accordance with NEPA, this document has been certified that it does not exceed 75 pages, excluding citations and appendices.

ACCESSIBILITY NOTICE

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

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

412 CEG	412th Civil Engineer Group
ACM	asbestos-containing material
ACP	Access Control Point
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFRL	Air Force Research Laboratory
APE	Area of Potential Effects
APSA	California Aboveground Petroleum Storage Act
AST	aboveground storage tank
AVEK	Antelope Valley East Kern Water Agency
B	building (as in B9620)
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BO	Biological Opinion
CA Water Board	California Water Resources Control Board
CAA	Clean Air Act
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2E	carbon dioxide equivalent
COF	Central Operations Facility
CWA	Clean Water Act
DAF	United States Department of the Air Force
DAFI	Department of the Air Force Instruction
DAFMAN	Department of the Air Force Manual
DESR	Defense Explosives Safety Regulation
DoD	United States Department of Defense
EA	Environmental Assessment
EKAPCD	Eastern Kern Air Pollution Control District
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	explosives safety quantity distance
°F	degree Fahrenheit
FDECP	fugitive dust emission control plan
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FRA	Fiscal Responsibility Act
ft^2	square foot/feet
GHG	greenhouse gas
GIS	geographical information system
GWP	global warming potential

HAZMAT	hazardous materials
HFPO-DA	hexafluoropropylene oxide dimer acid
HWAS	hazardous waste accumulation sites
HWMP	Hazardous Waste Management Plan
IAP	initial accumulation point
IPMP	Installation Pest Management Plan
ISW	Integrated Solid Waste
IWVGA	Indian Wells Valley Ground Authority
kV	kilovolt
LBP	lead-based paint
$\mu g/m^3$	micrograms per cubic meter
MBAL	Main Base Active Landfill
MBTA	Migratory Bird Treaty Act
MDAQMD	Mojave Desert Air Quality Management District
MRTFB	Major Range and Test Facility Base
MSL	mean sea level
MSW	municipal solid waste
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyls
pCi/L	picocuries per liter
PFAS	polyfluoroalkyl substances
PFBS	perfluorobutane sulfonic acid
PFHxS	perfluorohexane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RDT&E	research, development, test, and evaluation
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SCE	Southern California Edison

SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
tpy	tons per year
TSCA	Toxic Substances Control Act
US	United States
USC	United States Code
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WEG	wind erodibility group
WEI	Wind Erodibility Index
WWTP	Wastewater Treatment Plant

CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (US) Department of the Air Force (DAF) and the 412th Civil Engineer Group (412 CEG) at Edwards Air Force Base (AFB) propose to implement 10 projects (as summarized in **Table 2-1** in **Section 2.1**) under the Air Force Research Laboratory (AFRL) District Plan in support of the DAF test mission at the Edwards AFB AFRL. The proposed projects would include facility construction and demolition, utilities and communications infrastructure installation or upgrades, land modification, and improvements to roads and trails. This Environmental Assessment (EA) provides sufficient, documented information to analyze potential environmental effects associated with implementing the proposed projects in the AFRL District collectively referred to as the "Proposed Action" in this EA.

This EA evaluates the potential environmental impacts of the Proposed Action and Alternatives. This document was prepared in accordance with the *National Environmental Policy Act of 1969* (42 *United States Code* [USC] §§ 4321, 4332, and 4336) (NEPA), as amended by the *Fiscal Responsibility Act of 2023* (Public Law 118-5) (FRA); US Department of Defense (DoD) NEPA procedures dated 1 July 2025, and Executive Order (EO) requirements. The DAF rescinded its NEPA regulations at Title 32 *Code of Federal Regulations* (CFR) Part 989 because the Council on Environmental Quality rescinded its NEPA regulations (40 CFR §§ 1500–1508), which the DAF regulations were meant to supplement, and because the DoD has promulgated Department-wide NEPA procedures that guide the DAF's NEPA process. The DoD NEPA procedures went into effect on 1 July 2025.

These federal regulations establish both the administrative process and substantive scope of the environmental impact analysis designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The Proposed Action or Alternatives would only commence upon satisfactory completion of this EA and the issuance of a Finding of No Significant Impact (FONSI) and a Finding of No Practicable Alternative (FONPA) for construction in a floodplain.

1.2 LOCATION AND BACKGROUND

1.2.1 Edwards AFB

Edwards AFB is located in the Antelope Valley within the western Mojave Desert of Southern California. The Base is 30 miles northeast of the city of Lancaster and occupies roughly 308,000 acres (approximately 481 square miles) (**Figure 1-1, Appendix A**), falling within three counties: Kern, Los Angeles, and San Bernardino. The main Edwards AFB community is in Kern County. Edwards AFB is the second-largest DAF Base and is home to the Air Force Test Center as well as the National Aeronautics and Space Administration's (NASA's) Armstrong Flight Research Center (Edwards AFB, 2024a; Military Installations, 2024; NASA, 2024). Edwards AFB falls under Air Force Materiel Command and is the center for conducting and supporting research and development of flight, in addition to testing and evaluation of aerospace systems from concept to combat (Edwards AFB, 2024a). Additionally, Edwards AFB is home to 15 tenant units and operates the DAF Test Pilot School.

Edwards AFB is divided into eight major and seven special districts that represent the overall function and types of mission support facilities that are located within them, such as housing or

community services (**Figure 1-2, Appendix A**). The major districts are the AFRL, Edwards 93523, Flightline, Main Base, North Base, South Base, Radar Hill, and Special Use districts. The special districts are the Military Training, Rich Road, Rogers Dry Lakebed, Rosamond Dry Lakebed, Precision Impact Range Area, Test and Evaluation North, and Test and Evaluation South districts. The Proposed Action would occur solely within the AFRL District, located in the eastern portion of Edwards AFB.

1.2.2 Air Force Research Laboratory

The AFRL is the primary scientific research and development center for the DAF and plays an integral role in leading the discovery, development, and integration of warfighting technologies for US Air, Space, and Cyberspace forces. The AFRL is headquartered at Wright-Patterson AFB in Ohio and has locations in 10 states. The AFRL is subdivided into two directorates: functional and technological. The Edwards AFB AFRL District mission is to sharpen American power. The technological directorate focuses on development and innovation. The AFRL location at Edwards AFB (**Figure 1-2, Appendix A**) is one of two locations in California and focuses on pioneering aerospace technologies in support of the DAF (including the US Space Force operations) (AFRL 2024a, 2024b).

Testing at the Edwards AFB AFRL began in the 1940s. The AFRL is located within its own district at Edwards AFB comprising approximately 17,322 acres of land and roughly 370 facilities. The AFRL District is located approximately 10 miles east of the Edwards AFB Main Base complex. Due to Rogers Dry Lakebed, the driving distance between host unit activities and the research site via established roadways is approximately 30 miles. Multiple facilities within the AFRL District are more than 40 years old, are in poor condition, and require excessive amounts of man-hours and dollars to maintain with consistent need for repairs. The site comprises Detachment 7, Site Support Division, Rocket Propulsion Division, Rocket Finance-Edwards, and other support partners. The Site Support Division is structured to manage a mixed work force of functional disciplines and subject matter experts to meet DAF, federal, state, and local regulatory requirements for research, development, and testing in coordination with the host/tenant support agreement.

1.3 Purpose and Need

The purpose of the Proposed Action is to support the DAF test mission of the AFRL at Edwards AFB and to support a full spectrum of DoD test and evaluation requirements for the foreseeable future in accordance with DoD Directive 3200.11, *Major Range and Test Facility Base (MRTFB)*. Support of the AFRL would include updating and enhancing current test facilities, making optimum use of existing facilities (e.g., utilities and structures) in a manner consistent with Installation priorities. This support also includes the identification of areas for new construction that would provide Edwards AFB with the capability to increase the number and types of missions.

The Proposed Action is needed to support future space/rocket propulsion research, development, and test at the research site, as well as to support the conduct of research, exploratory, and advanced development programs in scientific and engineering areas. New missions are increasingly becoming more technologically advanced with requirements that greatly differ from missions of the past. Current facilities within the AFRL District are lacking the capability to support technological advancements, are aging and degrading, and are not suitable to support the staffing and mission needs for the AFRL program. This makes it more difficult for Edwards AFB to continue to support new and existing missions.

Consistent with DoD NEPA procedures dated 1 July 2025, the DAF developed criteria to support the purpose and need for the Proposed Action. These criteria establish a means for determining the reasonableness of alternatives to the Proposed Action and whether those alternatives merit further analysis in the EA. In accordance with DoD NEPA procedures, the following criteria meet the purpose of and need for the Proposed Action and were used to identify reasonable alternatives for analysis in the EA. The alternative must:

1) support DAF mission requirements and future mission capabilities requirements for advanced technology needs;
2) comply with AFRL District security and access requirements for work with non-vetted and foreign personnel;
3) meet applicable DoD installation master planning criteria consistent with Unified Facilities Criteria 2-100-01, *Installation Master Planning*, and DAF comprehensive planning policy and directives; and
4) maintain safe and reliable infrastructure for mission objectives.

This EA evaluates **10** projects within the Edwards AFB AFRL District that make up the Proposed Action. Individual purpose and need statements for the 10 projects proposed in this EA are included in **Table 2-1** in **Section 2.1**.

1.4 Intergovernmental Coordination, Public and Agency Participation

NEPA and DoD NEPA Implementing Procedures include public and agency review of information pertinent to proposed actions and alternatives. As part of the scoping[1] process, the DAF notified federal, state, and local agencies and tribal governments with jurisdiction that could potentially be affected by the Proposed Action and Alternatives via written correspondence throughout the development of this EA. A mailing list of recipients of this correspondence as well as samples of the outgoing letters and all responses are included in **Appendix B**.

1.4.1 Government-to-Government Consultation

The *National Historic Preservation Act* (NHPA) (54 USC § 300101, et seq.) and implementing regulations at 36 CFR Part 800, direct federal agencies to consult with federally recognized Native American tribes when a Proposed Action or Alternatives may have an effect on tribal lands or on properties of religious and cultural significance to a tribe. Consistent with the NHPA, the *Native American Graves Protection and Repatriation Act* (25 USC § 3001 et seq.), DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, and DAF Instruction (DAFI) 90-2002, *Interactions with Federally Recognized Tribes*, the DAF invited federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action and Alternatives 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 NEPA consultation and requires separate notification to all relevant tribes. The timelines for tribal consultation are also distinct from those of NEPA consultation. The Edwards AFB point of contact for federally recognized tribes is the Base Commander. The point of contact for consultation with

[1] Scoping is a process for determining the extent of issues to be addressed and analyzed in a NEPA document.

the Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation is the Edwards AFB Cultural Resources Manager.

1.4.2 Agency Consultations and Coordination

Implementation of the Proposed Action involves coordination with several organizations and agencies. Information concerning the location and nature of the projects included in the Proposed Action was evaluated to identify threatened and endangered species and other protected species (e.g., migratory birds) with a potential to be impacted by the Proposed Action. In addition, a Programmatic Biological Opinion (BO) was issued on 11 March 2014 for the desert tortoise (*Gopherus agassizii*) for operations and activities at Edwards AFB. Information from these reports is incorporated into this EA where applicable.

EO 11988, *Floodplain Management*, directs federal agencies to determine whether a proposed action would occur within a floodplain and to avoid or minimize adverse impacts on floodplains. If an agency considers avoiding adverse impacts on a floodplain and determines that no practicable alternative to undertaking the action is feasible, EO 11988 requires minimizing impacts by design or modification. In such cases, agencies must also prepare and circulate a notice to explain how avoidance was not practicable and describe minimization measures. Because the execution of the Proposed Action would unavoidably occur in a floodplain, the DAF placed an early public notice in the following local newspapers regarding the Proposed Action and its potential to affect floodplain resources on Edwards AFB (**Appendix B**):

- *Antelope Valley Press* – Published on 30 and 31 May 2025
- *Mojave Desert News* – Published on 4 June 2025

The DAF coordinated with state agencies regarding potential effects from the Proposed Action and Alternatives. Compliance with Section 106 of the NHPA and implementing regulations (36 CFR Part 800) requires that the State Historic Preservation Officer (SHPO) be given the opportunity to concur on determinations of eligibility and effects. Refer to **Section 3.7.1** for project details regarding Section 106 consultation processes.

1.5 Public and Agency Review

As explained in **Section 1.4.2**, the DAF published an early public notice on 30 and 31 May and 4 June 2025 to notify the public of the potential for the Proposed Action to affect floodplain resources on Edwards AFB. No responses regarding the publication were received.

Per DoD NEPA Implementing Procedures effective 1 July 2025, a public review period of a Draft EA is not required. The DAF will publish a notice for the Final EA and FONSI once available at the following website: https://www.edwards.af.mil/About/Environment/.

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF PROPOSED ACTION

The DAF proposes to implement 10 development projects (the Proposed Action) that would aid the Base's capability to increase the number of AFRL missions. The Proposed Action would involve the construction of new facilities; upgrade, renovation, and demolition of existing buildings; reactivation of test stands/pads; construction of new test pads; installation of additional utility and communications systems; construction of additional access roads and parking lots; and replacement of tanks (**Table 2-1**). Individual project components would be finalized upon development of the Edwards AFB AFRL District Plan. As such, Edwards AFB developed project laydown areas for each project location (**Figures 2-1–2-4** in **Appendix A**). These laydown areas represent the maximum footprint for each project in which construction, renovation, and demolition would have the potential to occur. With this approach, the EA analyzes potential environmental impacts for any project activities that would occur within the project laydown areas. The projects would involve maximum project laydown areas of 7,707,578 square feet (ft^2) within the Edwards AFB AFRL District. All projects are anticipated to be completed over a 10-year period—approximately 2025–2034.[2] Project 1 would be anticipated to start in 2028; Projects 2, 3, 7, and 9 would be anticipated to occur between 2030 and 2034; and Projects 4–6, 8, and 10 would be anticipated to occur between 2025 and 2029. Analysis within this EA is based on these assumptions within the identified project laydown areas.

[2] Environmental analysis typically is considered relevant for approximately five years. This EA is evaluating overall project laydown areas where the maximum footprint for an action may occur rather than individual project components. If individual components extend beyond the boundaries of the overall laydown areas/parameters analyzed in this EA, additional environmental analysis may be required.

Table 2-1 Proposed AFRL District Projects

Map ID Number	Project Title and Description	Purpose and Need	Estimated Maximum Laydown Area (ft^2)
P1	AFRL Central Operations Facility and demolish Buildings (B) 8252, 8255, 8349, 8350, 8351, 8352, 8353, 8354, 8356, 8361, and 8368	**Purpose:** Consolidate and modernize existing research and development capabilities. **Need:** Improve operational efficiency and facilities effectiveness.	4,222,071
P2	Establish Resource Processing System at B8620	**Purpose:** Enhance research and development capabilities for advanced propulsion systems. **Need:** Support industry advancements and meet evolving operational requirements.	128,800
P3	Repair Critical Infrastructure along Mercury Boulevard	**Purpose:** Repair aging infrastructure to ensure operational continuity and mitigate potential risks. **Need:** Maintain essential infrastructure to support ongoing operations.	1,878,487
P4	Test Development Facility at B8620; AFRL District Area 1-14	**Purpose:** Develop and mature research and development capabilities. **Need:** Improve existing infrastructure and support technological advancement.	Captured within the laydown area of Project 2
P5	Modular Adaptable Test Facility at B8582; AFRL District Area 1-21	**Purpose:** Provide a relocatable test facility with a cost-effective and quick pace capability for components and testing. **Need:** Promote cost and scheduling reductions through the ease of relocating to other facilities with minimal infrastructure integration requirements.	19,888
P6	Construct a Modular Secure Facility next to B8358	**Purpose:** To expand operational capabilities. **Need:** To meet the requirements of upcoming missions.	87,418
P7	Installation of a shade structure at fire department B8370	**Purpose:** Improve operational efficiency and safety. **Need:** Support an increase in personnel and operational needs.	12,248
P8	Construct an additional parking area at B8523	**Purpose:** Increase parking capacity to accommodate growth. **Need:** Support an increase in personnel and operational needs.	165,307
P9	Pave North Arrow Road and construct an adjacent concrete pad	**Purpose:** Enhance infrastructure to support future operations. **Need:** Enable future testing and operational expansion.	493,625
P10	Test Cell, Infrastructure Improvement, and Access Road Construction	**Purpose:** Modernize and expand testing infrastructure. **Need:** Support increased testing demands and future research and development efforts.	699,734
TOTAL			**7,707,578**

AFRL = Air Force Research Laboratory; B = Building (as in B9620); ft^2 = square feet

2.2 ALTERNATIVE SCREENING

The AFRL District is a restricted district within Edwards AFB dedicated to the AFRL mission; therefore, the number of suitable locations within the Installation boundary for siting the projects listed under the Proposed Action is limited. While the DAF has 10 AFRL locations throughout the US, the AFRL location at Edwards AFB is specific to aerospace systems and would be the only viable location to support the Proposed Action. Due to these limitations, and the DAF's need to utilize existing facilities in a manner consistent with Installation policies, no other locations for siting the projects nor infrastructure alternatives were evaluated.

2.3 ALTERNATIVES CARRIED FORWARD FOR FURTHER ANALYSIS

2.3.1 Alternative 1 (Proposed Action)

Alternative 1, the Proposed Action, is described in detail in **Section 2.1**.

2.3.2 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. Furthermore, as most of the structures are 40 years old or older, the current capabilities in the AFRL District would diminish gradually as facilities become obsolete and unrepairable. There also would be no new construction to support expansion of the area for new incoming programs, and existing facilities would not be utilized for these programs. The full spectrum of DoD test and evaluation requirements for the foreseeable future and beyond in accordance with DoD Directive 3200.11 would not be achieved.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action.

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Table 2-2 summarizes the potential impacts associated with the Proposed Action and No Action Alternative. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-2 Summary of Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Air Quality and Greenhouse Gas	Implementation of the Proposed Action would result in short-term, negligible, adverse impacts to air quality from construction, renovation, and demolition activities. Impacts to air quality would not be considered significant.	Implementation of the No Action Alternative would result in no impact to air quality.
Soils and Geological Resources	Implementation of the Proposed Action would result in no impacts to geological resources and both short-term and long-term, minor, adverse impacts to soils.	Implementation of the No Action Alternative would result in no impact to soils and geological resources.
Biological Resources	Implementation of the Proposed Action would result in no impacts to aquatic resources; long-term, minor, adverse impacts to vegetation and wildlife; and long-term, negligible, adverse impacts to species of concern. The DAF has determined that implementation of the Proposed Action Projects 2, 3, 4–8, and 10 likely would not adversely affect the desert tortoise; Project 9 likely would not adversely affect the desert tortoise and designated critical habitat; and Project 1 likely would adversely affect the desert tortoise.	Implementation of the No Action Alternative would result in no impact to biological resources.
Water Resources	Implementation of the Proposed Action would result in no impacts to wetlands; long-term, minor, adverse impacts to surface waters and stormwater; long-term, moderate impacts to floodplains; and both short-term and long-term, negligible, adverse impacts to groundwater.	Implementation of the No Action Alternative would result in no impact to water resources.
Cultural Resources	Implementation of the Proposed Action would not result in adverse effects to archaeological or historic properties, historic architectural properties, or Traditional Cultural Properties.	Implementation of the No Action Alternative would result in no impact to cultural resources.
Noise	Implementation of the Proposed Action would result in short-term, minor, adverse impacts and long-term, negligible, adverse impacts to noise.	Implementation of the No Action Alternative would result in no impact to noise.
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	Implementation of the Proposed Action would result in no impacts to polychlorinated biphenyls; short-term, minor, adverse impacts to hazardous materials and wastes and petroleum products; long-term, moderate, beneficial impacts to asbestos and lead-based paint; long-term, moderate, adverse impacts to per- and polyfluoroalkyl substances; short-term, minor, adverse impacts to pesticide management; and long-term, moderate, adverse impacts to Environmental Restoration Program sites.	Implementation of the No Action Alternative would result in no impact to hazardous materials and wastes, toxic substances, and contaminated sites.
Safety and Occupational Health	Implementation of the Proposed Action would result in no impacts to flight safety or explosives safety and direct and indirect, long-term, minor, beneficial impacts and short-term, negligible, adverse impacts to occupational safety.	Implementation of the No Action Alternative would result in no impact to safety and occupational health.

Resource Area	Proposed Action	No Action Alternative
Infrastructure, Including Transportation and Utilities	Implementation of the Proposed Action would result in short-term, negligible, adverse impacts and long-term, minor, beneficial impacts to transportation; short-term, negligible, adverse impacts on the electrical, natural gas distribution, communication systems, and sanitary sewer/wastewater; short-term, minor, adverse impacts to solid waste; and long-term, moderate, beneficial impacts to the potable water supply.	Implementation of the No Action Alternative would result in no impact to infrastructure, including transportation and utilities.
Socioeconomics	Implementation of the Proposed Action would result in no impacts to population, housing, or education and direct, short-term, negligible, beneficial impacts to employment.	Implementation of the No Action Alternative would result in no impact to socioeconomics.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 RESOURCES ELIMINATED FROM DETAILED ANALYSIS

The DAF considered but eliminated from further analysis land use, airspace, and protection of children. The Proposed Action would occur entirely within the Edwards AFRL District and would be consistent with existing airspace and would be compatible with existing land use. No local populations or communities exist within the project area, eliminating the potential for impacts to local populations or communities.

3.2 RESOURCES CARRIED FORWARD FOR DETAILED ANALYSIS

The DAF considered the AFRL District and its environs as the Region of Influence (ROI) for each environmental resource. None of the projects under the Proposed Action or No Action Alternative would occur outside the boundaries of the AFRL District at Edwards AFB. Based on the results of internal and external scoping (see **Section 1.4**), the following resources were carried forward for analysis: air quality and greenhouse gas; soils and geological resources, biological resources; water resources; cultural resources; noise; hazardous materials and waste, toxic substances, and contaminated sites; safety and occupational health; infrastructure, including transportation and utilities; and socioeconomics.

Based upon the nature of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify potential effects. Further, each resource analysis section (i.e., **Sections 3.3–3.12**) concludes with a reasonably foreseeable effects analysis considering the effects on the environment that would result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions at Edwards AFB (**Table 3-1**).

The area surrounding the AFRL District is rural or associated with Edwards AFB and development is minimal or industrial. It is therefore unlikely that potential impacts of the projects listed in **Table 3-1** would result in reasonably foreseeable effects when combined with the effects of the Proposed Action.

Table 3-1 Past, Present, and Reasonably Foreseeable Environmental Actions

Name	Description	Timeframe	Approximate Distance from Base
Edwards AFB Main Base District Plan EA	The DAF proposes implementing eight short-term development projects involving construction of new facilities, renovation and repair of existing facilities, and demolition of obsolete facilities.	NEPA in progress; development Fiscal Years 2025–2029	On Base
Edwards AFB South Base District Plan EA	The DAF proposes implementing the South Base District Plan which includes new facilities and resurfacing the South Base Airfield. The project would also include the revitalization of the Munitions Complex and modernization of existing buildings, infrastructure, and utilities systems.	NEPA ongoing	On Base

Name	Description	Timeframe	Approximate Distance from Base
General Conservation Plan for the Desert Tortoise in California Draft Environmental Impact Statement	The General Conservation Plan for the Desert Tortoise in California Environmental Impact Statement describes and analyzes alternatives for compliance with Section 10 of the federal Endangered Species Act. The planning area includes most desert tortoise habitat in California and consists of a variety of land ownership types. The planning area covers approximately 15,241,600 acres across seven counties in southern California.	NEPA ongoing	On Base and throughout California
California Broadband	Installing fiber along Highway 58 (northern Base boundary) in 2025. Parts of the project would be on Base.	Estimated 2025	<1 mile; borders Base boundary
Perimeter Road Runway 23R	Construct road around runway 23R.	2028	On Base
SCE Company's Cal City Substation 115 kV Upgrade Project	Under this project, the Bureau of Land Management is the Lead Agency and Edwards AFB is a Cooperating Agency per a Memorandum of Understanding. SCE proposes to construct two new 115 kV transmission lines that would serve as Electrical Needs Area. The project would cross Edwards AFB and Bureau of Land Management properties.	Estimated 2026/2027	Varied distances with on-Base portions near the north boundary, north gate, and Highway 58 and 395
SCE Ivanpah Control Project (Bishop-Ridgecrest-Kramer junction)	SCE proposes to improve existing 115 kV transmissions lines, between Ivanpah and Control Substations, across approximately 360 miles of Ivanpah Control transmission line spanning Inyo, Kern and San Bernardino counties. Project would restring poles on Base.	Estimated 2025/2026	Varied distances with on-Base portions near the north Base boundary
Indian Wells Valley Groundwater Authority	IWVGA proposes to construct, operate, and maintain an imported water pipeline. Phase I of the project would install approximately 50 miles of pipeline from California City to Ridgecrest. Phase II of the project would install approximately 24 miles of pipeline, extending from the AVEK Mojave Tank Farm near Silver Queen Road, east of Highway 14, to the beginning of the Phase I Imported Water Pipeline Conveyance System located in California City near the intersection of Redwood and California City boulevards.	2026–2030	Approximately 10–50 miles

AFB = Air Force Base; AVEK = Antelope Valley East Kern Water Agency; DAF = Department of the Air Force; IWVGA = Indian Wells Valley Groundwater Authority; kV = kilovolt; NEPA = National Environmental Policy Act; SCE = Southern California Edison

3.3 Air Quality and Greenhouse Gas

3.3.1 Affected Environment

To improve air quality and reduce air pollution, Congress passed the *Clean Air Act* (42 USC § 7401 et seq., as amended) (CAA), which set regulatory limits on air pollutants and helps to ensure basic health and environmental protection from air pollution. The US Environmental Protection

Agency (USEPA) has divided the US into air quality control regions to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Edwards AFB is located in the Eastern Kern Air Pollution Control District (EKAPCD) and the Mojave Desert Air Quality Management District (MDAQMD). The EKAPCD and MDAQMD serve as the ROI for the Proposed Action.

Air quality is determined by ambient concentrations of specific pollutants identified by the USEPA as potentially harmful to public health or welfare (USEPA, 2025a). Under the CAA, the USEPA sets NAAQS for criteria air pollutants determined to impact human health and the environment: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, particulate matter (PM_{10} and $PM_{2.5}$), and lead. **Table 3-2** shows the specific concentration limits (primary and secondary) for each of the criteria pollutants. The primary NAAQS provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly. Secondary NAAQS provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings (USEPA, 2025b).

Table 3-2 National Ambient Air Quality Standards

Pollutant	Primary/Secondary[a,b]	Averaging Time	Level[c]
Carbon monoxide	Primary	8 hours	9 ppm
	Primary	1 hour	35 ppm
Nitrogen dioxide	Primary	1 hour	100 ppb
	Primary and Secondary	Annual	53 ppb
Ozone	Primary and Secondary	8 hours	0.070 ppm
$PM_{2.5}$	Primary	1 year	9.0 µg/m^3
	Secondary	1 year	15 µg/m^3
	Primary and Secondary	24 hours	35 µg/m^3
PM_{10}	Primary and Secondary	24 hours	150 µg/m^3
Sulfur dioxide	Primary	1 hour	75 ppb
	Secondary	1 year	10 ppb
Lead	Primary and Secondary	Rolling 3-month average	0.15 µg/m^3

Source: USEPA, 2025b

µg/m^3 = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standards; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppb = parts per billion; ppm = parts per million; USEPA = US Environmental Protection Agency

a. Primary Standards: the levels of air quality necessary, with an adequate margin of safety to protect public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the USEPA.

b. Secondary Standards: the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

c. Concentrations are expressed first in units in which they were promulgated.
   (1) In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.
   (2) The level of the annual nitrogen dioxide standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
   (3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) ozone standards.
   (4) The previous sulfur dioxide standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a state implementation plan call under the previous sulfur dioxide standards (40 CFR § 50.4(3)). A state implementation plan call is a USEPA action requiring a state to resubmit all or part of its state implementation plan to demonstrate attainment of the required NAAQS.

Greenhouse gases (GHGs) trap heat in the atmosphere and are generated by both natural processes and human activities. GHGs include water vapor, carbon dioxide, methane, nitrous oxide, and ozone, as well as several hydrocarbons and chlorofluorocarbons (USEPA, 2025c). Each GHG has a global warming potential (GWP), based on its atmospheric lifetime and ability to absorb infrared energy (USEPA, 2025d). GWP provides a basis for calculating carbon dioxide equivalents (CO_2e), with carbon dioxide assigned a GWP of one. GHGs are multiplied by their GWP, and the resulting values are added together to estimate the total CO_2e. The USEPA regulates GHG primarily through the GHG Tailoring Rule that applies to emissions from larger stationary sources. The DAF adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 tons per year (tpy) of CO_2e as a "threshold of insignificance" for NEPA. Emissions below this level are considered too minor to warrant further analysis, while those exceeding it may be significant and require additional evaluation (Air Force Civil Engineer Center [AFCEC], 2023).

3.3.1.1 Air Emission Sources at Edwards AFB

When a region meets the NAAQS for a criteria pollutant, it is classified as in "attainment" for that pollutant. If the region fails to meet the standards, it is classified as "nonattainment" for that pollutant. In nonattainment areas, the affected state, territory, or local agency must develop a state implementation plan for USEPA review and approval. The plan is enforceable at the state level and lays out a pathway for how the state would comply with air quality standards. If air quality improves in a nonattainment region and the improvement results meet the criteria for classification as attainment, then that region is reclassified as a "maintenance" area. Under the CAA, the General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas to demonstrate conformity with the state implementation plan. Agencies are required to show that the net change in emissions from a federal proposed action would be below applicable *de minimis* threshold levels (i.e., so minor as to merit disregard).

Per the CAA, the USEPA's PSD New Source Review permit program regulates criteria and certain non-criteria air pollutants for air quality control regions designated as unclassified or in attainment status with respect to the federal standards. In such areas, a PSD review is required for new "major source" or "major modification of existing source" emissions that exceed the tpy threshold of a regulated CAA pollutant, dependent on the type of major stationary source. For "minor source" emissions, a PSD review is required if a project increases a "major source" threshold.

The California Air Resources Board has transferred its authority over stationary source criteria pollutant and hazardous air pollutant emissions to local air districts. Edwards AFB is located within eastern Kern County, where the regulatory and reporting requirements are established by the EKAPCD, and western San Bernardino County, where regulatory and reporting requirements are established by the MDAQMD. The California Environmental Protection Agency has established more stringent air quality standards in the EKAPCD than those set by the USEPA. These more stringent regulations are also under the EKAPCD regulatory authorities. A new or modified stationary source is required to provide offsets for the new source review balance when it exceeds offset trigger levels. The more stringent EKAPCD new source review offset triggers for nonattainment areas are shown in **Table 3-3**.

Table 3-3 Air Pollution Control District Offset Levels

Pollutant	EKAPCD Offset Trigger Level (tpy)	MDAQMD Offset Threshold (tpy)
$PM_{2.5}$	15	NS
PM_{10}	27	15
Volatile organic compounds	25	25
Nitrogen dioxide	25	25
Sulfur dioxide	NS	25

Source: EKAPCD, 2025; MDAQMD, 2024

EKAPCD = Eastern Kern Air Pollution Control District; MQAQMD = Mojave Desert Air Quality Management District; NS = not specified; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; tpy = tons per year

Permitting requirements for federal owners and operators are largely based on a "potential to emit," defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. Calculations are used to determine whether a federal facility is defined as a "major source" under the CAA requiring a Title V Operating Permit; however, some "non-major" or "minor source" federal owners or operators are subject to other stationary permitting requirements.

Since 2007, the EKAPCD has regulated the testing and propellant combustion of rockets under District Rule 431. The permits associated with aerospace encompass aircraft and rocket component material fabrication, rocket and aircraft fuel combustion, and surface coating operations. The rule requires facilities performing such operations to monitor the emissions generated during the testing of rockets and submit an approved plan to the district. The Rocket Test Plan requires the consideration of wind direction and the duration of the rocket burn to ensure emissions do not adversely impact the surrounding community (EKAPCD, 2023). The operations at the test development facility at B8620 and the modular adaptable test facility at B8582 would be required to operate in accordance with District Rule 431. For projects located within the EKAPCD that would disturb 10 or more contiguous acres of land, the EKAPCD requires a fugitive dust emission control plan (FDECP) pursuant to EKAPCD Rule 402 (EKAPCD, 2015). For projects located in the MDAQMD that involve non-residential construction/demolition activity with a disturbed area of at least 5 acres, the MDAQMD requires a FDECP pursuant to MDAQMD Rule 403 (MDAQMD, 2020).

The ROI maintains the following designations for the NAAQS (USEPA, 2025e):

- unclassifiable/attainment for lead, nitrogen oxide, carbon monoxide, sulfur dioxide, and $PM_{2.5;}$
- moderate nonattainment for the 2024 PM_{10} NAAQS standard;
- serious nonattainment for the 2008 ozone NAAQS standard; and
- severe nonattainment for the 2015 ozone NAAQS standard.

Edwards AFB maintains existing permits with the EKAPCD and MDAQMD to emit criteria and toxic air pollutants from existing operations. Some examples of permitted equipment include the following: generators, paint spray booths, fire water pumps, and aviation fuel dispensing systems (EKAPCD, 2023).

3.3.1.2 Regional Climate

The climate in Kern and San Bernardino counties varies widely across the seasons, with extremely hot summers and cool winters, with dry and mostly clear conditions year round. Over the course of the year, the temperature typically varies from 32 degrees Fahrenheit (°F) to 98°F. Precipitation is minimal, with the cooler months of December through April providing the greatest chance of precipitation; and a dry period from May through November. The annual average precipitation in this region is 7.2 inches per year. Wind in the region remains relatively constant throughout the year, ranging on average from 7 to 10 miles per hour (Weatherspark, 2025). Wind directions are generally consistent with little seasonality in the area, winds largely blow from the southeast throughout the year, with some slight northeast variation in the cooler months of November through January (Iowa State University, 2024).

At Edwards AFB, yearly average temperatures range from 43°F to 84°F. Precipitation is consistent with the regional climate, with most precipitation occurring in the cooler months; the annual average precipitation on Edwards AFB is 4.9 inches. Wind within Edwards AFB typically comes from the southwest, with an annual average of approximately 10 miles per hour and maximum gusts of up to approximately 78 miles per hour (NASA, 2022).

3.3.2 Environmental Consequences

3.3.2.1 Evaluation Criteria

The environmental impact methodology for air quality impacts presented in this EA is derived from Department of the Air Force Manual (DAFMAN) 32-7002, *Environmental Compliance and Pollution Prevention* (February 2020). The Proposed Action is broken down into basic units. For example, a basic development project that consists of replacing a building with a new building could be broken down into demolition (ft^2), grading (ft^2), building construction (ft^2 and height), architectural coatings (ft^2), and paving (ft^2). These data are then input into the DAF's Air Conformity Applicability Model, which models emissions based on the inputs and estimates air emissions for each specific criteria and precursor pollutant, as defined in the NAAQS. The calculated emissions are then compared against the applicable threshold based on the attainment status of the ROI. If the annual net increase in emissions from the project are below the applicable thresholds, then the Proposed Action and Alternatives are not considered significant and would not be subject to any further conformity determination. Assumptions of the model, methods, and detailed summary results are provided in **Appendix C** of this EA.

The ROI is in serious nonattainment for the 2008 ozone NAAQS standard, and severe nonattainment for the 2015 ozone NAAQS standard (40 CFR § 81.305). Due to the EKAPCD new source regulations and General Conformity Rule, applicability for the nonattainment status of ozone precursors—volatile organic compounds (VOCs) and nitrogen oxides (NO_x)—are restricted to 25 tpy. EKAPCD also restricts $PM_{2.5}$ to 15 tpy and PM_{10} to 27 tpy. MDAQMD new source regulations restrict PM_{10} to 27 tpy and VOCs, NO_x, and sulfur dioxide to 25 tpy before offsets are required. Additionally, due to the toxicity of lead, the use of the lead PSD threshold as an indicator of potential air quality impact insignificance is not protective of human health or the environment. Therefore, the *de minimis* value of 25 tpy is used instead. The DAF has adopted a PSD value of 75,000 tpy for CO_2e. The following thresholds are applicable to the Proposed Action:

- 25 tpy *de minimis* value for ozone precursors (VOCs and NO_x);
- 25 tpy *de minimis* value for sulfur dioxide;
- 25 tpy *de minimis* value for PM_{10};

- 15 tpy *de minimis* value for $PM_{2.5}$;
- 10 tpy *de minimis* value for lead;
- 75,000 tpy PSD value for CO_2e; and
- 250 PSD value for carbon monoxide and ammonia.

3.3.2.2 Proposed Action

All proposed construction would occur within the footprint of the Installation. Calculations have been performed to account for construction projects being completed over the course of the ten-year Proposed Action period (2025–2034). The following assumptions were used for construction projects:

- Projects 4–6, 8, and 10 would occur between 2025 and 2029; these actions are spread out evenly across these years.
- Projects 2, 3, 7, and 9 would occur between 2030 and 2034; these actions are spread out evenly across these years.
- Project 1 would start in 2028 and is estimated to take three years and is spread out equally across years 2028 through 2030.
- Paved roads would be 15 feet wide.
- The emissions from the new fuel tanks would be comparable to emissions from existing tanks they are replacing.
- Water line infrastructure improvements include up to five miles of water line.
- Water line trenching would be up to 5 feet wide.
- The Central Operations Facility includes 180,000 ft^2 of construction that is two stories high.
- For the purposes of calculating emissions based on building volume (cubic feet), all other buildings are assumed to have an average height of 12 feet to account for some variation in the heights across all proposed projects.
- New impervious surfaces are assumed to be concrete or asphalt.

Emissions primarily would be generated by

- diesel-powered construction equipment operating on site,
- trucks removing or delivering materials,
- trucks operating within the fence line of the proposed development area,
- construction workers commuting to and from work,
- paving of roads and parking areas,
- dust created by grading and other bare earth construction activities, and
- application of architectural coatings.

Detailed information on the emissions estimates and assumptions can be found in **Appendix C**.

Air Emissions

Table 3-4 presents the estimated air emissions with implementation of the Proposed Action annualized over the ten-year Proposed Action period. **Table 3-5** summarizes the highest estimated annual emissions for each pollutant with implementation of the Proposed Action compared to their respective thresholds within the ROI. The steady-state air emissions represent the ongoing annual emissions from ongoing future operations and building heating after construction is complete.

Table 3-4 Estimated Annual Air Emissions of the Proposed Action (tpy)

Pollutant	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Steady State
VOC	0.391	0.386	0.381	1.083	1.081	0.834	0.084	0.081	0.080	0.079	0.006
NO_x	0.938	0.907	0.888	1.042	1.097	1.168	0.692	0.682	0.686	0.695	0.365
CO	1.105	1.095	1.091	1.212	1.227	1.273	0.680	0.654	0.653	0.656	0.091
SO_2	0.038	0.073	0.109	0.296	0.483	0.652	0.686	0.721	0.755	0.790	0.789
PM_{10}	0.353	0.342	0.340	1.420	1.423	1.509	0.423	0.422	0.422	0.423	0.023
$PM_{2.5}$	0.034	0.030	0.028	0.030	0.030	0.031	0.020	0.019	0.018	0.018	0.008
Lead	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ammonia	0.003	0.003	0.003	0.007	0.007	0.006	0.001	0.001	0.001	0.001	0.000
CO_2e	199	215	232	361	449	525	432	446	462	479	377

Source: **Appendix C** of this EA.

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = inhalable particles with diameters of 10 micrometers or smaller; $PM_{2.5}$ = fine inhalable particles with diameters of 2.5 micrometers or smaller; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compound

Table 3-5 Estimated Highest Annual Air Emissions

Pollutant	Highest Annual Emissions (tpy)	GENERAL CONFORMITY	
		Threshold (tpy)	Exceedance (yes or no)
VOC	1.083	25	No
NO_x	1.168	25	No
CO	1.273	250	No
SO_2	0.79	250	No
PM_{10}	1.509	27	No
$PM_{2.5}$	0.034	15	No
Lead	0	25	No
Ammonia	0.007	250	No
CO_2e	525	75,000	No

CO = carbon monoxide; NO_x = nitrogen oxides; PM_{10} = inhalable particles with diameters of 10 micrometers or smaller; $PM_{2.5}$ = fine inhalable particles with diameters of 2.5 micrometers or smaller; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compound

The proposed development projects include up to 314,512 ft^2 of new construction, 240,401 ft^2 of demolition, 480,827 ft^2 of grading, 206,689 ft^2 of paving, and up to 132,000 ft^2 of trenching. Project actions are spread out over approximately 10 years. Emissions from the projects are expected to be short term and are all below PSD thresholds of significance within the ROI. Short-term, negligible adverse impacts to air quality would be anticipated to occur during construction as a result of an increase in emissions from construction equipment.

3.3.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. There would be no changes to air quality and greenhouse gas beyond baseline conditions; therefore, no impacts to air quality and greenhouse gas would occur.

3.3.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action would be anticipated to result in short-term, negligible, adverse impacts to air quality in the ROI. Several of the projects listed in **Table 3-1** would include grading or construction actions of various sizes and scales that would occur on Edwards AFB. Development under those projects would have the potential to contribute to increased air emissions. These projects include projects evaluated under the proposed Main Base District Plan EA, projects evaluated under the South Base District Plan EA, and the Perimeter Road Runway 23R project, as well as the SCE Company's Cal City Substation 115 kV Upgrade Project which would cross onto Edwards AFB property. Air emissions for each of these projects would be managed individually through permitting with the EKAPCD or MDAQMD. When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Edwards AFB, short-term, minor, adverse reasonably foreseeable effects to air quality would be anticipated to occur with implementation of the Proposed Action.

3.4 SOILS AND GEOLOGICAL RESOURCES

The ROI for soils and geological resources is the individual project laydown areas in the AFRL District, which together encompass the maximum potential area for ground disturbance under the Proposed Action, including construction staging.

3.4.1 Affected Environment

3.4.1.1 Topography

Edwards AFB is located in the western Mojave Desert in the southern portion of the Basin and Range physiographic province (National Park Service [NPS], 2015). The western Mojave Desert is characterized by a largely flat expanse of land with broad valleys and relatively small mountain ranges (Edwards AFB, 2020). The Base is situated approximately 13 miles southeast of the Tehachapi Mountains and approximately 24 miles north of the San Gabriel Mountains. Common topographic features found on the Base include hills, alluvial fans, valley floors, and basins. Edwards AFB is characterized by three distinct physiographic areas: an upland section in the northwest portion of the Base, with elevations ranging from 2,270 to 3,200 feet above mean sea level (MSL); a lowland section of the central and southwestern portion of the Base, with elevations ranging from 2,270 to 2,675 feet above MSL; and a highland portion of the Base east of Rogers Dry Lake that extends to the Base's eastern boundary, with elevations ranging from 2,270 to 3,424 feet above MSL. The ROI, as well as the rest of the AFRL District, is within the third distinct area, which has two prominent relief features: Leuhman Ridge and Haystack Butte, both of which are over 3,400 feet above MSL (Edwards AFB, 2020).

3.4.1.2 Geology

The most common geological material found on Edwards AFB is granite, a course-grained rock primarily composed of quartz, feldspar (a group of rock-forming minerals), and ferromagnesian minerals (minerals with high amounts of iron and magnesium). The landforms found on Edwards AFB (hills, alluvial fans, valley floors, and basins) contain mostly gravel and sandy washes. The alluvial fans and valleys are covered with soil material that has eroded from nearby hills, which are largely made up of outcrops of granite and quartz monzonite, with volcanic rock forming some of the smaller features. The basins are composed of clay playas (Edwards AFB, 2020). The ROI is situated primarily within a Mesozoic Era (252–66 million years ago) geologic unit generally characterized by Mesozoic granitic rocks, specifically quartz monzonite and granite (NPS, 2023a). Some project laydown areas also cross into two separate Pleistocene-Holocene Epoch (2.9 million

years ago to present) geologic units characterized by marine and nonmarine sand deposits (specifically Quaternary sand) and sedimentary rocks (specifically Quaternary alluvium), respectively (California Department of Conservation, 2010, 2015; NPS, 2023b).

3.4.1.3 Soils

The ROI contains approximately five different soil types (listed in **Table 3-6** and illustrated in **Figures 3-1–3-4, Appendix A**). The Cajon-Machone soils complex makes up the majority of the ROI (75 percent) and is present in the laydown areas for Projects 1, 3, 6, and 7. Cajon loamy fine sand makes up the second-largest percent of the ROI (12.7 percent) and is present in the southern portion of the Project 3 laydown area and in the Project 10 laydown area. Norob sandy loam (2.2 percent of the ROI) and the Norob complex, overblown (5.1 percent of the ROI) are present at the Project 9 laydown area. The Randsburg-Rock outcrop complex makes up 5 percent of the ROI and is present in the laydown areas for Projects 2 and 4, 5, 6 and 8 (United States Department of Agriculture [USDA], 2024). Approximately 87.7 percent of the soils in the ROI are classified as "somewhat excessively drained," meaning that water drains through and is removed from the soil quickly; the remaining 12.3 percent of soils are classified as "moderately well drained" and "well drained" (USDA, 2024b).

Table 3-6 Soil Types Associated with the Proposed Action

Map Unit Symbol	Name	Slope (%)	Acres in ROI	Percent of ROI
104	Cajon loamy fine sand	2–9	19.5 (849,420 ft^2)	12.7
107	Cajon-Machone complex	2–9	115.2 (5,018,112 ft^2)	75.0
135	Norob sandy loam	0–2	3.4 (148,104 ft^2)	2.2
137	Norob complex, overblown	0–5	7.9 (344, 124 ft^2)	5.1
141	Randsburg-Rock outcrop complex	15–50	7.6 (331,056 ft^2)	5.0

Source: USDA, 2024a
ft^2 = square feet; ROI = Region of Influence

Soil surfaces are vulnerable to both wind and water erosion once the soil has been disturbed; however, wind erosion occurs much more frequently at Edwards AFB. The Wind Erodibility Index (WEI) and the K Factor, Whole Soil for each soil type in the ROI are presented in **Table 3-7.**[3]

Table 3-7 Soil Characteristics

Map Unit Symbol	Name	Wind Erodibility Index	K Factor	Percent of ROI
104	Cajon loamy fine sand	134	.32	12.7
107	Cajon-Machone complex	134	.24	75.0
135	Norob sandy loam	86	.24	2.2
137	Norob complex, overblown	250	.15	5.1
141	Randsburg-Rock outcrop complex	86	.32	5.0

Source: USDA, 2025a, 2025b
ROI = Region of Influence

[3] The Wind Erodibility Index is expressed as the number of tons of soil per acre per year that can be expected to be lost to wind erosion (USDA, 2025a). The K Factor is used to predict the average annual rate of soil loss from water erosion in tons per acre per year and is expressed as a number ranging from 0.02 to 0.69, with high values indicating a greater vulnerability to water erosion. "Whole Soil" indicates that any rock fragments in the soil have been included when calculating the K Factor (USDA, 2025b).

As can be seen in the table, the soils making up 87.7 percent of the ROI have a WEI of 134; the Norob complex, overblown (5.1 percent of the ROI) has a WEI of 250. Soils are placed into wind erodibility groups (WEG) based on their WEI, with WEG 8 being the least susceptible to wind erosion and WEG 1 being the most susceptible. Soils with a WEI of 134 belong to WEG 2, and soils with a WEI ranging from 160–310 belong to WEG 1 (USDA, 2002). This puts 92.8 percent of the soils in the ROI into WEGs 1 and 2, indicating that wind erosion would be a concern in all project laydown areas. All soils in the ROI have low-to-moderate K Factor values (approximately 0.05–0.45), indicating that water erosion would not be as great a concern as wind erosion (USDA, 2025a, 2025b; California State Water Resources Control Board [CA Water Board], 2013).

Soils can be rated "not limited," "somewhat limited," or "very limited," with the level of performance decreasing and amount of necessary maintenance increasing for structures constructed on soils with more limitations. This is due to various characteristics of these soils, including shrink-swell potential and soil strength (USDA 2025c, 2025d).

All soils in the ROI have a rating of "very limited" for their suitability to support small commercial buildings and local roads and streets. This indicates that the soils have one or more characteristics that are unfavorable for the specified use. In the ROI, these limiting characteristics are flooding potential, shrink-swell potential, low soil strength, slope, and depth to soft bedrock. Soils on sloped ground are prone to soil creep, where soil materials gradually move downhill (Fairbridge, 1968). Sloped ground and soil creep can cause issues with the functionality and structural stability of buildings and infrastructure over time (Crosetto et al., 2018). Soils with higher shrink-swell potential expand and contract with changes in soil moisture levels, which can damage any structures those soils support, including roads (Barman, 2022). Depth to soft bedrock can affect construction by increasing the difficulty of installing deep foundations. Soil limitations can be overcome with special installation techniques and design strategies, often involving high levels of maintenance to reach a desired performance level (USDA, 2025c, 2025d).

Under State of California regulations, projects that would disturb 1 or more acres of soil would require a Construction General Permit from the CA Water Board under the National Pollutant Discharge Elimination System (NPDES). These projects would require the preparation and implementation of a site-specific stormwater pollution prevention plan (SWPPP) (CA Water Board, 2022). It is standard practice at Edwards AFB to adopt site-specific SWPPPs as they do not maintain a Base-wide SWPPP. These site-specific SWPPPs are created on an individual project basis by project proponents (Edwards AFB, 2024b).

The ROI is located in two separate California Air Districts: EKAPCD and MDAQMD. For projects located within the EKAPCD that would disturb 10 or more contiguous acres of land, the EKAPCD requires a FDECP pursuant to EKAPCD Rule 402 (EKAPCD, 2015). For projects located in the MDAQMD that involve non-residential construction/demolition activity with a disturbed area of at least 5 acres, the MDAQMD requires a FDECP pursuant to MDAQMD Rule 403 (MDAQMD, 2020).

3.4.1.4 Prime Farmland

Prime farmland is protected under the *Farmland Protection Policy Act* (7 USC §§ 4201–4209), and is defined as land, other than urban or built-up land or water areas, that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. None of the soils of the ROI are classified as prime farmland. Therefore, prime farmland is not carried forward for analysis in this EA.

3.4.2 Environmental Consequences

3.4.2.1 Evaluation Criteria

Potential adverse impact(s) to earth resources would include

- substantial alteration of unique, valued, or beneficial geologic or topographic conditions;
- substantial soil loss or erosion off site;
- measurable loss or degradation of a valued or beneficial soil function; and
- disturbance of soils with contaminant(s) above regulatory threshold(s).

3.4.2.2 Proposed Action

Topography

The Proposed Action would not result in substantial alteration of unique, valued, or beneficial topographic conditions in the AFRL District; therefore, implementation of the Proposed Action would not be anticipated to result in impacts to topographical resources.

Geology

The Proposed Action would not result in substantial alteration of unique, valued, or beneficial geologic conditions in the AFRL District; therefore, implementation of the Proposed Action would not be anticipated to result in impacts to geological resources.

Soils

Under the Proposed Action, a maximum of approximately 177 acres (7,707,578 ft^2) of soil in the AFRL District would be disturbed during project construction and demolition, including grading, excavation, backfilling, and compacting of soils or fill materials within project laydown areas. This would equate to approximately one percent of the total area of the AFRL District, or 0.06 percent of the total area of Edwards AFB. Based on the WEI and the K Factors of the soils in the ROI, ground-disturbing activities in the AFRL District would increase the potential for soil erosion, namely from wind, to occur during ground-disturbing activities associated with construction.

Under the Proposed Action, potential adverse effects on soils, including soil loss, contamination, and structural alteration, would be managed at an individual project level and in accordance with applicable federal, state, and local regulations. For projects located within the EKAPCD (Projects 1–8 and 10) that would disturb 10 or more contiguous acres of land, Edwards AFB would submit a FDECP to the EKAPCD Air Pollution Control Officer for approval, pursuant to EKAPCD Rule 402. Edwards AFB would also implement one or more of the appropriate fugitive dust emission control measures listed in Rule 402, such as the use of wind breaks, water trucks, and/or the application of dust suppressant. The FDECP for the EKAPCD must include, among other things, the total area of land surface to be disturbed, actual and potential sources of fugitive dust emissions on the site, and all control measures that would be implemented before, during, and after any dust-generating activity (EKAPCD, 2015).

For Project 9, which is located in the MDAQMD, Edwards AFB would submit a FDECP to the MDAQMD Air Pollution Control Officer pursuant to MDAQMD Rule 403, as is required for non-residential construction/demolition activity with a disturbed area of at least 5 acres. Once approval of the FDECP was obtained, Edwards AFB would maintain the FDECP throughout the duration of the activities specified therein. The FDECP must include, among other things, the total area of land surface to be disturbed, specifics on fugitive dust control measures that would be used to stabilize certain activities, water application equipment and/or dust suppression types that would

be used, other dust control methods such as physical barriers that would be implemented, and long-term stabilization methods (MDAQMD, 2020).

Per California state regulations, Edwards AFB would obtain a Construction General Permit from the CA Water Board for all projects that would disturb 1 or more acres of soil. Edwards AFB would adopt site-specific SWPPPs for projects under the Proposed Action, which would include best management practices (BMP) and requirements for erosion and sediment control. Edwards AFB also prepares erosion and sedimentation plans on a project- and issue-specific basis and would prepare and implement these plans, as appropriate, for the Proposed Action (Edwards AFB, 2024b). Implementation of BMPs would minimize impacts to soil resources, and projects would be designed and implemented in accordance with UFC 3-210-10 (as amended in 2016) and the *Energy Independence and Security Act* (42 USC § 17094) Section 438 to minimize impacts to soil resources. With the use of BMPs and adherence to all required plans and permits, impacts to soils as a result of erosion and potential soil loss would be anticipated to be short-term, minor, and adverse.

Although the soils within the ROI are rated as having "very limited suitability" for small commercial buildings and similar structures, as well as for local roads and streets, limitations can be managed with the use of special design and installation techniques, and adequate maintenance. Construction has previously occurred in these locations to develop the existing buildings and infrastructure in the AFRL District. Similar installation techniques and design strategies would be implemented under the Proposed Action to address any limiting factors due to soil conditions. With the use of proper BMPs, installation and design strategies, and post-construction maintenance, impacts to soils in terms of their ability to support the facilities that would be built under the Proposed Action would be anticipated to be long-term, minor, and adverse.

Overall, the Proposed Action would impact a small percentage of the total ground area in the AFRL District and on Edwards AFB as a whole. Given the amount of land that would be disturbed under the Proposed Action in the context of the larger Base, and with proper implementation of BMPs for soil suitability related to development and adherence to applicable permits and regulations, impacts to soils under the Proposed Action would be expected to be both short and long term, minor, and adverse.

3.4.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. There would be no changes to soils and geological resources beyond baseline conditions; therefore, no impacts to soils and geological resources would occur.

3.4.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to soils. Several of the projects listed in **Table 3-1** would include grading or construction actions of various sizes and scales that would occur on Edwards AFB. Disturbance of soils under those projects would have the potential to contribute to increased soil erosion. These projects include projects evaluated under the proposed Main Base District Plan EA, projects evaluated under the South Base District Plan EA, and the Perimeter Road Runway 23R project, as well as the SCE Company's Cal City Substation 115 kV Upgrade Project which would cross onto Edwards AFB property. Soil disturbance for each of these projects would be managed individually through permitting with their respective air quality management districts. When considered in conjunction

with the effects of past, present, and reasonably foreseeable actions at Edwards AFB, long-term, minor, adverse effects to soils would be anticipated to occur with implementation of the Proposed Action.

3.5 BIOLOGICAL RESOURCES

The ROI for this resource is the AFRL District on Edwards AFB.

3.5.1 Affected Environment

3.5.1.1 Vegetation

Edwards AFB is located in the Mojave Desert in southern California. Topography in the Mojave Desert is typical basin and range with alternating basins (valleys) and mountains. Terrain on Edwards AFB is largely plains, playas, basins, and dunes. Plants in the Mojave Desert are adapted to very dry conditions and temperatures that range from near freezing in the winter to over 100ºF during the summer. Creosote bush (*Larrea tridentata*) is the dominant and most characteristic plant species of the Mojave Desert. Saltbush (*Atriplex* spp.) communities occur on saline flats, often near playas and on clay pan soils. Three vegetation communities occur within the ROI (**Figure 3-5, Appendix A**). A common characteristic of the Mojave Desert vegetation communities is the high density and diversity of annual plant species that appear in the spring, most notably after years with normal to above-average precipitation during the previous fall and winter seasons. Annual plant species are mostly absent during years of below normal precipitation.

Joshua Tree Woodland

Joshua trees (*Yucca brevifolia*) are an iconic plant species of the Mojave Desert and often the tallest species. Joshua tree woodland contains Joshua trees with at least one-percent cover distributed through a shrub layer dominated by creosote bush or saltbush. Joshua tree woodland occurs primarily along the southwest side of the AFRL District and covers approximately 6,940 acres.

Creosote Bush Scrub

Creosote bush is the dominant and characteristic plant species of the Mojave Desert. In some areas, white bursage (*Ambrosia dumosa*) is a co-dominant species with creosote bush. These dominant species typically have large interspaces between shrubs. Although dominated by creosote bush, the shrub composition varies by soil type. Other shrub species that may occur with creosote bush are white bursage saltbush, white burrobush (*Hymenoclea salsola*), Anderson's wolfberry (*Lycium andersonii*), spiny hopsage (*Grayia spinosa*), Nevada jointfir (*Ephedra nevadensis*), Shockley's goldenhead (*Acamptopappus sphaerocephalus*), winterfat (*Krascheninnikovia lanata*), and Indian ricegrass (*Achnatherum hymenoides*). Creosote bush scrub vegetation occurs through the northern half of the AFRL District and covers approximately 9,310 acres of the ROI.

Xerophytic Saltbush Scrub

The xerophytic saltbush scrub association is dominated by saltbush species such as allscale saltbush (*Atriplex polycarpa*). Plants in this association are adapted to alkali soils. Depending on the soil characteristics, other common Mojave Desert shrub species may also occur but in lower abundance. Areas of xerophytic saltbush scrub occur throughout the AFRL District and cover approximately 1,070 acres.

3.5.1.2 Invasive Species

EO 13751, *Safeguarding the Nation From the Impacts of Invasive Species,* requires federal agencies to prevent, detect, control, and monitor invasive species, and restore native species, as these species harm native habitats and hinder management efforts. The Edwards AFB *Invasive Species Management Plan* (Edwards AFB, 2018a) describes how the Base manages invasive species. The management approach to invasive species involves four steps or stages depending on the abundance and area occupied by species. These stages include prevention, eradication, containment, and asset protection. Prevention involves actions to prevent invasive species that are not present from becoming established. Eradication targets those invasive species that occur in localized areas that could be eliminated through control measures. Containment is used on species that are unlikely to be eradicated but can be reduced or contained with targeted control methods. Asset protection refers to invasive species that are widespread and abundant where long-term management is required.

Edwards AFB has identified 17 invasive species for targeted management (Edwards AFB, 2018a). Targeted invasive species that may occur in or have the potential to spread to the ROI include shortpod mustard (*Hirschfeldia incana*), Sahara mustard (*Brassica tournefortii*), and Russian thistle (*Salsola* spp.). Other species of concern for targeted management are identified in the Edwards AFB *Invasive Species Management Plan*.

Other non-target but abundant invasive species are annual grasses, particularly cheatgrass (*Bromus tectorum*), red brome (*Bromus rubens*), Mediterranean grass (*Schismus barbatus*), and Arabian schismus (*S. arabicus*). Invasive non-native annual grasses are an issue throughout the Mojave Desert ecosystem including on Edwards AFB. These invasive annual grasses are cool-season grasses that germinate in the winter and use soil moisture before many native desert species start their growth cycle and then provide dry fuel that helps spread wildfire when they occur.

3.5.1.3 Wildlife

Mammals

Many mammal species have been recorded on Edwards AFB, as listed in the Edwards AFB *Integrated Natural Resources Management Plan* (Edwards AFB, 2020). The Mohave ground squirrel (*Xerospermophilus mohavensis*) is known to occur throughout the vicinity of the ROI. Due to its protected status, details of this species are included in **Section 3.5.1.5**.

Bat surveys have been conducted on Edwards AFB using a variety of techniques including surveys of potential bat roosts, acoustic monitoring, night vision equipment, and mist-netting. Bat surveys occurred in 1994 and 1996 and more recently in 2017[4] (Edwards AFB, 2020). As documented in the *Integrated Natural Resources Management Plan for Edwards Air Force Base* (2020), most documented bat activity was near water sources but also in occupied and abandoned buildings, and rock outcrops. It is suspected that the distribution of bats is limited by the available roosting habitat. In the AFRL District, a canyon bat was detected near the fire station pond (1994–1996).

[4] Species identified during these surveys included the California myotis (*Myotis californicus*), canyon bat (*Parastrellus hesperus*), hoary bat (*Lasiurus cinereus*), pallid bat (*Antrozous pallidus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), western small-footed myotis (*Myotis ciliolabrum*), and Yuma myotis (*Myotis yumanensis*). Other species may occur but could not be confirmed using acoustic monitoring.

Avian Species and Migratory Birds

The *Migratory Bird Treaty Act* (16 USC § 703–112) (MBTA) makes it unlawful for anyone to pursue, hunt, shoot, wound, kill, trap, capture, or collect migratory birds or their parts, nests, or eggs unless permitted to do so by regulations (50 CFR § 10.12). EO 13186, *Responsibilities of Federal Agencies To Protect Migratory Birds*, requires all federal agencies undertaking activities that may affect migratory birds to follow a set of actions that further implement MBTA and develop a Memorandum of Understanding with US Fish and Wildlife Service (USFWS). The *National Defense Authorization Act for Fiscal Year 2003* (Public Law 107-314, 116 Stat. 2458) allows the incidental take of migratory birds during authorized military readiness activities, including all training and operations of the US Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Further, the *Authorization of Take Incidental to Military Readiness Activities* authorizes incidental take during military readiness unless such activities may result in significant adverse effects on a population of migratory bird species. The *Bald and Golden Eagle Protection Act of 1940* (16 USC §§ 668–668d) (BGEPA) prohibits actions to "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The BGEPA also prohibits activities around an active or inactive nest site that could result in disturbance to returning eagles.

Approximately 300 species of birds have been observed at Edwards AFB (Edwards AFB, 2020). The high diversity of birds can be attributed to the aquatic habitats in the southwestern part of the Base, outside of the ROI, which include the Piute Ponds Complex, Branch Memorial Park Pond, and the South Base sewage ponds. The areas contain open water, wetland, and adjacent mesic habitats that support a wide variety of bird life that do not occur in desert habitats. Bird surveys have been conducted on Edwards AFB including point counts and bird banding. A list of birds observed at Edwards AFB can be found in Appendix C of the Base's *Integrated Natural Resources Management Plan* (Edwards AFB, 2020). The only aquatic habitat in the ROI is the pond at the fire station.

The diversity of birds in the desert habitats of the ROI is substantially less than that found in the western part of the Base. Playas, xerophytic scrub, creosote scrub, and Joshua tree woodland habitats support about two percent of the average number of birds observed[5] (Edwards AFB, 2020). The abundance and diversity of birds changes seasonally as migratory species pass through the desert areas of southern California in the spring and fall and winter resident species arrive during fall migration. Migratory birds are protected under the MBTA. Bald and golden eagles are protected under the BGEPA. The ROI does not contain habitat for the bald eagle. Golden eagles are known to nest in the region surrounding Edwards AFB but are not known to nest on the Base (Edwards AFB, 2020).

[5] Some of the birds expected to occur in the xeric creosote-dominated habitats in the ROI are the common raven, Gambel's quail (*Callipepla gambelii*), mourning dove (*Zenaida macroura*), roadrunner (*Geococcyx californianus*), black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), verdin (*Auriparus flaviceps*), chukar (*Alectoris chukar*), LeConte's thrasher (*Toxostoma lecontei*), lesser nighthawk (*Chordeiles acutipennis*), and loggerhead shrike (*Lanius ludovicianus*). Avian predator species that may occur in the ROI include the ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), and short-eared owl (*Asio flammeus*).

Reptiles and Amphibians

Four species of amphibians (two native and two non-native species) have been documented on Edwards AFB (Edwards AFB, 2020).[6] Habitat for the four species does not occur in the ROI.

Reptiles are a common part of the fauna of the Mojave Desert, particularly in the xerophytic habitats (Edwards AFB, 2020). Based on previous surveys, 18 of the 22 known reptile species are found in the creosote bush scrub vegetation. Seven species were found in Joshua tree woodland, and six species were found in the xerophytic saltbush scrub.[7]

3.5.1.4 Aquatic Resources

Aquatic resources are habitats that contain either permanent or sufficient temporary water to support plant or wildlife species that require water or hydric soils for at least part of their life cycle. Most aquatic habitats on Edwards AFB are located on the western part of the Base with limited aquatic habitat within the ROI; a pond is located at the AFRL District fire station (Edwards AFB, 2020). This resource is not carried forward for analysis in the EA.

3.5.1.5 Threatened or Endangered Species

The ESA protects threatened and endangered species and the ecosystems on which they depend. Under the ESA, an "endangered species" is at risk of extinction, while a "threatened species" is likely to become endangered in the foreseeable future. The USFWS maintains a list of candidate species under evaluation for possible listing. The California Endangered Species Act, overseen by the California Department of Fish and Wildlife (CDFW), is guided by the California Environmental Quality Act, which requires consultation with USFWS and CDFW on projects that may impact listed species.

One federally listed species, the Mojave Desert tortoise (desert tortoise), occurs in the ROI. The southwestern pond turtle (*Actinemys pallida*) is proposed for listing as threatened and is present in the Piute Pond Complex. Habitat for the southwestern pond turtle does not occur in the ROI. The USFWS proposed to list the monarch butterfly as threatened in December 2024. The monarch depends on milkweed species (*Asclepias* spp.) for laying eggs and for the larval stage. Correspondence with Edwards AFB confirmed that, while there is a limited amount of milkweed within the ROI, there is not enough to sustain a population of monarch butterflies. As such, the monarch is considered a migratory species (Hailstone, 2025).

The desert tortoise, listed as threatened in 1990, occurs throughout the ROI. Approximately one-third of the eastern portion of the ROI is designated as desert tortoise critical habitat as part of the Fremont-Kramer Critical Habitat Unit of the Western Mojave Recovery Unit (USFWS, 1994). The desert tortoise is an herbivorous reptile and is a year-round resident at Edwards AFB. The desert tortoise is uniquely adapted to the dry, hot conditions of the Mojave Desert. They can tolerate extended periods without drinking water. Tortoises spend most of their time in burrows to escape hot temperatures during the summer (estivation) and brumate in the winter to escape cold temperatures. Desert tortoises are most active during spring and early summer when annual plants

[6] The two native species are the Pacific treefrog (*Pseudacris regilla*) and western toad (*Anaxyrus boreas*). The two non-native species are the African clawed frog and American bullfrog (*Lithobates catesbeianus*).
[7] Common species in xerophytic habitats include the Mojave desert tortoise (*Gopherus agassizii*), common side-blotched lizard (*Uta stansburiana*), desert horned lizard (*Phrynosoma platyrhinos*), desert spiny lizard (*Sceloporus magister*), Great Basin collared lizard (*Crotaphytus bicinctores*), tiger whiptail (*Aspidosceli tigris*), long-nosed leopard lizard (*Gambelia wislizenii*), and sidewinder (*Crotalus cerastes*).

are most abundant, and when they search for mates in the fall; however, they may be active aboveground during other seasons when climatic conditions are favorable such as after summer thunderstorms when water may be available.

Edwards AFB has consulted with the USFWS under Section 7 of the ESA regarding potential impacts of DAF activities on the desert tortoise. The USFWS has issued a BO to Edwards AFB that specifies environmental protection measures that the DAF must implement to help conserve the desert tortoise (USFWS, 2014).

In January 2025, the Mohave ground squirrel was petitioned for federal listing. The petition is currently under review and maintains the same protection as a listed species until a determination is made. The Mohave ground squirrel is found near the ROI with a high potential to exist therein.

California Species of Special Concern

Species of concern are those that may be listed as rare, threatened, or endangered by the State of California or identified by natural resource management agencies as species considered at risk due to factors such as declining populations, restricted habitats, or specific vulnerability. The California Native Plant Society lists plant species according to four categories. List 1 species that are extinct, extirpated (eradicated), endangered, threatened, or rare in both California and elsewhere with List 2 containing those species that are also extinct, extirpated, endangered, threatened, or rare in California but are more common elsewhere.

Based on surveys on Edwards AFB, the desert cymopterus (*Cymopterus deserticola*), crowned onion (*Muilla coronata*), and desert monardella (*Monardella exilis*) are known to occur in the ROI. The desert cymopterus has been recorded at the southern end of the AFRL District and the desert monardella has been recorded at several locations in the southern half of the AFRL District. The crowned onion has been recorded at the northern end of the district (Edwards AFB, 2020, 2025a).

Of the California listed threatened or endangered animals observed on Edwards AFB, four are considered vagrant observations (outside their normal range). The willow flycatcher (*Empidonax traillii*) and bank swallow (*Riparia riparia*) are considered migrants. The ROI contains habitat for neither species. The Mohave ground squirrel is state listed as threatened and has been observed in the AFRL District and surrounding areas of Edwards AFB. The burrowing owl (*Athene cunicularia*), a wintering and year-round resident, is listed as a species of special concern. The burrowing owl has been observed throughout Edwards AFB including the AFRL District but is more abundant on the west end of the Base (Edwards AFB, 2020). The pallid bat (*Antrozous pallidus*) is listed as uncommon or vulnerable by the CDFW. The short-eared owl (*Asio flammeus*) is listed as a third-priority species of special concern during breeding season. The ringtail (*Bassariscus astutus*) is listed as fully protected by the CDFW. The Townsend's big-eared bat (*Corynorhinus townsendii*) is listed an imperiled or vulnerable by the CDFW. LeConte's thrasher (*Toxostoma lecontei*) and the loggerhead shrike (*Lanius ludovicianus*) are known to occur within the vicinity of the ROI and are also listed federally as birds of conservation concern. The western red bat (*Lasiurus frantzii*) has been documented within Edwards AFB through echolocation. Although the primary locations were outside of the ROI, it is possible that the species would be found in the area. The American badger (*Taxidea taxus*) has been documented within Edwards AFB with the potential to occur within the ROI. The Joshua tree is protected under the *California Western Joshua Tree Conservation Act*. This act is a California Law enacted in 2023 which prohibits the importation, export, take, possession, purchase, or sale of any western Joshua tree in California unless authorized by the CDFW (CDFW, 2025a, 2025b, 2008; Edwards AFB, 2020).

3.5.2 Environmental Consequences

3.5.2.1 Evaluation Criteria

The level of impact to biological resources is based on the following:

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological impact.

Adverse impacts on biological resources would occur if the Proposed Action negatively affects species or habitats of high concern over relatively large areas, or if estimated disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that the agency's proposed actions would not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with either a "No Effect" determination by the federal agency or a BO from USFWS that the Proposed Action either would or would not jeopardize the continued existence of a species.

The DAF has consulted with the USFWS under Section 7 of the ESA regarding potential impacts of DAF activities and future activities on the desert tortoise at Edwards AFB. USFWS has issued *Biological Opinion for Operations and Activities at Edwards Air Force Base, California* (8-8-14-F-14) (USFWS, 2014). This BO is the current BO that governs DAF activities on Edwards AFB with respect to the desert tortoise and designated critical habitat. The BO provides criteria for determining the potential effect of a proposed action on the desert tortoise (**Table 3-8**).

Table 3-8 Criteria for Impacts to Desert Tortoise and Critical Habitat

Criteria for a Not Likely to Adversely Affect Finding for the Desert Tortoise or its Critical Habitat
1) Projects in which any effects would occur outside of desert tortoise habitat would have no effect on the species.
2) If the following criteria are met: a) The project is within habitat of the desert tortoise; b) Desert tortoise habitat is present, but degraded or disturbed, in the project area. The loss or disturbance of a minor amount of undisturbed habitat may also be considered as being not likely to adversely affect the species, when considered with regard to its distribution in the action area; and c) Neither desert tortoises nor their diagnostic sign are observed during surveys or a habitat assessment.
3) If the following criteria are met for critical habitat for the desert tortoise: a) The project is within designated critical habitat, but the primary constituent elements of desert tortoise critical habitat are not present; b) The primary constituent elements would not be affected by the proposed project; or c) Effects to the primary constituent elements would be so minor that they are not substantially measurable when considered within the context of the critical habitat unit. Such effects may occur, for example, when a narrow strip of land supporting the primary constituent elements of critical habitat at the edge of an existing road may be affected by an action.

Source: USFWS, 2014

3.5.2.2 Proposed Action

Vegetation

Under the Proposed Action, the DAF has estimated the maximum footprint (project laydown area) of the proposed projects would be approximately 7,707,578 ft^2 or 177 acres. However, most of the projects would occur on existing disturbed areas, including buildings that would be demolished. Projects 2, 4, 5, 7, 8 and 10 would be almost exclusively within existing disturbed areas. Some additional disturbance may occur around the perimeter of these project sites but would not be a substantial area (approximately one to two acres for all five projects). Projects 2, 4, 5, 7, and 8 occur in creosote bush vegetation and would have no discernible impact on vegetation. Project 9 also occurs in creosote bush vegetation and would pave a portion of North Arrow Road and construct an adjacent cement pad on previously disturbed land. Project 9 would potentially disturb a maximum of 8.6 acres of creosote bush vegetation depending on the final road width. The current unpaved road is approximately 15 feet wide. Project 1 is the construction of an AFRL Central Operation Facility and would include the demolition of 11 buildings. Approximately 60 to 65 acres of Joshua tree woodland vegetation would potentially be disturbed for the construction of Project 1 depending on the final design and layout of the facility. Project 3 would repair critical infrastructure along Mercury and Mars Boulevards. Project 3 occurs in both creosote bush and Joshua tree woodland vegetation. The footprint of these infrastructure projects would be approximately 43 acres. Most of this area is along existing paved roads and may include additional disturbance along the roads to accommodate utility repairs or upgrades. Approximately four to five acres of new disturbance may occur in Joshua tree woodland in the vicinity of Project 1. Project 10 occurs in Joshua tree woodland vegetation but involves modernizing an existing facility and would include minimal disturbance to the surrounding vegetation. Implementation of the Proposed Action would result in long-term, minor, adverse impacts to vegetation.

Wildlife

As discussed under impacts to vegetation, most of the Proposed Action would be implemented on previously disturbed or developed sites. Implementation of Project 1 would potentially disturb up to 60 to 65 acres of undisturbed Joshua tree woodland wildlife habitat. Potential impacts to small mammals and reptiles are expected to be negligible and insignificant as large areas of similar habitat occur in the region surrounding Project 1. Larger species and migratory birds would move to adjacent areas. Clearing vegetation during the non-breeding and nesting seasons would avoid potential impacts to migratory birds. Pre-construction surveys for nesting birds and bats would be done on an individual basis if land disturbance was performed during the nesting season. Land disturbances along existing roads and on the perimeter of existing developed areas would disturb lower quality habitat as these areas are currently more likely to be avoided by many wildlife species because of the existing adjacent disturbed areas. Implementation of the Proposed Action would result in long-term, minor, adverse impacts to wildlife.

Threatened or Endangered Species

The desert tortoise is the only federally listed species in the ROI. However, in January 2025, the Mohave ground squirrel was petitioned for federal listing. The petition is currently under review. During the review process, the Mohave ground squirrel maintains the same protection as a listed species until a determination is made. There is a high likelihood that the Mohave ground squirrel would be observed throughout the ROI with potential to occur or be observed within any of the project areas. Edwards AFB would monitor for the presence of the Mohave ground squirrel and

adhere to identified federal protection requirements while the petition is under review. Once a decision is made, Edwards AFB would adhere to applicable requirements for protection of the Mohave ground squirrel before, during, and after implementation of the Proposed Action.

The desert tortoise occurs throughout the AFRL District. Project 1 would potentially disturb up to 60 to 65 acres of tortoise habitat. Project 3 may disturb tortoise habitat along Mars and Mercury Boulevards. Project 9 is the only project in the Proposed Action that is in designated desert tortoise critical habitat. Project 9 would disturb a maximum of 8.6 acres of creosote bush vegetation depending on the final width of the paved road. Desert tortoises could be accidentally injured or killed during land clearing or potentially relocated if found during pre-construction surveys. The criteria in the BO were applied to the individual project components in the Proposed Action analyzed in this EA (see **Table 3-8**). Projects 2, 4, 5, 7, 8 and 10 would be almost exclusively within existing disturbed/developed areas (see **Figures 2-1** and **2-4** in **Appendix A**). Some additional disturbance may occur on the perimeter of these locations but would not have a discernible effect on tortoises or tortoise habitat. Project 3 involves the repair and upgrade of infrastructure along Mercury and Mars Boulevards (see **Figures 2-1** and **2-2, Appendix A**). Project 3 activity would occur along existing roads. As described in **Table 3-8**, Criterion 3c would affect a narrow strip of land supporting the primary constituent elements of desert tortoise habitat and would not adversely affect the desert tortoise or its habitat. Project 6 is located between an existing paved road and a shallow excavated area that has regrown with shrubs. The site contains a paved pull-out area and is mostly disturbed or degraded. None of these eight projects occurs within designated desert tortoise critical habitat. The DAF has determined that these eight projects are not likely to adversely affect the desert tortoise based on Criterion 2 in **Table 3-8**. Project 9 occurs in designated critical habitat for the desert tortoise and contains creosote bush vegetation. The estimated maximum size of Project 9 is approximately 11.3 acres and involves the paving of an existing dirt road and construction of a concrete pad. The concrete pad would be constructed in a previously disturbed area with degraded or no vegetation. The existing dirt road is approximately 10 ft wide. The road likely would be widened, with vegetation removed along the side of the existing road, and a turnaround area would be cleared at the end of the paved section (see **Figure 2-3, Appendix A**). The DAF has determined that Project 9 is not likely to adversely affect the desert tortoise and designated critical habitat based on Criteria 2b and 3c in **Table 3-8**.

Project 1 potentially would disturb up to approximately 60–65 acres of undisturbed desert tortoise habitat along Mars Boulevard (see **Figure 2-1, Appendix A**). Any desert tortoises found in this area during pre-construction surveys would be relocated. The DAF has determined that the potential disturbance of this area, the potential for having to relocate desert tortoises, and the potential for injury or mortality of tortoises during land clearing are likely to adversely affect the desert tortoise and its habitat. Project 1 does not occur within critical habitat designated for the desert tortoise.

Under the existing BO, the DAF does not consult with the USFWS on a project-by-project basis but rather implements the agreed-upon terms and conditions in the BO through authorized biologists. For all the projects within the Proposed Action, regardless of their potential effect on desert tortoises or their habitat, the DAF would maintain records of the project name, description of the proposed action, the location, and size.

Under the auspices of the BO, the DAF provides the USFWS with an annual report that includes all activities that occur across the Base. The activities occurring under the Proposed Action would be included in the annual report for the year in which the activity occurred. The annual report

would include the information that the DAF maintains in its records for any activity it determined was likely to adversely affect the desert tortoise or its critical habitat. The annual report would be provided to the USFWS by 31 January for each year that the existing BO is in effect. Further, to monitor the impact of incidental take, the DAF would report the progress of the Proposed Action and its impact on the desert tortoise to USFWS as specified in the incidental take statement (50 CFR § 402.14(i)(3)).

The DAF has implemented a set of standardized minimization measures to protect desert tortoises and conserve their habitat, which are applied selectively through the NEPA analysis process (**Appendix D**). These measures have been developed through numerous previous consultations with USFWS. With the implementation of these protective measures, including reporting requirements, as well as compliance with requirements for disposition of dead or injured specimens as outlined in the BO, the DAF would maintain protective coverage and fulfill its requirements under Section 7 of the ESA for this Proposed Action.

California Species of Special Concern

Impacts to species of concern have the potential to occur during construction, renovation, and demolition activities, as ground disturbance would be expected. Project laydown areas have been identified for each project and include the maximum location in which ground-disturbing activities have the potential to occur. Project 1 would result in 60–65 acres of new ground disturbance, while the laydown areas for Projects 2–10 have been previously disturbed. Suitable conditions for species of concern may be present in all project laydown areas. If any species of concern are identified within project laydown areas prior to and during construction, Edwards AFB would implement BMPs to prevent adverse impacts. BMPs could include establishing exclusion zones around occupied areas; avoiding areas with burrows for the Mohave ground squirrel or burrowing owl; and avoiding desert cymopterus, monardella, and crowned onion plants.

Pre-construction surveys for the desert tortoise for Project 1 would also include observation for the desert cymopterus, Mohave ground squirrel, and burrowing owl. No current observations for these species have been made in the proposed site for Project 1.

Impacts to species of concern are expected to be negligible and not significant. The Joshua tree is protected under the *California Western Joshua Tree Conservation Act* and the California ESA for which BMPs have been identified within the Edwards AFB *Integrated Natural Resources Management Plan* and agreed upon by the USFWS and CDFW. Further, Edwards AFB adheres to the requirements set forth in the BO for the desert tortoise, and the Mohave ground squirrel is currently petitioned for federal listing and therefore under protection. Therefore, long-term, negligible, adverse impacts to species of concern would occur under implementation of the Proposed Action.

3.5.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. There would be no changes to biological resources beyond baseline conditions; therefore, no impacts to any biological resources would occur.

3.5.2.4 Reasonably Foreseeable Effects

The development of Projects 2, parts of Project 3, Projects 4, 5, 7, 8, and 10 in the Proposed Action would occur in previously developed areas or would only affect a narrow strip of land along

existing roads. A small portion of desert tortoise critical habitat would be paved under Project 9. However, the road and area where the concrete pad would be constructed is currently utilized, and implementation of the Proposed Action would not result in use that would substantially differ from the current use.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Edwards AFB as identified in **Table 3-1**, the potential disturbance of 60–65 acres associated with Project 1 and pavement associated with Project 9 would have long-term, adverse but minor reasonably foreseeable effects to biological resources.

3.6 WATER RESOURCES

The ROI for water resources is the AFRL District.

3.6.1 Affected Environment

3.6.1.1 Surface Waters and Wetlands

Waters of the US, also known as jurisdictional waters, including surface water resources as defined at 33 CFR § 328.3, are regulated under Sections 401 and 404 of the *Clean Water Act* (33 USC § 1251 et seq.) (CWA) and Section 10 of the *Rivers and Harbors Act*. Wetlands, as defined by the US Army Corps of Engineers (33 CFR § 328.3) and USEPA (40 CFR § 120.2(c)(1)), deemed "jurisdictional" are regulated under Section 404 of the CWA and states are provided authority to enforce surface water quality standards under Section 401 of the CWA when a federal agency's project requires a Section 404 wetlands permit. Pursuant to the CWA, the CA Water Board sets and enforces quality standards for the state's rivers, streams, lakes, wetlands, ocean, and groundwater. Edwards AFB is located within the Lahontan Regional Water Quality Control Board (CA Water Board, 2025a).

There is no permanent surface water within the ROI outside of a pond located at the fire station. Surface water hydrology at Edwards AFB is ephemeral and is driven by rainfall, with patterns following a basic desert model of extremes: dry and wet years. Surface flows in channels as well as ponds are determined by rainfall events that provide substantial amounts of precipitation for surface water hydrology (Edwards AFB, 2020). Due to infrequent rainfall in the Mojave Desert, the ephemeral systems are wet only intermittently after rainfall occurrences. There are several ephemeral systems that surround the AFRL District area, and one unnamed ephemeral stream that transects the Project 1 laydown area and flows southwest to discharge at evaporation ponds located adjacent to the AFRL District Wastewater Treatment Plant (WWTP) evaporation ponds. The ephemeral systems at Edwards AFB are not protected under the 2020 Navigable Waters Protection Rule of the CWA, as they neither support hydrophytic plant species nor have a dominance of hydric soil types; thus, the system transecting Project 1 is considered non-jurisdictional (Edwards AFB, 2020).

The WWTP evaporation ponds include four ponds that are approximately two acres each and are situated west of Downfall Road. Directly adjacent to the current AFRL District WWTP ponds are evaporation ponds that are made up of six ponds ranging from 0.5 to 0.9 acres. The total number of stormwater ponds is unknown, but various stormwater ponds are and have been in use throughout the main Base and AFRL District. The AFRL District WWTP evaporation ponds are greater than a mile away from the Proposed Action Area, and there are no existing wetlands within the ROI (National Wetlands Inventory, 2026). As such, wetlands are not discussed further in this EA.

3.6.1.2 Stormwater

Stormwater is regulated under the CWA Section 402 NPDES program. A NPDES permit under Section 402 of the CWA is required for discharges into navigable waters. Discharging pollutants from a point source such as a pipe, ditch, or channel into receiving waters without a NPDES permit is prohibited under the CWA. The permit limits discharge, monitoring, and reporting requirements to ensure that the discharge does not negatively impact water quality and public health. The CA Water Board and nine regional water quality control boards issue NPDES permits to any entity engaging in industrial or construction activities that discharge pollutants into receiving water. Edwards AFB does not discharge stormwater to waters of the US and is not required to attain coverage under California NPDES stormwater permits (DAF, 2002).

Under the *Energy Independence and Security Act*, federal facility projects larger than 5,000 ft^2 must maintain or restore, to the maximum extent feasible, the predevelopment hydrologic conditions of the property. The ROI discharges to open desert where discharge flow rates are low due to minimal precipitation and high evaporation rates (Edwards AFB, 2024c; US Geological Survey [USGS], 2002).

3.6.1.3 Groundwater

Most of the water supply for the AFRL District is supplied by the Antelope Valley East Kern Water Agency (AVEK) and is provided in drinking water quality form. The AVEK mainly sources water from the California Aqueduct and is alternatively supplied by the State Water Project, which is water stored in the aquifer at various underground storage facilities. This water is extracted as local groundwater for water quality purposes or as supply during drought. Groundwater may also be extracted from active installation wells that are fed by the Antelope Valley aquifer. These wells provide drinking water to the Base and serve as a backup source to the AVEK supply (Edwards AFB, 2023a).

There are three active water production wells within the ROI. The AFRL District Well Field is located east of Rogers Dry Lake and north of the El Mirage Fault. All the wells are drilled and constructed in the Middle Aquifer of the Lancaster Sub-basin. The California Department of Health recommended that the Main Base District and AFRL District water supply wells always be maintained in operable conditions as part of a Six- Month Contingency Plan to address short- and long-term disruptions in State Water Project water supplies (Edwards AFB, 2020).

Groundwater has been impacted at four major sites due to the release of mission-related contaminants during historic operations. Groundwater monitoring wells have been, and continue to be, installed and sampled to define and characterize the extent of groundwater plumes in the ROI (**Figure 3-6, Appendix A**). Based off investigations into the contaminants of potential concern, migration of contaminants to drinking water supply wells both on-and-off the Base has not been detected. However, sampling results analyzed in 2021 indicated the presence of contaminants of potential concerns, including perchloroethylene, trichloroethylene, n-nitrosodimethylamine, and perchlorate that exceeded their respective screening levels in groundwater wells sampled around the AFRL District area (Edwards AFB, 2021).

3.6.1.4 Floodplains

EO 11988, *Floodplain Management*, provides guidelines that agencies should follow as part of their decision-making process on projects that have potential impacts to, or within, the floodplain. This EO requires that federal agencies avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid direct

and indirect support of floodplain development wherever there is a practicable alternative. If there is no way to avoid impacts to a floodplain, agencies are required to prepare a FONPA to accompany the FONSI. EO 13690, *Establishing a Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder Input*, established a Federal Flood Risk Management Standard and a process for further soliciting and considering stakeholder input; however, this EO was later revoked by Section 6 of EO 13807, *Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure*. EO 13807 did not revoke or otherwise alter EO 11988.

Flood hazards exist with each type of flooding that occurs at Edwards AFB: flooding associated with channels, shallow flooding, and inundation caused by ponding. Analysis of flood hazards at Edwards AFB is difficult to compute due to minimal existing streamflow and precipitation data, extremely arid temperatures, and poorly defined channels. Highly variable precipitation, combined with high evaporation losses and moderate to very high soil permeability, makes the ephemeral channels on Edwards AFB highly unpredictable compared to streams with perennial flows (USGS, 2002).

Approximately 10 acres of the ROI are located within a Zone AE, 100-year floodplain, with seven of those acres making up the channel that transects the Project 1 laydown area (**Figure 3-7, Appendix A**). This defined natural channel (with minor construction modifications) overlays an undeveloped floodplain and is the main drainage channel conveying water flow away from the developed industrial area of the AFRL District. The channel conveys flow in a south-southeasterly direction to a short-constructed diversion, just upstream of Mars Boulevard, which directs flow to three 18-inch parallel corrugated metal pipe culverts beneath Mars Boulevard, located at the downstream end of the AFRL District designated for flood assessment (Desert Research Institute, 2004).

While the USGS has documented inability to compute specific flood frequencies due to the scarcity of historical streamflow and precipitation data at Edwards AFB, as well as the area's extreme aridity, the 100-year floodplain is still a relevant concept for safety and infrastructure planning.

3.6.2 Environmental Consequences

3.6.2.1 Evaluation Criteria

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. In general, potential adverse impact(s) to water resources may include

- fill or dredge of jurisdictional waters of the US subject to Sections 401 and 404 of the CWA;
- the unauthorized release of contaminants into an “impaired” waterbody subject to a Total Maximum Daily Load, or the calculation of the maximum amount of a pollutant allowed to enter a waterbody where the waterbody will meet and continue to meet water quality standards for that particular pollutant;
- noncompliance with applicable stormwater management requirements for the prevention, control, and minimization of erosion and sedimentation;
- development within a 100-year floodplain without full consideration of alternatives and methods that would avoid, prevent, or minimize adversely affecting its functional value; and

- the unmitigated release of a regulated contaminant into the environment with potential to enter groundwater.

3.6.2.2 Proposed Action

Surface Water

There are no permanent natural streams or rivers located within the ROI. One unnamed ephemeral stream transects the Proposed Action Area in the Project 1 laydown area, and several unnamed ephemeral streams surround the ROI in all directions. Under the Proposed Action, buildings in the Project 1 laydown area would be demolished and replaced with the Central Operations Facility project. The unnamed ephemeral stream runs along the eastern boundary of the proposed Project 1 laydown area and would be approximately 450 ft east of the area where construction activities would occur. Additionally, the footprint of construction disturbance involved is considered minimal at an estimated 5 acres (220,000 ft^2). Planned linear infrastructure involving paving and grading would have the potential to disrupt the movement of the ephemeral stream, disrupting rates of flow. Streams at the Base only retain water during precipitation events and are prone to rapid evaporation; however, these streams are vital for minimizing infrastructure damage during intense storm events by draining stormwater runoff and reducing flooding. The potential for runoff from construction, renovation, and demolition sites during high-intensity events would be managed through the application of BMPs such as using drainage systems to direct stormwater. With the use of BMPs, impacts to rates of flow with the implementation of the Proposed Action would be unlikely.

Any substantial changes that affect storm drains, ponds, and ephemeral streams in the project area would follow requirements in the Base's stormwater management plan. In addition, the potential for runoff from initial construction and long-term research and testing activities would be managed through the implementation of BMPs as described in the **Stormwater section** below. Under the Proposed Action, long-term, minor, adverse impacts to surface waters would be anticipated to occur due to the increase in impervious surfaces.

Stormwater

Implementation of the Proposed Action would add approximately 375,000 ft^2 of impervious surfaces to the ROI with the construction of new facilities and test pads and the paving of new roadways and parking areas. This increase would occur in areas that currently contain impervious cover from existing facilities, roads, or parking lots, but may potentially affect current stormwater runoff drainage patterns. Additionally, the increase in impervious surfaces may result in an increase of stormwater runoff in the area. Managing stormwater with BMPs and the implementation of the Edwards AFB Stormwater Management Plan would minimize the impact of stormwater runoff throughout the development process of the Proposed Action. BMPs for stormwater management include maintaining grading and topography at project locations, utilizing stormwater drainage through the numerous, existing, unlined channels and ephemeral streams at Edwards AFB, and adhering to and implementing BMPs for construction and post-construction stormwater management in accordance with the USEPA's National Menu of Best Management Practices (BMPs) for Stormwater or other technical guidance.

Activities resulting in ground disturbance of one or more acres of soil, or any disturbance that is less than one acre but is part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities. Though Edwards AFB

does not discharge into "waters of the US," the disturbance of land greater than one acre would require Edwards AFB to obtain a Construction Stormwater General Permit. A Notice of Intent with jurisdiction of where the proposed project impacts would occur, and the application fee would need to be submitted to the Lahontan Regional Water Quality Control Board that oversees the district in which Edwards AFB resides (CA Water Board, 2025b).

With the use of BMPs during and after construction, and implementation of design standards to manage increases in stormwater runoff and to limit opportunities for stormwater contamination, long-term, minor, adverse impacts to stormwater would have the potential to occur with implementation of the Proposed Action.

Groundwater

Under the Proposed Action, groundwater infiltration within the ROI would be decreased by the increase in the overall impervious area resulting from construction and development activities. However, implementing BMPs to limit deep excavations, utilization of stormwater ponds and infiltration basins, and installing barriers and buffers would minimize impacts to groundwater during construction activities. Overall, negligible impacts to groundwater aquifers would be anticipated from changes to groundwater infiltration or groundwater recharge under the Proposed Action.

Ground disturbance would occur over a previously developed area of the ROI with the expansion of pavements, roadway improvements, grading, and construction of new structures. During redevelopment and construction, heavy machinery and chemicals may be used to support development. Due to the testing and research operations expected to occur post-development, heavy machinery and chemicals may be used during AFRL District missions. Groundwater is recharged through the permeation of surface and stormwater precipitation; as such, groundwater would have the potential to become contaminated during short-term construction and during long-term operations of the AFRL District if contaminated stormwater reached the groundwater supply. Edwards AFB would implement BMPs to manage stormwater runoff, thereby reducing the potential contamination of groundwater resources.

Development-related construction may potentially necessitate the relocation of existing monitoring wells and remediation of groundwater contamination. Contaminated groundwater plumes surround the entire Projects 1, 2, 4, 5, and 6 laydown areas and encompass the southern end of the Project 3 laydown area and northeastern side of the Project 10 laydown area. Edwards AFB installs and decommissions monitoring wells based on site-specific data and outcomes of ongoing assessments. There are currently monitoring wells present in the Project 1 (five wells), Projects 2 and 4 (one well), Project 3 (three wells), and Project 10 (two wells) laydown areas (see **Figure 3-6** in **Appendix A**). Due to the depth of the solvent plumes, exposure to the solvent fumes in the laydown areas would not be anticipated. However, monitoring wells within the project laydown areas may provide a path for direct exposure to workers who may have direct contact with the monitoring well. Any contaminated groundwater encountered during construction, demolition, or renovation activities would be managed according to state and federal regulations to ensure protection of water resources and human health. Therefore, implementation of the Proposed Action would be anticipated to result in both short-term and long-term, negligible, adverse impacts to groundwater.

Floodplains

There is one floodplain located within the ROI, specifically in the Project 1 laydown area. Construction within the 100-year floodplain is permissible, but it requires strict adherence to regulations and guidelines to ensure safety and minimize flood risks. Such regulations and BMPs could include, but would not be limited to, the construction of structures above the base-flood elevation (that is, the elevation of surface water that results from a flood that has a one-percent chance of equaling or exceeding that level in any given year), dry- (preventing or limiting water from entering a building) or wet-proofing of foundations, and use of permanent tie-downs of non-structural equipment such as propane tanks or wash racks. Prior to construction and renovation, Edwards AFB would consult current floodplain regulations to ensure that development designs maintain compliance and that the construction and renovation would not result in adverse impacts to floodplains without proper mitigation.

As described in the **Stormwater section** above, Edwards AFB would implement BMPs to manage the flow and outfall of stormwater due to increased impervious surfaces and impediments to reduce adverse impacts to floodplains. With adherence to regulations and implementation of BMPs, long-term, moderate, adverse impacts to 100-year floodplains would be anticipated to occur with implementation of the Proposed Action; accordingly, a FONPA for the Proposed Action would be required.

3.6.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. There would be no changes to water resources in the ROI beyond baseline conditions; therefore, no impacts to water resources would occur.

3.6.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to surface water and stormwater and long-term, moderate, adverse impacts to groundwater and floodplains; no impacts to wetlands would occur. The projects identified in **Table 3-1** evaluate the construction of additional facilities, parking, structures, and/or other impervious surfaces within or adjacent to the ROI for water resources. The Edwards AFB Main Base District Plan EA and the Edwards AFB South Base District Plan EA involve further development of new and existing facilities at the Base. The increase in impervious surfaces would be anticipated to increase the potential for stormwater runoff at the Base when combined with the impervious surfaces that would be added under the Proposed Action. However, improvements to stormwater infrastructure management would be expected to occur before and after construction of these projects by implementing temporary and permanent control measures that reduce stormwater runoff and improve water quality and drainage; thus, resulting in long-term, minor, beneficial, reasonably foreseeable impacts to stormwater infrastructure management throughout Edwards AFB.

The Indian Wells Valley Groundwater Authority (IWVGA) Imported Water Pipeline Project would divert water managed by AVEK from California City to Ridgecrest. The diversion may impact the distribution of water supplied by AVEK and may place a higher demand on the extraction of drinking water from active groundwater wells on the Base, resulting in a disruption to groundwater recharge rates. Additionally, the IWVGA Imported Water Pipeline Project would likely occur during the implementation of the Edwards AFB Main Base and South Base District Plans and may further impact drinking water supply and demand when considered with the

potential increase of personnel under the listed projects, which may result in long-term, minor, adverse, reasonably foreseeable impacts to groundwater.

3.7 CULTURAL RESOURCES

The ROI for cultural resources is considered equivalent to the Area of Potential Effects (APE), as defined at 36 CFR § 800.16(d). The APE is influenced by the scale and nature of each undertaking and may be different for various kinds of effects caused by the undertaking. Types of potential effects include those that are physical, visual, auditory, and/or atmospheric. The physical APE for the Proposed Action includes all places where construction would occur or equipment or material would be staged, and any other locations where ground-disturbing activity would potentially take place, all of which are encompassed by the project laydown areas for each of the 10 projects included under the Proposed Action. The visual APE, which also considers potential auditory, atmospheric, and reasonably foreseeable effects, includes a 0.5-mile radius from project laydown areas for projects under the Proposed Action with aboveground visual modifications that potentially could be within the line of sight from a historic property. Projects with a visual APE include Project 1 and Projects 6–10. The APEs are depicted on **Figure 3-8** in **Appendix A**.

3.7.1 Affected Environment

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 EOs, including the *Archaeological and Historic Preservation Act of 1974*, as amended (54 USC § 300101 et seq.), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). NHPA Section 106 requires all federal agencies to consider effects of federal undertakings on historic properties prior to deciding on or taking an action and integrate historic preservation values into their decision-making process. The term *historic properties* specifically refers to those listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing.[8] When a federal agency determines that an undertaking would cause an adverse effect to a historic property, the agency must seek to avoid, minimize, or mitigate such effects (36 CFR § 800.1(a)). NHPA Section 106 also requires agencies to consult with federally recognized American Indian tribes that have previously expressed interest in being notified or consulted regarding undertakings in the region.

Ordinarily, cultural resources less than 50 years old are not considered for NRHP eligibility. However, such properties would qualify if they are integral parts of districts that do meet the criteria or if they fall within identified categories, referred to as "criteria considerations" (36 CFR § 60.4). For example, resources on DoD property constructed prior to the end of the Cold War in December 1991 could still be considered eligible under criterion consideration "g" if associated

[8] To be eligible for the NRHP, properties must be at least 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 NRHP criteria for evaluation.

with the Cold War despite its age being less than 50 years, should its historical significance and aspects of integrity deem it eligible.

For the purposes of this analysis, cultural resources yet to be evaluated for NRHP eligibility were treated as NRHP eligible.

Edwards AFB has an *Integrated Cultural Resources Management Plan* that provides direction for the protection and management of cultural resources on the Installation in compliance with the NHPA and other legal requirements (Edwards AFB, 2022). It also describes an overview of previous cultural surveys undertaken by Edwards AFB to identify historic properties and a general overview of known cultural resources. Specific relevant cultural resources data was reviewed from the Edwards AFB cultural resources geographical information system (GIS) database.

3.7.1.1 Archaeological Resources

The analysis of archaeological resources in this EA is limited to the physical APE, as implementation of the Proposed Action would not introduce visual, auditory, or atmospheric elements capable of altering the condition of known archaeological sites within the AFRL District. To date, all areas within the physical APE have been subject to systematic archaeological investigation, including 28 separate surveys (**Appendix E**), and excluding areas that have been previously developed or mechanically disturbed by past Installation activities to depths exceeding those anticipated under the Proposed Action. There are three previously recorded archaeological sites located at least partially within the laydown areas associated with Projects 3, 5, and 9 (**Table 3-9**), all of which are currently unevaluated for NRHP eligibility.

Table 3-9 NRHP-Unevaluated Archaeological Sites within the Physical APE

Edwards AFB Site ID	California OHP ID	Site Type	NRHP Status	Proposed Action Project
EAFB-1206	CA-KER-3097	Prehistoric	Unevaluated	Project 3
EAFB-1287	CA-KER-3454H	Historic	Unevaluated	Project 5
EAFB-2319	CA-SBR-8847	Prehistoric	Unevaluated	Project 9

AFB = Air Force Base; APE = Area of Potential Effects; ID = identification; OHP = Office of Historic Preservation; NRHP = National Register of Historic Places

3.7.1.2 Historic Architectural Resources

There are 131 buildings and structures located within the physical and visual APE that are known to have been constructed prior to 1992; 18 have unlisted construction dates in Edwards AFB records. The NRHP status of each building includes 4 that are individually eligible, 34 that are contributing elements of eligible historic districts, 83 that have been previously determined ineligible, and 28 that are currently unevaluated for eligibility (including 9 buildings with no construction dates listed). In addition, there are 12 historic architectural resources and 3 modern buildings within the physical APE that would be subject to demolition or physical modification in some form. Therefore, 66 architectural resources are carried forward for analysis of potential effects (**Appendix E**).

3.7.1.3 Traditional Cultural Properties

No Traditional Cultural Properties (TCPs) have been identified on Edwards AFB to date, and no surveys have been conducted to specifically identify sacred sites on the Installation. Edwards AFB and the DAF recognize the rights of Native American tribes to access religious sites and objects on lands under DAF control and to practice traditional religious activities within the limitations of the military mission. To facilitate and maintain ongoing government-to-government relations,

Edwards AFB identified and coordinated with the following six federally recognized tribes with ancestral ties to Installation lands to consult on the DAF's definition of the APEs and its determination of effects under the Proposed Action:

- Chemehuevi Indian Tribe
- Colorado River Indian Tribes
- Fort Independence Indian Community of Paiute Indians
- Morongo Band of Mission Indians
- Tejon Indian Tribe
- Yuhaaviatam of San Manuel Nation

There were no areas of concern for cultural resources identified by the tribes during scoping for the Proposed Action. Therefore, TCPs are not discussed further in this EA. Tribal scoping correspondence can be found in **Appendix B**. Any necessary consultation would occur during the Section 106 process as identified in **Section 3.7.1**.

3.7.2 Environmental Consequences

3.7.2.1 Evaluation Criteria

Adverse impacts to cultural resources would occur if the Proposed Action

- physically alters, damages, or destroys all or part of a resource;
- alters the characteristics of the surrounding environment that contribute to the resource's significance;
- introduces visual or audible elements that are out of character with the property or that alter its setting;
- neglects the resource to the extent that it deteriorates or is destroyed; or
- results in 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 the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, -eligible, or -potentially eligible resource or potentially impacts TCPs.

3.7.2.2 Proposed Action

Archaeological Resources

Under the Proposed Action, all laydown areas associated with Projects 1–10 either have been previously surveyed or have been previously developed or mechanically disturbed by past Installation activities to depths exceeding those anticipated under the Proposed Action. Three archaeological sites (EAFB-1206, EAFB-1287, and EAFB-2319) unevaluated for NRHP eligibility underlay portions of the laydown areas for Projects 3, 5, and 9. Section 106 consultation for Projects 1–10 was initiated with the SHPO on 11 September 2025. At this time, Projects 1–10 are not individually or cumulatively considered an undertaking, and the SHPO requested that consultation be initiated on an individual basis for each project as it progresses to the status of an undertaking, as defined at 36 CFR § 800.16(y). Therefore, Section 106 consultation would be re-initiated on a project-by-project basis, and determinations of eligibility for sites EAFB-1206, EAFB-1287, and EAFB-2319 would be made prior to or during the Section 106 process. Based on current information, adverse impacts to known archaeological sites are not anticipated.

Historic Architectural Resources

Visual, Auditory, and Atmospheric Effects

Under the Proposed Action, the 66 architectural resources carried forward for analysis would be located within the visual, auditory, and atmospheric APE. The Proposed Action is not anticipated to introduce new atmospheric emissions beyond baseline conditions, and auditory effects would be temporary and localized (e.g., construction noise). Visible changes to the built environment would occur; however, such changes would be characteristic of routine Installation development, and the overall character of the setting would not be altered. Section 106 consultation for Projects 1–10 was initiated with the SHPO on 11 September 2025. At this time, Projects 1–10 are not individually or cumulatively considered an undertaking, and the SHPO requested that consultation be initiated on an individual basis for each project as it progresses to the status of an undertaking, as defined at 36 CFR § 800.16(y). Therefore, Section 106 consultation will be re-initiated on a project-by-project basis. Based on current information, adverse visual, auditory, and atmospheric impacts to architectural resources are not anticipated.

Physical Effects

Under the Proposed Action, two buildings within the physical APE each are contributing elements of a NRHP-eligible historic district (B8620 and B8582). B8620 is associated with Projects 2 and 4 and B8582 is associated with Project 5. Implementation of Project 2 would include the establishment of a resource processing system at B8620. Implementation of Project 4 would include the establishment of a test development facility, also at B8620. Implementation of Project 5 would include the establishment of a modular adaptable test facility at B8582. While B8620 and B8582 are contributing elements of an NRHP-eligible district, the proposed interior modifications associated with each project would not adversely affect the individual buildings nor the district of which they are contributing elements. Section 106 consultation for Projects 1 through 10 was initiated with the SHPO on 11 September 2025. At this time, Projects 1–10 are not individually or cumulatively considered an undertaking, and the SHPO requested that consultation be initiated on an individual basis for each project as it progresses to the status of an undertaking, as defined at 36 CFR § 800.16(y). Therefore, Section 106 consultation will be re-initiated on a project-by-project basis. Based on current information, adverse physical impacts to architectural resources are not anticipated.

Summary of Consequences to Cultural Resources

The APE for Projects 1–10 either has been previously surveyed or is located within areas of prior disturbance. Section 106 consultation for Projects 1–10 was initiated with the SHPO on 11 September 2025. At this time, Projects 1–10 are not individually or cumulatively considered an undertaking, and the SHPO requested that consultation be initiated on an individual basis for each project as it progresses to the status of an undertaking, as defined at 36 CFR § 800.16(y). Therefore, Section 106 consultation will be re-initiated on a project-by-project basis. Based on current information, adverse impacts to known cultural resources are not anticipated.

In accordance with federal and DAF regulations, should any previously unidentified cultural resources or human remains be encountered during ground-disturbing activities within the APE, the DAF would act in accordance with the inadvertent discovery of cultural resources procedures outlined in the Installation's *Integrated Cultural Resources Management Plan.* This would minimize damage to resources and ensure that development is conducted in accordance with applicable laws and requirements (Edwards AFB, 2022). Immediately upon inadvertent discovery, all activities in the vicinity of the discovery would cease and the location would be secured by

establishing a 25-foot buffer zone around the discovery. Notification procedures would then be followed so that the Installation Cultural Resources Manager, the Installation Commander, and the Base Civil Engineer can make the appropriate decisions to proceed in accordance with federal laws and regulations. Additionally, the SHPO and all appropriate stakeholders would be notified.

3.7.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. Furthermore, as most of the structures are 40 years old or older, the current capabilities in the AFRL District would eventually decrease as facilities become obsolete and unrepairable. There would also be no new construction to support expansion of the area for new incoming programs and existing facilities would not be utilized for these programs. The full spectrum of DoD test and evaluation requirements for the foreseeable future and beyond in accordance with DoD Directive 3200.11 would not be achieved. Cultural resources would remain in their current state. Therefore, there would be no adverse effects to historic properties under the No Action Alternative.

3.7.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action would be anticipated to result in no adverse effects to historic properties. Several of the projects listed in **Table 3-1** include grading or construction actions of various sizes and scales that would occur on Edwards AFB. Disturbance of these soils would have the potential to harm or destroy archaeological sites, if present. These projects would include projects evaluated under the proposed Main Base District Plan EA and the South Base District Plan EA, the Perimeter Road Runway 23R project, and the SCE Company's Cal City Substation 115 kV Upgrade Project which would cross onto Edwards AFB property. In addition, all projects listed in **Table 3-1** include elements of construction, renovation, and demolition that could alter the setting of historic buildings, the effects of which could be physical, visual, auditory, and/or atmospheric. When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Edwards AFB, no reasonably foreseeable effects to cultural resources would be anticipated to occur with implementation of the Proposed Action.

In accordance with federal and DAF regulations, should any previously unidentified cultural resources or human remains be encountered during ground-disturbing activities within the APE, the DAF would act in accordance with the inadvertent discovery of cultural resources procedures outlined in the *Integrated Cultural Resources Management Plan* (Edwards AFB, 2022) to minimize damage to resources and to ensure that applicable laws and requirements are identified and met. Immediately upon inadvertent discovery, all activities in the vicinity of the discovery would cease and the location would be secured by establishing a 25-ft buffer zone around the discovery. Notification procedures would then be followed so that the Installation Cultural Resources Manager, the Installation Commander, and the Base Civil Engineer can make the appropriate decisions to proceed in accordance with federal laws and regulations. Additionally, the SHPO and all appropriate stakeholders would be notified. Further, additional consultation with tribes and the SHPO may be required in the event of an inadvertent discovery of cultural resources.

3.8 NOISE

The ROI for noise is a 1-mile area around the project laydown areas within the AFRL District of Edwards AFB.

3.8.1 Affected Environment

Noise and sound levels are expressed in logarithmic units measured by decibels (dB). A sound level of 0 dB is barely audible under extremely quiet listening conditions, while normal speech equates to a sound level of approximately 60 dB, sound levels above 120 dB begin to be felt inside the human ear as discomfort, and sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall, 1995). To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted to de-emphasize very low and very high frequencies to better replicate human sensitivity and is denoted as an A-weighted decibel (dBA). All sound levels presented in this document are in units dBA unless otherwise noted. The *Noise Control Act of 1972* (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. In 1974, the USEPA provided information suggesting that continuous and long-term noise levels greater than 65 dBA are normally unacceptable for noise-sensitive receptors such as residences, schools, churches, and hospitals that make up the Edwards 93523 community district (USEPA, 1974).

As is normal for military installations with a flying mission, the primary driver of noise at Edwards AFB is aircraft operations. The AFRL District is located approximately 10 miles east of the Main Base Complex and the noise environment is dominated by aircraft-generated noise. In addition to aviation noise, some additional noise results from the day-to-day activities from operations, maintenance, and the industrial functions associated with the operations of the AFRL District. These noise sources include the operations of ground-support equipment and other transportation noise from vehicular traffic. Noise from aircraft operations at Edwards AFB remains the dominant noise source.

Housing and community services, which would contain noise-sensitive receptors (e.g., residences, schools, hospitals, parks), are primarily located within the Main Base Complex. The closest population center to the ROI is the City of Boron, which is approximately 5 miles to the north. Due to the location of the AFRL District and ROI within a remote area of Edwards AFB property, there are no noise-sensitive receptors identified within one mile of the proposed project sites.

3.8.2 Environmental Consequences

3.8.2.1 Evaluation Criteria

When evaluating noise effects, several aspects are examined:

- the degree to which noise levels generated by construction and operational activities would be higher than the ambient noise levels;
- the degree to which there would be hearing loss or annoyance; and
- the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source.

An environmental analysis of noise includes the potential effects on the local population and estimates the extent and magnitude of the noise generated by the Proposed Action.

3.8.2.2 Proposed Action

Under the Proposed Action, all project activities would occur entirely within the AFRL District of Edwards AFB. The Proposed Action would result in short-term, intermittent, localized noise impacts during construction, renovation, and demolition activities. The construction and renovation of new facilities, road paving, and utility work would all require the operation of heavy machinery. Sound would be generated from the operation of construction and demolition

equipment and from associated traffic. However, the equipment would be operated intermittently during construction, renovation, and demolition, and potential noise impacts would be short-term and limited to daylight hours during the construction, renovation, or demolition period. The individual projects described under the Proposed Action are likely to be implemented over the span of multiple years, reducing the chance for overlap between multiple areas of construction-related noise within the ROI.

The loudest machinery typically used for construction and demolition activities produces peak sound pressure levels ranging from 86 to 95 dBA at a 50-foot distance from the source (**Table 3-10**). Sound levels typically lessen by approximately 6 dBA per every doubling of the distance from the sound source. The presence of existing buildings also helps to reduce sound levels. At a distance of 1,600 ft, the sound generated from construction and demolition equipment would be less than 67 dBA as recommended by the Federal Highway Administration (2006).

Table 3-10 Sound Levels of Construction Equipment under the Proposed Action from a Distance of 50 Feet

Equipment	Sound Level (dBA)
Bulldozer	85
Scraper	85
Front Loader	80
Backhoe	80
Grader	85
Crane	85

Source: Federal Highway Administration, 2006
dBA = A-weighted decibel

There are no noise-sensitive receptors within 1-mile of the proposed project laydown areas, and the only individuals with the potential to be impacted by construction noise would be workers involved directly in the construction, renovation, or demolition actions, and AFRL District staff. Adherence to standard DAF Occupational Safety and Health regulations that require hearing protection along with other personnel protective equipment and safety training would minimize the risk of hearing loss to construction workers. AFRL District staff may experience intermittent noise from the individual construction actions as they are implemented; however, staff would not be present within the project laydown areas and would not be at risk for hearing loss.

Long-term operational noise levels within the Edwards AFB AFRL District would not be expected to change. The noise environment would continue to be dominated by aircraft noise generated from the Edwards AFB airfield and the operation of the new buildings and testing facilities would not substantially alter these conditions at the AFRL District.

Therefore, short-term, minor, adverse impacts to construction workers within the individual project laydown areas and long-term, negligible, adverse impacts to the noise environment would occur under the Proposed Action.

3.8.2.3 No Action Alternative

Under the No Action Alternative, the proposed development projects would not occur at the AFRL District. Activities occurring within existing facilities would continue to operate per the status quo, and the noise environment would continue to be dominated by aircraft noise. There would be no

short-term noise impacts to workers from the operation of heavy machinery, and noise at the AFRL District would not change from current conditions; therefore, no impacts to noise would occur.

3.8.2.4 Reasonably Foreseeable Effects

Project activities associated with the Proposed Action would result in temporary, localized noise increases. Noise could be compounded by other construction projects identified in **Table 3-1** that would occur concurrently; however, the location of the proposed roadway, infrastructure, and utility improvements in relation to the AFRL District are at a distance that would not result in noticeable increases to the overall noise environment. All developments would be implemented near areas already subject to a high level of noise from aircraft operations, which is the primary source of noise on Edwards AFB and the AFRL District. In order to minimize disturbance to local residences, workplaces, and sensitive receptors, noise reduction measures would be implemented, as required by individual development actions. When considered in conjunction with the effects of other past, present, and reasonably foreseeable actions at the AFRL District, no significant reasonably foreseeable effects to the noise environment would be anticipated with implementation of the Proposed Action.

3.9 Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites

The ROI for this resource is the AFRL District, located in the eastern portion of Edwards AFB.

3.9.1 Affected Environment

3.9.1.1 Hazardous Materials and Wastes

The *Comprehensive Environmental Response, Compensation, and Liability Act* (42 USC § 9601 et seq.) (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA) and the *Toxic Substances Control Act of 1979* (15 USC § 2601 et seq., as implemented by 40 CFR Part 761), sets the definition of hazardous materials (HAZMAT). The Occupational Safety and Health Administration (OSHA) enforces regulations for worker safety, including proper handling and training related to HAZMAT, under 29 CFR Part 1910.

The *Solid Waste Disposal Act*, as amended under the *Resource Conservation and Recovery Act* (42 USC § 6901 et seq.) (RCRA) and further amended by the *Hazardous and Solid Waste Amendments of 1984*, sets the definition of hazardous wastes.

Air Force Policy Directive 32-70, Environmental Considerations in Air Force Programs and Activities, establishes the policy that the DAF is committed to performing the following actions:

- 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.

The procedures and standards governing the issue, supply, use, and/or disposal of HAZMAT, and recordkeeping for safety and legal compliance are established under DAFMAN 32-7002. DAFMAN 32-7002 also provides guidance and procedures on managing hazardous and solid waste and establishes roles, responsibilities, and requirements for the Hazardous Waste Management Plan (HWMP). The Edwards AFB HWMP is updated annually and implements

requirements outlined in DAFMAN 32-7002 in addition to the most current versions of all other applicable DoD and DAF instructions (Edwards AFB, 2024d).

Edwards AFB is responsible for the research, development, test, and evaluation (RDT&E) of new and modified aircraft weapon systems and sub-systems. The RDT&E operations include testing various types of munitions dropped from aircraft and firing small and large caliber weapons. The AFRL District at Edwards AFB manages the RDT&E of liquid and solid rocket motor propellant systems. These vital operations generate waste munitions, solid rocket propellant waste, and used laboratory materials contaminated with solid propellant (Edwards AFB, 2023b). Edwards AFB also generates hazardous waste from several on-site sources including maintenance and repair activities, painting and sandblasting, photo processing, and cleanup of occasional chemical spills (Edwards AFB, 2017).

Edwards AFB is classified as a large-quantity generator (USEPA Identification Number CA1570024504), generating more than 1,000 kilograms of hazardous waste per month (Edwards AFB, 2024d). The Base maintains non-permitted initial accumulation points (IAP) and/or hazardous waste accumulation sites (HWAS) that are co-located with the operations generating the waste (**Figures 3-9** and **3-10, Appendix A**).[9,10] Waste at the IAPs that either reach the volume capacity of 55 gallons or reaches the storage time limit are transferred to HWAS.

Wastes that are at or near their HWAS or IAP time limits are transferred to the Hazardous Waste Support Facility at B4916 where the waste can be stored for up to one year before being manifested and shipped off site for eventual disposal. The Hazardous Waste Support Facility is defined as a storage facility in accordance with Title 22 of the California Code of Regulations 66264.170 and requires a RCRA permit to operate. The Edwards AFB HWMP identifies 1 Hazardous Waste Support Facility, 16 IAPs, and 40 HWAS; none of which are located within the project laydown areas (Edwards AFB, 2024d). Edwards AFB provided GIS data that identifies four hazardous material shops: two located in B8255 and one located in B8354 within the Project 1 laydown area, and one located in B8620 within the Project 2/Project 4 laydown area.

3.9.1.2 Toxic Substances

Toxic substances can be present in the production, use, and disposal of specific chemicals. Edwards AFB maintains operations and procedures manuals that are in accordance with regulations and guidelines specific to toxic substances. While the use of these substances in common materials has been banned for several decades, such substances may still be found in some areas of the Base as described below.

Asbestos

Asbestos is regulated by the USEPA under the CAA, CERCLA, the *Toxic Substances Control Act* (Public Law 94-469) (TSCA), and California Code of Regulations Title 8, Section 1529, *Asbestos*, under the authority of OSHA. In 1981, OSHA issued OSHA 3096, *Asbestos Standard for the Construction Industry*, which defines pre-1981 materials to be more likely to contain asbestos

[9] IAPs are a designated area, typically near the point of waste generation, where hazardous waste is temporarily stored for up to 90 days for large-quantity generators before it is moved to a central accumulation area or shipped off site for disposal. IAPs are regulated by volume, allowing the accumulation of hazardous waste up to 55-gallons and acutely hazardous waste (i.e., wastes that can cause serious illness, injury, or death) up to one quart.
[10] Project laydown areas 3 and 9 do not contain hazardous materials and wastes sites and are therefore not shown on **Figures 3-9** and **3-10** in **Appendix A**.

(OSHA, 2002). While pre-1981 materials are more likely to contain asbestos, the USEPA does not have an asbestos cut-off date. All untested building materials, except unpainted wood, metal, and glass, regardless of age, are also assumed to contain asbestos until testing has proven otherwise. Asbestos can be found in a variety of materials such as floor tiles, mastics and adhesives, popcorn ceiling, roofing materials, joint compound, pipe insulation, and window glazing.

Edwards AFB maintains an Asbestos Management Plan and an Asbestos Operating Plan that detail responsibilities and requirements for identifying, evaluating, and maintaining ACMs. Review of maintenance, renovation, or demolition activities that might disturb asbestos is completed by 412 CEG under the supervision of the designated Asbestos Operations Officer and the Base Asbestos Coordinator to ensure that appropriate measures are taken to prevent release of and exposure to friable (easily crumbled or pulverized) asbestos (Edwards AFB, 2023c, 2015).

Communication with Base personnel confirmed that all buildings within the AFRL District, including those associated with the Proposed Action, are presumed to contain asbestos materials. In addition, 9 of the 19 buildings associated with the Proposed Action have been surveyed and confirmed to contain ACM (**Appendix F**).

Lead-Based Paint

Lead is a naturally occurring heavy metal that has been used in a variety of products including ceramics, pipes, plumbing materials, paint, gasoline, and batteries. In 1978, LBP containing lead levels equal to or higher than 0.06 percent, or 600 parts per million (ppm), was banned after it was found to pose serious health risks, particularly to children. In 2008, this level was reduced to 0.009 percent, or 90 ppm, in accordance with 16 CFR § 1303. Additionally, paint chips containing lead can lead to additional environmental concerns such as the contamination of underlying soil from deteriorating and flaking paint.

Lead is regulated by USEPA and the State of California under the California Code of Regulations, Title 8, *Industrial Relations*, and Title 17, *Public Health*, as well as the California Health and Safety Code. The DAF follows procedures stated in the *Residential LBP Hazard Reduction Act of 1992* (Public Law 102-550), also referred to as Title X, on the use and disposal of LBP on federal facilities. Edwards AFB follows DAFMAN 32-7002 for assigning the roles and responsibilities for lead hazard management and identifying procedures for handling and minimizing the exposure to lead (Edwards AFB, 2014).

Communication with Base personnel confirmed that all buildings within the AFRL District, including those associated with the Proposed Action, are presumed to contain LBP due to age. In addition, 9 of the 19 buildings associated with the Proposed Action have been surveyed and confirmed to contain LBP (**Appendix F**).

Polychlorinated Biphenyls

PCBs are a group of man-made organic chemicals commercially manufactured from 1929 until production was banned in 1979 by the TSCA. PCBs were used in many industrial and commercial applications due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties. Oil containing PCBs is commonly found in older electrical transformers and light fixtures. Many of the products that contain PCBs have been removed from use; however, legacy equipment is occasionally encountered. TSCA regulates the disposal of PCBs at concentrations greater than 50 ppm.

Edwards AFB operates as a facility that uses or stores at least 45 kilograms of PCBs contained within in-service transformers and electrical switches. Under 40 CFR § 761.180, *Records and Monitoring*, Edwards AFB is required to annually prepare and submit a document log summarizing the PCB waste that has been handled and disposed of during the calendar year to USEPA Region 9 (Edwards AFB, 2024d). Edwards AFB does not have any known PCB-containing equipment (e.g., transformers, capacitors, motors) in service or storage that contains PCB levels greater than 50 ppm. Based on the Edwards AFB PCB log, there are no known PCB transformers located within the Proposed Action project laydown areas. However, due to the age and size of Edwards AFB, it is possible that unknown PCB articles and/or items that contain greater than 50 ppm may be found during various projects (Edwards AFB, 2021). If PCBs are found during the development of the Proposed Action, notification would be provided to the Edwards AFB Hazardous Waste Program Manager to ensure appropriate procedures are properly communicated and followed by all necessary personnel.

Petroleum Products

DAFMAN 32-1067, *Water and Fuel Systems*, identifies compliance requirements for underground storage tanks (USTs) and aboveground storage tanks (ASTs) and associated piping, that store petroleum products and hazardous substances. Operations at the Base require the use of petroleum products. The DAF has determined that Edwards AFB is not subject to the federal requirements of 40 CFR Part 112, *Oil Pollution Prevention*. However, Edwards AFB operates as a facility with an aggregate aboveground petroleum storage capacity exceeding 1,320-gallons and is therefore subject to the State of California's *Aboveground Petroleum Storage Act* (APSA) (California Health and Safety Code, Division 20, Chapter 6.67). Edwards AFB is required to meet the federal regulatory requirements under APSA, including preparing and implementing a spill prevention control and countermeasures (SPCC) plan. The SPCC plan outlines procedures and practices to prevent accidental petroleum discharges in compliance with APSA, which generally adopts the provisions of 40 CFR Part 112 (Edwards AFB, 2024c).

There are four in-service ASTs located within the Project 1 laydown area and one out-of-service, emptied AST located within the Project 8 laydown area (**Figure 3-9, Appendix A**). The ASTs located in the Project 1 laydown area include one tank containing 10,000-gallons of unleaded gasoline and three tanks containing 10,000-gallons, 256-gallons and 138-gallons of diesel. Edwards AFB conducts monthly and annual inspections of the tanks for discrepancies and leaks. A 4,865-gallon propane tank is located within the Project 7 laydown area (**Figure 3-9, Appendix A**). Propane tanks are not regulated by either the APSA or 40 CFR Part 112, but industry standards for storage, handling, transportation, and use are outlined in the National Fire Protection Association 58 (Edwards AFB, 2024c).

3.9.1.3 Radon

The USEPA classifies radon into three zones based on the greatest potential for elevated indoor radon levels. The radon zone for both Kern and San Bernardino counties is Zone 2, moderate radon potential, with average indoor radon levels between two and four picocuries per liter (pCi/L); however, radon potential throughout the counties can vary (USEPA, 2025f). Radon monitoring at Edwards AFB completed in 2006 and 2009 identified the average radon level as 0.9 pCi/L, less than the action level (4.0 pCi/L) (Edwards AFB, 2012). Therefore, this resource is not carried forward for analysis in this EA.

3.9.1.4 Per- and Polyfluoroalkyl Substances

In April 2024, the USEPA issued the Final National Primary Drinking Water Regulation that established maximum contaminant levels for six PFAS chemicals in drinking water: perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonate (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA), and mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and perfluorobutane sulfonic acid (PFBS) (USEPA, 2025g). In May 2025, the USEPA announced its intention to extend compliance deadlines for PFOA and PFOS while re-evaluating regulatory determinations for PFNA, PFHxS, PFBS, and HFPO-DA (USEPA, 2025h). PFAS are often prevalent around airfields due to the use of aqueous film-forming foam for fire suppression. In November 2015, aqueous film-forming foam formulas that are more environmentally responsible replaced the previous formula (AFCEC, 2025).

Site investigations were conducted at Edwards AFB in 2018 and 2021 to determine whether PFOS/PFOA are present above the USEPA's lifetime Health Advisory. Sites throughout the Base where PFOS/PFOA may have been released into the environment through training, maintenance, and storage were selected for evaluation, including Operational Unit 4/9 that encompasses the south and northeast areas of the AFRL District. Sample results indicated the presence of PFOS/PFOA above the Health Advisory in subsurface soil and groundwater (DAF, 2022; Edwards AFB, 2018b). Edwards AFB continues to evaluate PFAS remedial investigations and characterize groundwater contamination plumes at the AFRL District through groundwater monitoring wells (DAF, 2022). Three of these PFAS monitoring wells (13-MW04, 133-OW01A, 133-OW01B) are in the Project 1 laydown area (Edwards AFB, 2024e).

There are no known on- or off-Base impacts to drinking water from PFAS. Migration of the contaminants to off-Base drinking water sources would be unlikely due to the lack of substantial rainfall and streams and lakes to serve as surface water to groundwater pathways that could reach potential drinking water wells. Groundwater recharge for the primary drinking water supply in the Antelope Valley aquifer occurs primarily through precipitation infiltrating the bedrock hills and the basin margins (DAF, 2022).

3.9.1.5 Pesticide Management

Edwards AFB maintains and implements an Installation Pest Management Plan (IPMP) that is prepared in accordance with DoD Instruction 4150.07 and Air Force Manual 32-1053, *Integrated Pest Management Program*. The IPMP provides guidance for an effective integrated pest management program that follows pertinent laws and regulations. Non-chemical control techniques such as eliminating pest entryways, repairing broken or damaged doors, windows and vents, and bait and traps are prioritized over the use of chemical applications (Edwards AFB, 2024f).

Pesticides used at Edwards AFB must be registered by the USEPA, approved for use as a pesticide in the state of California, and approved by the DAF for control of target pests. Types of approved chemical pesticides used at the Base can be found in the IPMP. Pesticides are stored at the Army Air Force and Exchange Service and Commissary stores, the Base Housing Office, and the Mobility Office; none of which are located within the Proposed Action project laydown areas (Edwards AFB, 2024f). Additionally, there is no evidence of chlordane use prior to its nationwide ban in 1988, nor has any other pesticide contamination been identified.

3.9.1.6 Environmental Restoration Program

The DoD's ERP requires each installation to identify, investigate, and remediate hazardous waste disposal or release sites. ERPs are utilized to identify and fully evaluate any areas suspected to be contaminated with HAZMAT from past DAF operations and to eliminate or control any hazards to the public health, welfare, or the environment. Fully restored ERP sites have minimal restrictions for future development, but land use controls may be necessary. These controls limit access to contaminated areas to ensure safety and protect human health and the environment.

Rocket engine testing activities at the AFRL District resulted in multiple ERP sites, including four major and extensive groundwater contamination plumes (perchloroethylene, trichloroethylene, perchlorate) and Dense Nonaqueous Phase Liquids (chemicals that are denser than water with limited solubility), in fractured bedrock, an abandoned sanitary landfill containing heavy metals, and an area where electroplating wastes were dumped (USEPA, 2025g). Edwards AFB implements remedial action plans that are indicative to the ERP site to monitor and remedy the site until a status of inactive or closed is determined. Additionally, Edwards AFB has a large ongoing groundwater monitoring program to evaluate and measure the distribution of groundwater plumes. Through monitoring contaminations and implementing remedial measures, Edwards AFB has been able to successfully reach a closed or inactive status on several of its ERP sites and continues to remediate the active sites. Within the AFRL District at Edwards AFB, there are 16 inactive or closed ERP sites and three ERP sites with ongoing remediation efforts.

3.9.1.7 Test Area 1-14 PCB Spill Area (SS312)

SS312 is an area identified for cleanup by the USEPA due to the release and contamination of PCBs within B8622. A substation originally installed in 1965 housed two electric transformer units and a voltage regulator on a 15-foot by 38-foot concrete pad; all three units utilized oils containing PCBs. In 1991, an estimated one pint of PCB oil was spilled onto the concrete pad during the retro-filling of one of the former transformers. Moreover, oil stains formerly visible on the concrete pad indicate that there were likely leaks or spills from all three units (Edwards AFB, 2008). Edwards AFB began strategizing plans for remediation in 2008 and continues to investigate, remedy and monitor the contamination as a part of the Soil and Debris Sites Record of Decision every five years to ensure the selected remedy continues to be protective of human health and the environment (Edwards AFB, 2008, 2013). SS312 is on the northeast boundary of the Project 2/Project 4 laydown areas, about 100 feet northeast of B8620.

3.9.1.8 Closed AFRL Landfill (LF-13)

The AFRL District Landfill began operation in 1961 and functioned without regulatory oversight until 1976. Waste was burned at the landfill until 1966 when Edwards AFB transitioned to burying waste cells and covering the cells with clean soil. Historic data indicates the landfill received non-hazardous commercial and construction waste and was restricted from receiving hazardous waste. However, waste oil drums discovered buried along the landfill indicate that hazardous waste liquids were disposed of in or near the landfill. The site was identified as an ERP site in 1984 and was closed for use in 1991 (Edwards AFB, 2008). A cover system was installed over the site in 2002, and semiannual sampling of nine groundwater monitoring wells and quarterly monitoring of the five landfill gas wells has since been conducted as part of the post-closure maintenance and monitoring program outlined in the approved LF-13 Post-Closure Maintenance and Monitoring Plan (Edwards AFB, 2008). As of 2024, the landfill was found to be in compliance with regulations and Edwards AFB continues inspection, monitoring, and sampling activities (Edwards AFB, 2024g). The northeast section of LF-13 is located within the Project 1 laydown area.

3.9.1.9 Test Area 1-42 Oxidation Ponds and Burn Pit (Site WP125)

Site WP125 contains oxidation ponds and burn pits which were identified for cleanup by the USEPA when groundwater, surface, and subsurface areas were found to be contaminated with chemicals including chloroform and tetrachloroethylene. As described in **Section 3.6**, permanent surface water does not exist within the AFRL District outside of a pond located at the firehouse. The USEPA has concluded that migration of contaminated groundwater is stabilized and controls to contain any intermittent surface water in bermed areas have been applied to prevent the discharge of surface water (Propublica, 2025; USEPA, 2025i). A small section of the southern end WP125 overlaps with the Project 10 laydown area (**Figure 3-10, Appendix A**).

There are 15 ERP sites within the project areas that are considered closed or have remedies that have been determined to be functioning as intended.[11]

3.9.2 Environmental Consequences

3.9.2.1 Evaluation Criteria

A significant impact to HAZMAT and hazardous wastes, petroleum/oil/lubricants, toxic substances, and contaminated sites within the ROI would occur if the Proposed Action results in

- noncompliance with applicable federal and state regulations;
- increased amounts of hazardous waste generated or procured beyond Edwards AFB's current waste management procedures and capacities; or
- disturbance or creation of contaminated sites resulting in negative effects on human health or the environment.

Impacts to ERP sites would be considered adverse if the Proposed Action disturbs (or creates) contaminated sites resulting in adverse effects to human health or the environment. Physical development of contaminated sites could expose construction and maintenance workers, visitors, occupants, or ecological systems to potential hazards associated with contaminants.

3.9.2.2 Proposed Action

Hazardous Waste and Materials

Implementation of the Proposed Action would result in activities that would involve the construction of new facilities and structures as well as the enhancement and renovation of current facilities. These types of activities would require the use and disposal of certain HAZMAT such as paints, solvents, welding gases, sealants, and preservatives. It would be anticipated that the quantity of products containing HAZMAT used during the development of the Proposed Action would be minimal and for a short duration. Contractors would be responsible for the management of HAZMAT, which would be handled and disposed of in accordance with federal, state, and local regulations as well as in accordance with the Edwards AFB HWMP.

[11] The 15 ERP sites are: Phillips Lab Civil Engineering Yard (SS133)—located east of Project 1 laydown area; Test Area 1-21 Exhaust Apron (SD159)—located north of Project 5 laydown area; Test Area 1-14 Accumulation Point (SS132)—located east of Project 2/Project 4 laydown areas; B8370 Wash Rack (SD140)—located northeast of Project 7 laydown area; Sewer lines through Phillips Laboratory (WP141)—encompasses the entire AFRL District; 7th Army Air Force Bombing and Gunnery Range (AL504-A)—encompasses the entire AFRL District; Test Area 1-42 Water Treatment Facility (WP124)—located within Project 10 laydown area; B8424 Removed USTs (ST358); Test Area 1-14 Removed Heating Oil USTs 1 & 2 Area B (ST143-B); B8240 Removed Mogas USTs (ST184); B8255 and B8359 Removed USTs (USTP) (ST145); B8354 Removed Heating Oil UST (ST354); B8581 Removed Diesel UST (ST139); B8595 and Test Area 2-5 Removed USTs (SD037); and B8407, B8410 and B8411 Removed USTs (ST356).

Additional operations resulting from implementation the Proposed Action to support the AFRL mission in researching, developing and testing space rocket propulsion would be anticipated to increase the overall use of HAZMAT and the quantity of hazardous waste generated at the Base. However, as Edwards AFB already operates as a large-quantity generator with a permitted hazardous waste storage facility, the Base would be equipped to handle the increased load. Additionally, hazardous waste would be handled and disposed of in accordance with federal, state, and local regulations as well as in accordance with the Edwards AFB HWMP. Therefore, short-term, minor, adverse impacts to HAZMAT and waste would be anticipated to occur under implementation of the Proposed Action.

Toxic Substances

Asbestos

Based on GIS data provided by Edwards AFB, asbestos surveys completed at the AFRL District have identified ACM within nine buildings located in the Proposed Action Areas. Additionally, intel received from communication with Base personnel confirmed that all buildings in the AFRL District are presumed to contain asbestos material. New construction areas would not use ACM; however, demolition and renovation activities during the construction and the renovation of current facilities may result in the disturbance of ACM existing within the structures. Prior to the implementation of the Proposed Action, the 412 CEG would review renovation plans to ensure that appropriate measures would be taken to reduce any potential exposure to, and release of, asbestos. Prior to construction, renovation, and demolition activities, ACM surveys would be completed on all buildings associated with the Proposed Action. Contractors would be required to adhere to all federal, state, and local regulations in addition to the requirements of the Edwards AFB Asbestos Management and Operations Plans (Edwards AFB, 2023c). A completed Notification of Renovation/Demolition form would be submitted to the MDAQMD 10 working days prior to the start of asbestos abatement or demolition activities if more than 160 ft^2 of ACM or more than 260 linear feet of asbestos-containing thermal system insulation would be disturbed (MDAQMD, 2025).

Asbestos management is standard for projects requiring the renovation or demolition of an older structure and is an anticipated component of the Proposed Action. The resource allocation required for asbestos management during implementation of the Proposed Action would be anticipated to be temporary and would not substantially impact the overall management of asbestos at the Base. The removal of ACMs during the demolition and renovation of older facilities would reduce the long-term burden of asbestos management at the Base. Further, removal of ACMs would reduce the risk of accidental disturbance of asbestos airborne fibers at the facilities, resulting in long-term, beneficial impacts relative to asbestos exposure. Therefore, long-term, moderate, beneficial impacts to asbestos management would be anticipated to occur under the Proposed Action.

Lead-Based Paint

Lead risk assessments completed at the AFRL District identified LBP in nine of the buildings located in the Proposed Action project laydown areas. The USEPA's Lead Renovation, Repair, and Painting Rule applies to renovations, repairs, and painting projects in non-residential buildings that may disturb LBP in buildings constructed prior to 1978 that have not yet been surveyed for lead would be assessed by a certified inspector prior to renovation activities. Additionally, the Edwards AFB lead management team would review renovation plans to implement proper procedures to reduce the risk and exposure of lead during renovation activities. During construction, licensed contractors would follow lead-safe work practices such as containing the

work area and minimizing lead dust and debris. Removal of LBP during demolition and renovation activities minimizes the risk of exposure to lead through deteriorating paint and debris at the facilities. Therefore, long-term, moderate, beneficial impacts to LBP management would be anticipated to occur under the Proposed Action.

Polychlorinated Biphenyls

No existing transformers or electrical equipment within the ROI contain known PCBs. Any PCBs encountered during the development of the project would be handled and disposed of in accordance with federal and DoD regulations. As such, there are no impacts anticipated to occur under implementation of the Proposed Action regarding PCBs.

Petroleum Products

The use of certain petroleum products would be required during implementation of the Proposed Action. Petroleum-based products, such as oils, diesel and gasoline, would be used in construction, demolition, and grading equipment. Construction contractors would be responsible for using petroleum products in accordance with BMPs identified in the Edwards AFB Spill Prevention, Control, and Countermeasure Plan. The existing ASTs located in the project areas are not anticipated to be affected by implementation of the Proposed Action and the use and volume of petroleum products would not be anticipated to increase after the Proposed Action is completed. Therefore, short-term, minor, adverse impacts on petroleum products would be anticipated to occur with implementation of the Proposed Action.

Per- and Polyfluoroalkyl Substances

There are three PFAS monitoring wells within the Project 1 laydown area that are used to monitor the contamination levels of groundwater plumes. Though there are no known PFAS impacts to drinking water on or off Base, construction activities that may alter groundwater flow and landscape such as excavation and soil removal may impact areas with potential PFAS contamination. Utilizing BMPs that eliminate surface runoff and movement of contaminated soil prior to and during construction would minimize the risks of PFAS contamination. Edwards AFB is currently engaged with the CA Water Board for PFAS monitoring and may need to ascertain whether such impacts would require changes to the long-term monitoring and remedial plans. As such, long-term, moderate, adverse impacts would be anticipated to occur with the implementation of the Proposed Action.

Pesticide Management

There are no structural pests that have been identified as present in the Edwards AFB AFRL District. However, wildlife pests such as birds, bats, and squirrels may utilize structures on the Base for nests and roosting. These pests have the potential to cause extensive physical damage to landscape areas and structures. Other wildlife pests that could cause injury to humans, including snakes and bobcats, have been identified in the Edwards AFB AFRL District. Pests encountered during construction and demolition activities would be reported to the Base Integrated Pest Manager, who would then implement the appropriate control methods as outlined in the IPMP.

Under the Proposed Action, some structures would be demolished resulting in an increase of bare earth land in the area. This would have the potential to expand invasive and noxious weed growth for Base-wide species such as broadleaf weeds and invasive grasses. During construction activities, control methods outlined in the IPMP, such as physically removing the weeds, using natural predators, and applying non-chemical or approved chemical herbicides, would be utilized as appropriate by authorized personnel to minimize the risk of invasive weed growth. Pesticide

applications could adversely impact non-target species and result in downstream contamination due to runoff from application sites and cause unintentional releases to the environment through spills and errors in the application of chemicals. As such, these would be used only if all other non-chemical method controls fail. Ground-disturbing activities such as excavation and grading are likely to occur under the Proposed Action. However, there is no evidence of the use of chlordane or any release of harmful pesticides into the environment within the ROI that would otherwise create potential hazards to construction workers. With the implementation of mechanical, biological, and chemical controls, short-term, minor adverse impacts to pest management under the Proposed Action would be anticipated.

Environmental Restoration Program

Test Area 1-14 PCB Spill Area (SS312)

The Project 2/Project 4 laydown areas would overlay the northeast section of SS312. Construction activities that may impact the ERP site would involve the alteration of landscape through excavation and soil removal. Additionally, contractors may have direct exposure to contaminated soils during the development of the Proposed Action. Any contaminated soil encountered during construction, demolition, and renovation activities would be managed according to state and federal regulations to ensure protection of human health and the environment. During the development of the Proposed Action, Edwards AFB would continue to monitor and regulate SS312 and implement the use of BMPs such as covering areas of disturbed soil to prevent erosion and runoff, to minimize the risk of contamination and exposure. Individual project components would be finalized upon development of the Edwards AFB AFRL District Plan. As such, the Project 2/Project 4 laydown areas represent the maximum footprint in which Projects 2 and 4 could occur. The final design plans for Projects 2 and 4 would avoid SS312. Implementation of Projects 2 and 4 would result in no adverse impacts to ERP sites because the excavation activities associated with these projects would avoid site SS312.

Closed AFRL Landfill (LF-13)

Under the Proposed Action, the Project 1 laydown area would overlay the northeast section of the closed AFRL District Landfill LF-13. Construction activities involving excavation or grading on LF-13 could potentially impact the integrity of the landfill cover. If grading and paving activities impact the integrity of the cap, Edwards AFB may need to engage with the California Environmental Protection Agency to ascertain whether such impacts would require changes to the long-term monitoring plan or the composition of the cover. Individual project components would be finalized upon development of the Edwards AFB AFRL District Plan. As such, the Project 1 laydown area represents the maximum footprint in which Project 1 could occur. The final design plans for Project 1 would avoid the LF-13 site. Implementation of Project 1 would result in no adverse impacts to LF-13 because the final plans would be designed to avoid the site.

Test Area 1-42 Oxidation Ponds and Burn Pit (Site WP125)

The Project 10 laydown area overlaps with a section of the southern end of site WP125. Construction activities that may impact the ERP site would involve the alteration of landscape through excavation and soil removal. Additionally, contaminated surface water is contained in bermed areas that may be impacted by activities and operations in the area. Individual project components would be finalized upon development of the Edwards AFB AFRL District Plan. As such, the Project 10 laydown area represents the maximum footprint in which Project 10 could occur. The project plans for the deeper excavations associated with Project 10 would be designed to avoid site WP125 and the associated bermed areas. Although portions of the Project 10 laydown

area overlap site WP125, these portions would be limited to surface development, potentially avoiding subsurface contamination. Utilizing BMPs that eliminate surface runoff and movement of contaminated soil prior to and during construction can minimize disturbance to the site. Any release of contaminated surface water would be handled in accordance with state and federal regulations, in addition to the Edwards AFB SPCC plan and HWMP. Long-term, moderate, adverse impacts to WP125 would be anticipated with the implementation of the Proposed Action.

3.9.2.3 No Action Alternative

Under the No Action Alternative, existing test facilities would remain the same and the AFRL District missions would be limited to current programs and activities. The existing facilities would not be updated, leaving the risk of exposure to ACM and LBPs within the buildings. There would be no changes to HAZMAT, hazardous waste, toxic substances, petroleum products, or contaminated sites in the ROI beyond baseline conditions; therefore, no impacts would occur.

3.9.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action would be anticipated to result in short-term, adverse impacts to hazardous wastes, no adverse impacts to the SS132 and LF-13 ERP sites, and long-term moderate, adverse impacts to the WP125 ERP site. The projects identified in **Table 3-1** would have the potential to generate hazardous waste during construction, demolition, and renovation activities at Edwards AFB. Hazardous wastes associated with the Edwards AFB Main Base District Plan EA, Edwards AFB South Base District Plan EA, and IWVGA projects would be managed in accordance with the Edwards AFB HWMP. Adherence to the Edwards AFB HWMP would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal HAZMAT regulations. Potential impacts from the accidental release of such products would be minimized by following response procedures specified in the Edwards AFB HWMP. Construction activities proposed within contaminated sites would be managed in accordance with the RCRA Corrective Action Program.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Edwards AFB, no significant, adverse reasonably foreseeable effects to HAZMAT, hazardous waste, toxic substances, petroleum products, or contaminated sites would be anticipated to occur with implementation of the Proposed Action.

3.10 Safety and Occupational Health

The ROI for safety and occupational health is the AFRL District at Edwards AFB.

3.10.1 Affected Environment

3.10.1.1 Occupational Safety

The primary federal statute addressing occupational hazards is the *Occupational Safety and Health Act* (29 USC §§ 651–678). Occupational safety considerations include ground operations, industrial and maintenance activities, and motor vehicle use, as well as risks from flight operations to personnel and safety on the ground. The ROI is not in the vicinity of the airfield at Edwards AFB and does not fall within a clear zone or an accident potential zone. Therefore, occupational safety considerations related to flight operations are not discussed further in this EA.

Ground mishaps can result from the use of equipment or materials and from construction, demolition, and maintenance functions. Ongoing DAF safety programs covering construction, industrial activities, operation of motor vehicles and other equipment, and everyday operations are

continuously refined as new activities are introduced and as new information becomes available. All DAF personnel receive regular safety training to keep the chances of mishaps as low as possible.

All construction contractors operating within Edwards AFB must follow occupational safety regulations to avoid posing any risks to workers or personnel on or off Base. Construction contractors and personnel are responsible for reviewing potentially hazardous workplace operations, monitoring exposure to workplace chemicals (e.g., ACM, LBP, HAZMAT), physical hazards (e.g., noise propagation, slips, trips, falls), and biological agents (e.g., infectious waste, wildlife, poisonous plants). Contractors are also responsible for ensuring that their employees and any contractually qualifying subcontractors and their employees have a clear understanding of OSHA requirements, and for complying with federal and state occupational safety and health standards for their employees, except for where the DAF has contractually agreed to assume responsibility (Edwards AFB, 2024b).

3.10.1.2 Flight Safety

The Proposed Action would not be associated with the Edwards AFB airfield or with any flight operations at Edwards AFB. Therefore, flight safety is not discussed further in this EA.

3.10.1.3 Explosives Safety

Explosives safety addresses risks associated with the use and management of military munitions and ordnance. Military munitions, such as aircraft and weapons munitions, include ammunition and explosives, propellants (solid and liquid), pyrotechnics, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. Defense Explosive Safety Regulation 6055.09 (DESR 6055.09)_DAFMAN 91-201, *Explosives Safety Standards* (February 2025), defines the guidance and procedures that deal with munition storage and handling.

Operational constraints are primarily associated with explosives safety quantity distance (ESQD) arcs, munitions storage areas, and transportation routes. ESQD arcs provide a buffer between areas where explosives are stored or handled and both on- and off-Base populated areas and create defined distances that are maintained between munitions storage areas, live ordnance loading areas, and other similar types of facilities. These distances are determined by the type and quantity of stored explosive material. Each explosive material storage or handling facility has ESQD arcs extending outward from its sides and corners for a prescribed distance. Within these ESQD arcs, development is either restricted or prohibited altogether to ensure personnel safety and to minimize potential for damage to other facilities in the event of an accident. Munitions and weapons storage is a permitted function in the AFRL District, and there are several ESQD arcs associated with the area (Edwards AFB, 2025b). The laydown areas for Projects 2, 4, 5, 9, and 10 are within ESQD arcs (**Figure 3-11, Appendix A**).

3.10.2 Environmental Consequences

DAF Policy Directive 91-2, *Safety Programs*, is implemented by DAFI 91-202, *The DAF Mishap Prevention Program*, which manages risks to protect DAF personnel from occupational deaths, injuries, or illnesses and minimizes loss of DAF resources. These standards apply to all DAF activities; adherence to DAF's Mishap Prevention Program ensures DAF workplaces meet federal safety and health requirements.

3.10.2.1 Evaluation Criteria

Safety-related impacts from a proposed activity are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts related to safety would occur if the Proposed Action resulted in DAF OSHA criteria being exceeded or the improper implementation of established or proposed safety measures, creating unacceptable safety risk to personnel. Adverse impacts would occur if the Proposed Action

- increases risks associated with the safety of construction personnel, contractors, military personnel, or the local community;
- hinders the ability to respond to an emergency; or
- introduces a new health or safety risk for which the Base is not prepared or does not have adequate management and response plans in place.

Significant adverse impacts to safety resources would occur if the Proposed Action

- substantially increases risks to the health and safety of workers or the public;
- substantially increases rates of injuries, illnesses, accidents, or emergencies;
- substantially affects the ability of law enforcement or other emergency response personnel to respond promptly to accidents and emergencies;
- causes workers or the public to reasonably perceive that health and safety risks had substantially increased; or
- contributes to a violation of any local, state, or federal regulation.

3.10.2.2 Proposed Action

Occupational Safety

Under the Proposed Action, Project 7, the installation of a shade structure at the fire department (B8370) would have beneficial impacts to occupational safety by mitigating the risk of heat illness and injury for personnel associated with the facility. Installation of the shade structure would also improve operational efficiency of the fire department, which would improve occupational safety in the AFRL District by allowing the fire department to respond to incidents more effectively. Projects 1-6 and Projects 8-10 would not be anticipated to result in any changes to occupational safety in the ROI under the Proposed Action.

During implementation of the Proposed Action, construction, demolition, and renovation activities would expose DAF personnel to safety hazards from heavy-equipment operation, HAZMAT, falls, construction equipment, and potentially noisy and confined environments. To minimize health and safety risks, ground operations and activities would adhere to all applicable occupational safety policies and procedures throughout construction and post-construction activities in accordance with all applicable requirements in DAFI 91-202 and DAFMAN 91-203, *Air Force Occupational Safety, Fire, and Health Standards*. In the event of a mishap involving government personnel or property, on or off the DAF installation, incidental to work performed in accordance with DAFI 91-204, *Safety Investigations and Reports*, the contractor would promptly report the relevant information to the Government Program Office (Edwards AFB, 2024b). Implementation of the Proposed Action would result in both direct and indirect, long-term, minor, beneficial impacts to occupational safety in the ROI due to installation of a shade structure and short-term, negligible, adverse impacts to occupational safety in the ROI due to construction, renovation, and demolition activities.

Explosives Safety

Through the test and safety review process at Edwards AFB, range safety operational plans are created specifically for and on an individual project basis (Edwards AFB, 2024b). Projects associated with the Proposed Action would be evaluated for their applicability to this test and safety review process to ensure safe operations.

Under the Proposed Action, the laydown areas for Projects 2, 4, 5, 9, and 10 would be located within ESQD arcs associated with munitions and weapons storage in the AFRL District (**Figure 3-11, Appendix A**) (Edwards AFB, 2025b). Per DESR 6055.09_DAFMAN 91-201, the DoD requires the submission of site and general construction plans for new construction of facilities not related to ammunition and explosives within ESQD arcs to the DoD Explosives Safety Board for review and approval. If applicable, site and construction plans for Projects 2, 4, 5, 9, and 10 would be submitted. In addition to other project components described in **Table 2-1**, Project 9 would involve paving of a pre-existing, semi-improved roadway, and Project 10 would involve construction of an access road. In accordance with DESR 6055.09_DAFMAN 91-201, on-Base roads are allowed within ESQD arcs. Projects 1 and 3 and Projects 6–8 would not be located within an ESQD arc, would not involve activities or uses that would require the creation of new ESQD arcs, and would not result in impacts to explosives safety. No changes to existing ESQD arcs would be anticipated to occur with implementation of the Proposed Action, and construction and demolition activities would not be expected to affect any pre-existing munitions storage facilities. All storage and handling of munitions at Edwards AFB would continue to be carried out by trained and qualified personnel and in accordance with DAF-approved technical orders; no changes to those activities would occur with implementation of the Proposed Action. Construction, demolition, and renovation activities under the Proposed Action would comply with established ESQD arcs, as defined by the DAF Guidance Memo to DESR 6055.09_DAFMAN 91-201. With adherence to all applicable safety standards and regulations, no impacts to explosives safety would be anticipated to occur with implementation of the Proposed Action.

3.10.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. Maintenance and repairs to facilities would continue as needed. Furthermore, as most of the structures are 40 years old or older, the current capabilities in the AFRL District would eventually decrease as facilities become obsolete and unrepairable. There would be no changes to safety and occupational health in the beyond baseline conditions.

3.10.2.4 Reasonably Foreseeable Effects

The Proposed Action would be anticipated to result in long-term, minor, beneficial and short-term, negligible, adverse impacts to safety and occupational health due to risks to construction personnel associated with construction activities. Several projects listed in **Table 3-1**, including the projects evaluated under the proposed Main Base District Plan EA, the projects evaluated under the South Base District Plan EA, and the Perimeter Road Runway 23R project similarly would result in risks to construction personnel associated with construction activities. These actions would result in short-term, negligible, adverse impacts to safety and occupational health. When considered in conjunction with other past, present, and reasonably foreseeable actions at Edwards AFB, no significant reasonably foreseeable impacts to safety and occupational health would be anticipated to occur with implementation of the Proposed Action.

3.11 INFRASTRUCTURE, INCLUDING TRANSPORTATION AND UTILITIES

The ROI for infrastructure is the AFRL District located within Edwards AFB.

3.11.1 Affected Environment

3.11.1.1 Transportation and Traffic

The AFRL District is located within the eastern portion of Edwards AFB, outside of the Main Base District security gates. Traffic does not freely flow between these two locations, and the AFRL District is accessible from the Main Base District via two routes. The first route is from California Highway 58 to Rocket Site Road. The second route consists of crossing Rogers Dry Lakebed east of the Main Base District; however, these roads have occasional operational closures and access to the AFRL District from this route is inconsistent. Both routes connect to Mercury Boulevard, which leads directly into the AFRL District, through its own secure Access Control Point (ACP) located on the western side of the AFRL District.

Due to the distance from the Main Base District and housing areas, traffic entering the AFRL District is limited to personnel who work at the facilities located in this district. In April 2023, between 100 and 200 vehicles accessed the AFRL District each weekday via the ACP. On the weekend, traffic only consisted of between 5 and 20 vehicles (Edwards AFB, 2023d). Mercury Boulevard enters the AFRL District at the ACP and runs northeast-southwest, acting as a main road that provides access to various test facilities and buildings. Mars Boulevard extends southeast into the AFRL District from its intersection with Mercury Boulevard just past the ACP and provides access to some of the district's more remote buildings. Mars Boulevard also acts as the southwestern border of the AFRL District, with all AFRL District facilities located to the north and northeast of this roadway.

Smaller streets within the AFRL District consist of both paved and unpaved roadways. Unpaved roads within the AFRL District have the potential to wash out during heavy precipitation events, making them difficult to drive on. The instability of these dirt roads creates a safety issue for vehicles transporting test materials and equipment to testing sites.

3.11.1.2 Electricity, Natural Gas, and Communications

Electrical service is provided to the AFRL District by SCE Electric. SCE serves a 50,000-square-mile area of central, coastal, and southern California, including parts of Kern County. The company generates the electricity it delivers through a mix of energy sources, including renewable energy, to support both residential and commercial customers. SCE has sufficient infrastructure and grid capacity in Kern and San Bernardino counties, providing reliable electric service in the region with adequate capacity to support future growth.

The AFRL District also maintains a 1.15-megawatt solar array. The solar field, which is approximately 7.5 acres is located to the northwest of the ACP, connects to the Installation's main electrical system, and provides backup electricity for the Base. Power is conveyed from the array to a switching station through 35 kV overhead power lines and utility poles, which provide electricity to the AFRL District's individual buildings (Edwards AFB, 2012). Fiber optic cables for Ethernet connections are linked through conduit on the overhead utility pole and line system that runs along the roadways throughout the AFRL District.

The AFRL District's natural gas service is provided by Pacific Gas and Electric Company (PG&E), which operates in several communities in Kern and San Bernardino counties including Bakersfield, Arvin, Boron, and Edwards AFB, among others. PG&E's natural gas system is designed to meet

the energy needs of both existing residential and commercial customers as well as future customers (PG&E, 2014).

3.11.1.3 Solid Waste

Edwards AFB operates one on-site municipal solid waste (MSW) landfill, the Main Base Active Landfill (MBAL), which is managed by an Integrated Solid Waste (ISW) services contract. MSW is generated by shops, offices, and food service areas, as well as from construction activities performed by approved construction contracts. The ISW contractor collects all MSW from the commercial and industrial areas on Edwards AFB in containers ranging from 72-gallon containers to 8-cubic-yard dumpsters issued to commercial and industrial operations on the Installation. The 412 CEG Environmental Management Division ensures that the solid waste contractor maintains a permit/license from the State of California for managing solid waste facilities, storage and handling, as well as composting facilities (Edwards AFB, 2024h).

The MBAL is approximately 1.3 miles northwest of the Edwards AFB Main Base and has a total area of 137 acres, which includes 60.5 acres for waste disposal. The remaining 76.5 acres include space for the Recycling Operations Center, a 4-acre composting facility/grinder operation, weigh scales for waste, the MBAL contractor's office, two inactive waste disposal cells, an inert debris processing area, and vacant land. The MBAL is a Class III non-hazardous solid waste landfill and is permitted to receive non-liquid, non-hazardous wastes, including MSW, construction and demolition, commercial and shop-generated wastes, and tires (Edwards AFB, 2024h).

Currently, the MBAL operates under Solid Waste Facility Permit No. 15-AA-0150, issued 20 June 2016 and renewed in 2021 by the Kern County Public Health Services Department with concurrence from the California Department of Resources Recycling and Recovery. The estimated closure date for the MBAL is May 2099, with a total remaining site capacity of 1,505,000 cubic yards of waste as of November 2020 (Edwards AFB, 2024h). The Recycling Operations Center is located south of the MBAL. Recyclable materials are delivered to the Recycling Operations Center through the industrial area collection program, the MBAL screening program, and individual drop-offs by Installation personnel. All recycling for Edwards AFB is conducted through the Base's Qualified Recycling Program in accordance with DAFMAN 32-7002.

The quantity of construction and demolition waste generated at Edwards AFB fluctuates annually. Construction and demolition contractors are responsible for transporting all waste generated whether for disposal at the MBAL, disposed of off Base, or recycled. Any specialized wastes are transported to the appropriate disposal facility, per the Edwards AFB ISW Management Plan (Edwards AFB, 2024h).

3.11.1.4 Potable Water Supply

Potable water is provided to Edwards AFB by AVEK. AVEK has rights to 144,844 acre-feet of water each year from the California Aqueduct and operates four treatment plants that can handle up to 118 million gallons per day, enough to serve nearly 500,000 people. AVEK has the capacity to support existing and future housing, businesses, and infrastructure development (Antelope Valley Economic Development and Growth Enterprise, 2021).

Water is supplied to the AFRL District through underground mains that originate along Mercury Boulevard and branch off to provide service to individual buildings. Water usage in the AFRL District includes human consumption, fire suppression, and other high demand uses such as year-round deluge water for rocket motor or engine testing in the AFRL District. The existing water

main is substantially aged and has suffered numerous breaks. Failure of the line jeopardizes the ongoing test operations at the various testing complexes with the AFRL District. Currently, the existing pipeline is not able to meet the annual water demand because it continuously develops leaks and must be shut down for repairs, resulting in an unreliable and inefficient water supply system. The deteriorated condition of the pipeline and the frequent shutdowns due to leaks also creates the potential for unsafe conditions as water trucks would be required for firefighting efforts if failure were to occur during an emergency.

3.11.1.5 Sanitary Sewer/Wastewater

Edwards AFB maintains a primary wastewater treatment plant within the Main Base District. A secondary wastewater treatment plant services the AFRL District. This facility is managed by PERC Water Corporation, the contractor responsible for the operation, maintenance, and repair of the Base's wastewater treatment plants (Edwards AFB, 2018c). The plant is registered under ID S204708 with the CA Water Board. Wastewater is conveyed through underground pipes to be treated at the existing AFRL District WWTP. The plant is rated for 35,000 gallons of wastewater each day and currently handles approximately 12,000 gallons per day, utilizing 34 percent of the total capacity (Edwards AFB, 2025c).

3.11.2 Environmental Consequences

3.11.2.1 Evaluation Criteria

The DAF defines a significant effect on or from infrastructure, including transportation and utilities, within the ROI as one or more of the following:

- measurable change or service reduction within the regional transportation network;
- prolonged or repeated interruption of public transportation services regionally;
- prolonged or repeated service disruptions to utility end users; or
- substantial increase in utility demand relative to existing and planned regional uses.

3.11.2.2 Proposed Action

Transportation

Implementation of the Proposed Action would result in temporary, localized impacts to existing roadways and vehicle circulation in the ROI surrounding the project laydown areas. Project construction would take place over the span of several years reducing compounding effects. Minor, localized impacts to transportation would be anticipated during construction due to the storage and operation of heavy machinery and materials; however, due to the limited traffic that exists in the remote AFRL District, these delays would be minor in nature and would not disrupt the long-term function of the roadways or the ability of staff to reach their destinations.

Implementation of the Proposed Action would include the construction of additional parking facilities under Project 8, the paving of an existing dirt road under Project 9, and the construction of a paved access road under Project 10. The additional vehicle parking that would be constructed under Project 8 would accommodate the increase in personnel resulting from the expansion of operational capabilities of the AFRL District. Project 9 would pave North Arrow Road, located in the far eastern portion of the AFRL District, and Project 10 would construct an access road associated with the test cell and infrastructure in the Project 10 laydown area. Establishing these paved roadways would reduce risks to vehicles from washout of unpaved roads during heavy precipitation events, making transportation of materials and equipment to the facilities in and

around these project laydown areas safer and more consistent. Implementation of Project 1 would result in the addition of a temporary access road that would bypass the ACP (**Figure 2-1, Appendix A**). Because this access road would bypass the AFRL District ACP, Project 1 would be fully enclosed with a security fence and closed to the rest of the AFRL District. Therefore, no impacts to traffic within the ROI would occur with implementation of Project 1.

Under the Proposed Action, the construction, renovation, and demolition activities associated with Projects 1-10 would not adversely impact overall traffic flow in the area. Therefore, short-term, negligible, adverse impacts would occur during construction, renovation, and demolition; and long-term, minor, beneficial impacts to transportation in the ROI would be anticipated to occur under the Proposed Action due to parking and roadway improvements.

Electricity, Natural Gas, and Communications Systems

Short-term, negligible, adverse impacts on the electrical and natural gas distribution systems could occur during construction, renovation, and demolition activities associated with the Proposed Action due to temporary service interruptions when rerouting aboveground or underground electrical lines, disconnecting a building slated for demolition, or connecting a newly constructed facility to the Installation's electrical or natural gas distribution system. Potential short-term, negligible, adverse impacts on communications system infrastructure would have the potential to occur during construction, renovation, and demolition activities associated with the Proposed Action due to temporary service interruptions from the rerouting of aboveground and/or underground communication lines.

Long-term, minor adverse impacts to the electrical and natural gas distribution systems in the ROI could occur under the Proposed Action, because the operation of newly constructed buildings would have the potential to increase the demand for electricity and natural gas; however, both distribution systems have the capacity that would be required to meet new demands associated with the Proposed Action. Cessation of operations at outdated and inefficient buildings proposed for demolition would decrease the overall demand for electricity and natural gas. Net increases in long-term demand would be expected to be slightly offset.

Solid Waste

Under the Proposed Action, there would be approximately 796,150 ft^2 of new construction and 418,741 ft^2 of demolition, which would result in an increase of solid waste. This increase has the potential to result in short-term, minor, adverse impacts to solid waste management at Edwards AFB. The USEPA guidance on estimating solid waste from construction and demolition projects indicates that approximately 4.39 pounds of debris would be generated for each square foot of construction and/or demolition activity (USEPA, 2003). Using this formula, solid waste generated from all construction and demolition under the Proposed Action would be anticipated to result in approximately 2,670 tons of debris. However, the increase in solid waste generation would be limited to the timeframe of the proposed construction and demolition activities, which would be anticipated to occur over the course of several years. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of solid waste generated under the Proposed Action, and all solid waste generated would be collected and transported for disposal or recycling in accordance with DAFMAN 32-7002. The Edwards AFB ISW Management Plan and State of California solid waste regulations would guide efforts to reduce, reuse, or recycle waste materials through the Edwards AFB Qualified Recycling Program to the maximum extent possible during implementation of the Proposed Action. Edwards AFB is

committed to meeting or exceeding the DoD goals of 40-percent landfill diversion of non-hazardous solid waste and 60-percent diversion of construction and demolition waste annually. Depending on the requirements of the individual project, construction debris would be disposed of either off Base or approved for disposal in the MBAL. The MBAL is estimated to be open until 2099 and would be expected to have sufficient capacity to accept construction and demolition-related waste generated during the Proposed Action. Therefore, short-term, minor, adverse impacts to Edwards AFB's solid waste management would be anticipated to occur under the Proposed Action.

No long-term impacts on solid waste management would be anticipated to occur under the Proposed Action because operations of the proposed new and consolidated facilities would not substantially increase the amount of solid waste generated in the AFRL District from everyday functions.

Potable Water Supply

Under the Proposed Action, Project 3 would replace or repair up to 5 miles of critical water infrastructure in the AFRL District along Mercury and Mars Boulevards. The repair and replacement of the water main would address ongoing issues concerning leaks and interruptions of service due to maintenance-related shutdowns. This would result in more consistent and reliable delivery to support potable water distribution, industrial water requirements, and fire suppression and hydrants for various testing complexes within the AFRL District. Consolidation of facilities under Project 1 would also improve the efficiency of potable water distribution. Aging and leaky connections from an overextended distribution system can reduce the efficiency of potable water delivery. Multiple buildings would be consolidated into a central facility, resulting in more streamlined distribution of potable water. Projects 2 and 4–10 would have no impact on the potable water supply within the AFRL District. Necessary repairs to the critical water infrastructure and the consolidation of facilities within the AFRL District would result in long-term, moderate, beneficial impacts to the potable water supply within the ROI.

Sanitary Sewer/Wastewater

Short-term, negligible, adverse impacts on the sanitary sewer and wastewater treatment system in the ROI could occur during construction and demolition activities associated with the Proposed Action due to temporary service interruptions when existing sewer/wastewater lines would be connected to newly constructed facilities or capped as appropriate.

The operation of new buildings would slightly increase the demand on the sanitary sewer and wastewater treatment system in the ROI; however, the removal of service from demolished buildings would decrease overall demand. The system has the capacity required to meet new demands; however, net changes in demand to the overall wastewater treatment system would be expected to be minimal. Long-term, negligible, adverse impacts to the sanitary sewer and wastewater treatment system in the ROI would be anticipated.

3.11.2.3 No Action Alternative

Under the No Action Alternative, the status and use of the AFRL District would not change. Testing operations would continue to operate under the status quo in aging facilities that have reached the end of their life. There would be no change to overall infrastructure, transportation, and utilities beyond baseline conditions. The existing water pipeline would not be able to meet the annual water demand because of continuous leaks and disruptions for repairs. The system would

continue to be unreliable and inefficient and would remain at risk for firefighting efforts. Therefore, implementation of the No Action Alternative would result in no impacts to transportation and traffic; electricity, natural gas, and communications; solid waste; and sanitary sewer/wastewater; and long-term, moderate, adverse impacts to the potable water supply.

3.11.2.4 Reasonably Foreseeable Effects

Implementation of the Proposed Action at the AFRL District would not result in any significant impact to Installation infrastructure, utilities, or transportation. Several of the projects listed in **Table 3-1** would include infrastructure actions of various sizes and scales that would occur in the communities surrounding Edwards AFB. Utility systems, including groundwater, electrical, and transportation infrastructure would be improved through the listed projects, including the SCE Company's Ivanpah Control Project and the Cal City Substation 115 kV upgrade projects. One of which would cross onto Edwards AFB property. California Broadbands' installation of fiber along Highway 58, including some on-Base portions, would provide high quality service and redundancy to communications infrastructure within the area. The IWVGA Imported Water Pipeline Project would divert water managed by AVEK from California City to Ridgecrest and may impact the distribution of potable water by the service provider. Other actions like roadway improvements may have localized positive impacts but would not overlap with the improvements under the Proposed Action. When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Edwards AFB AFRL District, long-term, minor, beneficial, reasonably foreseeable effects to infrastructure, transportation, and utilities would be anticipated to occur with implementation of the Proposed Action.

3.12 SOCIOECONOMICS

The ROI for socioeconomics is Kern, Los Angeles, and San Bernardino counties because Edwards AFB is located in these three counties.

3.12.1 Affected Environment

3.12.1.1 Population

No components of the Proposed Action would lead to permanent changes in population in the ROI. Therefore, population is not carried forward for analysis in this EA.

3.12.1.2 Employment

The 2023 estimated labor force participation and unemployment rates in the ROI are listed in **Table 3-11**, along with the rates for California and the US. The unemployment rates in California and the ROI were higher than the national unemployment rate, with the highest rate being in Kern County. Kern County also had the lowest labor force participation rate out of all five listed locations (United States Census Bureau [USCB], 2023a). The top industry by employment in the ROI is educational services and healthcare and social assistance (USCB, 2023b).

Table 3-11 Employment Characteristics

Location	Labor Force Participation Rate[a] (%)	Unemployment Rate
United States	63.5	5.2
California	63.9	6.4
Kern County	58.8	8.4
Los Angeles County	64.8	7.0
San Bernardino County	62.2	7.1

Source: USCB, 2023a

a Refers to the working age civilian population (those 16 years of age or older) who are employed or are actively seeking work.

3.12.1.3 Housing

No components of the Proposed Action would lead to a change in availability or accessibility of housing resources in the ROI. Therefore, housing is not carried forward for analysis in this EA.

3.12.1.4 Education

No components of the Proposed Action would lead to a change in availability or accessibility of education resources in the ROI. Therefore, education is not carried forward for analysis in this EA.

3.12.2 Environmental Consequences

3.12.2.1 Evaluation Criteria

Consequences to socioeconomic resources are assessed in terms of the potential impacts on the local economy from implementation of a proposed action. Because only employment is carried forward for analysis in this EA, the level of impacts from expenditures associated with the Proposed Action was assessed in terms of indirect impacts to employment. The magnitude of potential impacts can vary greatly depending on the location of an action. For example, implementation of an action that creates 10 employment positions might be unnoticed in an urban area but might have substantial impacts in a rural area. If potential socioeconomic changes from a Proposed Action result in substantial shifts in population trends or in unfavorable effects to regional spending and earning patterns, such changes may be considered adverse.

3.12.2.2 Proposed Action

Employment

With implementation of the Proposed Action, construction, demolition, and renovation activities associated with the Proposed Action would create a temporary increased demand for local building and construction personnel. This temporary increase in the need for labor would have the potential to beneficially impact employment in the ROI. As Edwards AFB is partially located in three separate counties, it would be possible for the necessary building and construction labor to be sourced from various areas in the ROI, dispersing potential beneficial impacts to employment across multiple communities. Therefore, direct, short-term, negligible, beneficial impacts to employment in the ROI would be anticipated to occur under the Proposed Action.

3.12.2.3 No Action Alternative

Under the No Action Alternative, current operations at the AFRL District would continue using antiquated facilities. There would be no new construction to support expansion of the area for new incoming programs and existing facilities would not be utilized for these programs. Existing

facilities in the AFRL District would not be able to accommodate the staffing needed to support future research, development, and test efforts at the research site, which could prevent future jobs from being created. Therefore, the No Action Alternative would have the potential to result in indirect, long-term, negligible, adverse impacts to employment in the ROI.

3.12.2.4 Reasonably Foreseeable Effects

Construction, demolition, and renovation activities associated with the Proposed Action would require local building and construction personnel to complete the work, and would have the potential to result in short-term, negligible, beneficial impacts to employment in the ROI. Construction for the proposed development projects under the Proposed Action would take place over the next approximately 5 to 10 years. If construction under the Proposed Action were to take place at the same time as construction associated with any of the projects listed in **Table 3-1**, there would be potential for reasonably foreseeable, short-term, minor, beneficial effects to local employment in the ROI. Edwards AFB projects that could be in the construction phase concurrently with the Proposed Action include the projects evaluated under the proposed Main Base District Plan EA, the projects evaluated under the proposed South Base District Plan EA, and the Perimeter Road Runway 23R project. Other projects proposed in the ROI that could be in the construction phase concurrently with the Proposed Action include the Bakersfield-to-Palmdale section of the California Broadband Project, the SCE Company's Cal City Substation 115 kV Upgrade Project, the SCE Ivanpah Control Project at the Bishop-Ridgecrest-Kramer junction, and the IWVGA Imported Water Pipeline Project.

When considered in conjunction with the effects of other past, present, and reasonably foreseeable actions at Edwards AFB and in the ROI, no significant reasonably foreseeable effects to socioeconomics would be anticipated to occur with implementation of the Proposed Action.

CHAPTER 4 LIST OF PREPARERS

The following individuals assisted in the preparation of this EA:

Tom Daues, PMP
Environmental Assessment Services, LLC
NEPA and Compliance Program Manager
M.S., Natural Resources
B.S., Biology
Years of Experience: 32
Contribution: Program Management, Quality Control

Elyse Maurer, CFM
Environmental Assessment Services, LLC
Project Manager
B.A., Geography
Years of Experience: 10
Contribution: Project Management, Quality Control

Brett Borrello
Environmental Assessment Services, LLC
Environmental Planner
B.S., Environmental Science
Minor: Geographic Information Systems
Years of Experience: 4
Contribution: Water Resources; Hazardous Materials and Waste, Toxic Substances, and Contaminated Sites

Ron Green
Environmental Assessment Services, LLC
Ph.D., Zoology
M.S./B.S., Wildlife Biology
Years of Experience: 33
Contribution: Biological Resources

J. Michael Nied, PE (WI)
Environmental Assessment Services, LLC
Project Manager
B.S., Biological Systems Engineering–Natural Resources
Years of Experience: 12
Contribution: Air Quality and Greenhouse Gas

Violet Perry, AICP
Environmental Assessment Services, LLC
Environmental Planner
M.S., Urban Planning
B.S., Outdoor Adventure Leadership
Years of Experience: 3
Contribution: Safety and Occupational Health, Soils and Geological Resources, Socioeconomics, Geographic Information Systems

Joanne Stover
Koman Environmental Assessment Services, LLC
Technical Editor
B.S., Business Administration–Management
Years of Experience: 30
Contribution: Technical Editor/Document Production, Administrative Record

Nick Sutton, AICP
Environmental Assessment Services, LLC
Project Manager
B.S., Biology
Years of Experience: 8
Contribution: Infrastructure, including Transportation and Utilities; Noise

Chris Swisher, RPA
Environmental Assessment Services, LLC
M.A., Applied Archaeology
B.A., Sociology and Anthropology
Years of Experience: 10
Contribution: Cultural Resources

4.1 GOVERNMENT CONTRIBUTORS

The following individuals contributed to this EA.

Contributor	Organization/Affiliation
Lawrence Echaves	Edwards AFB 412 CEG/CEVA
Reina Juarez	Edwards AFB 412 CEG/CEVA
Shaun Hyde	AFMC AFRL/RQIL
Jody Rice	AFMC AFRL/RQIB
Alison Sims	Edwards AFB 412 CEG/CEVA
Lisa Martellaro-Palmer	Edwards AFB 412 CEG/CEVA
Lynn Shreve	Edwards AFB 412 CEG/CEVA
Shari Fort	AFIMSC Det-6/CEB

CHAPTER 5 CITATIONS

Air Force Civil Engineer Center (AFCEC), 2023. *Level II, Air Quality Quantitative Assessment, Insignificance Indicators*. Technical Support Division. April.

AFCEC, 2025. "Air Force Response to PFAS." https://www.afcec.af.mil/what-we-do/environment/per-and-polyfluoroalki-substances (accessed 7 June 2025).

Air Force Research Laboratory (AFRL), 2024a. "About AFRL." https://www.afrl.af.mil/About-Us/ (accessed 2 December 2024).

AFRL, 2024b. "Aerospace Systems." https://afresearchlab.com/technology/aerospace/ (accessed 2 December 2024).

Antelope Valley Economic Development and Growth Enterprise, 2021. *Safe and Reliable Water.* https://avedgeca.org/water-air/. (Accessed 07 May 2025).

Barman, D., 2022. "Stabilization of Expansive Soils Using Chemical Additives: A Review." *Journal of Rock Mechanics and Geotechnical Engineering*. Vol 14, Issue 4. August.

Berglund, B. and Lindvall, T. (Eds.), 1995. "Community noise." *Archives of the Center for Sensory Research*, 1995, 2(1), 1-195.

California Department of Conservation, 2010. *California Geological Survey 150th Anniversary Geologic Map of California.* https://www.conservation.ca.gov/cgs/documents/publications/geologic-data-maps/GDM_002-Geologic-Map-of-CA-2010.pdf (accessed 9 May 2025).

California Department of Conservation, 2015. "Geologic Map of California." https://maps.conservation.ca.gov/cgs/gmc/ (accessed 9 May 2025).

California Department of Fish and Wildlife (CDFW), 2008. "California Bird Species of Special Concern." https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=84247&inline (accessed 5 December 2025).

CDFW, 2025a. "Western Josua Tree Conservation Act." https://wildlife.ca.gov/Conservation/Environmental-Review/WJT/WJTCA (accessed 20 May 2025).

CDFW, 2025b. "Special Animals List." https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline (accessed 5 December 2025).

California State Water Resources Control Board (CA Water Board), 2013. *RUSLE K Values.* https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/k_factor_map.pdf (accessed 19 May 2025).

CA Water Board, 2022. *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit).* https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0057-dwq.pdf (accessed 20 May 2025).

CA Water Board, 2025a. "State and Regional Water Boards." https://www.waterboards.ca.gov/waterboards_map.html (accessed 16 February 2026).

CA Water Board, 2025b. "Welcome to the Construction Stormwater Program." https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html (accessed 22 April 2025).

Crosetto, M.; R. Copons; M. Cuevas-Gonzalez; N. Devanthery; and O. Monserrat, 2018. "Monitoring Soil Creep Landsliding in an Urban Area Using Persistent Scatterer Interferometry (El Papiol, Catalonia, Spain)." *Landslides*. February 28. https://link.springer.com/article/10.1007/s10346-018-0965-5

Desert Research Institute, 2004. *Flood Assessment for the Air Force Research Laboratory, Edwards Air Force Base, California*. December.

Eastern Kern Air Pollution Control District (EKAPCD), 2015. *Rule 402 Fugitive Dust*. http://kernair.org/Documents/Rules/Rules%20March%202015/402_Fugitive_Dust_Staff%20Report_Final.pdf (accessed 13 May 2025).

EKAPCD, 2023. *Eastern Kern Air Pollution Control District 2022-2023 Information Report*.

EKAPCD, 2025. *Rule 210.1 New and Modified Stationary Source Review (NSR)*. http://www.kernair.org/Main_Pages/Subpages/Rules_Sub/200_Rules.html

Edwards Air Force Base (AFB), 2008. *Record of Decision Air Force Research Laboratory Soil and Debris Sites Operable Units 4 and 9 Edwards AFB, California*. May.

Edwards AFB, 2012, *Post-Monitoring Compliance Report, Edwards Air Force Base Borrego Solar Energy Project. Kern County, California*. January.

Edwards AFB, 2013. *Site 312 Explanation of Significant Differences from the Soil and Debris Sites Record of Decision (Operable Units 4/9 Air Force Research Laboratory Det 7, Edwards Air Force Base, California)*. August.

Edwards AFB, 2014. *Lead Management Plan*. March.

Edwards AFB, 2015. *Edwards Air Force Base Civil Engineering Asbestos Operations Plan*. February.

Edwards AFB, 2017. *Hazardous Waste Support Facility. RCRA Part B Permit Renewal Application*.

Edwards AFB, 2018a. *Invasive Species Management Plan*. March.

Edwards AFB, 2018b. *Site Inspection for Aqueous Film Forming Foam Areas at Edwards Air Force Base*. August.

Edwards AFB, 2018c. *Wastewater Plant Ensures Water Doesn't Go to Waste*. 412th Test Wing Public Affairs. 6 September. https://www.edwards.af.mil/News/Article/1622590/wastewater-plant-ensures-water-doesnt-go-to-waste/.

Edwards AFB, 2020. *Integrated Natural Resources Management Plan 2020-2025 for Edwards Air Force Base*. 23 September.

Edwards AFB, 2021. Memorandum for Record. "Calendar Year 2020 Polychlorinated Biphenyls (PCB) Annual Document Log." July.

Edwards AFB, 2022. *Integrated Cultural Resources Management Plan (ICRMP) Environmental Management Division, Edwards AFB, CA*. 18 April.

Edwards AFB, 2023a. *Water Quality Report. 2023 Monitoring Results for Edwards AFB – AFRL*. Public Water System ID: CA1510702.

Edwards AFB, 2023b. *Edwards Air Force Base Hazardous Waste Facility Call 1* Permit Modification*. March.

Edwards AFB, 2023c. *Edwards Air Force Base Asbestos Management Plan*. September.

Edwards AFB, 2023d. *FY23 April AFRL Gate Traffic Study*. Edwards AFB. April.

Edwards AFB, 2024a. "412th Test Wing (412 TW)." https://www.edwards.af.mil/About/ (accessed 2 December 2024).

Edwards AFB, 2024b. "Edwards AFB FY24 AFRL EA Data Request Form Draft 20241105." Personal communication with Edwards AFB and E. Maurer, EAS, LLC. 26 November.

Edwards AFB, 2024c. *Spill Prevention, Control and Countermeasure Plan*. July. CONTROLLED UNCLASSIFIED INFORMATION.

Edwards AFB, 2024d. *Department of the Air Force Hazardous Waste Management Plan: Edwards. Installation Supplement*. 29 February.

Edwards AFB, 2024e. *AFRL District Plan Wells Queried for PFAS*. 18 November.

Edwards AFB, 2024f. *Installation Pest Management Plan: Edwards Air Force Base. 17 September.*

Edwards AFB, 2024g. *Landfill Annual Compliance Monitoring Report Site 13, Operable Unit 4/9 Edwards Air Force Base, California*. January.

Edwards AFB, 2024h. *Department of the Air Force Integrated Solid Waste Management Plan: Edwards. Installation Supplement*. 12 February.

Edwards AFB, 2025a. *EAFB INRMP Species of Interest (SOI) Updated 20250131*. January.

Edwards AFB, 2025b. *Installation Development Plan*. January.

Edwards AFB, 2025c. "Edwards AFB EAs Data Needs Questions." Personal communication with Edwards AFB and E. Maurer, EAS, LLC. 28 May.

Fairbridge, R.W., 1968. "Soil Creep." *Geomorphology*.

Federal Highway Administration, 2006. *Construction Noise Handbook.* Chapter 9, "Construction Equipment Noise Levels and Ranges." https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm (accessed 2 January 2026).

Hailstone, M.R., 2025. "Edwards AFB AFRL EA, Biological Resources Species List." Email communication from M.R. Hailstone, DAF, to E. Maurer, EAS, LLC. 27 February.

Iowa State University, 2024. "Wind Roses." https://mesonet.agron.iastate.edu/sites/windrose.phtml?station=EDW&network=CA_ASOS (accessed 7 June 2025).

Military Installations, 2024. "Edwards AFB." https://installations.militaryonesource.mil/in-depth-overview/edwards-afb (accessed 2 December 2024).

Mojave Desert Air Quality Management District (MDAQMD), 2020. *Rule 403 Fugitive Dust Control*. https://www.mdaqmd.ca.gov/home/showpublisheddocument/8482/637393282546170000 (accessed 13 May 2025).

MDAQMD, 2024. "Rule 1303 New Source Review Requirements." https://www.mdaqmd.ca.gov/rules/rule-book/regulation-xiii-new-source-review (accessed 19 January 2026).

MDAQMD, 2025. "Asbestos." https://www.mdaqmd.ca.gov/permitting/asbestos-information (accessed 7 June 2025).

National Aeronautics and Space Administration (NASA), 2022. "Operational Climatic Data Summary." weather.dfrc.nasa.gov/data/climo/SFCCLIMO.TXT (accessed 1 December 2025).

NASA, 2024. "Armstrong Flight Research Center." https://www.nasa.gov/armstrong/ (accessed 2 December 2024).

National Park Service (NPS), 2015. "Southern Basin and Range." https://www.nps.gov/articles/southern-basin-and-range.htm#:~:text=The%20Basin%20and%20Range%20derives,erosion%20of%20the%20surrounding%20mountains (accessed 19 May 2025).

NPS, 2023a. "Mesozoic Era." https://www.nps.gov/articles/000/mesozoic-era.htm#:~:text=The%20Mesozoic%20Era%20(251.9%20to,ruled%20the%20land%20and%20air (accessed 9 May 2025).

NPS, 2023b. "Quaternary Period." https://www.nps.gov/articles/000/quaternary-period.htm (accessed 9 May 2025).

NPS, 2024. "Cryptobiotic Soil Crusts." https://www.nps.gov/glca/learn/nature/soils.htm#:~:text=Biological%20soil%20crusts%20are%20quite,impact%20on%20these%20delicate%20crusts (accessed 9 May 2025).

National Wetlands Inventory, 2026. "AFRL ROI."

Occupational Safety and Health Administration, 2002. https://www.osha.gov/sites/default/files/publications/osha3096.pdf (accessed 16 January 2026).

Pacific Gas and Electric Company, 2014. PG&E's Gas Service Territory. Pacific Gas and Electric Company. November.

Propublica, 2025. "Edwards Air Force Base." https://projects.propublica.org/bombs/installation/CA9571724504005700 (accessed May 2025).

Southern California Edison, 2025. "About Us: We are SCE." https://www.sce.com/about-us (accessed 7 May 2025).

United State Census Bureau (USCB), 2023a. "ACS 5-Year Estimates Subject Table S2301 (2023)." American Community Survey: Employment Status. https://data.census.gov/table/ACSST5Y2023.S2301 (accessed 2 May 2025).

USCB, 2023b. "ACS 5-Year Estimates Data Profiles Table DP03 (2023)." American Community Survey: Selected Economic Characteristics. https://data.census.gov/table/ACSDP5Y2023.DP03 (accessed 2 May 2025).

United States Department of the Air Force (DAF), 2002. *Notice of Termination Industrial Activities Storm Water General permit No. CAS000001 (Water Quality Order o. 97-03-DWQ)*. April.

DAF, 2022. *Addendum to the Site Inspection Report of Fire Fighting Foam Usage at Edwards Air Force Base, California*. July.

United States Department of Agriculture (USDA), 2002. *Wind Erodibility Groups (I)*. https://efotg.sc.egov.usda.gov/references/Agency/SD/Archived_winderos_100415.pdf (accessed 19 May 2025).

USDA, 2024a. *Soil Map – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties (AFRL Laydown Areas)*. Natural Resources Conservation Service.

USDA, 2024b. *Map Unit Description – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties*. Natural Resources Conservation Service.

USDA, 2025a. *Wind Erodibility Index – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties (AFRL Laydown Areas)*. Natural Resources Conservation Service.

USDA, 2025b. *K Factor, Whole Soil – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties (AFRL Laydown Areas)*. Natural Resources Conservation Service.

USDA, 2025c. *Small Commercial Buildings – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties (AFRL Laydown Areas)*. Natural Resources Conservation Service.

USDA, 2025d. *Local Roads and Streets – Edwards Air Force Base, California, Parts of Kern, Los Angeles, and San Bernardino Counties (AFRL Laydown Areas)*. Natural Resources Conservation Service.

United States Environmental Protection Agency (USEPA), 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. EPA550/9-74-004. March.

USEPA, 2003. *Estimating Building-Related Construction and Demolition Building Material Amounts*. March.

USEPA, 2025a. "Criteria Air Pollutants." 25 March. https://www.epa.gov/criteria-air-pollutants (accessed 19 May 2025).

USEPA, 2025b. "NAAQS Table." 25 March. https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed 19 May 2025).

USEPA, 2025c. "Overview of Greenhouse Gases." 16 January. https://www.epa.gov/ghgemissions/overview-greenhouse-gases (accessed 19 May 2025).

USEPA, 2025d. "Understanding Global Warming Potentials. 16 January." https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#:~:text=The%20Global%20Warming%20Potential%20(GWP,carbon%20dioxide%20(CO2) (accessed 19 May 2025).

USEPA, 2025e. "California Nonattainment/Maintenance Status for Each County by Year of All Criteria Pollutants." 30 April. https://www3.epa.gov/airquality/greenbook/anayo_ca.html (accessed 19 May 2025).

USEPA, 2025f. "California – EPA Map of Radon Zones." https://www.epa.gov/sites/default/files/2014-08/documents/california.pdf (accessed 7 June 2025).

USEPA, 2025g. "Per- and Polyfluoroalkyl Substances (PFAS) – Final PFAS National Primary Drinking Water Regulation."4 December. https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas (accessed 16 February 2026).

USEPA, 2025h. "EPA Announces It Will Keep Maximum Contaminant Levels for PFOA, PFOS." 14 May. https://www.epa.gov/newsreleases/epa-announces-it-will-keep-maximum-contaminant-levels-pfoa-pfos (accessed 16 February 2026).

United States Fish and Wildlife Service (USFWS), 1994. "Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise, Final Rule." *Federal Register* 59:5820–5866 (8 February 1994).

USFWS, 2014. *Biological Opinion for Operations and Activities at Edwards Air Force*. (8-8-14-F-14).

United States Geological Survey, 2002. *Flood-Prone Areas and Waterways, Edwards Air Force Base, California*. Open-File Report 00-183.

Weatherspark, 2025. *Climate and Average Weather Year Round in Edwards Air Force Base*. California, United States. https://weatherspark.com/y/1981/Average-Weather-in-Edwards-Air-Force-Base-California-United-States-Year-Round.