DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)

PROPOSED COMBAT SUPPORT TRAINING RANGE PROJECT
NELLIS AIR FORCE BASE, NEVADA

Pursuant to provisions of the National Environmental Policy Act (Title 42 *United States Code* § 4321 et seq.) (NEPA) and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP),* the United States (US) Department of the Air Force (DAF) prepared the attached Environmental Assessment (EA) to address the potential environmental consequences associated with Combat Support Training Range (CSTR) projects at Nellis Air Force Base (AFB) in Nevada.

Purpose and Need

The purpose of the Proposed Action is to create a training platform where combat support teams can acquire the skills necessary to establish, operate, protect and recover an expeditionary airbase. The CSTR would support integrated training by providing an adaptable infrastructure that simulates contested operations and enables the dynamic employment of expeditionary assets under various training scenarios. The Proposed Action is needed to ensure that Nellis AFB meets the requirements for a Regional Training Site within the western contiguous US (CONUS). Presently, there is a lack of satisfactory training locations in the western CONUS and an inability to meet combat support readiness within existing CONUS locations. Furthermore, the DAF does not yet have enough platforms to facilitate advanced certification exercises for combat support units positioned as “Force Elements.” The proposed CSTR would provide a facility that meets the 2020 and 2022 requirements directed by the Air Force Civil Engineer Center and the Air Force Installation and Mission Support Command and would assemble an entire Force Element and enable training and certification in a realistic setting.

Description of Proposed Action

The Proposed Action includes construction of new facilities, repurposing existing facilities, improving infrastructure, demolishing and removing obsolete equipment, grading, paving, and building and repairing roads.

The DAF developed the following selection standards to identify reasonable alternative locations for the Proposed Action for analysis in this EA. The alternative locations must:

1. support Rapid Airfield Damage Recovery (RADR) training to include expanding the current training airfield (750 feet x 150 feet) by an additional 2,000 feet, 48 vehicles to execute RADR operations, and storage facilities in which to store the equipment;
2. be located within the feasible construction proximity (30-minute drive or less) of the 820th Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Squadron located at Nellis;
3. contain at least 205 acres of developable land to fit all training components, including the mock air strip, in one location; and
4. be located within an area that is accessible by existing roads.

Based on the criteria above, the current Camp Cobra location was the only site that met all the criteria and was selected for the Proposed Action. The EA evaluates environmental impacts that would arise from the development of the CSTR and considers aspects of the training that may contribute to environmental impacts.

Summary of Findings

Potentially affected environmental resources were identified through communications with state and federal agencies and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include land use; earth resources; air quality and climate change; water resources; biological resources; cultural resources; noise; hazardous materials and wastes, toxic substances, petroleum products, and contaminated sites; infrastructure, including transportation and utilities; safety and occupational health; socioeconomics; and protection of children.

Land Use
No significant effects to land use would be expected to result from implementation of the Proposed Action. Development would be anticipated to occur on land designated as Open Space A, including roadways, concrete pads, graded space, and semi-improved surfaces. Implementation of the Proposed Action would be expected to result in long-term, negligible, adverse impacts to land use compatibility.

Earth Resources
No significant effects to earth resources would be expected to result from implementation of the Proposed Action. Long-term, moderate, adverse impacts to soils would have the potential to occur under the Proposed Action. Implementation of the Proposed Action would be expected to result in short-term, minor, adverse impacts to geology and long-term, minor, beneficial impacts to topography. The Proposed Action would grade up to 200 acres, and cover up to 20 acres with impervious surfaces, increasing the potential for soil erosion and sedimentation to occur during major rainfall events. With suitable project site analyses and implementation of best management practices (BMPs), the potential for increased soil erosion and sedimentation would be expected to be low and could be managed with structural controls and stormwater drainage improvements.

Air Quality and Climate Change
No significant effects to air quality would be expected to result from implementation of the Proposed Action. Implementation of the Proposed Action would be expected to result in long-term, minor-to-moderate, adverse impacts to air quality. The estimated total annual emissions of the Proposed Action could exceed the Prevention of Significant Deterioration permitting thresholds for nitrogen oxides, an ozone precursor. Clark County is in moderate nonattainment for the 2015 ozone National Ambient Air Quality Standard. Therefore, impacts from the Proposed Action on regional air quality would be expected to be long term and minor-to-moderate based on the findings of the Air Conformity Applicability Model. Permitting and coordination with the Clark County Division of Air Quality would establish operational constraints that would reduce the emissions emitted to remain below the threshold of insignificance.

Greenhouse gas (GHG) emissions, expressed in terms of carbon dioxide-equivalent (CO_2e), do not have a regulatory threshold; however, estimated emissions for CO_2e demonstrated that CO_2e emissions from the Proposed Action would be below the threshold of insignificance and would not result in a significant increase in GHG emissions.

Water Resources
No significant effects to water resources would be expected to result from implementation of the Proposed Action. Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to surface water; short-term, negligible, adverse impacts groundwater; long-term, minor, adverse impacts to stormwater; and long-term, moderate, adverse impacts to the Colorado State University Center for Environmental Management of Military Lands-mapped floodplains. There are no Federal Emergency Management Agency-mapped floodplains within the Proposed Action area; therefore, no impacts to regulated floodplains would occur. There are no wetlands within the Proposed Action area; therefore, no impacts to wetlands would occur. Potential impacts from runoff could be managed by utilizing BMPs and design standards that control stormwater runoff and limit opportunities for stormwater contamination.

Biological Resources
No significant effects to biological resources would be expected to result from implementation of the Proposed Action. Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to wildlife, vegetation, and migratory birds from loss of approximately 151 acres of habitat. The only federally protected species under the *Endangered Species Act* (ESA) known to occur within the study area is the federally threatened Mojave Desert tortoise (*Gopherus agassizii)*. The Proposed Action would likely adversely affect the desert tortoise because approximately 143 acres of potential tortoise habitat would be disturbed. Nellis AFB operates under a 2023 Programmatic Biological Opinion (PBO) from the US Fish and Wildlife Service, which sets limits on habitat disturbance and allows for translocation of desert tortoise and their eggs found in the project area. The potential disturbance would be within the allowed limits of the PBO, and measures would be implemented to minimize impacts. Nellis AFB would implement all the terms and conditions, conservation measures, and reporting requirements specified in the PBO. These environmental protection measures would ensure that potential impacts to desert tortoises

and their habitat would be minimized. No further consultation with the US Fish and Wildlife Services under Section 7 of the ESA is required for this Proposed Action.

Cultural Resources

No significant effects to cultural resources would be expected to result from implementation of the Proposed Action. Implementation of the Proposed Action is unlikely to cause an adverse physical, visual, auditory, or atmospheric effect to architectural or archaeological resources within the Area of Potential Effects (APE). A precise layout for the CSTR has not been determined, and potential adverse effects to cultural resources could occur if the layout is altered to impact these resources. The Proposed Action would have the potential to result in minor, direct, adverse visual effects to cultural resources at Nellis AFB if the seven unevaluated structures within the APE were determined to be eligible for listing in the National Register of Historic Places (NRHP) and were altered to be out of character for their architectural setting. Direct, adverse, physical effects could occur to the two unevaluated historic buildings and the one NRHP-eligible archaeological site (CK4986) in the project footprint if not avoided during site development. In accordance with Section 106 of the National Historic Preservation Act, the DAF consulted with the Nevada State Historic Preservation Office (SHPO) and federally recognized tribes regarding definition of the APE and its determination of effects. Nellis AFB will continue to consult with the SHPO on potential effects and determine whether mitigation measures would be necessary.

Noise

No significant effects to the noise environment would be expected to result from implementation of the Proposed Action. Construction activities during the development of CSTR would result in temporary noise increases. Noise associated with the operation of construction equipment would be generally short-term, intermittent, and localized. Operations of the facilities, mock airfield trainings, and RED HORSE operation of heavy equipment under the Proposed Action would result in long-term, minor, adverse effects to the noise environment. Operations from unmanned aircraft systems would be limited to less than 24 events per year and would be anticipated to result in short-term, negligible, adverse effects to the noise environment.

Hazardous Materials and Wastes

No significant, adverse cumulative effects to hazardous materials and waste would be anticipated to occur with implementation of the Proposed Action. Operation of the facilities under the Proposed Action may require the use of hazardous materials and therefore contribute to the generation of hazardous waste. Currently, Camp Cobra uses a small amount of hazardous materials and petroleum products, and while the Proposed Action would have the potential to slightly increase the amount used, the overall impact on Nellis AFB would be expected to be negligible. The anticipated result would be short-term, minor adverse impacts related to hazardous materials and waste. Inactive demolition landfill LF-7 is located within the Proposed Action area and could face potential impacts from grading or excavation activities. If the integrity of the landfill cap was impacted during construction, it could result in long-term moderate impacts that would require coordination with the Nevada Department of Environmental Protection.

Infrastructure, including Transportation and Utilities

No significant adverse effects to infrastructure, transportation, or utilities would be expected to result from implementation of the Proposed Action. Road improvements from the Proposed Action would be anticipated to have long-term beneficial impacts to transportation infrastructure. Negligible long-term adverse impacts from increased demand to liquid fuel storage, potable water supply, and the sanitary sewer system would be anticipated to occur. Short-term, negligible, adverse impacts to electricity and natural gas and solid waste infrastructure would be anticipated to occur due to brief service interruptions that could occur during construction when existing lines are connected to newly constructed facilities.

Safety and Occupational Health

No significant effects to safety and occupational health would be expected to result from implementation of the Proposed Action. The Proposed Action would be anticipated to have short-term, negligible impacts to ground safety. DAF personnel may be exposed to safety hazards associated with common industrial construction activities. Ground operations and activities would adhere to all applicable occupational safety policies and procedures in DAF Manual 91-203 during and after construction to minimize health and safety risks. Under the Proposed Action, the Driving Course would pass through an explosive safety quantity distance arc. The Driving Course is an approved land use within explosive safety quantity distance arcs and no impacts to explosives safety would be anticipated.

Socioeconomics
No significant effects to socioeconomics would be expected to result from implementation of the Proposed Action. The Proposed Action would be anticipated to have short-term, negligible, beneficial impacts to population and employment due to the increased military personnel and need for local construction personnel to complete construction actions. The Proposed Action would have no significant impact on housing. Long-term, negligible, adverse impacts on educational resources could occur due to overcrowding challenges at the Clark County School District that could strain resources until solutions for capacity issues are reached.

Protection of Children
No significant adverse effects to children would be expected to result from implementation of the Proposed Action. Construction activities would not occur in the vicinity of base housing areas where children or other community members could be present. No disproportionate impacts to children would be anticipated to occur under the Proposed Action.

Cumulative Impacts

The EA considered the cumulative effects on the environment that result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions at Nellis AFB. The following projects could potentially occur concurrently and result in cumulative effects:

- Environmental Impact Statement for Master Planning and Installation Development at Nellis AFB
- Environmental Assessment for the Beddown of Tactical Air Support Squadron at Nellis AFB
- Completed Military Construction Projects
- Environmental Assessment for Nellis Reclaimed Waterline Project
- Environmental Assessment for Addition of F-35 Joint Strike Fighters, Addition of F-22A Raptors and Contract Adversary Air
- Environmental Assessment for Installation Development at Nellis AFB
- Collaborative Contract Aircraft Experimental Operations Unit Beddown
- Clark County Regional Flood Control District Confluence Detention Basin Expansion

No significant cumulative impacts were identified.

Mitigation

The EA analysis concluded that the Proposed Action would not result in significant environmental impacts; therefore, no mitigation measures are required. BMPs are described and recommended in the EA where applicable.

Conclusion

***Finding of No Significant Impact**.* After reviewing the EA prepared in accordance with the requirements of NEPA and 32 CFR Part 989, and which is hereby incorporated by reference, I have determined that the proposed activities would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement will not be prepared. This decision was made after considering all submitted information, including a review of agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the DAF.

JASON J. GLYNN
Colonel, USAF
Commander, 99th Air Base Wing

DATE

DRAFT
ENVIRONMENTAL ASSESSMENT FOR COMBAT SUPPORT TRAINING RANGE NELLIS AIR FORCE BASE, NEVADA

April 2025

Prepared for:
Department of the Air Force
Nellis Air Force Base, Nevada

PRIVACY ADVISORY

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA) and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

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

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

COMPLIANCE

This document has been certified that it does not exceed 75 pages, excluding citations and appendices, in accordance with Paragraph (e)(2) of NEPA (42 USC § 4336a). Generally, a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information.

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.

COVER SHEET

Draft Environmental Assessment for Combat Support Training Range, Nellis Air Force Base, Nevada

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

b. *Location: Nellis Air Force Base (AFB), Nevada*

c. *Designation: Draft Environmental Assessment*

d. *For Additional Information: Ms. Sirin Toksoz Jewell, 99 CES/CENPP, 6020 Beale Avenue, Building 812, Nellis AFB, Nevada. Phone: 702-652-9366 or by email at sirin.toksoz_jewell.1@us.af.mil.*

Abstract:

This Environmental Assessment has been prepared pursuant to provisions of the *National Environmental Policy Act,* Title 42 *United States Code*, § 4321 et seq. and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. EIAP informs decision-makers, regulatory agencies, and the public about a DAF proposed action before any decision is made on whether to implement the action.

The purpose of the Proposed Action is to establish a training platform to allow civil engineer combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. Expeditionary airbases support the DAF mission through being ready to set up on the fly and establish a site in the field through small teams that are flexible and trained in a wide variety of jobs, ready to deploy at any time. The Proposed Action is needed to meet DAF requirements for a Regional Training Site within the western contiguous United States. DAF currently lacks the infrastructure and equipment required to facilitate robust civil engineer combat support training exercises and certification in preparation for the high-end fight.

The analysis of the affected environmental and environmental consequences of implementing the Proposed Action and No Action Alternative concluded that by implementing standing environmental protection measures and best management practices, there would be no significant adverse impacts from the actions at Nellis AFB on the following resources: land use; earth resources; air quality and climate change; water resources; biological resources; cultural resources; infrastructure, including transportation and utilities; safety and occupational health; socioeconomics; and protection of children. Nellis AFB is an active installation with aircraft operations, demolition, and new construction actions currently under way as well as future development currently in the planning phase. Impacts associated with development would be minor; therefore, significant cumulative impacts are not anticipated from activities associated with the Proposed Action and Alternatives when considered with past, present, or reasonably foreseeable future actions.

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ACRONYMS AND ABBREVIATIONS

820 RHS	820th RED HORSE Squadron
AAGR	annual average growth rate
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing material
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFF	aqueous film forming foam
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AICUZ	Air Installations Compatible Use Zones
AMMPS	advanced medium mobile power sources
APE	Area of Potential Effects
APZ	Accident Potential Zone
ARPA	Archaeological Resources Protection Act of 1979
AST	aboveground storage tank
BASH	bird/wildlife aircraft strike hazard
BGEPA	Bald and Gold Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BPU	Base Expeditionary Airfield Resources power unit
CAA	Clean Air Act
CCA	Collaborative Contract Aircraft
CCSD	Clark County School District
CCWRD	Clark County Water Reclamation District
CEMML	Center for Environmental Management of Military Lands
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CNLV-WRF	City of North Las Vegas Water Reclamation Facility
CO_2	carbon dioxide
CO_{2e}	carbon dioxide-equivalent
CSU	Colorado State University
CSTR	Combat Support Training Range
CT	census tract
CWA	Clean Water Act
CZ	clear zone
DAF	Department of the Air Force
dBA	A-weighted decibel
DES	Department of Environment and Sustainability
DESR	Defense Explosive Safety Regulation
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EOD	explosives ordnance disposal
EOU	Experimental Operations Unit
ERP	Environmental Restoration Program
ESA	Endangered Species Act

ESQD	explosive safety quantity distance
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
ft^2	square foot/feet
GHG	greenhouse gas
GUA	general use area
GWP	global warming potential
HAZMAT	hazardous materials
HUC	Hydrologic Unit Code
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
IPaC	Information for Planning and Consultation
IRP	Installation Restoration Program
LBP	lead-based paint
lbs	pounds
LVIAQCR	Las Vegas Intrastate Air Quality Control Region
MILCON	military construction
MBTA	Migratory Bird Treaty Act
MSA	munitions storage area
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NDEP	Nevada Department of Environmental Protection
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	nitrogen oxides
NLVWD	North Las Vegas Water District
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
NSA	Nellis Solar Array
NVE	NV Energy
OSHA	Occupational Health and Safety Administration
PACM	presumed asbestos-containing material
PBA	Programmatic Biological Assessment
PBO	Programmatic Biological Opinion
PCB	polychlorinated biphenyls
PFAS	polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PGR	percent growth rate
PM_{10}	inhalable particulate matter
PM_{25}	fine inhalable particulate matter
PSD	Prevention of Significant Deterioration
PV	photovoltaic
RADR	Rapid Airfield Damage Recovery
RADRRTS	Rapid Airfield Damage Repair Regional Training School
RCRA	Resource Conservation and Recovery Act
RED HORSE	Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SNWA	Southern Nevada Water Authority
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
TASS	Tactical Air Support Squadron

TCP	Traditional Cultural Properties
TSCA	Toxic Substances Control Act
US	United States
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank

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CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (US) Department of the Air Force (DAF) and the Air Force Civil Engineer Center (AFCEC), with the support of Air Combat Command (ACC) and Nellis Air Force Base (AFB), proposes to develop a Combat Support Training Range (CSTR) at Nellis AFB. The site would be established and operated as a training platform for civil engineer combat support teams to train on skills needed to construct, operate, protect, and recover an expeditionary airbase. This EA provides sufficient information to analyze potential environmental impacts associated with developing, constructing, and operating a CSTR location at Nellis AFB.

ACC organizes, trains, and equips combat-ready forces to provide dominant combat airpower in support of national security strategy implementation. Nellis AFB is home to the 99th Air Base Wing, Air Force Warfare Center, 57th Wing, Nevada Test and Training Range, elements of the 53rd Wing and 505th Command Control Wing, 801st Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers (RED HORSE) Training Squadron, and more than 52 tenant units and agencies. The 99th Air Base Wing is the host wing for Nellis AFB. A CSTR location at Nellis AFB would allow combat support teams to train on skills needed to construct, operate, protect, and recover an expeditionary airbase.

The *National Environmental Policy Act of 1969*, as amended (*42 United States Code* [USC] § 4321 et seq.) (NEPA) requires federal agencies to consider alternatives to a proposed action and to analyze potential impacts of alternative actions. This Environmental Assessment (EA) evaluates the potential environmental impacts associated with developing a CSTR location at Nellis AFB. This document was prepared in accordance the DAF NEPA regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. EIAP informs decision-makers, regulatory agencies, and the public about a DAF proposed action before any decision is made on whether to implement the action.

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. Development proposed at Nellis AFB would only commence upon satisfactory completion of this EA and issuance of a Finding of No Significant Impacts (FONSI).

1.2 LOCATION

1.2.1 Nellis AFB

Nellis AFB, located in Clark County in the southeast corner of the state of Nevada, lies 5 miles northeast of the city of Las Vegas and adjacent to the city of North Las Vegas (**Figure 1-1**). The unincorporated town of Sunrise Manor and undeveloped portions of Clark County surround the majority of Nellis AFB, although open space dominates to the northeast. Covering 14,161 acres, the base contains three major functional areas. Area I, the Main Base, is located east of US Highway 93 and includes the airfield and most base functions. Area II, northeast of the Main Base, contains the Munitions Storage Area/Weapons Storage Area. Area III, situated northwest of the Main Base, includes a number of facilities such as a hospital, storage, and housing.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to establish a training platform to allow civil engineer combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. An expeditionary airbase is a mobile installation that can be established rapidly in the field under a variety of conditions. Such installations often consist of simple structures such as concrete block buildings, K-spans, and tents. The concept of an expeditionary airbase allows DAF to set up an airfield where it is needed, rather than limiting air support to locations where permanent infrastructure exists. Expeditionary airbases support the DAF mission through being ready to set up on the fly and establish a site in the field through small teams that are flexible and trained in a wide variety of jobs, ready to deploy at any time.

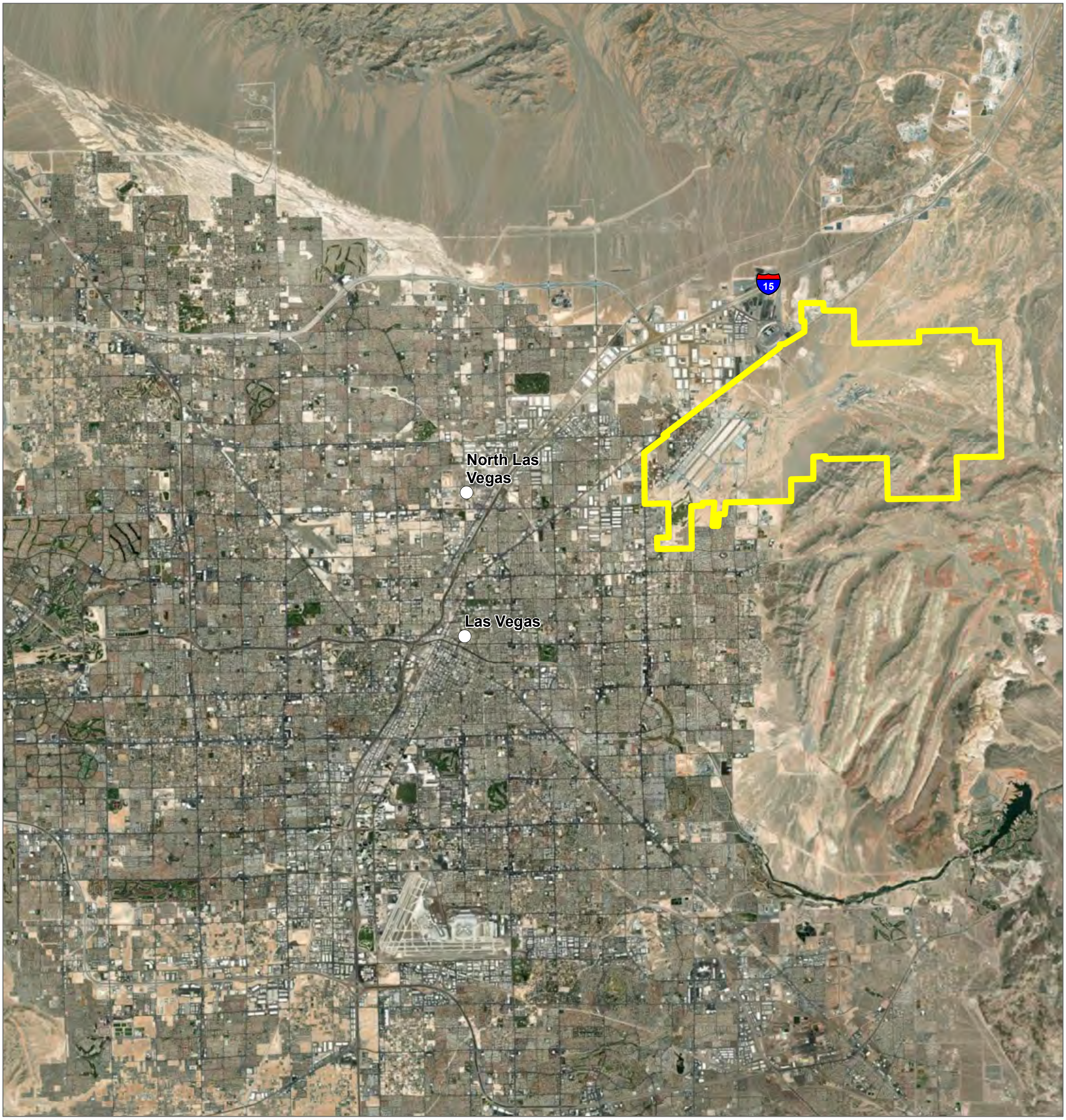
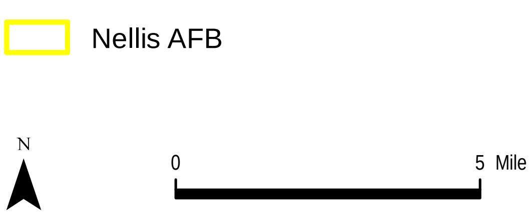
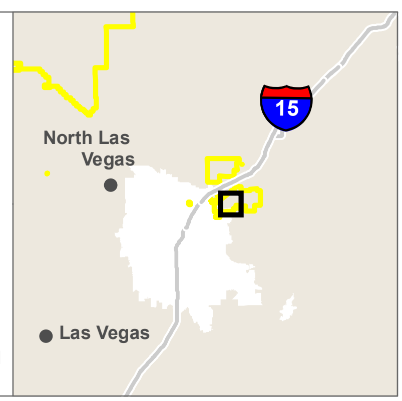


FIGURE 1-1
Regional Map of Nellis Air Force Base, Nevada





Implementation of the Proposed Action would provide a setting that contains flexible infrastructure that would allow dynamic employment of expeditionary assets under a variety of training configurations in a minimalist, realistic environment that simulates contested operations.

The Proposed Action is needed to meet DAF requirements for a Regional Training Site within the western contiguous US (CONUS). DAF currently lacks the infrastructure and equipment required to facilitate robust civil engineer combat support training exercises and certification in preparation for the high-end fight. In 2020, the Commander of AFCEC directed the establishment of Civil Engineer CSTR locations within a 10-hour drive from all CONUS installations. Currently, there is a lack of adequate training locations in western CONUS, and existing CONUS locations lack the capacity to meet combat support readiness throughput requirements. The Proposed Action would provide a facility that meets the 2020 requirements set forth by AFCEC and AFIMSC.

Additionally, the DAF currently does not have sufficient platforms to enable high-end certification exercises for combat support teams postured as "Civil Engineer Force Elements" within the new Air Force Generation (AFFORGEN) model. AFFORGEN is a newly implemented model that aims to reconstitute manpower, aircraft, and equipment into Force Elements that train, deploy, and recover as cohesive units. The Proposed Action would facilitate the assembly of an entire Force Element and would allow the Force Element to train and certify in a realistic environment.

1.4 Scope of the Environmental Assessment

In accordance with 32 CFR § 989.8, the DAF determined the appropriate level for this analysis is an EA. An EA is a concise public document that briefly discusses the purpose and need, alternatives, and potential environmental impacts of a proposed federal action. It aids in agency planning and decision-making, or facilitates the preparation of an EIS, as necessary. This EA has been prepared in accordance with NEPA (42 USC § 4321 et seq.) and the EIAP (32 CFR Part 989).

1.5 Intergovernmental Coordination, Public and Agency Participation

The EIAP, in compliance with NEPA guidance, includes public and agency review of information pertinent to a proposed action and alternatives. The DAF's compliance with the requirement for intergovernmental coordination and agency participation begins with the scoping[1] process (32 CFR § 989.18). Accordingly, 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 during the development of this EA. A mailing list of the recipients of this correspondence as well as a sample of the outgoing letters and all responses are included in **Appendix A**.

1.5.1 Government-to-Government Consultation

The *National Historic Preservation Act* (54 USC § 300101, et seq.) (NHPA) 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.), US Department of Defense (DoD) Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, and Department of Air Force 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 Nellis AFB point of contact for Native American tribes is the Base Commander. The point of contact for consultation with the Tribal Historic Preservation Officer and the State Historic Preservation Officer (SHPO) is the Nellis AFB Cultural Resources Manager.

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

NHPA Section 106, Air Force Manual 32-7003, *Environmental Conservation*, and DAFI 90-2002 require that Nellis AFB engage in government-to-government consultations between the DAF and federally listed or affiliated tribes if requested and agreed to by the pertinent tribe(s) and that the consultation process be completed prior to fully finalizing the EA.

1.5.2 Agency Consultations and Coordination

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the *Endangered Species Act of 1973*, as amended (16 USC § 1531 et seq.) (ESA), and implementing regulations at 50 CFR Part 402 requires communication with the US Fish and Wildlife Service (USFWS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. On 5 May 2023, the DAF initiated Section 7 consultation under the ESA for the Proposed Action using the USFWS's Information for Planning and Consultation (IPaC) tool. Basic information concerning the location and nature of the projects included in the Proposed Action was input into IPaC to obtain an official species list from the USFWS. The list identifies threatened and endangered species and other protected species (e.g., migratory birds) with potential to be affected by the Proposed Action (**Appendix A**). In addition, a Programmatic Biological Opinion (PBO) was issued on 28 September 2023 for the Nellis AFB and the Small Arms Range (**Appendix B**). Information from these reports is incorporated into this EA where applicable.

Other federal agencies the DAF might coordinate with include the US Environmental Protection Agency, Bureau of Land Management (BLM), National Park Service, US Forest Service, and Bureau of Indian Affairs.

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) require that the SHPO be given the opportunity to concur on determinations of eligibility and effects. If no historic properties are identified or are present but would not be affected, this EA would be used to provide a "no historic properties affected" or "no adverse effect" finding, respectively, to the SHPO and other consulting parties for review.

The DAF also coordinated with the following state and local government agencies:

- Air and water quality effects – Nevada Department of Environmental Protection (NDEP) and Clark County Department of Environment and Sustainability (DES)
- Habitat and species of concern – Nevada Department of Wildlife (NDOW)

1.5.3 Public and Agency Review

The DAF invites the public and other interested stakeholders to review and comment on this Draft EA. Accordingly, a notice of availability of the Draft EA and Draft FONSI was published in the following local newspapers to commence a 30-day public comment period.

- Las Vegas Review Journal
- Desert Lightning News

During the public comment period, the Draft EA and Draft FONSI are available online for view or download at https://www.nellis.af.mil/Public-Affairs/Community-Engagement/Partnerships/Environment/. Additionally, printed copies of the Draft EA and Draft FONSI are available by request and placed at the following area libraries for review:

- Sunrise Library, 5400 E Harris Ave, Las Vegas, NV 89110 45
- Alexander Library, 1755 W Alexander Rd, North Las Vegas, NV 89032

1.6 Decision to be Made

This EA analyzes the potential environmental consequences of the Proposed Action and Alternatives. The Proposed Action involves construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, maintenance of the infrastructure, and facilitation of ongoing training. Should the DAF choose to implement the Proposed Action, this EA will assist in determining an appropriate scope of action to minimize potential adverse environmental impacts and allow for additional environmental review in compliance with NEPA.

Based on the analysis in this EA, the DAF will make one of three decisions regarding the Proposed Action:

1. Determine that the Proposed Action and Alternatives would have no significant environmental impacts and issue a signed FONSI;
2. Initiate preparation of an Environmental Impact Statement if it is determined that implementation of the Proposed Action and Alternatives would cause significant impacts to the human and natural environment; or
3. Select the No Action Alternative, whereby the Proposed Action would not be implemented.

As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding a proposed project and be available to inform decision-makers of the potential environmental impacts.

Should the DAF decide to implement the Proposed Action as noted above, this EA will identify any actions the DAF will commit to undertake to minimize environmental effects and comply with NEPA.

1.7 Scope of the Environmental Assessment

NEPA regulations require federal agencies to consider alternatives to a Proposed Action and to analyze potential impacts of alternative actions. Potential impacts of the Proposed Action and Alternatives described in this EA will be assessed in accordance with the NEPA regulations, which require that federal agencies analyze the potentially affected environment and degree of the effects of the action.

This EA is organized into the following sections:

- Chapter 1, Purpose and Need for the Proposed Action, includes an introduction and background on the project, location, scope of the EA, purpose and need statements, intergovernmental coordination and public and agency participation, public and agency review, and decision to be made.
- Chapter 2, Description of the Proposed Action and Alternatives, includes a description of the Proposed Action, selection standards for alternatives, a description of the alternatives being analyzed, application of selection standards, alternatives considered but eliminated from detailed analysis, and a summary of potential environmental consequences.
- Chapter 3, Affected Environment and Environmental Consequences, includes a description of the natural and built environments within and surrounding IRs 320, 500, and 501 that may be affected by the Proposed Action and Alternatives, including a No Action Alternative. This chapter also includes a discussion of direct, indirect, and cumulative impacts.
- Chapter 4, List of Preparers, provides a list of the preparers of this EA.
- Chapter 5, References, contains references for studies, data, and other resources used in the preparation of this EA.
- Appendices, as required, provide relevant correspondence, studies, modeling results, and public review information.

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following sections describe the Proposed Action, alternatives screening process, and alternatives retained for analysis in this EA.

2.1 INTRODUCTION

This section provides a description of the standards used in selecting the Proposed Action and Alternatives; a detailed description of the Proposed Action and Alternatives, including the No Action Alternative; identification of alternatives considered but eliminated from further analysis; comparison of environmental consequences of the alternatives; and mitigation measures.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The DAF proposes to repurpose existing structures as well as construct new, austere (or minimalist) buildings, such as basic concrete block and prefabricated steel structures. The primary infrastructure feature of the installation would be a new 3,000-foot training airfield with taxiway system and associated Logistics Area. The training location would be connected to a new training airfield with a taxiway system. The new airfield would include a driving course using existing roads and a foot patrol area located outside of the footprint. This EA evaluates the potential environmental impacts that could arise from the development and operation of a CSTR at the existing site.

The project includes the construction of new facilities, repurposing of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The 820th REDHORSE Squadron (820 RHS), a self-sufficient engineering and logistics unit located at Nellis AFB, would be responsible for all clearing, grading, paving, and construction associated with the project.

The Proposed Action would establish a small, permanent-party presence of up to 20 personnel and would support additional personnel during temporary training events. Flexible CSTRs would be used to train teams in base defense, urban operations, local population engagement, and distributed operations. In order to meet the training requirements, CSTRs should support modifications to the natural infrastructure, such as grading and compaction for helicopter landing zones, erection of temporary structures, placement and mitigation of unexploded ordnance below grade, and construction of berms.

The CSTR would provide a location to facilitate integrated civil engineer training exercises ranging from small, unit-led events to major command-directed, large-team certification efforts. The mock airfield and associated accessory structures primarily would function as a setting for the 801 RED HORSE Training Squadron to host Rapid Airfield Damage Recovery (RADR) training. The mock airfield would be 12-inch-thick concrete, 150 feet wide by 1,000 feet long. The airfield would be used solely for combat support training; no aircraft operations would occur. The CSTR would be used to host temporary training events for groups up to 60 personnel 5–10 times per month, groups up to 200 personnel 1–2 times per month, and groups up to 750 personnel 3–5 times per year. Training events would last 1–12 days.

Overall, the development of the CSTR would establish approximately 796,000 square feet (ft^2) of new impervious surface, 10,556 linear feet of semi-improved roadways, and 7,950 feet of fencing, requiring approximately 8 million ft^2 of grading. **Table 2-1** lists each construction/improvement project that would be included under the Proposed Action, with accompanying square footage.

Table 2-1
Construction, Paving, and Grading under the Proposed Action

Description	Preserved (repurposed)	New Construction (ft^2)	Paving (ft^2)	Grading (ft^2)
Site Support Area				
Repurpose existing paved surfaces and Bldgs. 10112, 10136, 10146, 10164, and 10152	14,241			
Construct covered storage		10,000		12,000
Construct vehicle maintenance facility		11,000		13,200
Create semi-improved roadways (approximately 974-feet long x 10-feet wide)				9,740
Provide other considerations including dumpsters, fuel points, and access to a vehicle wash rack		TBD		
Contingency Beddown Area				
Create graded space for lodging temporary duty station personnel and flexible training functions (31 acres)				1,350,360
Repurpose existing improved surfaces and Bldgs. 10155, 10157, and 10165	10,830			
Construct latrines and showers with power, water, and wastewater		4,000		4,800
Construct laundry facility with power, water, and wastewater		650		780
Construct expeditionary dining facility with power, water, and wastewater		1,500		1,800
Grade semi-improved roadways (approximately 4,500-feet long x 10-feet wide)				45,000
Grade semi-improved surfaces for erecting temporary structures				TBD
Construct concrete pads for storage and recurring placement of assets such as generators and water-purification units		25,000		30,000
Install electric utility connections and associated equipment to simulate connection of expeditionary power distribution to a power plant. This includes temporary use of mobile generators to establish operational proficiency		TBD		
Install water source connection, storage, and discharge points for water-purification units		TBD		
Mock Village Area				
Grade 14 acres				609,840
Repurpose existing improved surfaces and Bldg. 10160	1,280			
Develop semi-improved roadways (approximately 1,515-feet long x 10-feet wide)				15,150
Develop semi-improved surfaces for erecting expedient, reconfigurable structures				

Description	Preserved (repurposed)	New Construction (ft^2)	Paving (ft^2)	Grading (ft^2)
Airfield Training Area				
Construct a mock airfield (150 feet x 3,000 feet)			450,000	540,000
Construct a parallel taxiway (75 feet x 2,000 feet)			150,000	180,000
Construct three ladder taxiways (75 feet x 250 feet)			56,250	67,500
Construct two aprons (200 feet x 350 feet)			140,000	168,000
Logistics Area				
Develop semi-improved roadways (approximately 3,573 feet long x 10 feet wide)				35,730
Develop semi-Improved surfaces				TBD
Construct covered storage		84,000		100,800
Graded Contingency Training Area				
Develop graded space for flexible training function (approximately 97.5 acres)				4,247,100
Develop semi-improved roadways (approximately 10,556-feet long x 10-feet wide)				105,560
Develop semi-Improved surfaces				TBD
Construct concrete pads for storage and recurring placement of assets		10,000		12,000
Driving Course				
Regrade and repair 8 miles of semi-improved roadway (assumed 12-feet wide)				506,880
TOTALS	**26,351**	**146,150**	**796,250**	**8,056,240**

2.3 Selection Standards for Alternative Screening

Consistent with 32 CFR § 989.8, selection standards were developed to establish a means for determining the reasonableness of an alternative to the Proposed Action and whether an alternative should be carried forward for further analysis in the EA. Potential alternatives to the Proposed Action were evaluated based on universal selection standards, which were applied to all alternatives. In accordance with 32 CFR § 989.8(c), the following selection standards 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:

- support RADR training to include expanding the current training airfield (750 feet x 150 feet) by an additional 2,000 feet, 48 vehicles to execute RADR operations, and storage facilities in which to store the equipment;
- be located within the feasible construction proximity (30-minute drive or less) of the 820 RHS, located at Nellis;
- contain at least 205 acres of developable land to fit all training components, including the mock air strip, in one location; and
- be located within an area that is accessible by existing roads.

Based on these selection standards, three reasonable alternatives were identified for evaluation.

2.4 Alternatives Retained for Detailed Analysis

2.4.1 Alternative 1 (Proposed Action)

Camp Cobra is an existing contingency training area located approximately 2 miles east-northeast of the north end of the main runway at Nellis AFB (see **Figure 1-1**). The camp is located within Area II of Nellis AFB and comprises approximately 54 acres of disturbed and developed area. Camp Cobra contains a number of austere structures and is used for realistic training to simulate conditions that the warfighter could encounter in combat. Alternative 1 proposes to establish and operate a training platform for combat support teams at Camp Cobra to train skills needed to construct, operate, protect, and recover an expeditionary airbase. The training location would be connected to a new 3,000-foot training airfield with taxiway system and would be augmented by an 8-mile driving course/foot patrol area on existing roads located outside of the Camp Cobra footprint (**Figure 2-1**).

The project consists of two main components.

- CSTR expansion with mock airfield, and
- driving course/foot patrol area.

Construction would occur over 2–3 years using a phased approach. The mock airfield would be completed within the first 6 months.

In addition to the development of the CSTR, this EA considers aspects of the training that have the potential to contribute to environmental impacts. As part of the training regimen, Alternative 1 includes range control and operational deconfliction for the following items:

- spectrum management;
- blanks and dye marking cartridges;
- propane-fed fire trainers;
- flares;
- smoke, tear gas, and other training analogs;
- ground burst simulators; and
- directed energy equipment (i.e., recovery of airbase denied by ordnance platform).

Although this EA considers environmental impacts associated with these requirements, precise numbers of training activities are unknown at this time. Each of the above-listed requirements would be employed only after deconfliction, coordination, and approval through the host wing.

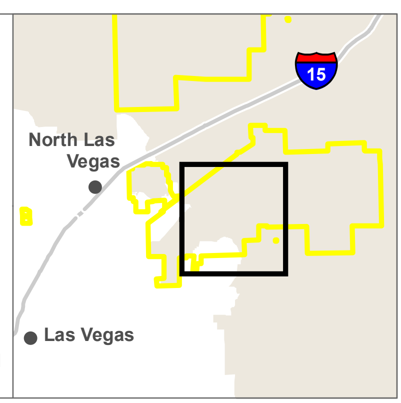
FIGURE 2-1
Project Overview – Alternative 1

★ Connex Village
Driving Course / Foot Patrol Roads
Proposed Airfield Road
Existing Ranges
Proposed Airfield
100-Yard Foot Patrol Buffer

N

0 1 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



2.4.1.1 Combat Support Training Range Expansion with Mock Airfield

Under Alternative 1, Camp Cobra would be expanded by approximately 149 acres to create a 205-acre CSTR. The CSTR would be subdivided into six general use areas (GUAs) that support different functions of the training platform (**Figure 2-2**). For purposes of analysis, this is the defined Proposed Action area.

Alternative 1 would preserve and repurpose existing buildings and structures where appropriate and augment the existing buildings with new construction. The 820 RHS would construct the buildings, using "austere" construction methods, i.e., plain concrete blocks and prefabricated steel. Building renovations, demolitions, and repairs would follow asbestos and lead-based paint surveys.

A precise layout for the CSTR has not been developed; however, an approximate arrangement of the GUAs has been established along with a list of improvements proposed within each GUA. This EA assumes that the project design may fluctuate. So, rather than evaluating a specific design, the analysis focuses on the likely impacts of the known components, regardless of their arrangement. The GUAs are described as follows; the proposed improvements within each GUA are listed above in **Table 2-1**.

- **Site Support Area:** The Site Support Area would consist of developed space for administrative functions, classrooms, storage, and vehicle maintenance. This GUA would be approximately 9 acres and occupy the easternmost portion of the CSTR.
- **Contingency Beddown Area:** The Contingency Beddown Area would consist of graded space for lodging temporary duty assignment personnel and flexible training functions. The Contingency Beddown Area would be used for erecting temporary facilities and equipment to simulate contested operations. The Contingency Beddown Area would be approximately 31 acres and be located adjacent to the west end of the Site Support Area.
- **Mock Village Area:** The Mock Village Area would consist of approximately 14 acres of graded space capable of being repeatedly reconfigured to create tactical training areas for host-nation engagement and urban operations.
- **Airfield Training Area:** The Airfield Training Area would be utilized as a mock airfield consisting of 3,000 feet of runway, taxiways, and ramps. This GUA would be approximately 18.5 acres and be located on previously disturbed land within the expanded CSTR footprint.
- **Logistics Area:** The Logistics Area would be used for storage and flexible training functions. This GUA would be approximately 33 acres and located on previously disturbed land within the expanded CSTR footprint.
- **Graded Contingency Training Area:** The CSTR would consist of approximately 97.5 acres of graded space used for flexible training functions. This GUA would be located on previously disturbed land within the expanded CSTR footprint.

2.4.1.2 Driving Course and Foot Patrol Area

Under Alternative 1, the CSTR would become the starting point for a road driving course that exits the northeastern corner of the CSTR and forms an approximately 8-mile loop to the east (see **Figure 2-1**). The driving course would be routed along existing gravel roads and would pass through specific locations along the route that are identified for training on ambushes and opposing force engagement. These training locations would be created through the placement of shipping containers (i.e., Connex boxes) arranged as Connex "villages" to simulate conditions in the field.

The existing roads are currently in disrepair and, in some places, completely washed out. As such, the entire 8-mile-long driving course would require regrading and repair prior to use, as defined in **Table 2-1**.

Alternative 1 would include establishment of a foot patrol area within a 100-yard buffer on either side of the driving course. This space would be used by small teams to conduct simulated reconnaissance foot patrols in adverse terrain. No improvements or grading would be required within the foot patrol area.

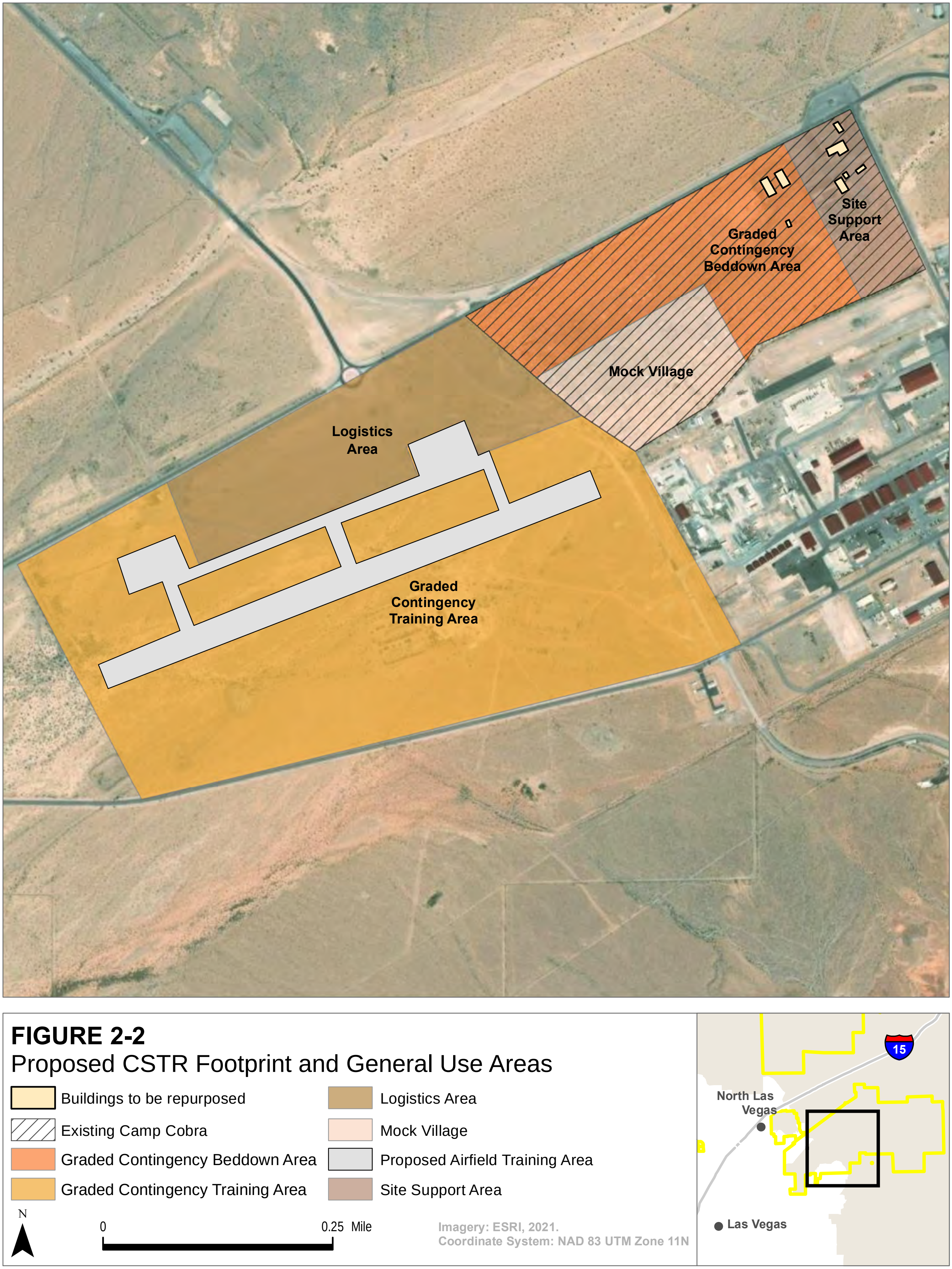


FIGURE 2-2
Proposed CSTR Footprint and General Use Areas

2.4.2 No Action Alternative

NEPA regulations require evaluation of the No Action Alternative under NEPA. The No Action Alternative serves as a baseline for evaluating the impacts of the Proposed Action and Alternatives.

Under the No Action Alternative, the proposed training area would not be constructed and readiness would be severely impacted. Nellis AFB would continue to lack the infrastructure and equipment required to facilitate robust combat support training exercises. Furthermore, the DAF would not meet the 2020 AFCEC requirement to establish a Civil Engineer CSTR location within a 10-hour drive from all CONUS installations and the western CONUS would continue to lack the capacity to meet combat support readiness throughput requirements.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The DAF considered two additional alternatives but eliminated them from further consideration because they do not meet selection standards for the Proposed Action as outlined in **Section 2.3** and summarized in **Table 2-2**. Programmatic land use planning and currently planned developments have limited the number of areas available for siting the Proposed Action. Due to these limitations, no other locations for siting the project were evaluated; thus, this EA analyzes the Proposed Action and the No Action Alternative.

Table 2-2
Comparison of Alternatives

Alternative Actions	Selection Standard				Meets Purpose and Need
	1. Supports RADR training	2. Can be constructed by RHS	3. Fits all training component in one location	4. Accessible by existing roads	
Alternative 1 (Proposed Action)					
Develop entire CSTR in one location at the current Camp Cobra location.	Yes	Yes	Yes	Yes	Yes
Alternative 2					
Locate the mock airfield portion of the project near the exploded ordnance disposal range.	Yes	Yes	No	Yes	Yes
Alternative 3					
Do not construct mock airfield.	No	No	No	Yes	No

CSTR = Combat Support Training Range; RHS = RED HORSE Squadron

2.5.1 Alternative 2

Alternative 2 includes the same proposed construction, paving, grading, and training activities as Alternative 1 (see **Table 2-1**). Under Alternative 2, the mock airfield would be constructed in an alternative location approximately 2.75 miles east of the existing Camp Cobra property near the existing explosives ordnance disposal (EOD) range. Under Alternative 2, personnel, equipment, and supplies would need to be transported to the alternative location. Locating the mock airfield near the EOD range would require additional investment in infrastructure, as utility connections are insufficient near the EOD range, and the increased use of the road would result in additional wear and tear, thus requiring additional ongoing maintenance.

Under this alternative, the EOD range would become a shared space and the schedule for training activities would be coordinated with ordnance disposal. The 99th Civil Engineer Squadron, the party responsible for ordnance disposal, has primary control of the EOD range; as such, mock airfield training could only take place when ordnance disposal is not taking place.

This alternative was eliminated because it does not meet selection standard 3, because it would not accommodate all components of the Proposed Action, including the mock airfield, in one contiguous location.

2.5.2 Alternative 3

Alternative 3 includes the same proposed construction, paving, grading, and training activities as Alternative 1; however, the mock airfield would not be constructed. Mock airfield training would be conducted at a location off site from Nellis AFB. The exact location for conducting mock airfield training outside of Nellis AFB has not been identified; however, given the lack of facilities to complete such training, it is assumed that such a facility would need to be constructed in order for DAF to establish compliance with the 2020 AFCEC directive that civil engineering CSTR locations be located withing a 10-hour drive from all CONUS locations.

Under this alternative, personnel that require mock airfield training would be transported to the off-site location if the travel distance is feasible under a single mobilization. If the distance between fragmented training capabilities is too far, personnel could be forced to complete mock airfield training during a second mobilization.

This alternative was eliminated because it does not meet selection standards 2 and 3 because it would place a hypothetical mock airfield outside of a 30-minute driving radius from the 820 RHS (standard 2) and would not accommodate all components of the Proposed Action, including the mock airfield, in one contiguous location (Standard 3).

2.6 Summary of Environmental Consequences

The potential impacts under the Proposed Action and No Action Alternative are summarized in **Table 2-3**. 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 2-3
Summary of Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Land Use	Under the Proposed Action, limited development in Open Space A land use district would be expected to result in long-term, negligible, adverse impacts to land use compatibility.	Under the No Action Alternative, there would be no change to land use at Nellis AFB.
Earth Resources	Under the Proposed Action, long-term, moderate, adverse impacts to soils would have the potential to occur. These impacts would be minimized with BMPs during and post construction.	Under the No Action Alternative, there would be no change to earth resources at Nellis AFB.
Air Quality and Climate Change	Under the Proposed Action, short-term, minor-to-moderate adverse impacts to air quality would be anticipated to occur during construction as a result of an increase in emissions from construction. Ongoing operations of onsite generators would result in long-term, minor-to-moderate, adverse impacts to air quality for ozone precursor nitrogen oxides.	Under the No Action Alternative, no impacts to air quality would occur at Nellis AFB.
Water Resources	Under the Proposed Action, long-term, minor, adverse impacts to stormwater would have the potential to occur. These impacts would be minimized by BMPs during and post construction and design standards to manage increases in stormwater runoff and to limit opportunities for stormwater contamination.	Under the No Action Alternative, no impacts to water resources would occur at Nellis AFB.
Biological Resources	Under the Proposed Action, long-term, minor, adverse impacts to wildlife would be anticipated to occur from grading and impact to 151 acres of wildlife habitat. The Proposed Action would likely adversely affect the desert tortoise because approximately 143 acres of potential tortoise habitat would be disturbed. These	Under the No Action Alternative, no impacts to biological resources would occur at Nellis AFB.

Resource Area	Proposed Action	No Action Alternative
	impacts would be mitigated through adherence with a 2023 PBO that allows for disturbance of potential tortoise habitat at Nellis AFB. The 2023 PBO for Nellis AFB also includes the current translocation guidance plan for any and all desert tortoise and their eggs that may be found in the project area.	
Cultural Resources	The Proposed Action is unlikely to cause an adverse physical, visual, auditory, or atmospheric effect to architectural or archaeological resources within the APE. A precise layout for the CSTR has not been determined, and potential adverse effects to cultural resources could occur if the layout is altered. The Proposed Action would have the potential to result in minor, direct, adverse visual effects to cultural resources at Nellis AFB if the seven unevaluated structures within the APE were determined to be eligible for listing in the NRHP and were altered such that they became out of character for their architectural setting. Direct, adverse, physical effects could occur to the two unevaluated historic buildings and the one NRHP-eligible archaeological site in the project footprint if not avoided, depending on the results of ongoing SHPO consultation.	Under the No Action Alternative, no impacts to cultural resources would occur at Nellis AFB.
Noise	Under the Proposed Action, short-term, negligible impacts to the noise environment would be anticipated to occur during construction and mock airfield repair activities; however, no significant impact on the long-term noise environment at Nellis AFB would be anticipated to occur.	Under the No Action Alternative, no impacts to the noise environment would occur at Nellis AFB.
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	Under the Proposed Action, short-term, negligible, adverse impacts to petroleum products and long-term moderate, adverse impacts to the LF-7 ERP site would be anticipated to occur. Impacts would be mitigated through coordination with the Nevada Department of Environmental Protection.	Under the No Action Alternative, no impacts to hazardous materials and wastes would occur at Nellis AFB.
Infrastructure, including Transportation and Utilities	Under the Proposed Action, negligible, long-term, beneficial impacts would be expected to occur to transportation systems within the ROI from the improvements to roadways at the CSTR project site. Additionally, negligible-to-minor, adverse impacts to solid waste, sanitary sewer system, and potable water infrastructure would have the potential to occur during implementation of new connections.	Under the No Action Alternative, the beneficial impacts to transportation systems from the improvements to roadways at the CSTR project site would not occur. No impacts to infrastructure would occur at Nellis AFB.
Safety and Occupational Health	Under the Proposed Action, short-term, negligible, adverse impacts to ground safety would be anticipated to occur. 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.	Under the No Action Alternative, no impacts to Safety and Occupational Health would occur at Nellis AFB.

Resource Area	Proposed Action	No Action Alternative
Socioeconomics	Under the Proposed Action, long-term, negligible, beneficial impacts would be anticipated to occur to employment and population growth. Long-term, negligible, adverse impacts to educational resources would also be anticipated to occur with the arrival of new personnel and their dependents, which would have the potential to place further demands on educational resources within the ROI.	Under the No Action Alternative, long-term, negligible, adverse impacts to employment would be anticipated to occur because there would be no increase in temporary duty personnel spending money in the local community while in the area for training activities hosted at the proposed CSTR.
Protection of Children	Under the Proposed Action, no disproportionate impacts to children would be anticipated to occur.	Under the No Action Alternative, no impacts to children would be anticipated to occur at Nellis AFB.

APE = Area of Potential Effects; BMP = best management practice; CSTR = Combat Support Training Range; ERP = Environmental Restoration Program; NRHP = National Register of Historic Preservation; PBO = Programmatic Biological Opinion; ROI = Region of Influence; SHPO = State Historic Preservation Office

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CHAPTER 3 EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for the analyses in this EA, the DAF defined a study area specific to each resource or sub-resource area. Referred to as a Region of Influence (ROI), these areas delineate a boundary where possible effects from the considered alternatives would have a reasonable likelihood to occur. Beyond these ROIs, potential adverse effects on resources would not be anticipated. For the purposes of analysis, potential effects are described as follows:

- **Beneficial–**positive effects that improve or enhance resource conditions
- **Adverse–**negative or harmful results
- **Negligible–**adverse effects likely to occur but at levels not readily observable by evaluation
- **Minor–**observable, measurable, tangible adverse effects qualified as below one or more significance threshold(s)
- **Moderate–**tangible effects that are readily apparent, qualified as below one or more significance threshold(s)
- **Significant–**obvious, observable, verifiable adverse effects qualified as above one or more significance threshold(s); not mitigable to below significance

When relevant to the analyses in this EA, potential effects are further defined as direct or indirect; short- or long-term; and temporary, intermittent, or permanent.

To determine the potential for "significant" effects under the Proposed Action, the DAF defined impact thresholds to support the analyses in this EA. Based upon the nature of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify effects. Further, each resource analysis section (i.e., **Sections 3.4–3.15**) concludes with a cumulative effects analysis that considers the effects on the environment that result from the incremental effects of the Proposed Action when added to the effects of other past, present, and reasonably foreseeable actions at Nellis AFB; no non-DAF actions were identified to demonstrate this consideration. **Table 3-1** summarizes past, present, and reasonably foreseeable future actions at Nellis AFB considered in the cumulative effects evaluations.

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

Name	Description	Timeframe	Approximate Distance from Base
Master Plan and Installation Development at Nellis AFB (Nellis AFB, 2025a)	Development of the east side of Nellis AFB.	Active NEPA (timeframe 5–10 years)	On Nellis AFB
Final Environmental Assessment for the Beddown of Tactical Air Support Squadron (TASS) at Nellis AFB (Nellis AFB, 2017a)	Stand up the TASS by transferring and assigning up to 16 F-16C aircraft and increasing installation population. Expanding the east side of the existing ramp and the live ordnance loading area. Construct new support and maintenance facilities and a new headquarters.	Past	On Nellis AFB
Completed Military Construction (MILCON) Projects	The completed construction of a new Combat Rescue Simulator (7,726 ft^2); new Joint Simulation Environment Facility (50,590 ft^2); new Joint Simulation Environment Facility (50,590 ft^2); a new facility for the 365th Intelligence,	Past	On Nellis AFB

Name	Description	Timeframe	Approximate Distance from Base
	Surveillance, & Reconnaissance (70,451 ft^2) and demolition of B-69, B-470, and B-474; and construction of a new F-35A Munitions Assembly Conveyor Facility, including a sunshade (15,000 ft^2), concrete pad (60,000 ft^2), and administration building (546 ft^2).		
Final Environmental Assessment for Nellis Reclaimed Waterline Project (Greeley and Hansen, 2017)	The construction of a City of North Las Vegas Water Reclamation Facility (CNLV-WRF) with a pipeline between the CNLV-WRF and the Sunrise Vista Golf Course to use reclaimed water to irrigate the golf course.	Past	On Nellis AFB
Final Environmental Assessment for Addition of F-35 Joint Strike Fighters, Addition of F-22A Raptors and Contract Adversary Air (Nellis Aggressor EA) (Nellis AFB, 2021)	Adding 17 F-35 Joint Strike Fighter aircraft and three F-22A to provide squadron support and increase personnel.	Ongoing	On Nellis AFB
Final Environmental Assessment for Installation Development (Nellis IDP EA) (Nellis AFB, 2024)	Implementing a total of 32 construction, renovations, infrastructure and demolition projects over a 6-year period.	Beginning FY 2025	On Nellis AFB
Collaborative Contract Aircraft (CCA) Experimental Operations Unit (EOU) Beddown	Beddown up to 40 personnel using existing facilities at Nellis AFB to support to EOU CCA, primarily to occur at Creech AFB but would have a footprint at Nellis AFB.	Future date to be determined	On Nellis AFB
Clark County Regional Flood Control District Confluence Detention Basin Expansion (CCRFCD, 2024c)	CCRFCD proposes to expand the regional confluence detention basin to 1,945 acre-feet and extend the existing stormwater conveyance into the southwestern portion of the installation to meet the expanded detention basin.	Beginning FY 2028	On Nellis AFB

ACC = Air Combat Command; AFB = Air Force Base; NEPA = National Environmental Policy Act

3.2 Resources Considered but Eliminated from Detailed Analysis

The DAF considered but eliminated from further analysis airspace management because none of the proposed activities would directly impact airspace or flight operations.

3.3 Resources Carried Forward for Detailed Analysis

The DAF considered Nellis AFB and its environs as the ROI for each environmental resource. None of the projects under the Proposed Action would occur outside the boundaries of Nellis AFB. The following resources were carried forward for analysis: land use; earth resources; air quality and climate change; water resources; biological resources; cultural resources; infrastructure, including transportation and utilities; safety and occupational health; socioeconomics; and protection of children.

3.4 LAND USE

3.4.1 Definition of Resources

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. The Installation Development Plan (IDP) is Nellis AFB’s planning tool to guide future development on the installation to be aligned with current and programmed mission requirements and was prepared in response to AFI 32-7062, *Comprehensive Planning*. Goals and objectives of land use planning are to maintain mission readiness; achieve and maintain compliance with operational, safety, environmental, energy, and security regulations and requirements; maximize functional capabilities through the utilization and adaption of existing areas; incorporate Leadership in Energy and Environmental Design guidelines; achieve environmental compliance through reduction of the installation environmental footprint; and foster awareness of the installation by community stakeholders (Nellis AFB, 2018).

The ROI for land use is Nellis AFB and its environs.

3.4.2 Existing Conditions

Nellis AFB is located northeast of the city of Las Vegas in Clark County, Nevada. It occupies approximately 16,439 acres of land and is divided into three areas: Area I (the main installation), Area II, and Area III. Area I is located east of Las Vegas Boulevard and contains 31 percent of the total installation land area. Area I has the greatest variety of land use activities, including runways, industrial facilities, housing areas, and most of the installation’s administrative, training, and support facilities. Area II is located northeast of Area I and accounts for 62 percent of the total installation land area. Most of Area II is undeveloped acreage, and its developed portions are primarily occupied by the 801 RED HORSE Training Squadron, 820 RED HORSE Squadron, 57th Munitions Squadron, and 58th Rescue Squadron. The Proposed Action area is located in Area II. Area III, west of Las Vegas Boulevard, makes up 7 percent of the total installation land area and includes the majority of installation family housing units and recreational facilities.

There are 12 land use districts at Nellis AFB: Airfield; Housing/Community A; Housing/Community B; Industrial A; Industrial B; Industrial C; Industrial D; Munitions Storage Area (MSA); Open Space A; Open Space B; Open Space C; and Small Arms Range. Land use categories within the land use ROI include Industrial D, MSA, and Open Space A (**Figure 3-1**).

Land on Nellis AFB within the Industrial D land use district is insulated in location and surrounded by wild terrain. This area is capable of supporting specialized training, such as combat operations and installation readiness. Only 2 percent of the land on Nellis AFB falls under this designation, though the demand for this district has been growing (Nellis AFB, 2018).

Land on Nellis AFB within the MSA land use district is the primary mission storage, maintenance, and assembly area for the installation. Development in areas designated as MSA is limited due to explosive safety quantity distance (ESQD) arcs. Only 5 percent of the land on Nellis AFB falls under this land use district (Nellis AFB, 2018).

Land on Nellis AFB within the Open Space A land use district serves as a buffer for MSA land use areas. Land in this district is largely preserved as open space with limited development opportunities due to DAF’s goal of continued preservation of these areas in addition to the presence of ESQD arcs. This is the land use district with the most land on Nellis AFB, and comprises approximately 26 percent of the land on the installation (Nellis AFB, 2018).

To address land use with respect to noise, an Air Installation Compatible Use Zone (AICUZ) report was developed for Nellis AFB in 2017 (Nellis AFB, 2017b). Aviation easements guide land use around the installation to applications that are compatible with an operational AFB and the AICUZ Program. An AICUZ report typically includes land use guidelines that help determine development in the neighboring jurisdictions. See **Section 3.10.2** for a detailed description of the existing noise environment and **Section 3.13.2** for a description of the Nellis AFB safety zones.

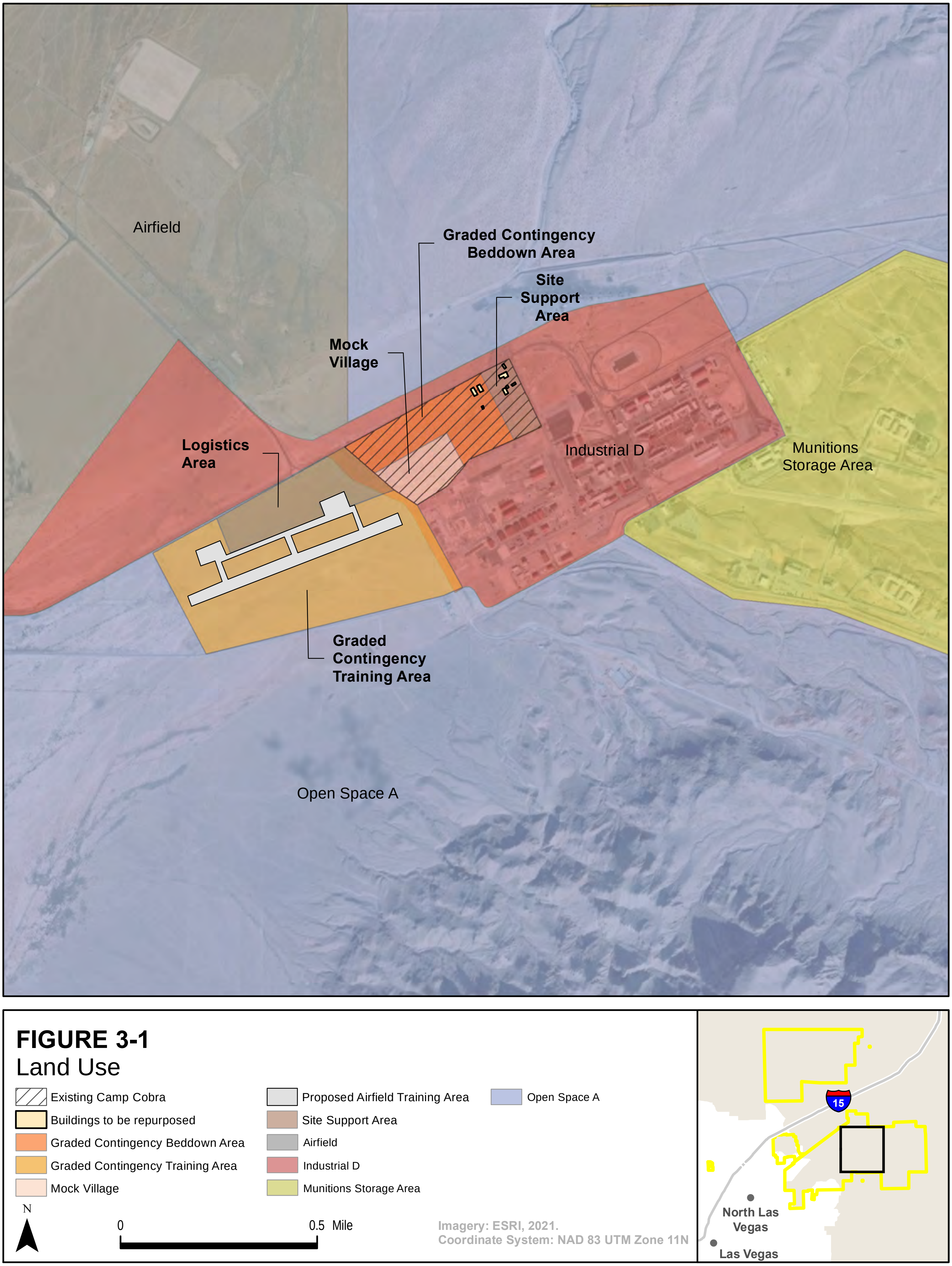


FIGURE 3-1
Land Use

3.4.3 Environmental Consequences

3.4.3.1 Evaluation Criteria

Potential impacts to land use are based on the level of land use sensitivity in areas potentially affected by a proposed action as well as compatibility of the action with existing conditions. In general, a land use impact would be adverse if it meets one of the following conditions:

- is inconsistent or noncompliant with existing land use plans or policies,
- precludes the viability of existing land use,
- precludes continued use or occupation of an area,
- is incompatible with adjacent land use to the extent that public health or safety is threatened, or
- conflicts with planning criteria established to ensure the safety and protection of human life and property.

A significant impact on or from land use within the ROI would occur if the Proposed Action results in the following:

- land use that would discontinue or substantially change existing or adjacent land use; and/or
- land use that would be inconsistent with applicable management plans, policies, regulations, and ordinances.

3.4.3.2 Proposed Action

The Contingency Beddown Area, Site Support Area, and Mock Village Area would be located on land designated as Industrial D to the southeast of O'Bannon Road. Projects under the Proposed Action occurring on land designated as Industrial D would support specialized training and installation readiness and are consistent with the current land use. No changes to the Industrial D district would occur. Therefore, no impacts to land use in the Industrial D district would be anticipated with implementation of the Proposed Action.

The existing driving course is located on land designated as MSA. The proposed improvements to the driving course would occur on previously established, semi-improved roadway and no changes to land use in the MSA district would occur. Therefore, no impacts to the land use in the MSA district would be anticipated with implementation of the Proposed Action.

The Airfield Training Area, Logistics Area, and Graded Contingency Training Area would be located on land designated as Open Space A. Projects at the Airfield Training Area would result in minimal development and would maintain the presence of open space. Projects in the Logistics Area and Graded Contingency Area include roadways, concrete pads, graded space, and semi-improved surfaces (see **Table 2-1**). Under the Proposed Action, the land in these areas would remain minimally developed. Long-term, negligible, adverse impacts to land use in the Open Space A district would be expected to occur with implementation of the Proposed Action due to minimal development taking place in the open space that currently exists.

Construction, paving, and grading activities associated with the Proposed Action would occur entirely within the existing boundaries of Nellis AFB. The projects that would occur under the Proposed Action would be implemented in areas that have been previously disturbed. Overall, the Proposed Action would be expected to result in long-term, negligible, adverse impacts to land use compatibility. There would be no changes to existing land use under the Proposed Action.

3.4.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to land use in the ROI beyond baseline conditions.

3.4.3.4 Cumulative Impacts

The Proposed Action would be consistent with the current land use. The Proposed Action would neither change existing land use nor affect future adjacent land use. Projects identified in **Table 3-1** involve the construction, renovation, and demolition of facilities within Nellis AFB.

Implementation of the Nellis Master Plan and installation development projects would be anticipated to result in long-term, moderate impacts to land use. The land use designation for the majority of the 1,261 acres of land involved with that proposed action would permanently change from open space to other developed uses.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Nellis AFB, moderate, adverse effects to land use resources would be anticipated to occur with implementation of the Proposed Action.

3.5 EARTH RESOURCES

3.5.1 Definition of the Resource

Earth resources consist of surface and subsurface materials and their properties. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils are typically described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential (the extent certain clay materials will enlarge when wet and shrink when dry), and erosion potential affect their abilities to support certain applications or uses. Soil properties must be examined for their compatibility with particular activities or types of land use. Beneficial use of earth resources can vary widely based on the location and its existing geological features.

The ROI for earth resources is the Proposed Action area.

3.5.2 Regulatory Setting

For surface disturbances involving grading in Clark County, a developer must obtain a grading or building permit from Clark County Department of Public Works. Grading plan submittals are reviewed by Clark County's Department of Public Works to verify compliance with applicable codes and ordinances. Grading permits would not be issued until all requirements are met and the plan has been approved, including any geotechnical and stormwater pollution prevention documentation required (Clark County, 2024b).

3.5.3 Existing Conditions

3.5.3.1 Regional Geology

Nellis AFB is located within the physiographic area known as the Basin and Range Province in the southwestern portion of the US. This area was formed as a result of tectonic extension that created normal faults oriented north to south, resulting in north-to-south-oriented mountain ranges separated by valleys or basins filled with alluvial deposits (loose clay, gravel, sand, or silt deposited by running water or similar setting). Nellis AFB is adjacent to the Lake Mead Recreational Area, which acts as a natural divide between the northern and southern portions of the Basin and Range Province (National Park Service, 2020). The mountain ranges surrounding Nellis AFB primarily consist of limestone with portions of sandstone, shale, dolomite, gypsum, and interbedded quartzite. The alluvial deposits found within the ROI are composed of poorly sorted gravelly, cobbly, and stony sand deposits in the upper reaches that grade to finer textured material toward the valley floors. Basin floors are depositional areas of late-laid silt and clay and younger alluvial deposits. Most of these alluvial deposits have been transported by water and deposited on the sloping basin floors of the floodplains (Nellis AFB, 2019c).

3.5.3.2 Topography

Topography is characterized by the natural and physical representation of an area. Nellis AFB is situated in a topographic depression, lying northeast of the city of Las Vegas, Nevada. The installation and adjacent areas are part of two major desert regions of the US—the Mojave Desert and the Great Basin Desert (Nellis, 2018a). As part of the Las Vegas Valley, Nellis AFB is located at the base of Sunrise Mountain (to the east) and the Spring Mountains (to the west). The ROI drains to the southwest; elevation of the ROI ranges from 1,885 feet in the southwestern corner up to 1,940 feet in the northeastern corner (US Geological Survey, 2024).

3.5.3.3 Soils

Nellis AFB sits atop alluvial fans and deposits with soils consisting of silty sands. These soils were formed by the erosion of the Las Vegas Mountain Range to the north and the peaks of Sunrise Mountain and Frenchman's Peak to the east-southeast (Nellis AFB, 2018). In the foothills of Sunrise Mountain and Frenchman's Peak, silty sands give way to carbonate rocks.

The soil types within the ROI are summarized in **Table 3-2** and illustrated in **Figure 3-2**. Soil types within the ROI include Weiser-Wechech soil association, which comprises 57 percent of the ROI, Upperline-St. Thomas-Upperline association (24 percent), Wechech-Weiser association (12.9 percent), glencarb very fine sandy loam/saline (2.9 percent), and Wechech-Ifteen association (2.9 percent). The Weiser-Wechech association, glencarb very fine sandy loam, and Wechech-Weiser association are characterized by low-to-moderate slopes (0–8 percent), while the Wechech-Ifteen association Weiser-Wechech and Upperline-St. Thomas-Upperline association are characterized by moderate-to-high slopes (4–30 percent). Soil characteristics discussed in this section were obtained from the US Department of Agriculture Soil Survey Geographic Database.

Table 3-2
Soil Types Within the ROI

Map Unit Symbol	Name	Slope (%)	Acres in ROI	Percent of ROI (%)	Runoff Potential
hqwm	Weiser-Wechech association	2–8	117.2	57.2	Low
hr24	Upperline-St. Thomas-Upperline association	8-30	49.4	24.1	Medium
hqvz	Wechech-Weiser association	2–8	26.4	12.9	Very High
1qq9c	Glencarb very fine sandy loam	0–2	5.9	2.9	Low
Hr2w	Wechech-Ifteen association	4-15	5.9	2.9	Very High

Source: US Department of Agriculture Soil Survey Geographic Database
ROI = Region of Influence

The Weiser-Wechech association soil type is found throughout the central portion of the ROI. This soil type occurs within alluvial fan remnants and has a soil profile typically consisting of extremely gravelly fine sandy loam from 0 to 6 inches below ground surface (bgs), followed by extremely gravelly sandy loam from 6 to 60 inches bgs. This soil type is considered to have low runoff potential and is well drained. Weiser-Wechech association has a calcium carbonate content of up to 40 percent. It is considered to be non-saline to very slightly saline.

The Upperline-St. Thomas-Upperline association soil type is found mostly on the eastern portion of the ROI. This soil type includes rock pediments and hill landforms with a soil profile typically consisting of very gravelly sandy loam from 0 to 39 inches bgs, followed by bedrock from 39 to 60 inches bgs. This soil type is considered to have a medium potential for runoff.

The Wechech-Weiser association soil type is found mostly along the southeastern portion of the ROI. This soil type occurs within an alluvial fan remnants landform with a soil profile typically consisting of very gravelly sandy loam from 0 to 13 inches bgs, followed by cemented material from 13 to 60 inches bgs. The cemented material is a petrocalcic soil that is formed when secondary calcium carbonate or other carbonates accumulate in the subsoil to the extent that the soil becomes cemented into a hardpan (hardened impervious). The depth to this restrictive layer can vary from 8 to 14 inches bgs. This soil type is considered to have a very high runoff potential largely due to the restrictive cemented hardpan layer. The very high runoff potential of this and similar soils found on Nellis AFB contributes to the potential for flash flooding, as the soils are not able to effectively absorb precipitation, driving the need for stormwater infrastructure on the installation despite low rainfall (Nellis AFB, 2019).

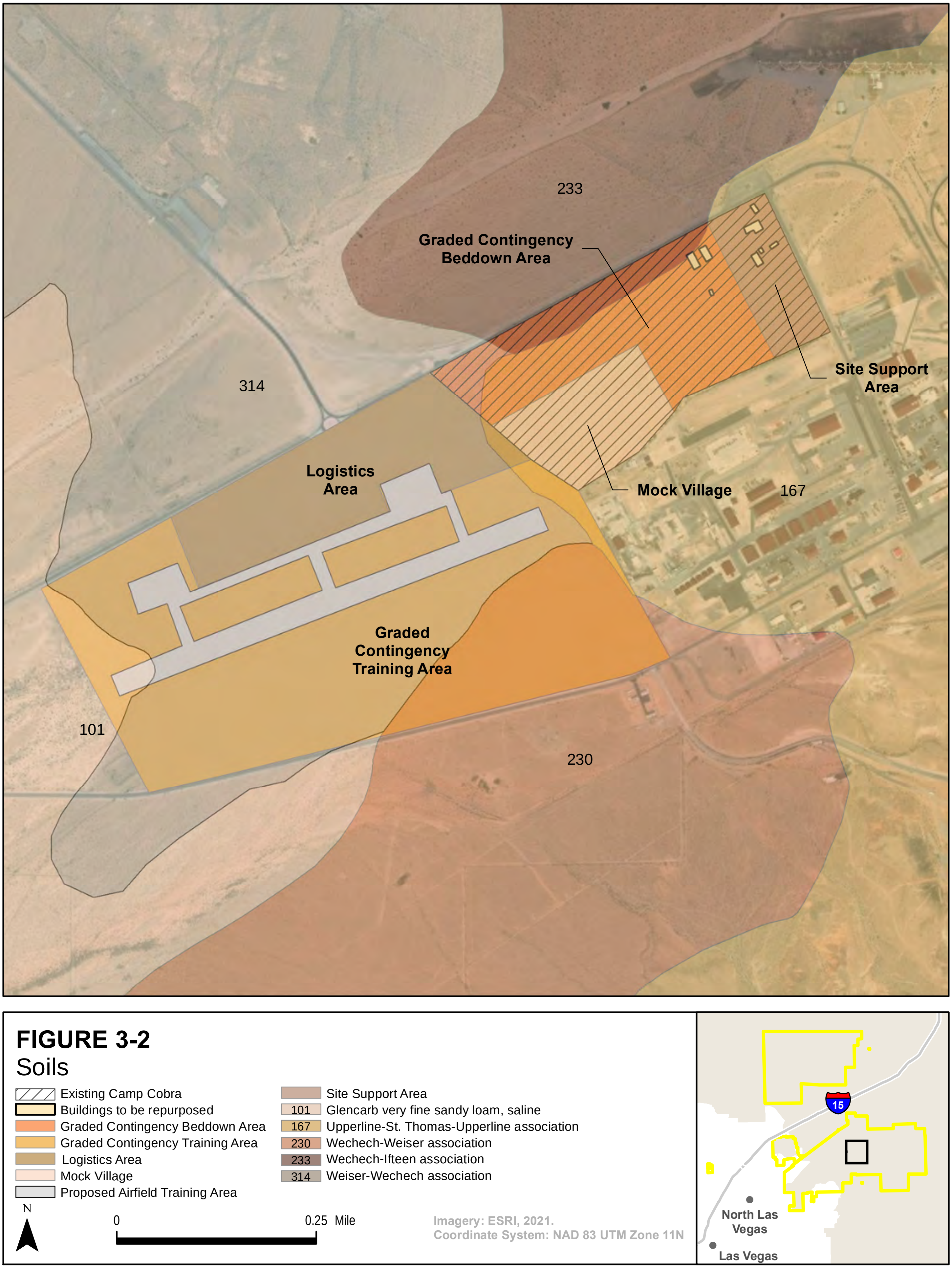


FIGURE 3-2
Soils

The glencarb very fine sandy loam soil type is found mostly along the western portion of the ROI. This soil type occurs within an alluvial flats landform with a soil profile typically consisting of very fine sandy loam from 0 to 6 inches bgs, followed by stratified very fine sandy loam to silty clay loam from 6 to 60 inches bgs. This soil type is considered to have low runoff potential and is well drained. Glencarb very fine sandy loam has a calcium carbonate content of up to 60 percent and a gypsum content of up to 5 percent and is considered to be moderately saline to strongly saline.

The Wechech-Ifteen association soil type is found mostly along the northeast portion of the ROI. This soil type occurs within an alluvial fan remnants landform with a soil profile typically consisting of loamy fine sand from 0 to 3 inches bgs, followed by very gravelly sandy loam from 3 to 13 inches bgs, followed by cemented material from 13 to 60 inches bgs. The cemented material is a petrocalcic hardpan. The depth to this restrictive layer can vary from 8 to 14 inches within this soil type. This soil type is considered to have a very high runoff potential largely due to the restrictive cemented hardpan layer.

3.5.4 Environmental Consequences

3.5.4.1 Evaluation Criteria

Potential adverse impacts to earth resources would occur if the Proposed Action:

- substantially alters the unique or valued geologic or topographic conditions;
- substantially erodes soil, sedimentation, and/or loss of natural function (e.g., compaction);
- alters geological structure that affects underlying aquifer systems; or
- develops on soils with characteristics that do not support the intended land use.

Significant impacts to earth resources would occur if the underlying topography, soil composition, or geology was altered such that the function of these resources would change irreversibly, resulting in impacts to the broader environment.

3.5.4.2 Proposed Action

Geology

Implementation of the Proposed Action would result in short-term, minor, adverse impacts to the existing geology of Nellis AFB. Under the Proposed Action, up to 20 acres of the Proposed Action area would be covered with impervious surfaces and up to 200 additional acres would be graded. Grading would result in minor, short-term impacts to existing stormwater management infrastructure including artificial ponds and onsite reservoirs. However, the stormwater management infrastructure would be replaced with ponds or stormwater detention basins similar to those that were removed. Proper construction practices, erosion-control measures, and structural engineering design incorporated during the development of the CSTR would minimize these short-term impacts. Any substantial changes that affect stormwater ponds in the project area would follow requirements in Nellis AFB Storm Water Management Plan (Nellis AFB, 2022b). The project must meet all federal design requirements for stormwater management and retention. Overall, there would be no long-term impacts to underlying aquifer systems from changes to groundwater infiltration or groundwater recharge from changes to the existing geology under the Proposed Action.

Topography

Implementation of the Proposed Action would result in long-term, minor, beneficial impacts to the existing topography of Nellis AFB. Under the Proposed Action, up to 20 acres of the Proposed Action area would be covered with impervious surfaces and up to 200 additional acres would be graded. The grading would result in changes in topography, including changes to the existing stormwater ponds and reservoirs. However, the site grading would be completed to include restoration of stormwater management infrastructure and improved infrastructure to support the use of the site for training activities. Grading would follow requirements in the *Nellis AFB Storm Water Management Plan* (Nellis AFB, 2022b). The project must meet all federal design requirements for stormwater management and retention. Such grading would change the site over the long term. Overall, these changes would be anticipated to result in long-term, minor, and beneficial impacts.

Soils

Under the Proposed Action, up to 20 acres of the Proposed Action area would be covered with impervious surfaces and up to 200 additional acres would be graded. Soil disturbance increases the potential for soil erosion and sedimentation to occur during a significant rainfall event. Approximately 15 percent of soils within the ROI are considered to have very high runoff potential. Therefore, disturbance of these soils would have the potential to contribute to increased erosion and sedimentation during rainfall events.

Implementation of the Proposed Action would result in long-term, moderate, adverse impacts to soils. These impacts would be minimized through the use of best management practices (BMPs) during and post construction as well as design standards to manage increases in stormwater runoff and to limit opportunities for sedimentation and erosion. Grading would follow requirements in the *Nellis AFB Storm Water Management Plan* (Nellis AFB, 2022b), as well as guidance from the Las Vegas Valley Stormwater Quality Management Committee (Las Vegas, 2009). The following BMPs would be implemented during site grading activities:

- Use temporary dikes, swales, and/or pipe slope drains to divert or intercept stormwater before it reaches long and/or steep slopes.
- Release captured stormwater at a slow and controlled rate to prevent damage to downstream drainage ways and structures.
- Install check dams in unlined drainage channels to slow runoff velocity and encourage settlement of sediments.
- Direct sediment-laden stormwater to temporary sediment traps and basins via berms or channels.
- Construct temporary sediment traps or basins at the drainage outlet for the site. When more than one basin is required due to the size of the site, construct these basins to operate in parallel.

Excavating medium hard-to-hard hardpan soils within the ROI may require a heavy-duty excavator or trencher or a dozer with the equivalent excavating characteristics of a Caterpillar D-10 with ripper. Excavation of hard-to-very hard and/or very hard cemented materials may require a dozer with the equivalent excavating/ripping characteristics of a Caterpillar D-11 (Geotechnical & Environmental Services, Inc., 2022). Use of the proper equipment would be required to overcome operational challenges associated with hardpan soil excavation.

3.5.4.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to earth resources in the ROI beyond baseline conditions.

3.5.4.4 Cumulative Impacts

Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to earth resources. Several of the projects list in **Table 3-1** include grading or construction projects of various size and scale within or in the vicinity of the Proposed Action area. Disturbance of these soils would have the potential to contribute to increased erosion and sedimentation during rainfall events. Implementation of the Nellis Master Plan and installation development projects would result in the addition of up to 1,480 acres of impervious surfaces and additional acreage would be graded. The TASS beddown action included expansion of the ramp space and live ordnance loading area on the east side of the airfield to accommodate additional aircraft (11.5 acres and 7 acres, respectively). The Nellis Reclaimed Waterline Project involved 12,100 linear feet of waterline trenching and associated grading and soil disturbance. Completed MILCON projects included the addition of approximately 204,313 ft^2 of new impervious surfaces and also resulted in soil disturbance from grading and excavation activities. The impacts to earth resources from these projects were considered moderate because of the associated scale of the grading, trenching, and soil disturbance.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Nellis AFB, long-term, minor, adverse cumulative effects to earth resources would be anticipated to occur with implementation of the Proposed Action.

3.6 AIR QUALITY AND CLIMATE CHANGE

3.6.1 Definition of the Resource

Ambient air quality refers to the atmospheric concentration of a specific compound (amount of pollutants in a specified volume of air) that occurs at a particular geographic location. Air pollution is a threat to human health and damages trees, crops, other plants, waterbodies, and animals. It creates haze or smog that reduces visibility in national parks and cities and interferes with aviation. 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 help to ensure basic health and environmental protection from air pollution.

The USEPA has divided the country into geographical regions known as air quality control regions to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Nellis AFB is in the Las Vegas Intrastate Air Quality Control Region (LVIAQCR) (40 CFR § 81.80), which serves as the ROI for the Proposed Action.

3.6.1.1 Criteria Pollutants

Air quality is defined by ambient concentrations of specific air pollutants that the USEPA has determined may affect the health or welfare of the public (USEPA, 2024a). The CAA requires USEPA to set NAAQS for commonly found air pollutants known as criteria air pollutants. These are pollutants the USEPA determined can affect the health or welfare of the public (USEPA 2024a) and include ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead.

Ozone is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or “ozone precursors.” These ozone precursors consist primarily of nitrogen oxides and volatile organic compounds that are directly emitted from a wide range of emission sources. For this reason, regulatory agencies limit atmospheric ozone concentrations by controlling volatile organic compound pollutants (also identified as reactive organic gases) and nitrogen oxides.

Table 3-3 shows the specific concentration limits (primary and secondary) for each of the criteria pollutants that have been determined to impact human health and the environment. 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, 2024b).

On 7 February 2024, USEPA strengthened the NAAQS for particulate matter. Specifically, the USEPA set the level of the primary annual $PM_{2.5}$ standard at 9.0 micrograms per cubic meter to provide increased public health protection, consistent with the available health science. The USEPA did not change the current primary and secondary 24-hour $PM_{2.5}$ standards, secondary annual $PM_{2.5}$ standard, or the primary and secondary PM_{10} standards (USEPA, 2024c).

Table 3-3
National Ambient Air Quality Standards

Pollutant	Primary/Secondary[a,b]	Averaging Time	Level
Carbon monoxide	Primary	8 hours	9 ppm
Carbon monoxide	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
	Primary	Annual	12 µg/m^3
	Secondary	Annual	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	3 hours	0.5 ppm
Lead	Primary and Secondary	Rolling 3-month average	0.15 µg/m^3

Source: USEPA, 2024b
Notes:
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 3 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.
µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; $PM_{2.5}$ = fine inhalable particles with diameters of 2.5 micrometers or smaller; PM_{10} = inhalable particles with diameters of 10 micrometers or smaller; ppm = parts per million; ppb = parts per billion

3.6.1.2 Greenhouse Gas Emissions

The earth's climate is changing. Multiple lines of evidence show changes in weather, oceans, and ecosystems, such as:

- changing temperature and precipitation patterns;
- increases in ocean temperatures, sea level, and acidity;
- melting of glaciers and sea ice;
- changes in the frequency, intensity, and duration of extreme weather events; and
- shifts in ecosystem characteristics, such as the length of the growing season, timing of flower blooms, and migration of birds.

The earth's temperature depends on the balance between energy entering and leaving the planet's system. When sunlight reaches the earth's surface, it can either be reflected back into space or absorbed by the earth. Incoming energy that is absorbed by the earth warms the planet. Once absorbed, the planet releases some of the energy back into the atmosphere as heat (USEPA, 2024d). Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth's temperature and contributes to global climate change. GHGs include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (USEPA 2024d).

Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth's surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide-equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. Carbon dioxide has a GWP of 1 and is therefore the standard by which all other GHGs are measured. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases (USEPA, 2024e).

The DAF has adopted the Prevention of Significant Deterioration (PSD) threshold for GHGs of 75,000 tpy of CO_2e as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator provides a threshold to identify actions that are insignificant or too trivial or minor to merit consideration. Actions with a net change in GHG (CO_2e) emissions below the PSD threshold are considered too insignificant on a global scale to warrant any further analysis. Actions with a net change in GHG (CO_2e) emissions above the PSD threshold are considered potentially significant and require further assessment to determine if the action poses a significant impact (AFCEC, 2023).

3.6.2 Regulatory Setting

3.6.2.1 General Conformity and Attainment

When a region or area meets NAAQS for a criteria pollutant, that region or area is classified as in "attainment" for that pollutant. When a region or area fails to meet NAAQS for a criteria pollutant, that region or area is classified as "nonattainment" for that pollutant. In cases of nonattainment, the affected state, territory, or local agency must develop a state implementation plan for USEPA review and approval. The state implementation plan is an enforceable plan developed at the state level that lays out a pathway for how the state would comply with air quality standards. If air quality improves in a region that is classified as nonattainment, and the improvement results in the region meeting 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 (i.e., attainment areas reclassified from a prior nonattainment designation) to demonstrate conformity with the state implementation plan for attainment of NAAQS. 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).

3.6.2.2 New Source Review

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 100 or 250 tons per year (tpy) 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.

3.6.2.3 State and Local Permits and Regulations

The NDEP is tasked with the stewardship of the natural resources of the state, including air quality. The permitting branches in the Nevada Bureau of Air Pollution Control issue air quality operating permits to stationary and temporary mobile sources that emit regulated pollutants to ensure that these emissions do not harm public health or cause significant deterioration in areas that presently have clean air.

Air pollution in Nevada is regulated by Nevada Administrative Code (NAC) Chapter 445B, Air Controls. State standards for ambient air, including ozone, carbon dioxide, nitrogen dioxide, sulfur dioxide, particulate matter as PM_{10} and $PM_{2.5}$, lead, and hydrogen sulfide, are listed in NAC Chapter 445B Section 22097. Section 94 of the Clark County Air Quality Regulations specifies that a dust control permit is required from the Clark County Department of Air Quality and Environmental Management if construction activities impact an area greater than 0.25 acre. The permit must include a dust mitigation plan and appropriate control measures as specified per the regulations (USEPA, 2024f).

For surface disturbances greater than 5 acres and not related to agriculture, the NDEP Bureau of Air Pollution Control requires a surface area disturbance permit. Clark County, however, has its own air district and is instead under the jurisdiction of the Clark County DES, which requires a dust control operating permit for soil-disturbing or construction activities of 0.25 acre or greater in overall area, mechanized trenching 100 feet or greater in length, mechanical demolition of any structure 1,000 ft^2 or larger, or for temporary commercial activities of 0.25 acre or greater in overall area (Clark County, 2024a).

3.6.3 Existing Conditions

3.6.3.1 Air Emission Sources at Nellis AFB

The LVIAQCR maintains the following designations for the NAAQS (USEPA, 2024g):

- unclassifiable/attainment for lead, nitrogen dioxide, sulfur dioxide, and $PM_{2.5}$,
- maintenance/attainment for carbon monoxide and PM_{10}, and
- moderate nonattainment for the 2015 ozone NAAQS standard.

As a federal installation that is considered a “major source” contributor for air pollution, Nellis AFB maintains a Title V Operating Permit (Part 70 Operating Permit, Source ID 114, 99th Civil Engineer Squadron, Nellis AFB, expires on 14 June 2026) which requires monitoring emissions and reporting the findings (Clark County DES, 2024). Title V is a federal program designed to standardize air quality permits and the permitting process for major sources of emissions across the country and requires the USEPA to establish a national operating permit program. USEPA defines a major source as a facility that emits or has the potential to emit any criteria pollutant or hazardous air pollutant at levels equal to or greater than the major source thresholds. The major source threshold for criteria pollutants may vary depending on the attainment status (e.g., marginal, serious, extreme) of the geographic area and the criteria or hazardous air pollutant in which the facility is located.

Stationary emissions sources at Nellis AFB include fuel storage tanks, loading racks, dispensing equipment, boilers, aggregate and concrete plants, emergency and nonemergency power generators, a hush house for engine testing, paint spray booths, media blasting equipment, degreasers, cooling towers, woodworking operations, fugitive dust, and miscellaneous chemical usage.

Mobile source emissions are generated by aircraft, vehicles, construction equipment, and other sources that move or have the potential to move from place to place. Aerospace ground equipment used to service aircraft includes generators, light carts, compressors, bomb lifts, hydraulic test stands, and other portable equipment required for aircraft operations. Equipment emissions come from forklifts, backhoes, tractors, and other onsite construction equipment. On-road vehicle emissions include both government-owned and privately owned vehicles. The most recent mobile and stationary source emissions inventories for Nellis AFB are presented in **Table 3-4**.

Table 3-4
Nellis AFB Stationary and Mobile Source Emission Summary in Tons per Year (2022)

Emission Source	VOCs[a]	NO_x[a]	CO[a]	SO_2[a]	PM_{10}[a]	$PM_{2.5}$[a]	CO_2e[b]
Stationary Sources	18.94	13.68	25.26	0.57	3.21	1.82	9,833
Fugitive Dust[c]	(d)	(d)	(d)	(d)	15.91	2.36	(d)
Total	**18.94**	**13.68**	**25.26**	**0.57**	**19.12**	**4.17**	**9,833**

Notes:
a Source: Nellis AFB, 2023a.
b Source: Nellis AFB, undated.
c Fugitive dust emissions reported for disturbed ground surfaces and haul road activity on Nellis AFB.
d Not applicable.
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, VOCs = volatile organic compounds

3.6.3.2 Regional Climate

The climate in Clark County varies widely across the seasons, with extremely hot summers and cold winters, with dry and mostly clear conditions year-round. Over the course of the year, the temperature typically varies from 38 degrees Fahrenheit (°F) to 105°F. The urban heat island effect has likely increased high-temperature days in Las Vegas, where a very high rate of growth has taken place since the 1950s (National Oceanic and Atmospheric Administration, 2022; World Population Review, 2024). Precipitation is minimal, with the cooler months of December through February providing the greatest chance of precipitation; the annual average precipitation is 6 inches per year. Wind remains relatively constant throughout the year, ranging on average from 7 to 9 miles per hour (Weatherspark, 2024). Wind directions are highly seasonal in the area, with winds largely blowing from the northeast in the cooler months of October through February. By March, winds start to split between northeasterly and southerly directions, and by April the predominant winds are out of the south-southwest. This pattern continues until September when the winds again split between the southwest and northeast and return to the winter pattern of winds out of the northwest by October. Wind speeds average 7.2 miles per hour and tend to be greatest when coming out of the south, which occurs during the warmer periods of the year (Iowa State, 2024).

The regional climate is being altered due to climate change (USEPA, 2016). In the coming decades, the changing climate is likely to decrease the flow of water in the Colorado River and other rivers in Nevada, increase the probability of extreme heat and drought, increase the frequency and intensity of wildfires, and decrease the productivity of ranches and farms (USEPA, 2016).

3.6.4 Environmental Consequences

3.6.4.1 Evaluation Criteria

The environmental impact methodology for air quality impacts presented in this EA is derived from Air Force Manual (AFMAN) 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 (ACAM), 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 LVIAQCR is in moderate nonattainment for the 2015 ozone NAAQS standard (40 CFR § 81.329) (USEPA, 2023). Due to the General Conformity Rule, applicability for the nonattainment status of ozone precursors—volatile organic compounds and nitrogen oxides—are restricted to 100 tpy. The LVIAQCR is in maintenance for carbon monoxide and PM_{10}; therefore, the 250 tpy PSD value is not used for these pollutants; instead, a more restrictive 100 tpy value is used. 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 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:

- 100 tpy *de minimis* value for ozone precursors (volatile organic compounds and nitrogen oxides),
- 100 tpy *de minimis* value for maintenance of carbon monoxide and PM_{10},
- 25 tpy de minimis value for lead, and
- 75,000 tpy PSD value for CO_2e.

3.6.4.2 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 three-year Proposed Action period (2025–2027). The following assumptions were used for construction projects:

- For the purposes of calculating emissions based on building volume (cubic feet), 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.
- Covered storage facilities do not require additional heating.

Emissions would primarily 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,
- dust created by grading and other bare earth construction activities, and
- application of architectural coatings.

Construction would follow all applicable Clark County Division of Air Quality rules, such as obtaining a dust control operating permit and preparing a dust mitigation plan prior to the start of any construction activity on any site that would include 0.25 acre or more of disturbed surface area (Air Quality Rules Section 94), and renewing the permit for each year of construction activity; controlling visible emissions (Air Quality Rules Section 26); and limiting idling of diesel-powered motor vehicles (Air Quality Rules Section 45). Additionally, stationary source permits would be required for the operation of concrete batch plants, asphalt plants, generators, storage tanks, fueling operations, or other stationary emission sources located on site for use in construction.

All proposed ongoing operations would occur within the footprint of the installation. Onsite diesel generators for ongoing training operations would include 12, 60-kilowatt (kW) advanced medium mobile power source (AMMPS) generators, 4, 30-kW AMMPS generators, and 1, 800-kW Base Expeditionary Airfield Resources power unit (BPU). Half of these generators are anticipated to be operated continuously during active training operations, and half of the generators would be emergency generators.

Calculations have been performed to account for generator emissions from ongoing operations under continuous use, worst-case scenario conditions. Both the planned continuous use and emergency generators are calculated under worst-case continuous use conditions. The following assumptions were used for generator emissions:

- The generators are assumed to be continuously used for a worst-case scenario of 8,760 hours per year. The total generators for the worst-case scenario include both the six planned 60-kW generators and the 30-kW generators include:
    - 12, 60-kW (80 horsepower) AMMPS generators;
    - 4, 30-kW (40 horsepower) AMMPS generators; and
    - 1, 800-kW (1,073 horsepower) BPU.

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

Air Emissions

Table 3-5 presents the estimated air emissions with implementation of the Proposed Action annualized over the three-year Proposed Action period. **Table 3-6** summarizes the highest estimated annual emissions for each pollutant with implementation of the Proposed Action compared to their respective thresholds within the LVIAQCR. The steady-state air emissions represent the ongoing annual emissions in future years.

Table 3-5
Estimated Annual Air Emissions of the Proposed Action (tpy) – Proposed Action

Pollutant	2025	2026	2027	Steady State
VOC	0.851	17.909	17.904	17.088
NO_x	1.400	179.516	179.510	178.333
CO	1.830	71.991	71.990	70.459
SO_2	0.077	11.791	11.918	11.968
PM_{10}	26.796	42.909	42.908	16.127
$PM_{2.5}$	0.053	16.165	16.162	16.120
Lead	0.000	0.000	0.000	0.000
Ammonia	0.003	0.004	0.004	0.003
CO_2e	338	10,433	10,493	10,238

Source: **Appendix C** of this EA.
tpy = ton per year 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, VOC = volatile organic compounds

Table 3-6
Estimated Highest Annual Air Emissions– Proposed Action

Pollutant	Highest Annual Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (yes or no)
VOC	17.909	100	No
NO_x	179.516	100	Yes
CO	71.991	100	No
SO_2	11.791	250	No
PM_{10}	42.909	100	No
$PM_{2.5}$	16.165	250	No
Lead	0.00	25	No
Ammonia	0.004	250	No
CO_2e	10,493	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, VOC = volatile organic compounds

Emissions from the generators for ongoing operations could exceed General Conformity PSD thresholds for NO_x under worst-case scenario conditions.

Short-term, minor-to-moderate adverse impacts to air quality would be anticipated to occur during construction as a result of an increase in emissions from construction equipment. Fugitive dust is highly regulated in Clark County, and a permit from the county is required before conducting ground-disturbing activities. Applicable construction projects must submit a dust mitigation plan, which includes the construction BMPs listed in the Section 94 Handbook of the Clark County Air Quality Regulations. BMPs include, but are not limited to:

- Stabilize soil prior to, during, and after cut and fill activities.
- Apply water to stabilize disturbed soil throughout the construction site.
- Limit vehicle traffic and disturbance on soils where possible.
- Limit the size of staging areas.
- Apply water to surface soils where support equipment and vehicles would be operated.

Construction would follow all applicable Clark County Air Quality Regulations, such as obtaining a dust control permit from the Clark County Department of Air Quality and Environmental Management for applicable construction activities, which include:

- soil-disturbing or construction projects greater than or equal to 0.25 acre,
- trenching greater than or equal to 100 feet in length, or
- mechanical demolition of any structure larger than or equal to 1,000 ft^2.

The ongoing operations of the onsite generators could exceed the General Conformity PSD threshold for NO_x under worst-case scenario continuous generator use conditions. Additional permitting and coordination with the Clark County Division of Air Quality is ongoing to establish operational constraints that would reduce the emissions emitted to remain below the threshold of insignificance. These operational constraints could be a fuel cap or limiting the maximum number of generators that operate at one time. These operational constraints would provide flexibility for the operation of these engines while still reducing emissions below the threshold of insignificance. Implementation of the Proposed Action would be anticipated to result in long-term, minor-to-moderate, adverse impacts to air quality.

Greenhouse Gas and Climate Change – CO_2e Emissions

The total combined direct and indirect GHG emissions were estimated through ACAM for the estimated ongoing operations of the Proposed Action (**Table 3-7**).

Table 3-7
Estimated GHG Emissions (MT/yr) – Proposed Action

Pollutant	2025	2026	2027	2028–2038 (steady state)
CO_2	338	10,433	10,493	10,238
CH_4	0.01361167	0.42019025	0.42258333	0.4126362
N_2O	0.0040664	0.08742962	0.08985438	0.08859626
CO_2e	339	12,003	12,063	11,808
Exceedance	No	No	No	No

CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide-equivalent; MT/yr = metric tons per year; N_2O = nitrous oxide

Unlike regional air quality, the affected area of GHG and climate change is global. As such, the intensity or degree of the GHG/climate change effects of the Proposed Action are compared with state and US GHG emission inventories (**Table 3-8**). Under the Proposed Action, GHG emissions would be insignificant compared to Nevada and US GHG inventories.

Table 3-8
Comparison of Total GHG Emissions Relative to Nevada and US Inventories (MT) – Proposed Action

Pollutant	2025–2038			Percent of State Total	Percent of US Total
	State Total	US Total	Proposed Action		
CO_2	554,440,075	71,910,358,506	133,887	0.02414806%	0.00018619
CH_4	1,193,208	358,776,764	5.395383	0.00045217%	0.00000150%
N_2O	88,033	21,009,907	1.155909	0.00131305%	0.00000550%
CO_2e	555,721,316	72,290,145,176	154,291	0.02776403	0.00021343%

CH_4 = methane; CO_2 = carbon dioxide; CO_2e = carbon dioxide-equivalent; MT = metric ton; N_2O = nitrous oxide

Overall, the Proposed Action would be estimated to release approximately 154,291 metric tons of GHG from 2025 through 2038, or 11,800 metric tons of GHG annually. This figure would account for approximately 0.02776403 percent of the state total and 0.00021343 percent of the US total of GHG projected to be released during the same period. Therefore, the Proposed Action would not be anticipated to result in a significant increase in GHG emissions.

3.6.4.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to air quality in the ROI beyond baseline conditions.

3.6.4.4 Cumulative Effects

The cumulative effects of construction occurring under the Proposed Action would generate an overall increase in ambient air pollution in Clark County.

The Nellis AFB actions, when combined with construction activities occurring under the Proposed Action, would result in an increase in localized and regional emissions in Clark County. Concurrent projects within the LVIAQCR on Nellis AFB would include development of the east side of Nellis AFB and installation development projects on the west side of the base. Implementation of the Nellis Master Plan and installation development projects would involve a large amount of grading, construction, paving, increased building heating, and trenching on the east site of the installation. Emissions associated with development of these projects would be anticipated to be below the PSD thresholds.

When considered in conjunction with other past, present, and reasonably foreseeable future actions at Nellis AFB, no significant cumulative effects to air quality would be anticipated to occur with implementation of the Proposed Action.

3.7 WATER RESOURCES

3.7.1 Definition of the Resource

Water resources include surface waters, wetlands, stormwater, groundwater, and floodplains. The *Federal Water Pollution Control Act of 1948*, as amended by the *Clean Water Act* (33 USC § 1251 et seq.) (CWA) was enacted to protect water resources vulnerable to contamination and quality degradation. The CWA provides the authority to establish water quality standards, control discharges into surface and subsurface waters (including groundwater), develop waste treatment management plans and practices, and issue permits for discharges. A National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the CWA is required for discharges into navigable waters. The USEPA oversees the issuance of NPDES permits at federal facilities as well as water quality regulations (CWA, Section 401) for both surface- and groundwater.

The ROI for water resources is Nellis AFB and the Las Vegas Wash (Hydraulic Unit Code [HUC] 15010015) and Lake Mead (HUC 15010005) subbasins of the Lower Colorado Region (US Geological Survey, 2017).

3.7.1.1 Surface Waters

The USEPA defines surface waters as Waters of the US, which are primarily lakes, rivers, estuaries, coastal waters, and wetlands. Jurisdictional waters, including surface water resources, as defined in 33 CFR § 328.3, are regulated under Sections 401 and 404 of the CWA and Section 10 of the *Rivers and Harbors Act*. Man-made features not directly associated with a natural drainage, such as upland stock ponds and irrigation canals, are generally not considered jurisdictional waters. The CWA regulates discharges of pollutants in surface Waters of the US. Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into Waters of the US.

3.7.1.2 Wetlands

The US Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions" (Environmental Laboratory, 1987). Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR Part 328). Federal protection of wetlands is also promulgated under Executive Order (EO) 11990, *Protection of Wetlands*, the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands. This EO directs federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands.

3.7.1.3 Stormwater

Stormwater is surface water runoff generated from precipitation and has the potential to introduce sediments and other pollutants into surface waters. Stormwater is regulated under the CWA Section 402 NPDES program. Impervious surfaces such as buildings, roads, parking lots, and even some natural soils increase surface runoff. Stormwater management systems are designed to contain runoff on site during construction and to maintain predevelopment stormwater flow characteristics following development through either the application of infiltration or retention practices. *Energy Independence and Security Act* (Public Law 110-140) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 ft^2 must maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the property with respect to the water temperature, rate, volume, and duration of flow.

3.7.1.4 Groundwater

Groundwater is water that exists in the saturated zone beneath the earth's surface in pore spaces and fractures and includes aquifers. Groundwater is recharged through percolation of water on the ground's surface (e.g., precipitation and surface water bodies) and upward movement of water in lower aquifers through capillary movement. Groundwater is an essential resource that can be used for drinking, irrigation, and industrial processes, and can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. Groundwater quality and quantity are regulated under several different programs. The federal sole source aquifer regulations, authorized under the *Safe Drinking Water Act*, protect aquifers that are critical to water supply.

3.7.1.5 Floodplains

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwater. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. The risk of flooding is influenced by local topography, the frequency of precipitation events, and the size and characteristics of the watershed upslope of the floodplain.

The Federal Emergency Management Act (FEMA) evaluates and maps flood potential, which defines the 100-year (regulatory) floodplain. The 100-year floodplain is the area that has a one-percent annual chance of inundation by floodwater. FEMA uses letter designations for flood zone classification. Zone A designates 100-year floodplains where flood depths (base-flood elevations) have not been calculated and further studies are needed. Zone AE floodplains include calculated base-flood elevations. Base-flood elevations are minimum elevation standards for buildings. Zone X indicates areas outside of the FEMA 100-year regulatory floodplain and indicate a low risk of flooding hazards (FEMA, 2020). Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to property and human health and safety.

EO 11988, *Floodplain Management*, provides guidelines that agencies should carry out 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. 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.

3.7.2 Existing Conditions

3.7.2.1 Surface Waters

Nellis AFB is located in the northeast portion of the Las Vegas Valley, an intermountain basin of approximately 1,600 square miles within the Basin and Range Province of the US, which extends southeasterly through the Las Vegas Wash into Lake Mead (Nellis AFB, 2019a).

Within Nellis AFB, natural perennial streams, rivers, springs, or lakes do not occur due to low precipitation, high evaporation rates, and low humidity. Several unnamed ephemeral streams and washes occur on Nellis AFB, including known ephemeral streams that traverse Nellis AFB and the Proposed Action area (**Figure 3-3**). Most of the ephemeral streams only contain water during infrequent storm events. However, some storm events are intense enough to result in flash flooding of these streams. Most of the ephemeral streams on Nellis AFB are connected to Waters of the US (e.g., Las Vegas Wash, Lake Mead, and Colorado River) (Nellis AFB, 2019a; USFWS, 2019). The 2015 Clean Water Rule was repealed by final rule on 29 August 2023, which states that ephemeral streams do not qualify as Waters of the US, as they are not "relatively permanent, standing, or continuous bodies of water." Accordingly, the ephemeral streams within the Proposed Action area are considered non-jurisdictional.

Surface water impoundments across Nellis AFB consist entirely of artificially constructed ponds. Within the Proposed Action area, there are three dry ponds; two dry reservoirs located in the proposed Graded Contingency Training Area (**Figure 3-3**). Stormwater drainage channels have been excavated **within** the Proposed Action area, within and adjacent to the Nellis AFB airfield, as well as within the residential areas to the west of the airfield. Runoff from Sunrise Mountain, located southeast of the Proposed Action area, generally crosses the east side of Nellis AFB in a sheet-flow manner, depositing into these stormwater drainage channels to the west. The Proposed Action area is located just north of the currently undeveloped east side of Nellis AFB.

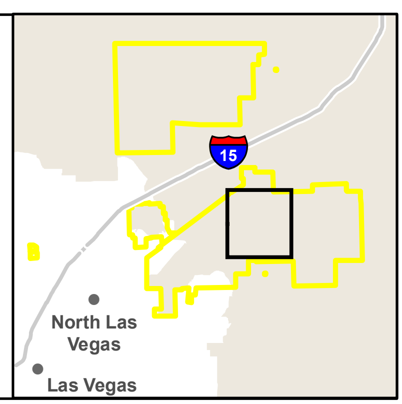
FIGURE 3-3
Water

Stream/River (Ephemeral)
Existing Camp Cobra
Reservoir
Buildings to be repurposed
Graded Contingency Beddown Area
Graded Contingency Training Area
Lake/Pond
Logistics Area
Mock Village
Proposed Airfield Training Area
Site Support Area

N

0 0.5 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



3.7.2.2 Wetlands

Although there are artificial ponds and reservoirs located within Nellis AFB, these ponds are not subject to wetlands protection under the CWA because they are man-made, artificially filled with treated groundwater, isolated, and/or do not connect to other water bodies (USACE, 2020). The remainder of the installation is arid scrub or developed land that contains no jurisdictional or non-jurisdictional wetlands (Nellis AFB, 2019a). Wetlands are not further analyzed in this EA.

3.7.2.3 Stormwater

In accordance with NPDES regulations, Nellis AFB is required to obtain coverage under a stormwater permit and has been issued coverage under the Nevada Industrial Stormwater General Permit based on the types of industrial activities conducted. Stormwater within Nellis AFB municipal areas is managed through NPDES for Municipal Separate Storm Sewer System permit NV-0021911 and crosses the installation in the form of sheet-flow or is diverted into one of several stormwater drainage channels. High-velocity flow derived from Sunrise Mountain to the east of the installation often results in sheet-flow flooding south of the Proposed Action area, which flows across the undeveloped portions of Nellis AFB and the paved surfaces of the flightline.

Despite the dry climate and infrequent rainfall in the area, stormwater events tend to be significant and intense in the Nellis AFB area. With the combination of the rainfall intensity and the region's soil impermeability, flooding is a major concern. Stormwater throughout Nellis AFB generally flows southeasterly via washes and ultimately empties into Lake Mead and the Colorado River. Severe thunderstorms can result in temporary flash flooding, and water sources have the potential to become contaminated. Because of the flow path and the connection other ephemeral streams and washes have with the Las Vegas Wash, implementation of BMPs would be required to reduce stormwater pollution (Nellis AFB, 2019a).

Several stormwater drainage channels exist within the Proposed Action area and carry stormwater runoff away from the site and toward other existing stormwater channels connecting to the Nellis AFB airfield and residential areas to the west of the airfield (Nellis AFB, 2024b). The expansive series of stormwater channels across Nellis AFB are both natural and man-made and include defined grass areas, bare earth, and concrete-lined structures. These channels facilitate the flow of stormwater from the installation into Clark County Regional Flood Control District channels, which in turn divert stormwater from Nellis AFB into the Las Vegas Wash. According to the Nellis Stormwater Pollution Prevention Plan, construction activities exceeding 1 acre (43,560 ft^2) are excluded from the Nevada Industrial Stormwater General Permit and must obtain their own state-issued general permit for stormwater discharges (Nellis AFB, 2010).

3.7.2.4 Groundwater

In the Las Vegas Valley, groundwater is protected from contaminants by a thick layer of clay and fine-grained sediments. More than 6,000 wells in the Las Vegas Valley provide year-round groundwater to residents and other users who are not on municipal supply (Las Vegas Valley Water District, 2021). Groundwater, which flows west to east in the Las Vegas Valley basin, accounts for approximately 15 percent of Nellis AFB's water supply (Nellis AFB, 2019a). Due to Nevada's climate and scarcity of water in the Las Vegas Valley, Nellis AFB has implemented strict groundwater conservation measures to ensure that the use of this resource is mitigated and monitored.

3.7.2.5 Floodplains

Local rainstorms can be severe enough to cause flash flooding, generating an increase in flood risk due to impermeable surfaces. Developed, nonporous surfaces increase flood risk by increasing the volume and flow rate of stormwater in localized areas. Stormwater flows through ephemeral streams, resulting in washes that often create small, localized floodplains known as alluvial fans. In these areas, soil tends to be more crumbly, and erosion due to water movement is usually higher than in the surrounding areas. Alluvial fans are potentially jurisdictional surface water features and are located throughout Nellis AFB.

Floodplains on Nellis AFB are documented in mapping by both FEMA and Colorado State University (CSU) Center for Environmental Management of Military Lands (CEMML); however, a comprehensive FEMA flood insurance rate map has not been developed for Nellis AFB and the available data reflect analysis from 2011 or older (CSU, 2021). Accordingly, there are no FEMA-mapped floodplains located within the Proposed Action area. The current FEMA-mapped floodplain is not representative of the actual impacts of surface and stormwater runoff within Nellis AFB regarding flooding (CSU, 2021). As a result, most of Nellis AFB is located within FEMA Zone X—an area with reduced flood risk due to levees. CSU has conducted supplemental research to identify floodplains within Nellis AFB. CSU estimates there are 3,886 acres of 500-year and 2,585 acres of 100-year floodplains within Nellis AFB (CSU, 2021) (**Figure 3-4**). The CSU CEMML-mapped floodplains cover a large portion of the Proposed Action area, generally bisecting the area northeast to southwest.

3.7.3 Environmental Consequences

3.7.3.1 Evaluation Criteria

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Potential adverse impacts to water resources would occur if the Proposed Action:

- reduces water availability or supply to existing users,
- overdrafts groundwater basins,
- exceeds safe annual yield of water supply sources,
- adversely affects water quality,
- endangers public health by creating or worsening health hazard conditions, or
- violates established laws or regulations adopted to protect sensitive water resources.

Significant impacts to water resources would occur if the surface water, stormwater, floodplains, or groundwater were altered such that the function of these resources would change irreversibly, resulting in impacts to the broader environment.

3.7.3.2 Proposed Action

Surface Water

Final project locations within the proposed CSTR have not been established; however, the dry ponds and reservoirs likely would be regraded and replaced with ponds or stormwater detention basins similar to those that were removed. There are no permanent natural steams or rivers located within the ROI. Several unnamed ephemeral streams bisect the Mock Village Area and Graded Contingency Training Area, while additional ephemeral streams surround the ROI in all directions. Any substantial changes that affect storm drains, ponds, and ways of ephemeral streams in the project area would follow requirements in the *Nellis AFB Storm Water Management Plan* (Nellis AFB, 2022b) and General Permit No. NVS0400000-80003.

Under the Proposed Action, approximately 796,250 ft^2 (roughly 18 acres) of new impervious surfaces (paving) would occur, in addition to 10,556 linear feet of semi-improved roadways and 7,950 feet of fencing, requiring approximately 8 million ft^2 of grading in total. New construction, renovation, paving, and grading that would occur under the Proposed Action would have the potential to disrupt the flow of ephemeral streams, resulting in potentially higher rates of flow. These higher rates of flow would have the potential to contribute to increased sedimentation and erosion of soils within and downstream of the Proposed Action area. However, these streams only contain water during precipitation events and are prone to rapid evaporation. In addition, the potential for runoff from initial construction and long-term training activities would be managed through the implementation of BMPs as described below in **Stormwater**. Under the Proposed Action, long-term, minor, adverse impacts to surface waters would be anticipated to occur due to the increase in impervious surfaces.

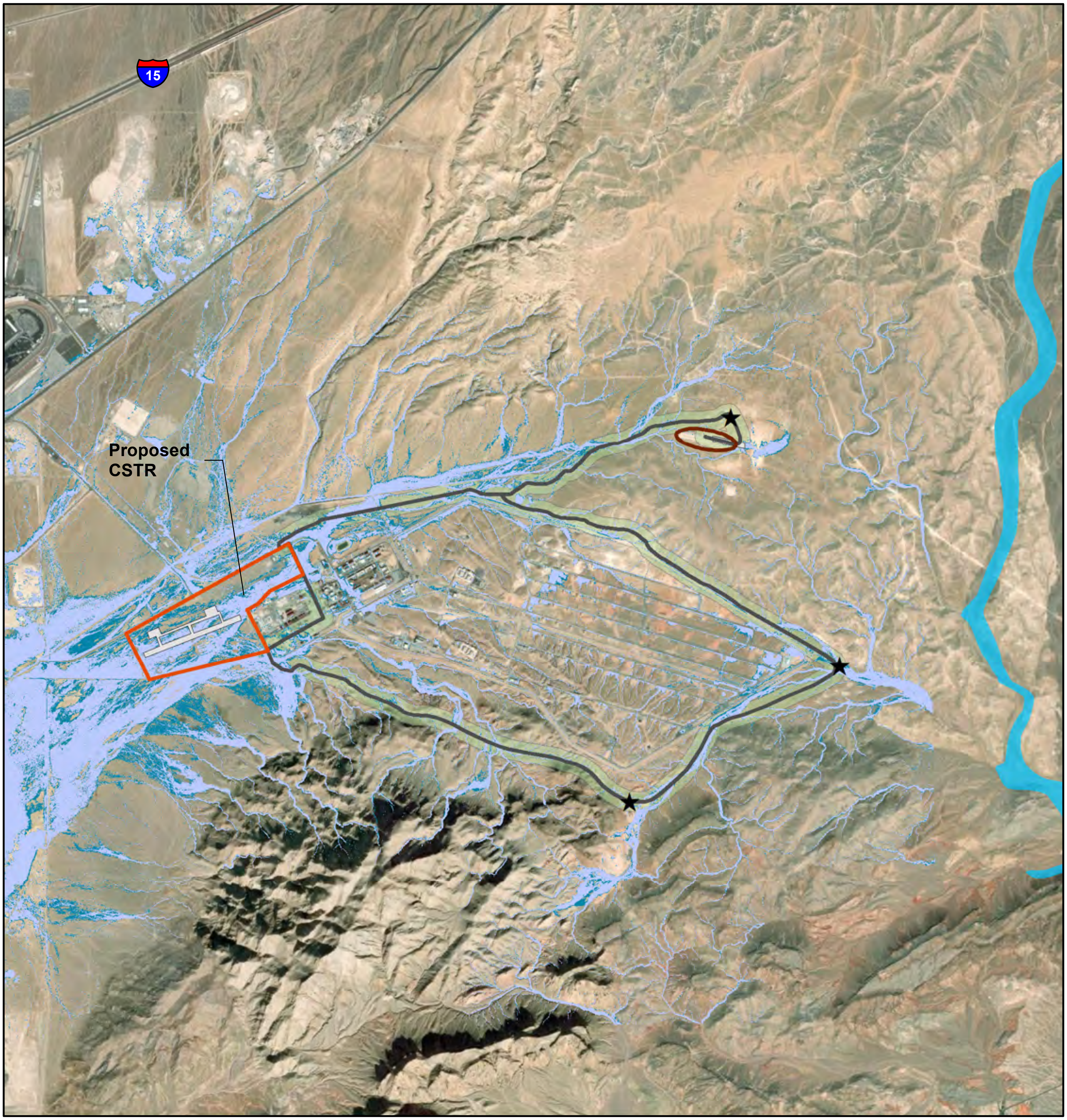


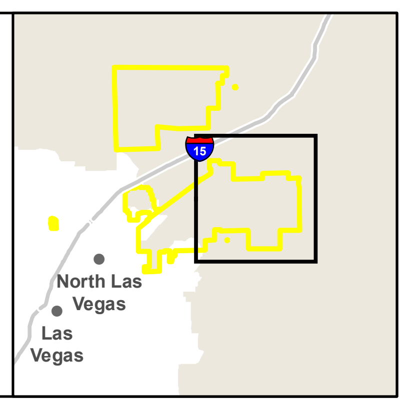
FIGURE 3-4
Floodplains

★ Connex Village
Driving Course/Foot Patrol Road
Existing EOD Range
Proposed Airfield Road
Proposed Airfield
CSU 100-Year Floodplain
CSU 500-Year Floodplain
100-Year Floodplain
100-Yard Foot Patrol Buffer

N

0 1.5 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



<u>Stormwater</u>

During construction, crews would adhere to BMPs for stormwater management, as determined by the Nellis AFB Natural Resources Division, to minimize runoff potential. Potential BMPs include:

- Maintain grading and topography at project locations.
- Stage equipment and construction materials in areas outside of known flash flooding areas.
- Adhere to and implement 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.
- Utilize stormwater drainage through the numerous, existing, unlined channels and ephemeral streams at Nellis AFB, which have adequate capacity to support additional development.

Under the Proposed Action, approximately 796, 250 ft^2 of new impervious surfaces (paving), as well as 10,556 linear feet of semi-improved roadways and 7,950 feet of fencing, requiring approximately 8 million ft^2 of grading in total, would occur over 2 to 3 years. Development of the mock airfield, aprons, and associated taxiways in the Airfield Training Area would occur within the first 6 months, resulting in 796,250 ft^2 of new impervious surface. The remaining development (i.e., preserved [repurposed], new construction, and grading) would occur over the proposed 2–3-year timeframe (see **Table 2-1**).

The construction of new buildings and renovation of existing facilities to meet CSTR objectives has the potential to introduce opportunities for stormwater contamination through the short-term use of construction equipment and materials. In the long term, new buildings, paved areas, and other impervious surfaces development would be constructed to support the CSTR. Operation of a CSTR would include vehicle maintenance facilities, and the use of other training materials such as propane-fed fire trainings and tear gas. Regular operations under the Proposed Action would result in potential increases in stormwater contamination from fuels (diesel, motor vehicle gasoline), oils and lubricants, used oils, and hazardous chemicals (see **Section 3.11** of this EA). The driving course project would involve regrading and repair of an existing, semi-improved roadway and establishment of a foot path. The foot path would not require any grading or additional pavement.

The exact locations of the new facilities, mock airfield, and pavements that would be located within Proposed Action area are not currently known. An increase in impervious surfaces would have the potential to route more runoff through Nellis AFB's extensive stormwater channel system over the course of development and use of the CSTR; however, in accordance with the *Energy Independence and Security Act*, if the footprint of an individual project exceeds 5,000 ft^2, development designs would be required to maintain or restore, to the maximum extent feasible, the predevelopment hydrology of the area with respect to the water temperature, rate, volume, and duration of flow.

Nellis AFB must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (General Permit Order NVR100000) prior to the construction of individual projects. To obtain coverage, Nellis AFB would need to submit a Notice of Intent, stormwater pollution prevention plan, other required documents, and permit fee to NDEP. Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation.

With the use of BMPs during and post construction (e.g., BMPs outlined in the installation Stormwater Management, Stormwater Pollution Prevention, and Spill Prevention, Control, and Countermeasure [SPCC] plans), and 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.

<u>Groundwater</u>

Implementation of the Proposed Action would result in short-term, negligible, adverse impacts to the groundwater recharge of Nellis AFB. Under the Proposed Action, up to 20 acres of the Proposed Action area would be covered with impervious surfaces and up to 200 additional acres would be graded. Grading would remove existing stormwater management infrastructure including artificial ponds and onsite reservoirs; this would reduce potential groundwater infiltration on a short-term basis. The stormwater management infrastructure would be replaced with ponds or stormwater detention basins similar to those that were removed. The 20 acres of impervious service likely would result in long-term, negligible, adverse impacts to underlying aquifer systems. The infiltration would be decreased by the impervious area; however, the improved stormwater basins and stormwater management infrastructure would serve as a BMP to retain water on site for longer, allowing for more infiltration. Overall, only 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 currently disturbed and/or developed area of Nellis AFB with the addition 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 types of airfield training expected to occur post-development, heavy machinery and chemicals may be used to support training 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 CSTR if contaminated stormwater reached the groundwater supply. However, the groundwater resources in the area are vast and deep and any contaminants are likely to remain in shallow groundwater resources with no historical evidence of contaminants reaching the deeper aquifer that underlies Nellis AFB. Furthermore, Nellis AFB would implement BMPs to manage stormwater runoff, thereby reducing the potential contamination of groundwater resources. Therefore, implementation of the Proposed Action would be anticipated to result in long-term, negligible, adverse impacts to groundwater.

Floodplains

There are no FEMA-mapped floodplains located within the Proposed Action area. The nearest identified FEMA floodplain is located approximately 1 mile west of the Proposed Action area. The CSU CEMML-mapped floodplains cover a large portion of the Proposed Action area, generally bisecting the area northeast to southwest (see **Figure 3-4**). Construction and renovation within the floodplain would adhere to applicable regulations defined by Nellis AFB as well as BMPs. 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 1-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, Nellis AFB would consult current floodplain regulations to ensure that development designs are in 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, Nellis 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 CSU CEMML-mapped floodplains would be anticipated to occur with implementation of the Proposed Action. There would be no impacts to FEMA-mapped 100-year floodplains; accordingly, a Finding of No Practicable Alternative for the Proposed Action is not required.

3.7.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to water resources in the ROI beyond baseline conditions.

3.7.3.4 Cumulative Impacts

Implementation of the Proposed Action would be anticipated to result in long-term, minor, adverse impacts to surface water and groundwater and long-term, moderate, adverse impacts to stormwater 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 the ROI for water resources.

The TASS beddown project, Nellis Aggressor EA, Nellis IDP EA, and completed MILCON projects all involved further development Nellis AFB pavements. The increase in impervious surfaces would be anticipated to increase the potential for stormwater runoff west of the Proposed Action area when combined with impervious surfaces under the Proposed Action. Implementation of the Nellis Master Plan and installation development projects would be anticipated to result in an increase of 1,480 acres of additional impervious surfaces. Increased runoff from impervious surfaces during stormwater events would have the potential to contribute to increased impacts to surface water, stormwater, and floodplains. Stormwater improvements to infrastructure would have the potential to occur, resulting in long-term, beneficial impacts to stormwater infrastructure management throughout Nellis AFB.

Additionally, the Clark County Regional Flood Control District project proposes an expansion of existing flood control infrastructure located in the southwestern portion of the installation. The expansion is currently under consideration and expected to begin design no sooner than 2028. When combined with the Proposed Action, cumulative, beneficial impacts to stormwater drainage and infrastructure would occur.

3.8 BIOLOGICAL RESOURCES

3.8.1 Definition of the Resource

Biological resources include native or invasive plants and animals; sensitive and protected floral and faunal species; and the associated habitats, such as wetlands, forests, grasslands, cliffs, and caves in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. The following is a description of the primary federal statutes that form the regulatory framework for the evaluation of biological resources.

The ROI for biological resources is the Proposed Action area.

3.8.1.1 Endangered Species Act

The ESA established protection for threatened and endangered species and the ecosystems upon which they depend. Under the ESA, an “endangered species” is defined as any species in danger of extinction throughout all, or a large portion, of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The ESA also allows the designation of geographic areas as critical habitat for threatened or endangered species. The USFWS maintains a list of candidate species being evaluated for possible listing as threatened or endangered under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and may warrant protection in the future under the ESA.

3.8.1.2 Migratory Bird Treaty Act

The *Migratory Bird Treaty Act* (16 USC § 703 et seq.) MBTA makes it unlawful for anyone to take migratory birds or their parts, nests, or eggs unless permitted to do so by regulations. Per the MBTA, “take” is defined as “pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 CFR § 10.12). Birds protected under the MBTA include nearly all species in the US except for non-native/human-introduced species and some game birds.

EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires all federal agencies undertaking activities that may negatively impact migratory birds to follow a prescribed set of actions to further implement the MBTA. EO 13186 directs federal agencies to develop a Memorandum of Understanding with the USFWS that promotes the conservation of migratory birds.

The *National Defense Authorization Act for Fiscal Year 2003* (Public Law 107-314, 116 Stat. 2458) provided the Secretary of the Interior the authority to prescribe regulations to exempt the Armed Forces from the incidental take of migratory birds during authorized military readiness activities. Congress defined military readiness activities as 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, in October of 2012, the Authorization of Take Incidental to Military Readiness Activities was published in the Federal Register (50 CFR § 21.15), authorizing incidental take during military readiness activities unless such activities may result in significant adverse effects on a population of a migratory bird species.

In December 2017, the US Department of the Interior issued M-Opinion 37050, which concluded that the take of migratory birds from an activity is not prohibited by the MBTA when the purpose of that activity is not the take of migratory birds, eggs, or nests. On 11 August 2020, the US District Court, Southern District of New York, vacated M-37050. Thus, incidental take of migratory birds is again prohibited. The interpretation of the MBTA remains in flux, and additional court proceedings are expected.

3.8.1.3 Bald and Golden Eagle Protection Act

The *Bald and Golden Eagle Protection Act of 1940* (16 USC §§ 668–668c) (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." Further, the BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," and "disturb" is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, injury to an eagle, a decrease in productivity by substantially interfering with the eagle's normal breeding, feeding or sheltering behavior, or nest abandonment by substantially interfering with the eagle's normal breeding, feeding, or sheltering behavior." The BGEPA also prohibits activities around an active or inactive nest site that could result in disturbance to returning eagles.

3.8.1.4 Invasive Species

Invasive species are non-native species whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health. EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, requires federal agencies to identify actions that may affect invasive species; use relevant programs to prevent introductions of invasive species; detect, respond, and control such species; monitor invasive species populations; and provide for restoration of native species. Invasive species damage native habitat and impede successful vegetation management by outcompeting native species.

3.8.2 Existing Conditions

3.8.2.1 Vegetation

Nellis AFB occurs in the Mojave Desert. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) vegetation communities typically characterize much of the Mojave Desert and are adapted to the hot, dry climate. The composition of vegetation communities is influenced by soil, geomorphology, and disturbance from human activity. Nellis AFB has completed mapping of vegetation communities consistent with the US Natural Vegetation Classification system (Wion and Olech, 2022). Vegetation communities were mapped to the alliance level of classification and, when identifiable, to the association level. Information on vegetation communities within the ROI was also recorded during desert tortoise surveys conducted in October 2024 (Nellis AFB, 2024).

The proposed Graded Contingency Training Area and Logistics Area contain two primary vegetation communities, creosote bush-burrobush bajada and valley desert scrub alliance and Parry's saltbush (*Atriplex parryi*) wet shrubland alliance as shown in **Figure 3-5**. This area slopes from the northeast to the southwest. Soils are alluvial deposits from stormwater flow that generally flows from the north-northeast to the south-southwest. Several stormwater washes run through the central part of this area. These channels carry stormwater runoff that originates on site and upgradient to the northeast. The washes are typically shallow—1 to 3 feet deep in most locations. There is evidence of broader shallow surface flow of water in areas near the channels. There are also several small water catchment basins that have been constructed in this area. The vegetation in the washes and water retention basins is classified as Parry's saltbush wet shrubland alliance. Common plant species in this plant community are listed in **Table 3-9**. Because stormwater provides a larger and more frequent water source, the Parry's saltbush wet shrubland alliance has a greater plant diversity and larger shrub species. The drier, upland sites outside the washes contain a creosote bush-burrobush bajada and valley desert scrub alliance that is typical of the Mojave Desert. This plant community is dominated by creosote bush and burrobush with some saltbush. Shrubs are widely spaced, and the creosote bush is relatively short (1.5 to 3 feet high). The herbaceous layer consists mostly of Arabian schismus, an introduced annual grass. A third plant community, Mojave rabbitbrush Mojave Desert wash scrub alliance, occurs in the area proposed for the Mock Village Area, Graded Contingency Beddown Area, and Site Support Area (existing Camp Cobra).

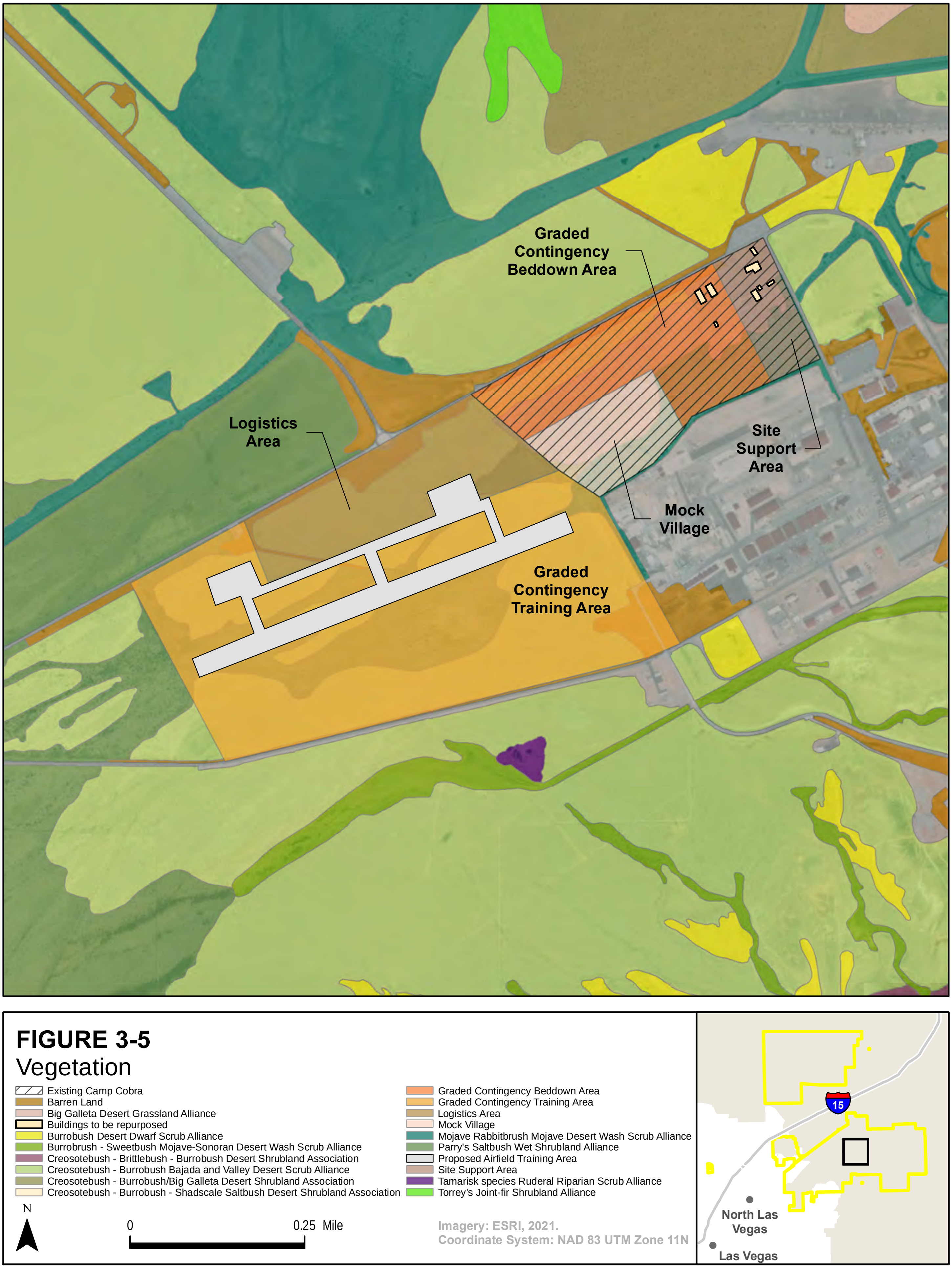


FIGURE 3-5
Vegetation

Table 3-9
Common Plant Species In Vegetation Communities In the Proposed Action Area

Species	Vegetation Community		
	Parry's Saltbush Wet Shrubland Alliance	Creosote Bush – Burrobush Bajada And Valley Desert Scrub Alliance	Mojave Rabbitbrush Mojave Desert Wash Scrub Alliance
Scientific Name	**Common Name**		
Ambrosia dumosa	Burrobush	Burrobush	Burrobush
Atriplex parryi	Parry's saltbush	Parry's saltbush	(a)
Atriplex canescens	Fourwing saltbush	Fourwing saltbush	(a)
Baccharis sarothroides	(a)	(a)	Desertbroom
Chorizanthe rigida	(a)	Devil's spineflower	(a)
Chilopsis linearis	Desert willow	(a)	Desert willow
Cucurbita palmata	Coyote gourd	(a)	Coyote gourd
Encelia spp	Brittlebush	(a)	(a)
Ephedra nevadensis	Nevada jointfir	(a)	(a)
Ericameria paniculata	Mojave rabbitbrush	(a)	Mojave rabbitbrush
Krameria erecta	Littleaf ratany	(a)	(a)
Larrea tridentata	Creosote bush	Creosote bush	Creosote bush
Physalis crassifolia	Thick leaf ground cherry	(a)	(a)
Pleuraphis rigida	Big galleta grass	(a)	(a)
Schismus arabicus	Arabian schismus	Arabian schismus	Arabian schismus
Sphaeralcea ambigua	Desert globemallow	(a)	(a)

Note:
a species not present or common in the vegetation community.

Two stormwater channels/ washes occur in this area. In addition to creosote bush and burrobush, Mojave rabbitbrush, desertbroom, and desert willow are common species. This area also contains a small area of creosote bush – burrobush bajada and valley desert scrub alliance vegetation along the north side and a previously developed area occupied by the existing Camp Cobra.

3.8.2.2 Wildlife

Common wildlife species that occur in the ROI include reptiles (e.g., lizards), small mammals (e.g., rodents and bats), birds, and medium-sized mammals (e.g., carnivores and jackrabbits) (Nellis AFB, 2024b). Biologists have identified 21 species of reptiles and one amphibian, Woodhouse's toad (*Anaxyrus woodhousii*), on Nellis AFB. Common native reptile species include the side-blotched lizard (*Uta stansburiana*), western banded gecko (*Coleonyx variegatus*), long-tailed brush lizard (*Urosaurus graciosus*), Great Basin whiptailed lizard (*Aspidocelis tigris*), Great Basin collared lizard (*Crotaphytus bicinctores*), desert iguana (*Dipsosaurus dorsalis*), desert tortoise, and sidewinder (*Crotalus cerastes*). Two non-native species of reptile known to occur on Nellis AFB are the rough-tailed bowfoot gecko (*Cyrtopodion scabrum*) and Mediterranean gecko (*Hemidactylus turcicus*). The desert tortoise is listed as threatened under the ESA and is discussed in **Section 3.8.2.3**.

A variety of small mammal species occurs within the ROI (Nellis AFB, 2024b). Common rodent species include Merriam's kangaroo rat (*Dipodomys merriami*), chisel-tooth kangaroo rat (*Dipodomys microps*), desert pocket mouse (*Chaetodipus penicillatus*), southern grasshopper mouse (*Onychomys torridus*), desert woodrat (*Neotoma lepida*), valley pocket gopher (*Thomomys bottae*), and white-tailed antelope ground squirrel (*Ammospermophilus leucurus*). Many of the small mammal species live underground and are abundant in the alluvial soils as evidenced by the abundance of burrows observed during desert tortoise surveys. Medium-sized mammals include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*) (Nellis AFB, 2024b). Six species of bats have been confirmed present in the vicinity of the ROI based on acoustic data records (greater than 20 calls) (Nellis AFB, 2020a). Calls of four additional bats species were also recorded. The most common species recorded were the canyon bat (*Parastrellus hesperus*), California myotis (*Myotis californicus*), Mexican free-tailed bat (*Tadarida brasiliensis*), western red bat (*Lasiurus blossevillii*), western yellow bat (*Lasiurus xanthinus*), and the hoary bat (*Lasiurus cinereus*). All except the western yellow bat are considered special-status species based on state of Nevada or federal agency designations, as discussed in **Section 3.8.2.3.**

Most bird species are protected under the MBTA. Birds that potentially occur in the ROI are discussed in **Section 3.8.2.3**.

3.8.2.3 Threatened or Endangered Species and Other Protected Species

Threatened or endangered species are species that have federal status and protection under the ESA. Other protected species includes birds protected under the MBTA or BGEPA, and Nevada state-listed and classified species, as well as Nevada species of greatest conservation need (SGCN).

Threatened or Endangered Species

Of the 16 endangered and 11 threatened species known to occur in Nevada, only the desert tortoise occurs on Nellis AFB (Nellis AFB, 2024b). The desert tortoise was listed as threatened in 1990. Nellis AFB most recently consulted with the USFWS in 2023 (**Appendix B**) under Section 7 of the ESA regarding potential effects of future and ongoing DAF activities at Nellis AFB. The Mojave population of the desert tortoise occurs north and west of the Colorado River in desert areas of Nevada, California, Utah, and Arizona. It occupies desert flats and slopes dominated by creosote shrubs at lower elevations and blackbrush (*Coleogyne ramosissima*) and Great Basin desert ecotone vegetation at higher elevations and on the northern edge of its range. Critical habitat was designated for the desert tortoise in 1994 but does not include Nellis AFB (USFWS, 1994; Nellis AFB, 2024b).

Surveys for desert tortoises on Nellis AFB have been conducted since 1990, most were designed to determine presence/absence or for clearance for construction projects. Only a few surveys were designed to estimate relative abundance or abundance/density (Nellis AFB, 2020b, 2021, 2023a). Most observations of desert tortoises have occurred in Area II surrounding the MSA, northeast of the ROI. The MSA is excluded by a tortoise-proof fence. Desert tortoises are also relatively abundant on the Small Arms Range, which is controlled and managed by the DAF but is outside the ROI for the Proposed Action.

Tortoise surveys that included small parts of the ROI or were adjacent to the ROI were conducted in 2018, 2019, 2020, and 2021. The 2018 survey included the western edge of the ROI and documented a possible desert tortoise burrow in creosote bush-burrobush vegetation (Nellis AFB, 2019a). Surveys in 2019 focused on Area II and the Small Arms Range but did not include the ROI. The most comprehensive tortoise surveys near the ROI were conducted in October 2020 and April 2021. These surveys were designed to estimate desert tortoise abundance and evaluate the quality of tortoise habitat but only included a small area on the southside of the ROI. A 100-percent coverage survey using transects spaced 10 meters (32.8 feet) apart was conducted in October 2024 in all portions of the ROI that were identified as potential desert tortoise habitat (**Appendix D**). The surveys covered approximately 151 acres and included creosote bush-burrobush bajada and valley desert scrub alliance, Parry’s saltbush wet shrubland alliance, and Mojave rabbitbrush Mojave Desert wash scrub alliance. The surveys were broken into two survey areas: a 143-acre survey area and an 8-acre survey area.

No evidence of tortoises was found in either survey area (**Figure 3-6**). One old, deteriorated burrow that may once have been a tortoise burrow was found, but it was partially collapsed, and vegetation had grown in the burrow entrance indicating no recent activity. The shrub cover in the creosote bush-burrobush bajada and valley desert scrub alliance areas was sparse, and the creosote bushes were relatively short (1.5 to 3 feet high), providing poor cover. A series of washes in the central part of the larger survey area were occupied by Parry’s saltbush wet shrubland alliance. Vegetation in the wash areas were well developed and in healthy condition, many in flower. The wash channels were observed to be relatively shallow, with no visible caliche layers. Several small stormwater catchment basins have been constructed in the area and are vegetated. Although these areas would provide sufficient cover and areas for construction of burrows by tortoises, it was evident that the area frequently collects and channels stormwater, which may prevent use by tortoises. Overall considering the vegetation, cover, and existing conditions, the habitat in the larger survey area (143 acres) would be considered fair-to-good tortoise habitat.

FIGURE 3-6
Tortoise Survey Transects

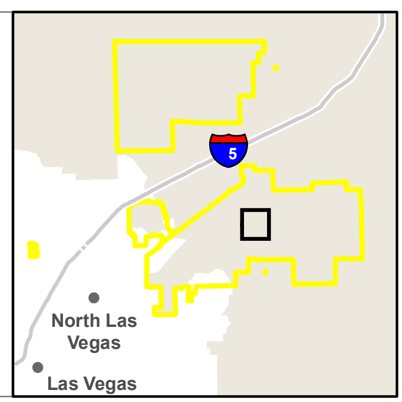
Survey Transects (30 meters)

Survey Area

N

0 0.25 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



The smaller survey area (8 acres) was located between the existing RED HORSE squadron facilities and Camp Cobra. The vegetation in this area is classification as Mojave rabbitbrush Mojave Desert wash scrub alliance. The two prominent features of the area are two wash channels that drain stormwater from the northeast. These channels merge on the west end of the survey area to form a wide channel area with abundant vegetation but is likely flooded during thunderstorms. This area drains into the larger survey area to the west. The habitat in this area was considered poor tortoise habitat primarily because it is isolated from other surrounding tortoise habitat by existing facilities, disturbed areas, chain-link fences, and roads.

Migratory Birds

Surveys for migratory birds have been conducted at Nellis AFB since 2007 (Nellis AFB, 2023b). The relative abundance and presence of individual species vary seasonally because species may be year-round residents, summer residents, temporary migrants, or winter residents. Common bird species likely to occur in the ROI based on stationary point counts include American kestrel (*Falco sparverius*), black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), house finch (*Haemorhous mexicanus*), white-crowned sparrow (*Zonotrichia leucophrys*), mourning dove (*Zenaida macroura*), and Gambel's quail (*Callipepla gambelii*) (Nellis AFB, 2023b). Several migratory birds that occur on Nellis AFB are considered special-status species. Of these species, the American kestrel, common nighthawk (*Chordeiles minor*), western burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), Le Conte's thrasher (*Toxostoma lecontei*), long-billed curlew (*Numenius americanus*), and sagebrush sparrow (*Artemisiospiza nevadensis*) were observed in similar habitat just south of the ROI during the 2020 and 2021 desert tortoise surveys (Nellis AFB, 2021).

Western burrowing owls are a special management interest on Nellis AFB (Nellis AFB, 2023c). Burrowing owls are declining in abundance and distribution throughout their range due to man-made threats (Smallwood and Morrison, 2018). In addition to being classified as a sensitive species by the BLM and a species of conservation concern by nine western states, including Nevada, the burrowing owl is listed by the USFWS as a National Bird of Conservation Concern (USFWS, 2021). Nellis AFB conducts surveys and nest monitoring of burrowing owls (Nellis AFB, 2024b, 2023d). Formerly, most of the burrowing owl activity was in the southwestern part of Area I near the Sunrise Vista Golf Course. However, because of a bird aircraft strike incident involving a burrowing owl near Nellis AFB Runway 03, those burrowing owls were relocated to the northern part of Area II in 2023 in accordance with the Nellis AFB Bird/Wildlife Aircraft Strike Hazard Plan (Nellis AFB, 2016). Fifteen artificial owl burrows were constructed in Area II for the relocation effort. The relocation was performed under a depredation permit from the USFWS. Existing burrows were collapsed after relocation to prevent reuse by owls. No burrowing owls or owl burrows were observed in the ROI during desert tortoise surveys in October 2024 (**Appendix D**).

Invasive Species

Nellis AFB has conducted surveys for invasive plants and noxious weeds. Three state-listed noxious weeds have been found on Nellis AFB: salt cedar (*Tamarix* spp.), African mustard (*Brassica tournefortii*), and Malta starthistle (*Centaurea melitensis*) (Nellis AFB, 2023d). Invasive species found on Nellis AFB include cheatgrass (*Bromus tectorum*), red brome (*B. rubens*), salt lover (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*) (Nellis AFB, 2024b). While salt cedar, African mustard, and Malta starthistle are well established and may be impossible to entirely eradicate, Nellis AFB has ongoing programs to identify and eradicate them to the extent feasible (Nellis AFB, 2023d). Although a few Russian thistles were observed during desert tortoise surveys, no areas were observed that had significant stands of invasive plants and noxious weeds. No salt cedars were observed in the wash areas in the central part of the ROI.

3.8.3 Environmental Consequences

3.8.3.1 Evaluation Criteria

The level of impact on 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.

A biological resources impact would be adverse if

- species or habitats of concern were affected over relatively large areas, or
- disturbances caused reductions in population size or distribution of a federally listed species.

A significant impact to biological resources within the ROI would occur if the Proposed Action results in the following:

- negatively affects species or habitats of concern;
- causes reductions in population size or distribution of species of high concern;
- disturbs or destroys habitats of concern;
- removes or changes critical protections provided to species and habitats of concern;
- causes substantial amount of vegetation removal from riparian habitats;
- results in direct loss or substantial degradation of terrestrial (e.g., fragmentation) or aquatic (e.g., wetlands) habitats; and/or
- causes an adverse effect on the recovery of a federally listed or candidate species.

3.8.3.2 Proposed Action

Vegetation

There are approximately 160 acres of undisturbed vegetation within the Proposed Action area. This area also contains approximately 9 acres of bare ground and 28 acres of developed land. Approximately 173 acres would be graded under the Proposed Action (see **Table 2-1**). For the estimation of potential impacts, it is assumed that up to 160 acres of undisturbed vegetation would be disturbed during project development (**Table 3-10**). The creosote bush-burrobush bajada and valley desert scrub alliance is relatively common on Nellis AFB, with over 6,000 acres. The disturbance of 105.3 acres represents about 1.7 percent of the mapped creosote bush-burrobush bajada and valley desert scrub alliance on the base. Creosote bush is a major component of approximately 50 percent of the vegetation on Nellis AFB and is common throughout the Mojave Desert. Impacts to this vegetation alliance would be minor, adverse, and long term. The Mojave rabbitbrush Mojave Desert wash scrub alliance is confined to ephemeral wash areas and is less abundant on Nellis AFB with 343 mapped acres. The potential disturbance of 18.4 acres of this vegetation alliance represents about 5.4 percent of the alliance on the base. Impacts to the Mojave rabbitbrush Mojave Desert wash scrub alliance would be minor, adverse, and long-term. The Parry’s saltbush wet shrubland alliance occurs on 1,274 acres on Nellis AFB. The Proposed Action would disturb approximately 36.2 acres of this alliance, representing approximately 2.8 percent of the Parry’s saltbush wet shrubland alliance on Nellis AFB. Impacts to this vegetation alliance would be minor, adverse, and long-term.

Table 3-10
Estimated Area of Potential Land Disturbance by Vegetation Type

Vegetation Association	Acres Disturbed	Percent of Association on Nellis AFB
Creosote bush-burrobush bajada and valley desert scrub alliance	105.3	1.7
Mojave rabbitbrush Mojave Desert wash scrub alliance	18.4	5.4
Parry’s saltbush wet shrubland alliance	36.2	2.8

Approximately 12 acres would be graded during development of the driving course. The driving course would be routed along existing gravel roads and improvements would include regrading and repairs in areas that are washed out. Impacts to vegetation would be expected to be negligible.

Wildlife

Up to 160 acres of wildlife habitat occupied by a variety of reptile, mammal, and bird species would have the potential to be disturbed and removed during project development; impacts to bird species are discussed under **Migratory Birds**. Populations of small mammals and reptiles in the Proposed Action area would be lost during vegetation removal as a result of mortality during land clearing. Species that are considered sensitive by the BLM and SGCN by the state of Nevada that could be affected by the loss of habitat include the desert horned lizard, desert iguana, Great Basin collared lizard, long-tailed brush lizard, and Mojave sidewinder. Monitoring studies indicate that several bat species occur in the area and likely forage for insects in or near the ROI. Because bats are highly mobile, project development likely would not cause direct mortality of bats. Larger species such as jackrabbits likely would move to adjacent areas. Impacts to reptile and small mammal populations would be expected to be minor but long-term from the loss of habitat. The reptile and small mammal species that occur in the ROI are relatively abundant and common in the Mojave Desert, and loss of local populations would not affect regional populations. The only evidence of predatory species in the ROI were several old badger burrows. Impacts to wildlife would be expected to be minor, adverse, and long-term from loss of habitat.

Threatened and Endangered Species

The only federally listed species that occurs on Nellis AFB is the threatened Mojave desert tortoise (*Gopherus agassizii)*. Surveys were conducted in October 2024 to determine the presence or absence of the desert tortoises on 151 acres of potential tortoise habitat in the ROI (Nellis AFB, 2024). No evidence of tortoises was found. One old partially collapsed burrow could have been a possible desert tortoise burrow. Vegetation had grown in the mouth of the burrow and no sign of tortoise activity was evident. The area is separated from adjacent habitat by paved roads on the north and south sides. The creosote bush-burrobush vegetation is relatively sparse and short, providing poor cover for tortoises. The central part of this area contains several wash channels that carry stormwater from the northeast to southwest. Several water catchment basins have been constructed in the area to catch and slow water runoff. These areas contain Parry's saltbush wet shrub alliance vegetation. Because of the water flow that occurs here and also the water retained in the catchment basins, vegetation is healthy and well developed. However, the soils are alluvial, and no caliche layers are present that would provide burrows or cover areas for desert tortoises. Any burrows likely would be flooded frequently enough to prevent long-term use. Overall, considering the vegetation, cover, and existing conditions, the habitat in the larger survey area (143 acres) would be considered fair-to-good tortoise habitat.

A second area of approximately 8 acres was surveyed within the existing Camp Cobra. The survey area was considered poor tortoise habitat because of the size, the surrounding development, and sparse vegetation in the area with the exception of two stormwater channels. No sign of desert tortoises or their activity was found.

The DAF has determined that Proposed Action would likely adversely affect the desert tortoise because approximately 143 acres of potential tortoise habitat would be disturbed. The 8 acres of habitat in the second survey was not considered viable desert tortoise habitat. The DAF conducts operations and programs at Nellis AFB under a PBO issued by the USFWS under Section 7 of the ESA for potential impacts to the Mojave desert tortoise. In 2023, the DAF prepared a programmatic Biological Assessment (PBA) to assess the continued operations and programs that occur at Nellis AFB over a 10-year period beginning with the issuance of the final PBO by the USFWS (Nellis AFB, 2023e). The Proposed Action in this EA was evaluated in the PBA and included in the final PBO issued by the USFWS September 2023 (**Appendix B**). The Proposed Action in this EA is identified in the PBA and PBO as the "Rapid Airfield Damage Repair Regional Training School (RADRRTS) Expansion and Training Activities" and is part of the Facilities Program in the PBO. The PBO establishes the maximum number of acres (i.e., adverse effect thresholds or limits) of desert tortoise habitat that may be affected by each program. At the time the PBO was issued, it was estimated that the RADRRTS may result in the disturbance of approximately 115 acres of suitable Mojave desert tortoise habitat. However, the combined PBO Mojave desert tortoise habitat disturbance limit for the Facilities Program is 1,395 acres, of which 1,300 acres can be new, permanent disturbance and up to 95 acres of new, temporary disturbance (**Appendix B**). Although the 143 acres of Mojave desert tortoise habitat disturbance for the Proposed Action would be greater than the initial estimate of 115 acres, the total permanent disturbance would still be within the 1,300-acre total permanent disturbance limit set in the PBO for the Facilities Program (**Appendix B**).

The PBO also establishes take limits for the Facilities Program. Ten tortoises per year can be moved out of harm's way (i.e., non-injury/non-mortality capture). Two detected injuries or mortalities of tortoises may occur incidental to the proposed activities. Exceeding these limits would require reinitiation of Section 7 consultation with the USFWS. Nellis AFB would implement all the terms and conditions, conservation measures, and reporting requirements specified in the PBO. These environmental protection measures, identified in **Appendix B**, would ensure that potential impacts to desert tortoises and their habitat would be minimized. Implementation of the environmental protection measures would preclude requirements for further consultation for this Proposed Action under Section 7 of the ESA.

A tortoise inspection would be conducted prior to construction. The inspection would include all areas within and adjacent to construction sites, including access routes, staging areas, disposal/stockpile sites adjacent to and in the construction sites (including any off-road areas), and in irrigation pipes, ditches, culverts, and other habitat features.

Migratory Birds

Approximately 151 acres of habitat used by a variety of migratory bird species would have the potential to be lost from development of the Proposed Action. Bird species that use the ROI would be displaced to other habitats, but survival and nesting success would depend on whether suitable habitat and nesting territories are available. The MBTA makes it unlawful to take migratory birds or their parts, nests, or eggs. To avoid potential take of migratory birds, nests, or eggs, ground clearing would be conducted outside the nesting season (March 1 through July 31) if practicable, or a preconstruction survey would be conducted during the nesting season (BLM, 2024). If nests are found, an appropriately sized buffer area would be established around the nest until the nesting attempt is completed. If no nests are found, land clearing would proceed within a designated timeframe following the survey. Birds designated as SGCN by the state of Nevada that are known to occur in the area and would have the potential to be displaced during project implementation include the American kestrel, common nighthawk, Le Conte's thrasher, long-billed curlew, and sagebrush sparrow. The impact on SGCN bird species would be expected to be minor and long term. The population size of these species in the ROI is not known, but breeding and nesting habitat would be lost for some individuals.

The western burrowing owls occur on Nellis AFB north of the ROI. As described in **Section 3.8.2.3**, burrowing owls located near the Sunrise Vista Golf Course were relocated in 2023 to artificial burrows in the northern part of Area II, north of the ROI. No burrowing owls or their burrows were observed in the ROI during the desert tortoise surveys in October 2024. Prior to clearing of vegetation, preconstruction surveys would be conducted to confirm the presence or absence of migratory birds, including burrowing owls. No impacts to western burrowing owls would be anticipated from implementation of the Proposed Action.

Invasive Species

Invasive species and noxious weeds were not abundant in the areas surveyed on October 2024. However, with the grading of the Proposed Action area, bare soil may provide conditions favorable to the establishment of invasive species such as Russian thistles and noxious weeds. During construction, crews would adhere to BMPs to minimize invasive species establishment. Potential BMPs include:

- Clean and inspect all equipment before being brought on site to avoid dispersal of non-native invasive species.
- Monitor and control invasive plant species.

The Proposed Action may have minor and long-term effects on the establishment of invasive and noxious weed species.

3.8.3.3 No Action Alternative

Under the No Action Alternative, the proposed combat support training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness requirements. There would be no changes to biological resources in the ROI beyond baseline conditions.

3.8.3.4 Cumulative Impacts

The Proposed Action would likely adversely affect the desert tortoise because approximately 151 acres of wildlife habitat, including 143 acres of potential tortoise habitat, would be developed with implementation of the Proposed Action. The projects identified in **Table 3-1** would also result in impacts to biological resources at Nellis AFB. Impacts to biological resources from Nellis Master Plan and installation development projects would result in the loss of approximately 1,000 acres of desert tortoise habitat immediately south of the

Proposed Action area. The 2023 PBO allows for cumulative take of up to 1,395 acres of desert tortoise habitat between the Facilities Program projects identified as the Nellis Master Plan and installation development projects and the projects under the Proposed Action. The cumulative desert tortoise habitat impact would be approximately 1,143 acres, which would be below the allowable acreage impacts to desert tortoise habitat.

Cumulative impacts to creosote bush-burrobush bajada and valley desert scrub alliance would be minor, adverse, and long term because this vegetation alliance is relatively abundant on Nellis AFB and in the Mojave Desert. The east-side development of Nellis AFB would disturb approximately 56 percent of Parry's saltbush wet shrubland alliance on Nellis AFB. The approximately 36.2 acres of Parry's saltbush wet shrubland alliance that would be disturbed by the Proposed Action would result in a minor (an additional 2.8 percent), adverse, and long-term cumulative impact. Cumulative impacts to the Mojave rabbitbrush Mojave Desert wash scrub alliance would be minor and long-term because a relatively small amount of cumulative acres (approximately 22 or 6.4 percent) would be disturbed.

The loss of approximately 151 acres of wildlife habitat from implementation of the Proposed Action would result in a moderate, adverse, and long-term cumulative impact to wildlife from the loss of approximately 1,000 acres of desert tortoise habitat from the east-side development of Nellis AFB. The projects listed in **Table 3-1** would result in long-term, minor, adverse impacts to biological resources because construction associated with these projects would occur primarily within previously disturbed or developed areas. When considered in conjunction with the Proposed Action, implementation of the projects identified in **Table 3-1** would result in long-term, adverse impacts to biological resources due to the removal of large areas of native vegetation.

3.9 CULTURAL RESOURCES

3.9.1 Definition of the Resource

Cultural resources are prehistoric and historic sites, structures, artifacts, and any other evidence of a particular culture or community. They include archaeological resources, historic architectural resources, and traditional cultural properties. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Historic architectural resources include standing buildings and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered eligible for National Register of Historic Places (NRHP) inclusion. However, structures less than 50 years may be considered for inclusion if shown to have historical significance, such as Cold War-era properties. Traditional cultural resources are associated with cultural practices and beliefs of a cultural group that are rooted in their history and maintain the community's identity. Historic properties are significant architectural, archaeological, or traditional resources that are defined as eligible for NRHP inclusion (36 CFR § 60.4).

Traditional Cultural Properties (TCPs) include land areas, sites, or resources associated with the cultural practices or beliefs of a present-day community (cultural group). TCPs could be plants, objects, raw material, archaeological resources, location of significant events, or hunting areas. These items link a community with its past and help to maintain the present-day cultural identity. TCPs may be eligible for NRHP inclusion.

Due to present-day community importance, the DoD American Indian and Alaska Native Policy emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. The policy requires consultation with federally recognized tribes associated with a proposed action location to assess effects prior to making decisions. DoDI 4710.02, *DoD Interactions with Federally Recognized Tribes* (September 2018), implements DoD policy, assigns responsibilities, and provides procedures for DoD interactions with federally recognized tribes in accordance with its American Indian and Alaska Native Policy and other DoD Directives. Additionally, DAFI 90-2002, *Interactions with Federally Recognized Tribes* (August 2020), provide guidance for installations to ensure compliance.

EO 13007, *Indian Sacred Sites*, defines sacred sites as any specific, discrete, narrowly delineated location on federal land that is identified by a Native American tribe or individual as sacred by virtue of its established religious significance to or ceremonial use by a Native American religious and identified as such to the land managing agency. EO 13007 also requires federal agencies to accommodate access to, and ceremonial use of, sacred sites by Native American religious practices and to avoid adversely affecting their integrity.

3.9.1.1 Regulatory Setting

Federal laws protecting cultural resources include the *Archaeological and Historic Preservation Act of 1974* (54 USC §§ 312501–312508), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm) (ARPA), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC §§ 3001–3013), the *National Historic Preservation Act* (54 USC § 30010 et seq.) (NHPA) and its implementing regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to making a decision or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized American Indian tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1(a)).

In accordance with Section 106 of NHPA, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO. Section 106 also requires that federal agencies give the Advisory Council on Historic Preservation a “reasonable opportunity to comment” on proposed actions. Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated under the NRHP criteria. Properties that are either listed on or eligible for listing on the NRHP are provided the same measure of protection under Section 106. Representatives of both the Nevada SHPO and the Advisory Council on Historic Preservation have been involved with ongoing consultation regarding the potential impacts of the Proposed Action and Alternatives on historic properties and mitigation procedures for potential adverse effects.

Not all cultural resources qualify as “historic properties”; i.e., those properties eligible for inclusion on the NRHP. The following criteria have been established as guidance for evaluating potential entries to the NRHP (36 CFR § 60.4). “Significance” in American history, architecture, archaeology, and culture is granted to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that meet at least one of the following criteria:

- an association with events that have made a significant contribution to the broad patterns of history (Criterion A);
- an association with the lives of persons significant in history (Criterion B);
- embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguished entity whose components may lack individual distinction (Criterion C); or
- have yielded, or may likely yield, information important in prehistory or history (Criterion D).

Generally, architectural resources must be more than 50 years old to be considered for inclusion on the NRHP. More recent structures must meet a higher level of exceptional significance to be considered NRHP-eligible (Criterion Consideration G). DoD structures of the Cold War-era (1946–1989) are evaluated under explicit guidance of National Park Service Bulletin 22.

EOs have been issued to ensure federally recognized tribes are consulted. EO 12875, *Enhancing the Intergovernmental Partnerships* (October 1993), and EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 2000), provide direction to improve government-to-government relations with tribes. Further, EO 13007, *Indian Sacred Sites* (May 1996), defines sacred sites as “any specific, discrete, narrowly delineated location on federal land that is identified by a Indian tribe or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.” EO 13007 also requires federal agencies “to accommodate access to and ceremonial use of Indian sacred sites to avoid adversely affecting the physical integrity of the Indian sacred sites.”

3.9.1.2 Region of Influence

For the purposes of cultural resources analyses, the ROI for cultural resources is considered equivalent to the Area of Potential Effects (APE), as defined by 36 CFR § 800.16(d): the "geographic area or areas within which an undertaking (project, activity, program, or practice) may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist," and thereby diminish their historic integrity. The terms "direct effect" and "indirect effect" are not defined in the NHPA nor in the Section 106 regulations. In March 2019, the District of Columbia circuit court issued an opinion that clarified the meaning of the term "directly" in Section 110(f) (US Court of Appeals, 2019). The opinion in National Parks Conservation Association v. Semonite concluded that:

> "…the meaning of the term 'directly' in Section 110(f) refers to the causality, and not the physicality, of the effect. This means that if the effect comes from the undertaking at the same time and place with no intervening cause, it is considered 'direct' regardless of its specific type (e.g., whether it is visual, physical, auditory, etc.). 'Indirect' effects are those caused by the undertaking that are later in time or farther removed in distance but are still reasonably foreseeable."

In other words, direct effects are not limited to those physical in nature. Visual, auditory, and atmospheric effects may be considered "direct effects" depending on the specific circumstances of each undertaking. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking.

The physical APE for the Proposed Action includes the approximately 205-acre CSTR footprint (**Figure 3-7**) as well as the 8-mile driving course, including the 50 ft buffer on both sides of the road. The visual APE includes a 0.5-mile radius of the CSTR footprint, which also incorporates the radius of atmospheric, auditory, and cumulative effects. This APE has yet to be reviewed and confirmed by SHPO, and this EA will be updated, as necessary, upon issuance of guidance by SHPO. In accordance with NHPA Section 106, the DAF is consulting with the Nevada SHPO, federally recognized tribes, and other agencies regarding definition of the APE and its determination of effects.

3.9.2 Existing Conditions

Nellis AFB has an Integrated Cultural Resources Management Plan (ICRMP) that provides direction for the protection and management of cultural resources on the installation in compliance with the NHPA and other legal requirements (Nellis AFB, 2019c) and describes cultural surveys undertaken by Nellis to identify historic properties. In addition to review of the ICRMP, information on cultural resources and surveys within the APE was acquired by searching the Nevada SHPO's Nevada Cultural Resources Inventory System.

3.9.2.1 Historic Architectural Resources

To date, 43 buildings and structures of historic age (or within the installation's period of historical significance) have been identified within the visual APE. Of these resources, 36 buildings and structures have been determined not eligible for listing in the NRHP. Seven buildings and structures are unevaluated and, for the purposes of this EA, are considered eligible (**Table 3-11**). Four historic buildings or structures are located within the physical APE—two that have been determined not eligible for listing in the NRHP and two that are unevaluated.

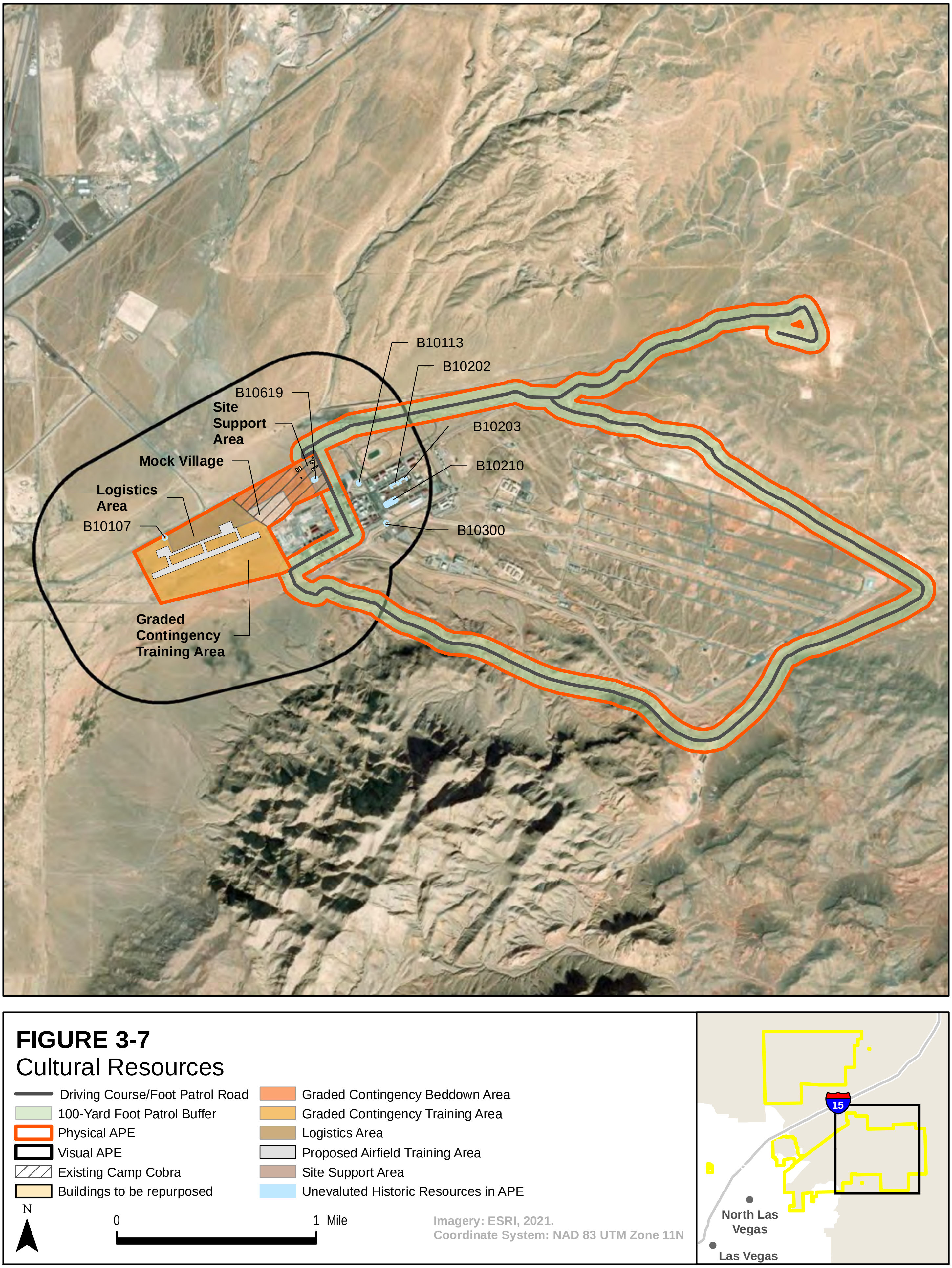

B10113
B10202
B10619
Site Support Area
B10203
Mock Village
B10210
Logistics Area
B10107
B10300
Graded Contingency Training Area
FIGURE 3-7
Cultural Resources
Driving Course/Foot Patrol Road
100-Yard Foot Patrol Buffer
Physical APE
Visual APE
Existing Camp Cobra
Buildings to be repurposed
Graded Contingency Beddown Area
Graded Contingency Training Area
Logistics Area
Proposed Airfield Training Area
Site Support Area
Unevaluted Historic Resources in APE
N
0
1 Mile
Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N
15
North Las Vegas
Las Vegas

Table 3-11
NRHP-Eligible, Potentially Eligible, and Unevaluated Architectural Resources within the APE

Bldg. No.	Name	NRHP Status	APE
10107	Nellis, BLDG 10107, Water Pump Station	Unevaluated	Physical
10113	Nellis, BLDG 10113, Water Pump Station	Unevaluated	Visual
10202	Nellis, BLDG 10202, Special Operations	Unevaluated	Visual
10203	Nellis, BLDG 10203, Special Operations	Unevaluated	Visual
10210	Nellis, BLDG 10210, Heating Plant	Unevaluated	Visual
10300	Nellis, BLDG 10300, Entry Control Building	Unevaluated	Visual
10619	Nellis, BLDG 10619, Operations Support Shed	Unevaluated	Physical

Source: Nellis AFB Real Property and Cultural Resources
APE = Area of Potential Effect

Four historic architectural studies have been completed within the APE (**Table 3-12**).

Table 3-12
Architectural Surveys Conducted within the APE

Report Number	Report Author(s)	Report Name	Year
Pending	Edmiston, Kelly, Ashley Konoske Wiley, et al.	Desktop Architectural Assessment for Unidentified National Register of Historic Places Historic Districts at Area II and Area III, Nellis Air Force Base, Clark County, Nevada	2024
24132	Edwards, Erin	Historical Building Inventory of Nellis AFB, Creech AFB, and Nevada Test and Training Range, Las Vegas, Nevada	2018
20297	Edwards, Susan	Documentation Regarding Nine Demolished Buildings at Nellis and Creech Air Force Bases, Clark County, Nevada	2015
19822	JRP Historical Consulting, LLC	Survey and Evaluation of 121 Buildings at Nellis Air Force Base, Clark County, Nevada	2014

Source: Nevada Cultural Resources Inventory System
APE = Area of Potential Effect

3.9.2.2 Archaeological Properties

To date, 31 archaeological sites have been identified within the APE as a result of seven archaeological surveys covering the entirety of the physical APE (**Table 3-13**). Of these sites, 30 have been determined not eligible for NRHP listing or non-contributing to the eligibility of larger, linear sites (with SHPO concurrence). One site (26CK4984) within the physical APE (in the foot patrol buffer) has been determined eligible for listing in the NRHP (**Table 3-14**).

Table 3-13
Archaeological Surveys Conducted within the APE

SHPO Report Number	Report Author(s)	Report Name	Year
34541	Toussaint, M., and J. Roberson	Archaeological Inventory and Evaluation of 1,000 Acres on the Nellis Air Force Base, Clark County, Nevada	2023
34386	Younie et al.	Class III Archaeological Inventory for the Fence-to-Fence Environmental Services at Nellis Air Force Base, Clark County, Nevada	2022
23535	Smith, Lisa M.	Nellis Air Force Base: Section 110 Archaeological Survey, Area II, Clark County, NV	2017
13137	Lawrence et al.	Nellis Air Force Withdrawal Lands, Clark County, Nevada	1999
MISC62	Bergin, Kathleen A.	Archaeology of Areas II and III, Nellis Air Force Base, Clark County, Nevada	1995
11366	Peter, Duane E.	Report of Negative Findings for Additional Survey of Area II Wastewater Service Area Sewer Line, Nellis Air Force Base, Nevada	1992
13296	Hatoff, Brian W.	#N-7262, Nellis AFB Withdrawal of BLM lands	1975

Source: Nevada Cultural Resources Inventory System
APE = Area of Potential Effect

Table 3-14
NRHP-Eligible and Unevaluated Archaeological Resources within the APE

Site No.	Temporal Affiliation	Description	NRHP Status	APE
CK4984	Precontact	Lithic quarry and reduction site	Eligible	Physical

Source: Nevada Cultural Resources Inventory System
APE = Area of Potential Effect

3.9.2.3 Traditional Cultural Properties

Sixteen federally recognized Native American tribes have historical ties to Nellis AFB and the surrounding area. To date, no TCPs have been identified within the APE. In accordance with NHPA Section 106, the DAF consulted with federally recognized tribes regarding definition of the APE and its determination of effects. Tribal consultation correspondence can be found in **Appendix A**.

3.9.3 Environmental Consequences

3.9.3.1 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 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 alter its setting or feeling;
- neglects the resource to the extent that it deteriorates or is destroyed; and/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 would be considered significant if it alters the integrity of a NRHP-listed, -eligible, or potentially eligible resource or would have the potential to impact TCPs.

3.9.3.2 Proposed Action

Architectural Properties

There are seven unevaluated historic architectural resources within the APE for the Proposed Action, two of which are within the physical APE (see **Table 3-14**). Until these resources are evaluated for NRHP eligibility, they are considered eligible. Adverse physical effects to historic architectural resources would have the potential to occur if the unevaluated archaeological resources within the physical APE were determined to be eligible for listing in the NRHP and were not avoided during ground-disturbing activities. The Proposed Action would not include demolition of or physical modifications to either of the two unevaluated architectural resources within the physical APE. Therefore, the Proposed Action is unlikely to cause adverse physical effects to architectural resources within the physical APE. A precise layout for the CSTR has not been determined, and potential direct, minor, adverse physical effects could occur if either of the two unevaluated architectural resources within the physical APE were determined to be eligible for listing in the NRHP and were not avoided during ground-disturbing activities.

Adverse visual effects to historic architectural resources would have the potential to occur from introduced visual or audible elements from development of the Proposed Action that are out of character with historic architectural resources that alter their setting or feeling. Adverse visual effects would have the potential to occur if unevaluated architectural resources within the visual APE were determined to be eligible for listing in the NRHP and had visual modifications that alter their setting or feeling. The projects included in the Proposed Action are military in nature and would be in character with the surrounding built environment. Therefore, the Proposed Action is unlikely to cause an adverse visual, auditory, or atmospheric effect to architectural resources within the APE. A precise layout for the CSTR has not been determined, and potential direct, minor, adverse visual effects could occur if any of the seven unevaluated architectural resources within the APE were determined to be eligible for listing in the NRHP and were altered to be out of character for their architectural setting during project development. Nellis AFB will continue to consult with the SHPO on potential effects and determine whether mitigation measures would be necessary.

Archaeological Properties

There is one NRHP-eligible archaeological site (CK4984) within the physical APE for the Proposed Action, which could be subject to physical effects with implementation of the Proposed Action. The only physical impacts to which site CK4984 may be subject would be from occasional foot patrols. Most of the site is outside of the foot patrol buffer. Nellis AFB will continue to consult with the SHPO on potential effects and determine whether mitigation measures would be necessary.

Traditional Cultural Properties

To date, there have been no TCPs identified within, or associated with, the APE. Therefore, implementation of the Proposed Action would be anticipated to result in no effects to TCPs in the ROI. Work would be conducted in accordance with the ICRMP, including procedures for inadvertent discovery of archaeological resources. If artifacts, features, or structural remains are discovered, during but not exclusive to mission actions, personnel would implement the following BMPs (Nellis AFB, 2019c):

- Immediately cease activities at the archaeological resource and make efforts to ensure protection until arrival of the CRM.
- Mark the resource to provide an efficient relocation, making effort to minimize the types of signs that would attract personnel and thus placing the resource in danger.
- Leave artifacts in place; it is illegal to collect or disturb archaeological materials under ARPA.
- Notify the CRM (99 DES/CES 702-652-5813 or 6828) within 24 hours of the discovery.
- Be available to assist in relocating the resource.

3.9.3.3 No Action Alternative

Under the No Action Alternative, the proposed combat support training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness requirements. There would be no changes to cultural resources in the ROI beyond baseline conditions.

3.9.3.4 Cumulative Impacts

The Proposed Action would have the potential to result in minor, direct, adverse visual and physical effects to cultural resources at Nellis AFB, depending on the results of ongoing SHPO consultation. The projects listed in **Table 3-1** involve construction of additional facilities, parking, structures, and/or other impervious surfaces within the visual and physical APE for the Proposed Action. Construction projects have the most potential to physically disturb archaeological sites and historic buildings. Renovation most often impacts architectural resources, infrastructure development poses physical and environmental threats to all historic properties, if present, and demolition is most likely to affect historic buildings and the historic landscape.

Implementation of the Nellis Master Plan and installation development projects would be anticipated to result in direct, adverse, visual impacts to cultural resources. The Red Flag Historic District and the Thunderbirds Hangar would have the potential to result in direct visual effects as a result of new construction within their viewshed. Consultation with the Nevada SHPO would occur on a project-by-project basis prior to beginning construction.

Completed MILCON projects at Nellis AFB constructed within the viewshed of historic properties resulted in adverse, direct, visual effects to cultural resources.

Several cultural resources would be adversely affected by proposed construction, renovation, infrastructure, and demolition projects evaluated in the Nellis IDP EA, including demolition of the Lomie Heard Elementary School, an NRHP-eligible historic district. Nellis AFB and the Nevada SHPO signed a Memorandum of Agreement for demolition of the district that stipulates required mitigation measures for the action. Other proposed projects evaluated in that EA would continually directly and indirectly impact cultural resources.

None of the seven unevaluated buildings or the one eligible archaeological resource would be impacted by the other planned projects. Additionally, any cumulative visual effects would be consistent with a military environment and any permanent construction would adhere to installation facilities standards. When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Nellis AFB, no adverse cumulative effects to cultural resources would be anticipated to occur with implementation of the Proposed Action.

3.10 NOISE

3.10.1 Definition of the Resource

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Noise is generally described as unwanted sound. Unwanted sound can be grounded in objectivity (e.g., hearing loss or damage to structures) or subjectivity (e.g., an individual's level of tolerance or annoyance to different sounds). Noise events elicit varying responses within a population or area based on the activity generating noise and its perceived importance and related factors, such as setting, time of day, exposure period or duration, and receptor sensitivity. In addition to humans, noise may also affect wildlife as indicated by behavioral changes during nesting, foraging, migration, or other life-cycle activities (USEPA, 1978).

Noise and sound levels are expressed in logarithmic units measured by decibels (dB). A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. 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. For example, environmental noise measurements usually employ an "A-weighted" scale, denoted as dBA, that de-emphasizes very low and very high frequencies to better replicate human sensitivity.

In accordance with DoD guidelines and standard practice for environmental impact analysis documents, the noise analysis herein uses the Day-Night Average Sound Level (DNL) and the Onset-Rate Adjusted DNL. DNL is a cumulative measure of multiple flight and engine maintenance activities throughout an average year.

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 (USEPA, 1974).

The ROI for noise is Nellis AFB.

3.10.2 Existing Conditions

The goal of the AICUZ program at Nellis AFB is to protect the health, safety, and welfare of individuals living or working near the military installation, while maintaining the DAF's operational mission. The program recommends operational noise levels be incorporated into local community planning decisions to minimize impacts to residents. The AICUZ study at Nellis AFB was updated in 2017 and represents an accurate depiction of the aircraft activities through 2024. The AICUZ allows the neighboring communities to take a long-range view in land use planning surrounding the installation (DAF, 2017a).

Aircraft operations are the primary source of noise associated with Nellis AFB. The level of noise exposure relates to a number of variables, including the aircraft type, engine power setting, altitude flown, direction of the aircraft, flight track, temperature, relative humidity, frequency, and time of operation (day/night). Aircraft assigned to Nellis AFB include the A-10 Thunderbolt, F-15 Eagle, F-16 Fighting Falcon, F-22 Raptor, F-35A, C-12 Huron, and the HH60G Pave Hawk helicopter. Aircraft that are not permanently assigned but conduct operations from the installation on an occasional basis are referred to as transient aircraft. Transient aircraft include the F/A-18 Super Hornet, KC-135 Stratotanker, C-130 Hercules, B-1 Lancer, B-2 Spirit, and the B-52 Stratofortress.

Multiple variables contribute to the overall noise environment surrounding Nellis AFB, including aircraft type, engine power settings, altitude, direction, temperature, humidity, and time of day. The airfield is located in the center of Area I and is generally aligned southwest to northeast. It includes aircraft hangars for maintenance and storage, aircraft parking ramps and taxiways, two hard-surface runways, assorted office buildings, munitions storage areas, and support facilities such as hush houses (buildings specifically designed to muffle engine noise) for engine run maintenance. Maintenance is also an integral part of any flying operation, and it requires a dedicated team of professionals to ensure that units can meet flying schedule requirements. Two key tasks in maintaining aircraft are low- and high-powered engine maintenance runs. Engine runs may be conducted at any power setting between idle and maximum power. The noise associated with these maintenance operations also contributes to the overall noise environment at Nellis AFB.

The DAF has established a program with the goal of reducing noise and vibrations from military aircraft, weapons systems, and munitions. The Nellis AFB Noise Abatement Program contains strategies, techniques, and procedures that have been put in place that help to protect people and structures from harmful effects of noise and vibration. Aircraft departing the installation expedite their turns and climbs after takeoff for noise abatement and to avoid populated areas around the installation (Nellis AFB, 2018). Leadership evaluates flight operations and practices periodically as well as complaints from public use areas. Being located away from main public areas, Nellis AFB has limited the number of noise complaints (DAF, 2017a).

Per AFI 32-1015, *Integrated Installation Planning* (as amended 4 January 2021), Nellis AFB models its noise exposure using the NOISEMAP suite of computer programs containing the core computational programs called “NMAP” version 7.3 and “MRNMap” version 3.0 for environmental analysis of aircraft noise. These programs generate noise planning contours, or levels, to inform future land development. These noise levels are based on the best available estimates of future mission needs and anticipated aircraft life cycles. These levels are represented in 5-decibel (dB) increments surrounding the Nellis AFB airfield, as shown in **Figure 3-8**, and reflect anticipated aircraft operations in the year 2024 (DAF, 2017a). The DAF uses the DNL to describe the cumulative noise exposure that results from all aircraft operations. DNL is a standard noise metric created by USEPA to describe the effects of noise on humans. This metric represents long-term exposure to noise and not on an individual occurrence.

3.10.3 Environmental Consequences

3.10.3.1 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 and/or annoyance; and
- the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source.

Adverse impacts to the noise environment would occur if the Proposed Action causes increases in the ambient noise environment within the ROI. The impacts would be considered significant if they cause long-term noise outside of the recommended noise limits for land use planning as outlined in Air Force Handbook 32-7084, *AICUZ Program Manager’s Guide*. 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.

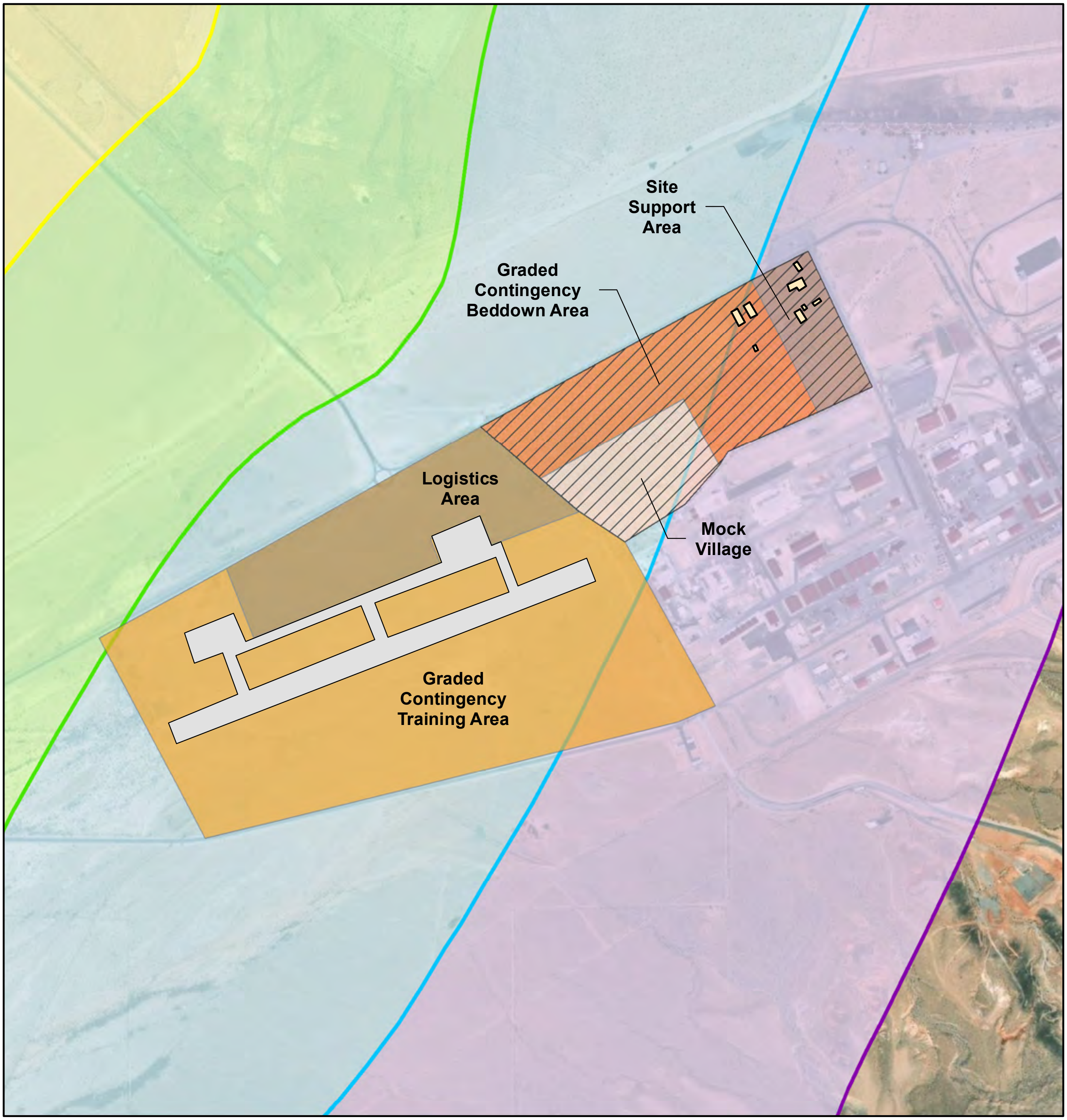


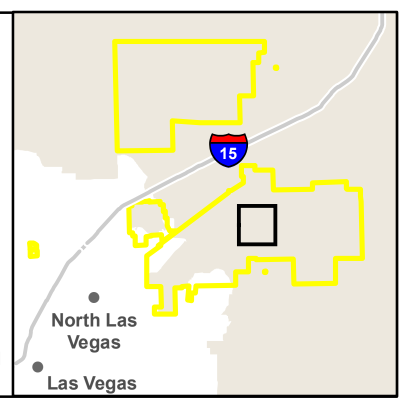
FIGURE 3-8
Noise

Existing Camp Cobra
Buildings to be repurposed
Graded Contingency Beddown Area
Graded Contingency Training Area
Logistics Area
Mock Village
Proposed Airfield Training Area
Site Support Area
60 db
65 db
70 db
75 db

N

0 0.25 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



3.10.3.2 Proposed Action

The Proposed Action would result in temporary noise increases during construction activities. Construction of the training facilities, the mock training airfield, the foot patrol path, and repairs to the driving course would require machinery that would temporarily introduce noise to the environment. Noise associated with the operation of construction equipment is generally short term, intermittent, and localized. The analysis in this EA uses A-weighted decibel (dBA) metrics to provide a weighted scale for judging loudness that corresponds to the hearing threshold of the human ear. A-weighting accounts for the frequency sensitivity of the human ear. The loudest machinery typically produces peak sound pressure levels ranging from 86 to 95 dBA at a 50-foot distance from the source (**Table 3-15**).

Table 3-15
Peak Sound Pressure Level of Construction Equipment from 50 Feet

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

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

All construction associated under the Proposed Action would occur within the installation's boundaries and would be intermixed with other existing noise-compatible activities, such as military training and aircraft operations. As a result of the existing ambient noise environment, construction noise would not be anticipated to be noticeably louder than background noise levels.

Adherence to standard DAF Occupational Safety and Health regulations that require hearing protection along with other personal protective equipment and safety training would minimize the risk of hearing loss to construction workers. Activities on military installations are not subject to local noise ordinances. Individuals on the installations, such as military personnel and government contractors living and working near the sites, might notice the noise. In addition, a limited number of delivery trucks and worker vehicles would be audible along nearby roadways as they arrive at and depart from the sites. Given the temporary nature of proposed construction activities, distance to nearby noise-sensitive areas, and existing noise environment, these effects would be anticipated to be negligible.

Operation of the facilities under the Proposed Action would not result in significant impacts to the existing noise environment. Associated operational activities would result in intermittent noise that would be indistinguishable from the noise generated by ongoing aircraft operations. Noise would be introduced to the existing environment through RADR training operations. A large focus of the RADR training would be to train personnel on rapid repair of runways damaged under combat-simulated conditions. Both damaging and repairing the runways would be anticipated to result in intermittent noise. These training operations would be limited to the proposed mock airfield and would be infrequent, at up to 12 RADR trainings annually. The proposed mock airfield is 1.4 miles from the closest boundary of Nellis AFB to the north, Las Vegas Boulevard. No noise-sensitive receivers are located within the project vicinity, and the existing 65 dB noise contour that originates from the Nellis AFB airfield encompasses the Proposed Action area. The driving course would be constructed along an existing gravel road, and vehicle noise during future operations would be expected to be similar to current conditions. The operation of the foot patrol path would not contribute measurably to the noise environment.

No observable long-term impacts or operational increases in noise would be expected to occur with implementation of the Proposed Action; existing noise contours would be unaffected.

3.10.3.3 No Action Alternative

Under the No Action Alternative, the proposed combat support training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all

CONUS installations and would continue to lack the capacity to meet combat support readiness requirements. There would be no changes to the noise environment in the ROI beyond baseline conditions.

3.10.3.4 Cumulative Impacts

Implementation of the Proposed Action would be anticipated to result in short-term, negligible impacts to the noise environment during construction activities and would have no significant impact on the long-term noise environment at Nellis AFB. The projects listed in **Table 3-1** involve the addition or modification of airframes and aircraft training operations within the ROI—the area covered by the Nellis AFB AICUZ program.

The TASS beddown, Nellis Aggressor beddown, and CCA EOU beddown involve modifications to aircraft composition and operations, which are the primary sources of noise at Nellis AFB. New aircraft and additional sorties have the potential to increase noise and expand the footprint of the noise planning contours on the timeline evaluated in each respective environmental document; the potential impacts to the noise environment have been incorporated into planning documents. The existing Nellis AFB AICUZ noise contours include anticipated actions at the installation through the year 2024. Future projects that could alter the composition of airframes operating out of Nellis AFB would have the potential to alter these planning guidelines. These changes would need to be accounted for in the next iteration of AICUZ documentation and would have the potential to result in changes to the existing noise contours.

Installation development actions under the Nellis IDP EA, MILCON projects, Nellis Master Plan and installation development projects, Nellis Reclaimed Waterline Project, and CCRFCD flood control utility projects would not be anticipated to result in significant impacts to noise from construction and demolition. Construction and demolition activities would result in short-term, temporary noise impacts, and operation of the new facilities would not be anticipated to alter the overall noise environment.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Nellis AFB, no significant cumulative effects to the noise environment would be anticipated to occur with implementation of the Proposed Action.

3.11 Hazardous Materials and Wastes, Toxic Substances, Petroleum Products, and Contaminated Sites

3.11.1 Definition of the Resource

Hazardous materials (HAZMAT) and hazardous wastes, toxic substances, and petroleum products are substances that, when released into the environment or handled incorrectly have the potential to cause harm to human health and the environment. These substances are evaluated together under a single topic because they all have the potential to cause harm. The definition of each type of substance is nuanced and, as such, each category of substance is regulated under different federal regulations and DAF policies. A more detailed definition of each category of is presented in the following sections.

The ROI for HAZMAT, hazardous waste, toxic substances, petroleum products, and contaminated sites is the Proposed Action area.

3.11.1.1 Hazardous Materials and Wastes

The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (42 USC § 9601) (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act* (SARA) and the *Toxic Substances Control Act* (15 USC § 2601, et seq., as implemented by 40 CFR Part 761) (TSCA), defines HAZMAT as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for the enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The *Solid Waste Disposal Act*, as amended by the *Resource Conservation and Recovery Act of 1976* (42 USC § 6901) (RCRA), which was further amended by the *Hazardous and Solid Waste Amendments of*

1984, defines hazardous wastes as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of HAZMAT throughout the DAF. This manual applies to all personnel acting on behalf of the DAF who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any associated activities.

3.11.1.2 Toxic Substances

Toxic substances are substances that might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACMs), lead-based paint (LBP), radon, polychlorinated biphenyls (PCBs) and polyfluoroalkyl substances (PFAS). The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards such as locations, quantities, and conditions help in determining the significance of a proposed action.

Asbestos

AFI 32-1001, *Civil Engineering Operations*, provides the direction for asbestos management at DAF installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669, 29 CFR § 1910.1025, 29 CFR § 1926.58, 40 CFR § 61.140, CAA Section 112, and other applicable AFIs and DoD Directives. AFI 32-1001 requires bases to develop an asbestos management plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as to document asbestos management efforts. In addition, AFI 32-1001 requires installations to develop an asbestos operating plan detailing how the installation manages known existing asbestos. USEPA regulates asbestos with the authority promulgated under OSHA at 29 USC § 669. CAA Section 112 regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-Based Paint

Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the *Consumer Product Safety Act* (Public Law 101-608, as implemented by 16 CFR Part 1303), the Commission lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of LBP in nonindustrial facilities. DoD implemented a ban on LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon

The US Surgeon General defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of naturally occurring uranium inside the earth. Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. AFMAN 48-148, *Ionizing Radiation Protection*, provides direction for radon management at DAF installations. All installations must have radon assessments for structures supporting housing, child development centers, and DoD Education Activity schools. Although 4.0 picocuries per liter is considered an "action" limit, any reading over 2 picocuries per liter qualifies as a "consider action" limit. USEPA and the US Surgeon General have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls (PCBs)

PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the US until they were banned in 1979. The disposal of PCBs is regulated under TSCA, which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per DAF policy, all installations should have been free of PCBs as of 21 December 1998. In accordance with 40 CFR Part 761 and DAF policy, both of which regulate all PCB articles, PCBs are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment

TSCA regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

Per- and Polyfluoroalkyl Substances

PFAS are a group of man-made chemicals that are very persistent in the environment and have the potential to lead to adverse human health impacts. PFAS include many individual chemical compounds, the most extensively studied of these are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). These chemicals are not naturally occurring, but low levels can be found in soils, water, packaging, and many industrial and consumer products (Military Health System, 2021).

Popular for their ability to increase heat resistance and reduce friction, PFAS have been widely used since the 1950s. In the 1970s, the DoD utilized aqueous film forming foam (AFFF) for fire suppression, which contains PFOS and PFOA. PFOS is a long-chain PFAS found in older stocks of AFFF and as a breakdown product of precursor compounds. PFOA is also a long-chain PFAS. PFOA is not an intended ingredient in AFFF but is a side product created during the manufacturing process. Many AFFF formulations contain other unintended PFAS side products that have similar health and environmental concerns (Alaska Department of Environmental Conservation, 2024).

AFFF is considered mission critical for its ability to effectively extinguish petroleum-based fires. Recently, the DoD has made efforts to phase out the use of PFAS-containing AFFF and transition to PFAS-free foams currently on the market. In 2016, the USEPA recognized the potential health risks associated with PFOS and PFOA accumulations in the human body and issued a lifetime health advisory for these compounds in drinking water (Military Health System, 2021).

3.11.1.3 Petroleum Products

Section 311 of the CWA, as amended by the *Oil Pollution Act* (Public Law 101-380), defines petroleum oil as crude and refined petroleum products, such as gasoline, fuel oils, and asphalt. Uncontrolled release of petroleum products has the potential to threaten the health and wellbeing of wildlife species, botanical habitats, soil systems, and water resources.

The CWA establishes requirements to prevent, prepare for, and respond to oil discharges at specific types of facilities, including military installations. The goal of the *Oil Pollution Act* is to prevent oil from reaching navigable waters and adjoining shorelines and to contain discharges of oil. The Act established the SPCC rule under 40 CFR Part 112. The SPCC rule requires facilities with an aggregate aboveground petroleum storage capacity greater than 1,320 gallons or an aggregate underground storage capacity of 42,000 gallons to develop and implement an SPCC plan. The SPCC plan establishes procedures, methods, and equipment requirements for managing the storage, transfer, and potential release of petroleum products. These plans must be prepared by or under the supervision of a professional engineer and must be designed to prevent a release from reaching navigable waters.

Department of the DAF Manual 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. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants.

3.11.1.4 Pesticides

Pesticides, herbicides, and insecticides can be used to control pest populations. Pest management programs include measures to control health-related pests (e.g., mosquitoes, ticks and fleas, bees and wasps, scorpions, spiders, venomous snakes, lice, mites, and chiggers); structural pests (e.g., termites and powder post beetles); general household/nuisance pests (e.g., ants, cockroaches and flies); weed pests (e.g., mixed vegetation and turf diseases); vertebrate pests (e.g., bats, rodents, gophers, feral animals, coyotes, and foxes); and bird pests (e.g., pigeons). Chlordane was used as a pesticide until it was banned in 1988. It is a persistent bio accumulative and toxic pesticide that was often applied to the soil around building foundations to control termites (Agency for Toxic Substances and Disease Registry, 2018).

3.11.1.5 Environmental Restoration Program

The *Superfund Amendments and Reauthorization Act of 1986* (Public Law 99-499) (SARA) established cleanup mandates for the DoD and established the DoD Environmental Restoration Program (ERP), which comprises the Installation Restoration Program and the Military Munitions Response Program. Through the ERP, each DoD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendments under the RCRA Corrective Action Program. The ERP aims to reduce risk to human health and the environment by identifying, evaluating, and responding to a release or threat of a release into the environment from DoD activities or DoD facilities. ERP sites involve releases of hazardous substances, pollutants or contaminants, hazardous waste, and petroleum products. In accordance with DoDI 4715.07, *Defense Environmental Restoration Program* (August 2018), the ERP goals are to facilitate compliance with applicable statutes, regulations, and other legal requirements and conduct environmental restoration activities.

3.11.2 Existing Conditions

3.11.2.1 Hazardous Materials and Wastes

Activities at Nellis AFB require the use and storage of a variety of HAZMAT, including flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, and pesticides. The corresponding safety data sheets of the hazardous and toxic substances used on Nellis AFB are documented through the Installation Hazardous Materials Pharmacy.

Hazardous and toxic substances disposal procedures are identified in the Nellis AFB Hazardous Waste Management Plan (Nellis AFB, 2015), and wastes are disposed of in compliance with applicable federal, state, and local regulations. The Nellis AFB SPCC plan identifies Building 10146, which is located within the Proposed Action area, as a site for HAZMAT and hazardous waste activity (Oneida Total Integrated Enterprises, 2021).

Current activities consist predominantly of storage and administrative functions. Very little, if any, hazardous waste is generated, and bulk storage of HAZMAT does not occur on site. Small quantities of HAZMAT may be present and contained within the equipment and materials stored on site. Training activities are not expected to generate hazardous waste or use hazardous materials. The visiting troops would be trained in accordance with the Nellis SPCC, and any waste from spill response would be transported to the 90-day satellite accumulation site for proper management. ACM and LBP waste are not anticipated because activation of the training activities would not disturb existing building materials. The Nellis AFB SPCC identifies only one on-base 90-day satellite hazardous waste accumulation point. The satellite accumulation point is located in building 853 and is not within the Proposed Action area.

3.11.2.2 Toxic Substances

Toxic substances can be present in the production, use, and disposal of specific chemicals. Nellis AFB maintains operation and procedure manuals that are in accordance with regulations and guidelines specific to toxic substances. Toxic substances such as asbestos, lead, and PCBs are being phased out of common materials, no known PCBs are present but ACM and LBP are still present in some areas of the installation.

Asbestos

Many buildings on Nellis AFB date from the 1940s through the 1980s; however, the majority of the buildings currently at Camp Cobra were built after 1990, ACM has not been identified in many of these facilities (**Table 3-16**). The USEPA issued a ban on asbestos-containing products in 1989 that phased out the use of asbestos-containing building materials. Buildings constructed prior to 1989 are assumed to be asbestos-containing. There are currently seven standing buildings within the Proposed Action area. Based on the age of the structures currently standing in the ROI, Building 10112 is presumed to contain ACM.

Table 3-16
Asbestos Status of Structures within the ROI

Building #	Date Built	Status	Notes
10112	1954	PACM	Presumed to contain ACM.
10136	1989	Non-PACM	Survey may be required for renovation, including roof.
10146	1991	Non-PACM	No asbestos history, roof not tested.
10155	2007	Non-PACM	No asbestos history, roof not tested.
10157	2004	Non-PACM	No asbestos history, roof not tested.
10164	1998	Non-PACM	No asbestos history, roof not tested.
10165	2000	Non-PACM	No asbestos records, survey may be required for renovation.

Source: Nellis AFB, 2003b
PACM = presumed asbestos-containing material

Nellis AFB routinely conducts testing for asbestos and LBP regardless of the age of the building for projects requiring renovation, demolition, and maintenance. Nellis AFB civil engineering personnel review all renovation or demolition of installation structures to ensure that appropriate measures are taken to reduce potential exposure to, and release of, friable (easily crumbled or pulverized) asbestos. Renovation and demolition work performed at Nellis AFB is completed in accordance with the Nellis AFB Asbestos Management and Operations Plan (Nellis AFB, 2021), which complies with Clark County DES and National Emission Standard for Hazardous Air Pollutants standards.

Lead-Based Paint

LBP with lead levels equal to or higher than 0.06 percent or 600 ppm was banned for use in the US in 1978. As such, buildings constructed prior to that date may contain LBP. Of the seven structures that exist in the Proposed Action area, all but one were constructed after 1978. Building 10112 was reported to have been constructed in 1954 and, thus, may have LBP present.

An LBP survey was conducted in 1993 and again in 1998. While LBP was found on various components within surveyed areas, the surveys focused on the Nellis AFB housing units and did not extend to the Proposed Action area.

Renovation and demolition work performed at Nellis AFB are completed in accordance with the *Nellis AFB Lead-Based Paint Management Plan* guidelines (Nellis AFB, 2003a) and follows regulations established by Clark County Health Authority and the USEPA.

Radon

The USEPA radon zone for Clark County is Zone 3 (low potential, predicted indoor average level less than 2 picocuries per liter); however, radon potential throughout the county can vary (USEPA, 2024f). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods, such as ventilation, room pressurization, or sealing of cracks.

Radon sampling has been conducted in accordance with AFMAN 48-148 at the child developmental centers/youth program buildings over the past two years and results have confirmed low risk/exposures. Clark County is USEPA low risk (Zone 3) for radon; as such, additional sampling is at the discretion of the Installation Radiation Safety Officer in coordination with Defense Centers of Public Health-Dayton. The Installation Radiation Safety Officer has also conducted sampling at below-grade buildings on base, and current data suggests that Nellis AFB is at low risk for exceeding 0.8 working level months per year, which is the standard that would require remediation. Due to the low potential for radon within the ROI, radon is not further analyzed in this EA.

Polychlorinated Biphenyls

PCBs were commercially manufactured from 1929 until production was banned in 1979 via TSCA. Many of the products that contained PCBs have been removed from use; however, legacy equipment that contains PCBs at concentrations greater than 50 ppm are occasionally encountered.

According to a 2002 Nellis AFB Management Action Plan, transformers containing concentrations of PCBs greater than 50 ppm have been removed from the installation (Nellis AFB, 2002). A 2003 Environmental Baseline Survey completed for a different portion of Nellis AFB states that Nellis AFB has met the criteria established by the DAF as being "PCB free" (Nellis AFB, 2003b). Therefore, the seven transformers located on the Proposed Action area are considered to be "PCB free."

Per- and Polyfluoroalkyl Substances

Nellis AFB is currently undertaking an extensive study of PFAS and their past use on the installation. PFAS are known for their persistence in nature and their resistance to breaking down. PFAS are often prevalent at airports due to the use of AFFF for fire suppression.

A preliminary assessment was performed in 2015 to identify locations at Nellis AFB where perfluorinated compounds may have been released and to provide an initial assessment of possible migration pathways and receptors of potential contamination. Fire-training areas and non-fire-training areas where AFFF storage or usage may have occurred were selected for evaluation. Three fire-training areas were identified as locations with a high mass of AFFF releases and probable groundwater contamination (CH2M Hill, 2015). A further investigation on several sites selected from the 2015 survey was conducted in 2018 (Oneida Total Integrated Enterprises, 2018). The ROI was not included for the identification and evaluation of PFAS in either assessment, potentially due to a lack of AFFF storage or usage in the area. Because the ROI has not been evaluated for PFAS, the potential for PFAS/AFFF contamination cannot be ruled out.

3.11.2.3 Petroleum Products

The use, storage, and transportation of petroleum products is vital to the mission of Nellis AFB. Petroleum products are used to heat buildings and provide fuel for emergency generators, vehicles, and operation of airborne assets across the installation.

The Nellis AFB SPCC plan was prepared in accordance with Title 40 CFR 112. Operating procedures and controls for spill prevention are practiced under the guidelines of the SPCC and section 311 of the Clean Water Act. There are no ASTs or USTs located in the Proposed Action area; however, there are currently eight in-service ASTs containing petroleum products, and one out-of-service AST directly southeast of the Proposed Action area. A sewer oil-water separator is located west of Building 10136 within the Proposed Action area. Active oil-water separators on the installation undergo monthly inspections and alarm testing. The oil-water separators at Nellis AFB are not used as oil storage containers and therefore are not subject to the provisions of 40 CFR 112 (Oneida Total Integrated Enterprises, 2021).

Most of the mobile emergency generators used throughout Nellis AFB have a diesel capacity of 55 gallons or less. The quantity of mobile generators with 55 gallons or more on the installation is unknown but would be subject to the provisions of 40 CFR 112 (Oneida Total Integrated Enterprises, 2021).

3.11.2.4 Pesticide Management

The Pest Management Program at Nellis AFB utilizes an integrated surveillance and control effort as implemented by DoDI 4150.7, *DoD Pest Management Program* (December 2019), and AFMAN 32-1053, *Integrated Pest Management Program* (August 2019). Pest management procedures are addressed in the Nellis Pest Management Plan (Nellis AFB, 2000). Pest Management personnel adhere to the pesticide label directions when handling pesticides. The Pest Management personnel provide treatment for all installation buildings and housing areas. Pest Management personnel maintain and monitor files of building and home treatments, including chemicals issued by the Facilities Improvement Center, which dispenses pest control supplies to residents through a self-help program.

Soil samples collected from Nellis AFB in August 2002 were tested for pesticides. The ROI was not included in this soil investigation. However, past routine, licensed application of pesticides may have resulted in contamination of the soil within the ROI. Chlordane was formerly applied to the soil around building foundations to control termites. Entomology shop records indicate that chlordane was used at Nellis AFB between 1985 and 1988; records of usage prior to 1985 are not available. Although all uses of chlordane were banned in 1988, it is a persistent, bio accumulative (gradual accumulation of substances, such as pesticides in an organism) and toxic chemical that is still present in the soils.

Based on the age of the structures currently standing within the ROI, most of which were constructed after 1985, it is unlikely that chlordane was applied around the building foundations of the existing buildings. However, it is possible that chlordane was applied to Building 10112, which was constructed in 1954. No chlordane investigations of the soil surrounding the foundation of Building 10112 are known to have been conducted.

3.11.2.5 Environmental Restoration Program

There are 46 ERP sites at Nellis AFB. These sites include former landfills, dump areas, the former sewage treatment plant, disposal and pit areas, fuel spills, the fire-training area, radioactive waste storage, bulk jet fuel storage tanks, and USTs. Twelve sites required remediation and nine of those are still being remediated (Nellis AFB, 2018). The remaining sites require no further action.

One ERP site (LF-7) is located within the ROI. LF-7 is a former trench-type landfill located on the south side of the Proposed Action area as shown in **Figure 3-9**. LF-7 is approximately 3.06 acres in size and located entirely within the Proposed Action area. The landfill site contains waste from as early as the 1950s and in 1996 was issued a No Further Remedial Action Planned/Closed status. An Installation Restoration Program (IRP) Phase I study conducted in 1981 determined that some waste may be hazardous, but that hazardous waste was not generated at quantities sufficient for contamination. The site was not considered to present significant environmental concerns and was not reviewed during an IRP Phase II study. In 1996, Nellis AFB removed surface debris at LF-7 and graded native fill material to channel surface runoff water away from the site to meet “no further action” requirements. LF-7 is under long-term monitoring, undergoing landfill cap/cover inspections and maintenance for report submission every 5 years. There are no current land use control requirements associated with LF-7; however, the integrity of the cap/cover should remain intact (Nellis AFB, 2020a).

3.11.3 Environmental Consequences

3.11.3.1 Evaluation Criteria

Impacts from HAZMAT or hazardous wastes would be significant if the Proposed Action:

- generates, uses, or stores HAZMAT or hazardous wastes in violation of federal or state regulations; or
- exposes construction workers to increased health risks from working in existing contamination without proper training and equipment.

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.

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

- is noncompliant with applicable federal and state regulations;
- increases the amounts of hazardous waste generated or procured beyond Nellis AFB’s current waste management procedures and capacities; and/or
- disturbs or creates contaminated sites resulting in negative effects on human health or the environment.

3.11.3.2 Proposed Action

Hazardous Materials and Wastes

The use of certain HAZMAT would be required during proposed development associated with the Proposed Action; HAZMAT that could be used include paints, adhesives, welding gases, solvents, preservatives, sealants, and pesticides. Construction contractors would be responsible for monitoring exposure to HAZMAT. Adherence to the Nellis AFB Hazardous Waste Management Plan would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal HAZMAT regulations (Nellis AFB, 2015).

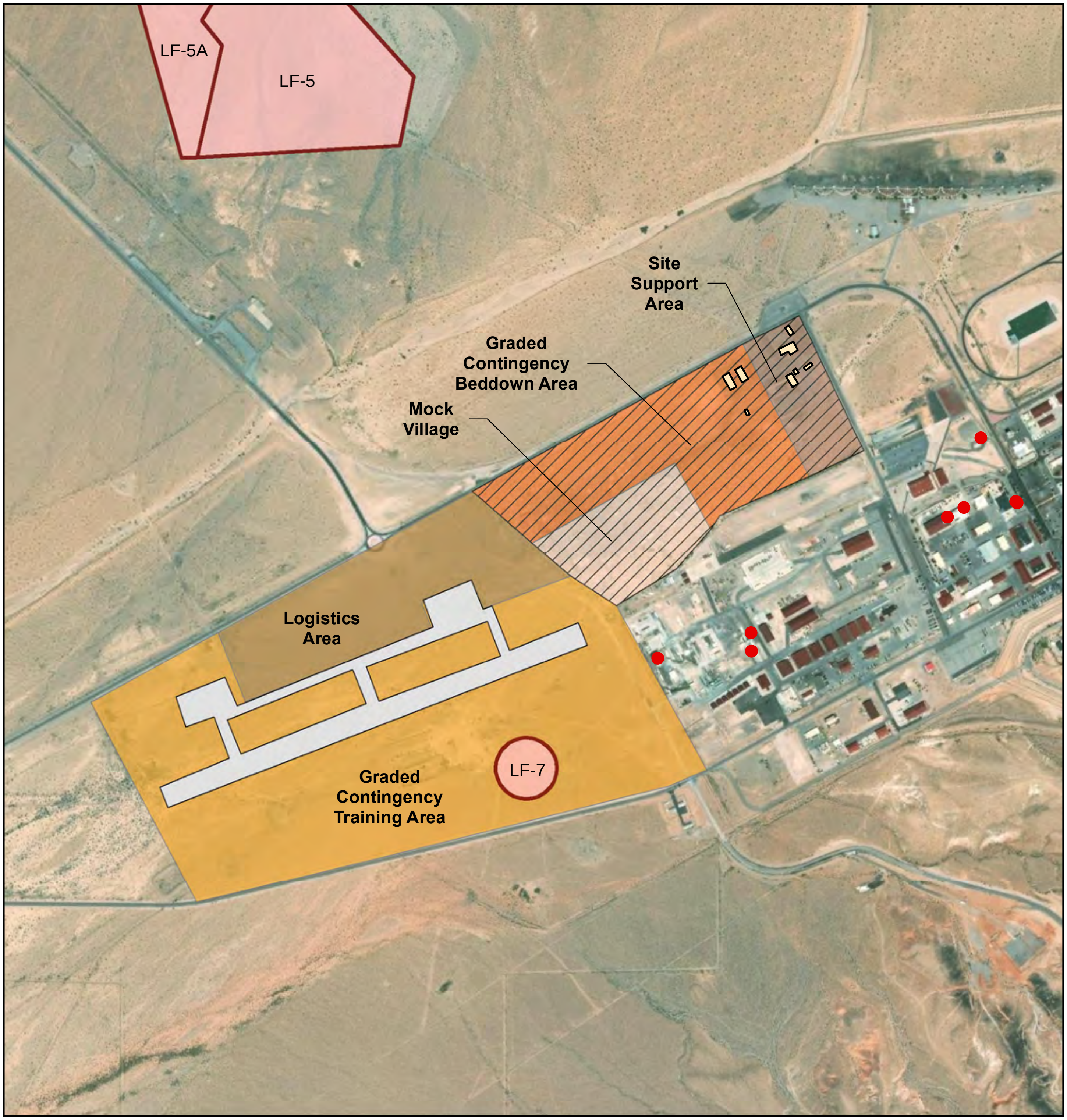


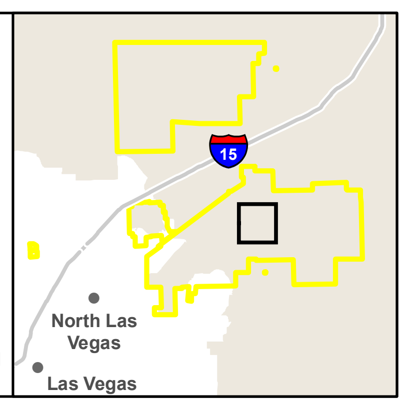
FIGURE 3-9
Hazardous Materials and Wastes

- Aboveground Storage Tank
- Existing Camp Cobra
- Buildings to be repurposed
- Environmental Restoration Site
- Graded Contingency Beddown Area
- Graded Contingency Training Area
- Logistics Area
- Mock Village
- Proposed Airfield Training Area
- Site Support Area

N

0 0.25 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N



Operation of the CSTR likely would require the use of routine HAZMAT and would produce small amounts of hazardous waste. Many of the same HAZMAT that would be used during construction of the site likely would be used for maintenance of the facility and reconfiguration of the site to suit training needs. A large focus of the training range would be to train personnel on rapid repair of runways damaged under combat-simulated conditions. The runway and associated taxiways would be constructed of a variety of different materials so that personnel could gain experience repairing various types of asphalt and concrete surfaces. Some of the materials used for runway repair, such as additives, solvents, adhesives, and paints, would be HAZMAT, and unused portions of these materials would contribute to the generation of hazardous waste at the site.

Implementation of the Proposed Action would result in short-term, negligible, adverse impacts to HAZMAT. Camp Cobra currently uses a small quantity of HAZMAT and generates a small amount of hazardous waste. Nellis AFB does not anticipate any major changes in hazardous waste generation from training operations. The visiting troops would be trained in accordance with the Nellis SPCC, and any waste from spill response would be transported to the 90-day satellite accumulation point for proper management. The satellite accumulation point is located in Building 853 and is not within the Proposed Action area. Operation of the CSTR would be conducted in compliance with the *Nellis AFB Hazardous Waste Management Plan*. Asbestos and LBP waste are not anticipated because activation of the training activities would not disturb existing building materials.

Toxic Substances

Asbestos
No buildings are slated to be demolished or renovated under the Proposed Action, as such, adverse impacts to ACM would not be anticipated to occur with implementation of the Proposed Action.

Lead-Based Paint
No buildings would be demolished under the Proposed Action, as such, adverse impacts to LBP would not be anticipated to occur with implementation of the Proposed Action.

Polychlorinated Biphenyls
PCBs would not be anticipated to be encountered within any of the existing transformers or electrical equipment on Nellis AFB under the Proposed Action. As such, adverse impacts related to PCBs would not be anticipated to occur with implementation of the Proposed Action.

Per- and Polyfluoroalkyl Substances
There are no known AFFF sites identified within the Purposed Action area. The area has not been evaluated for PFAS/AFFF; therefore, the possibility of contamination cannot be ruled out. However, as there is no known presence of PFAS within the Proposed Action area, adverse impacts related to PFAS, including PFOA and PFOS, would not be anticipated to occur with implementation of the Proposed Action.

Petroleum Products

Implementation of the Proposed Action would result in short-term, negligible, adverse impacts related to petroleum products. The Proposed Action would be anticipated to result in an increase in the amount of petroleum products used on site, as well as an increased risk of petroleum release. The use of certain petroleum products would be required during development activities associated with the Proposed Action. Hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction and grading vehicles. Construction contractors would be responsible for handing petroleum products in accordance with BMPs.

During operational activities, petroleum products would be used on site in vehicles for troop movement, heavy-equipment used in runway repair, and generators. The Proposed Action includes refueling at least a portion of the equipment on site. Refueling would be anticipated to be completed using mobile refueling techniques. As such, installation of permanent petroleum infrastructure would not be anticipated. All petroleum products used or dispensed on site would be handled in accordance with the SPCC plan. The visiting troops would be trained in accordance with the Nellis SPCC, and any waste from petroleum spills would be transported to the 90-day satellite accumulation point for proper management.

Pesticide Management

No evidence of chlordane use or other pesticide contamination was identified.

Environmental Restoration Program

Inactive demolition landfill LF-7 is located within the Proposed Action area along the southern boundary, as shown in **Figure 3-9**. Excavation or grading on LF-7 could potentially impact the integrity of the landfill cap. If grading and/or paving activities impact the integrity of the cap, Nellis AFB may need to engage with the NDEP to ascertain whether such impacts would require changes to the long-term monitoring plan and/or the composition of the cap.

Long-term, moderate, adverse impacts to the LF-7 ERP site likely would occur with implementation of the Proposed Action, requiring coordination with NDEP.

3.11.3.3 No Action Alternative

Under the No Action Alternative, the proposed combat support training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness requirements. There would be no changes to HAZMAT, hazardous waste, toxic substances, petroleum products, or contaminated sites in the ROI beyond baseline conditions.

3.11.3.4 Cumulative Effects

Implementation of the Proposed Action would be anticipated to result in short- term, negligible, adverse impacts to hazardous wastes and petroleum products and long-term moderate, adverse impacts to the LF-7 ERP. The projects identified in **Table 3-1** would have the potential to generate new hazardous wastes during construction, demolition, and renovation activities at Nellis AFB. Hazardous wastes associated with the Nellis Master Plan and installation development projects, TASS beddown, completed MILCON projects, Nellis Aggressor beddown, and Nellis IDP projects would be managed in accordance with the Nellis AFB Hazardous Waste Management Plan. Adherence to the Nellis AFB Hazardous Waste Management Plan would minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal HAZMAT regulations (Nellis AFB, 2015). Potential impacts from the accidental release of such products would be minimized by following response procedures specified in Nellis AFB’s Facility Response Plan (Nellis AFB, 2021). 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 Nellis AFB, no significant, adverse cumulative effects to HAZMAT, hazardous waste, toxic substances, petroleum products, or contaminated sites would be anticipated to occur with implementation of the Proposed Action.

3.12 Infrastructure, including Transportation and Utilities

3.12.1 Definition of the Resource

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area.

The infrastructure components include utilities, solid waste management, sanitary and storm sewers, and transportation. Utilities include electrical, natural gas, liquid fuel, potable water supply, sanitary sewage/wastewater, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population’s residential, commercial, and industrial needs. Sanitary and storm sewers (also considered utilities) include those systems that collect, move, treat, and discharge liquid waste and stormwater. Transportation is defined as the system of roadways, highways, and transit services in the vicinity of the installation that potentially could be affected by a proposed action.

The ROI for infrastructure is Nellis AFB.

3.12.2 Existing Conditions

3.12.2.1 Transportation

Nellis AFB is located northeast of the city of North Las Vegas, with Las Vegas Boulevard North connecting the installation to downtown Las Vegas. Las Vegas Boulevard North runs northeast/southwest through Nellis AFB. East Craig Road runs east/west to the western boundary of Nellis AFB, where it intersects Las Vegas Boulevard North at the Nellis AFB Main Gate. East Craig Road is also a major artery that funnels traffic from Interstate 15 (I-15) north of the installation to Las Vegas Boulevard North.

Nellis AFB has eight access control points across the installation: Main Gate, Beale South Gate, 215, Landings, Range Road, Speedway/Area II and Large Vehicle Inspection Station, Tyndale, and closed Hollywood Gate. Daily traffic on East Craig Road, Las Vegas Boulevard North, and North Nellis Boulevard is relatively heavy on weekdays, particularly during morning and evening commute times for installation personnel.

Nellis AFB has approximately 147 miles of paved roads. Intersections are controlled by stop signs (there are no traffic lights on the installation), which can cause minor traffic delays at these stopping points. Unpaved roads can be found in Areas II and III, with the majority located along the perimeter of the installation.

3.12.2.2 Electricity and Natural Gas

Nellis AFB receives most of its electricity from Nevada Energy (NVE), supplemented by hydropower from the Western Area Power Administration and two large on-base solar arrays, Nellis Solar Array (NSA) 1 and NSA 2. Western Area Power Administration provides approximately 14.3 megawatt-hours, about 11% of Nellis AFB's annual electricity needs. The 14.2-megawatt NSA 1, completed in 2007 and located in Area III, spans approximately 140 acres with roughly 72,000 solar panels. It is owned and managed by Solar Star NAFB, LLC, and Brookfield Renewable Partners. The 18.8-megawatt NSA 2, completed in 2015 and situated in Area I between the Sunrise Vista Golf Course and East Carey Avenue, covers approximately 102 acres with roughly 43,000 solar panels. NVE owns and manages this array. Together, NSA 1 and NSA 2 generate approximately 40% of Nellis AFB's annual electricity requirement, enabling the base to meet daytime peak power demands during the summer (Nellis AFB, 2020c). As part of the NSA 2 lease agreement, NVE constructed a new 22-megavolt-ampere distribution substation, named the Clinton substation, at the southwest corner of NSA 2 and extended a distribution feeder from the off-base, NVE-owned Carey Avenue substation into southern Area I. These upgrades, including the Clinton and Carey Avenue substations, enhance the resilience of the electrical distribution system, providing power to the installation even when the Northgate substation is offline for maintenance or other reasons. The Nellis AFB electrical system is robust enough to handle current and future mission requirements.(Nellis AFB, 2018).

Southwest Gas Company supplies natural gas to Nellis AFB through four delivery points: Area I, Area II, Area III, and the Michael O'Callaghan Federal Medical Center. Nellis AFB owns and maintains approximately 200,000 linear feet (40 miles) of natural gas piping downstream of the Southwest Gas delivery points. Family housing gas distribution was privatized in 2004. Facilities east of the flight line are not connected to the natural gas system. The current supply of natural gas is adequate to meet current the installation's needs (Nellis AFB, 2020c).

3.12.2.3 Liquid Fuel Storage

Jet fuel, diesel, and gasoline are delivered to Nellis AFB by the CALNEV Pipeline (owned and operated by Kinder Morgan, a company that transports petroleum). The CALNEV Pipeline moves fuel from California to Nellis AFB and Reid International Airport via a 550-mile, two-line pipe system, and provides Clark County with approximately 130,000 barrels of fuel per day (Clark County Planning Commission, 2006).

Nellis AFB manages a bulk storage system with four aboveground jet fuel tanks, containing a total of 47,400 barrels, or 1,990,800 gallons, of fuel. Nellis AFB also manages two operating storage tank facilities: the West Transient Ramp Type III Hydrant System and the Eastside Revetment modified Type III Hydrant System (Nellis AFB, 2018). The West Transient Ramp system includes two 10,000-barrel tanks with six aircraft refueling fill stands and nine aircraft fueling outlets. The West Transient Ramp facility receives fuel from the four bulk operating storage tanks (Nellis AFB, 2018). JET-A I fuel at the Eastside Revetment is provided by Kinder Morgan, from an off-installation bulk storage facility. Nellis AFB has seven combined commercial and governmental fill stations that provide unleaded, diesel, biodiesel, and JET-A products. Spill prevention, control, and countermeasures are specified in the Nellis, Creech, and Nevada Test and Training Range Facility Response Plan (Nellis AFB, 2021).

3.12.2.4 Potable Water Supply

The Las Vegas Valley gets approximately 90 percent of its water from the Colorado River. The Southern Nevada Water Authority (SNWA) provides potable water to the valley and delivers water from the Colorado River via an intake in Lake Mead to one of two treatment facilities: the Alfred Merritt Smith Water Treatment Facility or the River Mountains Water Treatment Facility. The North Las Vegas Water District (NLVWD) and SNWA connections are the primary supply to Nellis AFB. There are no current concerns regarding potable water supply from Lake Mead, and Nellis AFB currently has an adequate potable water supply to meet mission demands (Nellis AFB, 2023f). Long-term concerns due to Lake Mead's capacity do exist, as Lake Mead's water level has been at an all-time low due to record drought conditions. The combination of an ongoing drought, lower water levels in Lake Mead due to declining snowpack in the Colorado Rocky Mountains, and increased population in the Las Vegas Valley has contributed to the water level in the lake dropping to a minimum elevation of 1,040 feet in 2022 and triggering the first-ever shortage of water in the Colorado River (Bureau of Reclamation, 2023).

The Nellis AFB drinking water system provides water for domestic usage, irrigation, and fire protection. The system provides water to the entire installation excluding military family housing (Nellis AFB, 2015). Currently, the installation drinking water system consists of three supply connections (two NLVWD connections and one SNWA connection) and two active groundwater wells.

3.12.2.5 Sanitary Sewer System

The Clark County Water Reclamation District (CCWRD), a member of the SNWA, processes the wastewater generated by Nellis AFB. CCWRD governs the Clark County section of SNWA and services all areas in Clark County, collecting more than 110 million gallons of incoming wastewater per day (Lau, 2024; Nellis AFB, 2019). CCWRD's discharge connection at Nellis AFB currently takes in approximately 1.5 million gallons of installation wastewater per day. Nellis AFB's sanitary sewer system is capable of handling increased demand in the event that future expansion is required (Nellis AFB, 2020c). Septic systems are in place for areas on Nellis AFB that have remote access or no access to pipes.

3.12.2.6 Solid Waste Management

On average, Nellis AFB generates 2,704 tons of nonhazardous waste per year. Solid waste is taken by Republic Services, a solid waste collection company, to an approved landfill that has sufficient capacity to meet current and future mission demands (Nellis AFB, 2018).

3.12.3 Environmental Consequences

3.12.3.1 Evaluation Criteria

A significant impact to or from infrastructure, including transportation and utilities, within the ROI would occur if the Proposed Action results in 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; and/or
- substantial increase in utility demand relative to existing and planned regional uses.

Adverse impacts to infrastructure would occur if the Proposed Action:

- disrupts or improves the existing levels of service,
- increases energy or water consumption, and/or
- exceeds the capacity of sanitary sewer and solid waste management systems.

Adverse impacts to transportation would occur if the Proposed Action:

- substantially increases traffic that would cause a decrease in the level of service,

- substantially increases the use of the street systems or mass transit, and/or
- fails to meet on-installation parking needs.

Adverse impacts to utilities would occur if the Proposed Action:

- creates a demand that exceeds the existing supply capacity, and/or
- requires services in conflict with adopted plans and policies for the area.

3.12.3.2 Proposed Action

Transportation

Under the Proposed Action, approximately 729,000 ft^2 of grading is proposed to develop and repair semi-improved roadways in the Site Support Area, Contingency Beddown Area, Mock Village Area, Logistics Area, and Graded Contingency Training Area, and on the driving course. Approximately 70 percent of the proposed roadway grading would occur on the driving course to improve an existing 8-mile long, 12-foot-wide roadway.

The projects under the Proposed Action would occur over a 2–3-year period under a phased approach. The mock airfield would be completed within the first 6 months. Traffic levels on the installation would be anticipated to increase during construction and grading activities, with potential impacts determined by the amount of construction and grading occurring at the same time. The 820 RHS, located on-installation, would be responsible for all clearing, grading, paving, and construction associated with the Proposed Action, reducing the volume of traffic from off-site construction. Nearby Las Vegas and Nellis Boulevards, Craig Road, and I-15 would be able to accommodate the anticipated temporary increase in traffic from construction activities. Although implementation of the Proposed Action would have the potential to impact existing roadways and vehicle circulation on the installation, such impacts would be temporary and localized. Negligible, long-term, beneficial impacts would be expected to occur to transportation systems within the ROI from the improvements to roadways at the CSTR project site.

An 11,000 ft^2 Vehicle Maintenance Facility is proposed in the Site Support Area under the Proposed Action. This facility would have minor, long-term, beneficial impacts to traffic flow in the ROI by providing reduced vehicle travel to and from maintenance facilities located off the installation.

Electricity and Natural Gas

Under the Proposed Action, six facilities would be constructed within the proposed CSTR. A Vehicle Maintenance Facility and covered storage area are proposed in the Site Support Area; latrines, a laundry facility, and an expeditionary dining facility are proposed in the Contingency Beddown Area; and a covered storage area is proposed in the Logistics Area. These facilities would require connections to Nellis AFB's electrical distribution systems. Nevada Energy (NVE) provides the majority of Nellis AFB's electricity through the electrical grid. The remaining energy is provided by Western Area Power Administration hydropower, NSA 1, and NSA 2.

Construction activities associated with the Proposed Action would be anticipated to result in short-term, negligible, adverse impacts to the installation's electrical distribution systems due to brief service interruptions that could occur when existing electrical lines are connected to newly constructed facilities. The newly constructed facilities would have the potential to increase the demand on the system. Energy-efficient construction design standards would be anticipated to minimize the potential increase in demand. Net changes in long-term demand would be anticipated to be negligible, as the electrical systems at Nellis AFB have the capacity required to meet increased demands (Nellis AFB, 2018, 2025b).

In addition to newly constructed facilities, electric utility connections would be installed at the Contingency Beddown Area to simulate the connection of expeditionary power distribution to a power plant. This would include the temporary use of mobile generators.

Facilities east of the flight line are currently served by individual propane tanks, as there is no natural gas connection in this area. No impacts would be expected to the natural gas system at Nellis AFB because the Proposed Action area is located east of the flight lines, where there are no natural gas pipelines.

Liquid Fuel Storage

Implementation of the Proposed Action would result in long-term, negligible, adverse impacts to the liquid fuel storage at Nellis AFB. Liquid fuel would be provided by a fuel truck from the Logistics Readiness Squadron. The fuel requirements of onsite equipment would vary based on the running time and operations of various types of equipment. The fuel trucks would come from the Main Base about 10 minutes away. As long as advanced notice is provided, there would be no issues with fuel or fuel truck availability. Nellis AFB manages two operating storage tank facilities: the West Transient Ramp Type III Hydrant System and the Eastside Revetment modified Type III Hydrant System (Nellis AFB, 2018). Nellis AFB has seven combined commercial and governmental fill stations that provide unleaded, diesel, biodiesel, and JET-A products. Multiple bulk fuel storage facilities are located across Nellis AFB to ensure fuel continuity. The Nellis AFB fuel tank infrastructure has adequate fuel storage volume to meet the fuel supply needs for the Proposed Action. After construction, additional training activities would continue to cause increased demand for fuel on the installation. Changes in demand would be negligible, and the existing liquid fuel storage has the capacity to accommodate the additional demand.

Potable Water Supply

Under the Proposed Action, construction of new facilities that require access to potable water would occur in the Site Support Area and the Contingency Beddown Area. In the Contingency Beddown Area, water source connections, water storage, and discharge points for water purification would also be installed. Shower/shave/latrine units would be connected to the water system and would require extensions of utility lines to make those connections. Any alterations to the public water system would require review by NDEP Bureau of Safe Drinking Water.

The potable water system at Nellis AFB provides water for domestic, irrigation, and fire protection uses. There are no current concerns regarding potable water supply from Lake Mead, and Nellis AFB currently has an adequate potable water supply to meet mission demands (Nellis AFB, 2023f).

The Proposed Action would be anticipated to result in short-term, negligible, adverse impacts on the potable water supply system due to brief service interruptions that could occur during construction when existing lines are connected to newly constructed facilities. Negligible, long-term, adverse impacts would have the potential to occur because the operation of the new facilities would increase demand on the potable water supply system.

Sanitary Sewer System

Under the Proposed Action, three new facilities in the Contingency Beddown Area would be connected to the sanitary sewer system. Short-term, negligible, adverse impacts on the sanitary sewer system would be anticipated during construction due to brief service interruptions that could occur when existing lines are connected to newly constructed facilities. Negligible, long-term, adverse impacts would have the potential to occur because the operation of the new facilities would increase demand on the sanitary sewer system. Changes in demand would be minimal, and the sanitary sewer system has the capacity required to meet new demand.

Solid Waste Management

Under the Proposed Action, a total of 146,150 ft^2 of new construction is proposed: 21,200 ft^2 in the Site Support Area, 31,150 ft^2 in the Contingency Beddown Area, and 84,000 ft^2 in the Graded Contingency Training Area. Short-term, minor, adverse impacts on solid waste management could occur due to waste from construction. On average, Nellis AFB generates 2,704 tons of nonhazardous waste per year. Solid waste is taken by Republic Services, a solid waste collection company, to an approved landfill that has sufficient capacity to meet current and future mission demands (Nellis AFB, 2018).

The USEPA guidance on estimating solid waste from construction projects indicates that approximately 4.39 pounds (lbs)/ft^2 of debris would be generated for each square foot of construction activity; this formula can be applied to the construction of both buildings and impervious surfaces (USEPA, 2003). Using this formula, solid waste generated from all construction projects under the Proposed Action would be anticipated at approximately 321 tons. 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 off the installation for disposal or recycling in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*.

3.12.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed and the beneficial impacts from the improvements to roadways at the CSTR project site would not occur. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to infrastructure in the ROI beyond baseline conditions.

3.12.3.4 Cumulative Impacts

The concurrent Master Plan and installation development projects on the east side of Nellis AFB would result in the placement of up to 224 acres of utilities and infrastructure improvements including power lines, underground utility lines, and power substations (Nellis AFB, 2025). The projects identified in **Table 3-1** would result in an overall increase in the demand for utilities that service Nellis AFB and the surrounding communities.

The TASS beddown, Nellis Aggressor beddown, Nellis IDP projects, and CCA EOU beddown would result in long-term, adverse impacts related to the overall increase in demand for utilities. However, several identified past, present, and reasonably foreseeable projects would address existing infrastructure deficiencies and result in beneficial impacts to infrastructure. The Nellis Reclaimed Waterline Project created a new pipeline between the CNLV-WRF and the Sunrise Vista Golf Course to deliver non-potable reclaimed water for irrigation, resulting in beneficial impacts to wastewater infrastructure. The CCRFCD project proposes an expansion of existing flood control infrastructure located in the southwestern portion of the installation. The expansion is currently under consideration and expected to begin design no sooner than 2028. Under the proposed expansion, the existing north/south stormwater drain would be connected to an expanded flood control basin, resulting in beneficial, cumulative impacts to stormwater infrastructure.

When considered in conjunction with the effects of past, present, and reasonably foreseeable actions at Nellis AFB, no significant, adverse cumulative effects to infrastructure would be anticipated to occur with implementation of the Proposed Action.

3.13 Safety and Occupational Health

3.13.1 Definition of the Resource

This section discusses safety and occupational health concerns associated with ground, flight, and explosives activities. Ground safety considers safety issues associated with ground operations and maintenance activities that support unit operations. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Clear zones (CZ) and accident potential zones (APZs) around the airfield restrict the public’s exposure to areas where there is a higher accident potential. Flight safety considers aircraft risks such as midair collisions, bird/wildlife aircraft strike hazards (BASH), and in-flight emergencies. Explosives safety relates to the management and safe use of ordnance and munitions.

The ROI for safety and occupational health is Nellis AFB.

3.13.2 Existing Conditions

3.13.2.1 Ground Safety

Ground 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 Proposed Action area is not in the vicinity of the airfield at Nellis AFB and does not fall within a CZ or APZ. Therefore, ground safety considerations related to flight operations are not discussed further in this EA.

Ground mishaps can occur 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 and 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 on Nellis AFB must follow ground 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).

3.13.2.2 Flight Safety

The potential for aircraft mishaps during flight is a public safety concern. Incidents may occur because of midair collisions, collisions with man-made structures or terrain, mechanical failure, weather-related accidents, pilot error, or BASH. The Proposed Action would include the construction of a mock airfield that would not be used for flight activities, and training associated with the proposed CSTR would not involve any flight operations. Therefore, flight safety is not discussed further this EA.

3.13.2.3 Explosives Safety

Aircraft and weapon munitions include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosives devices, 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_DAF Manual (DESR6055.09_AFMAN) 91-201, *Explosives Safety Standards* (November 2023), defines the guidance and procedures that deal with munition storage and handling.

Operational constraints are primarily associated with ESQD arcs, munitions storage, and transportation routes. ESQD arcs provide a buffer between potentially hazardous areas and both on- and off-base populated areas and create defined distances that are maintained between MSAs, live ordnance loading areas, and other similar types of facilities (Nellis AFB, 2018). These distances are determined by the type and quantity of explosive material to be stored. 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. There are several areas with ESQD arcs on Nellis AFB, including a 3,960-acre ESQD arc associated with the base's primary MSA and overlaps with approximately 6.9 miles of the 8-mile-long driving course included in the Proposed Action (Nellis AFB, 2018) (**Figure 3-10**).

3.13.3 Environmental Consequences

Under 40 CFR § 989.27, the EIAP for an action must assess direct and indirect impacts of the proposed action and alternatives on the safety and health of DAF employees and others at a work site. Air Force Policy Directive (AFPD) 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 minimize 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.

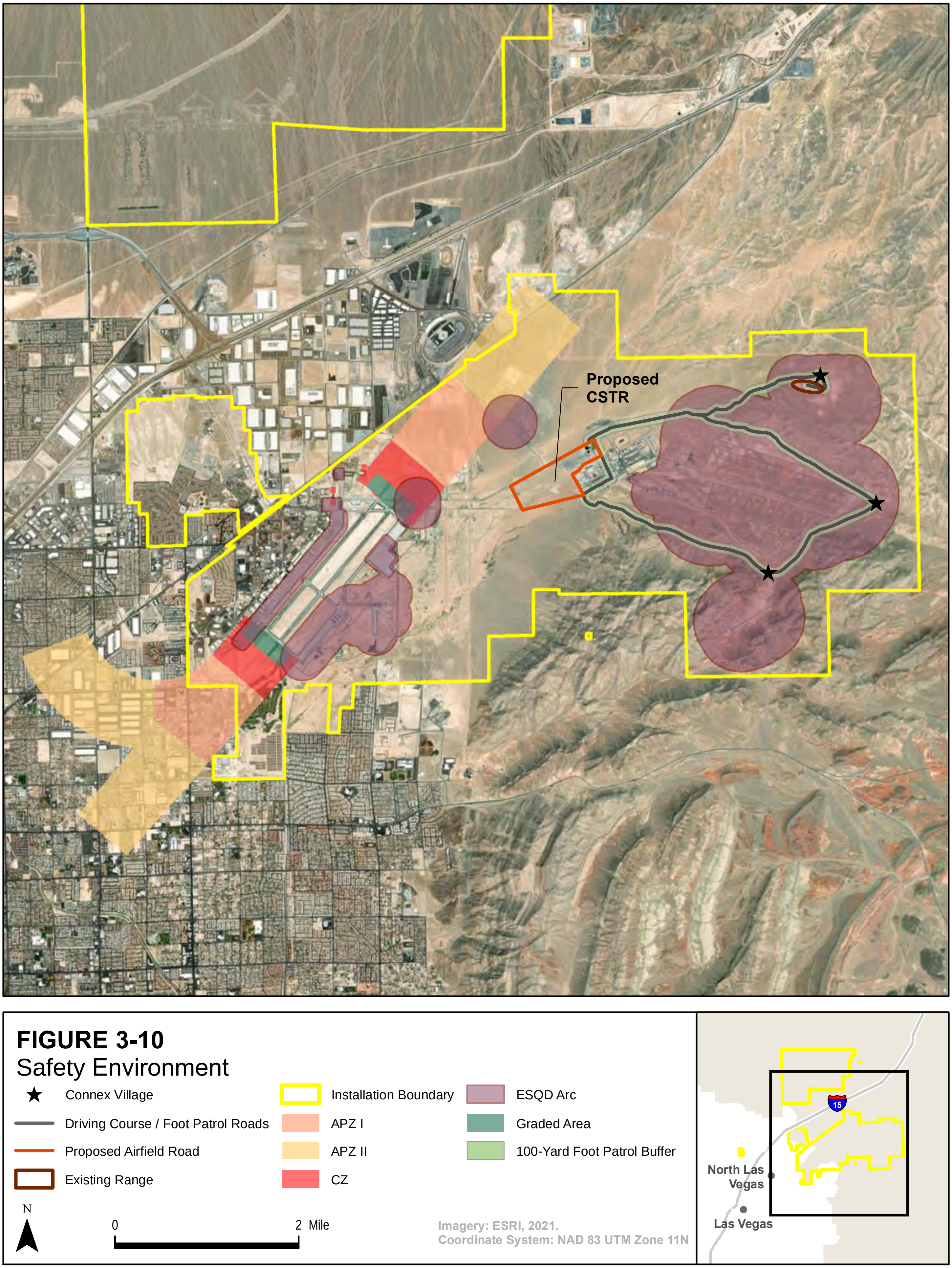


FIGURE 3-10
Safety Environment

APZ = Accident Potential Zone; CZ = Clear Zone; ESQD = Explosives Safety Quantity Distance.

3.13.3.1 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; and/or
- contributes to a violation of any local, state, or federal regulation.

3.13.3.2 Proposed Action

Ground Safety

Under the Proposed Action, training activities that would take place at the proposed CSTR would have the potential to create ground safety hazards related to increased fire risk from the use of pyrotechnics (i.e., ground burst simulators and propane-fed fire trainers); risks to DAF personnel from the use of smoke, tear gas, and other training analogs; and the operation of directed energy equipment (Joint Pacific Alaska Range Complex, 2013). To minimize these risks, Nellis AFB personnel would continue to comply with all applicable occupational safety and fire safety and prevention requirements and standards in accordance with DAFMAN 91-203, *Safety* (March 2022), which implements AFPD 91-2, and would follow all applicable directed energy equipment safety policies in accordance with AFPD 91-4, *Directed Energy System Safety* (January 2020). With adherence to relevant safety requirements, training activities associated with implementation of the Proposed Action would not be anticipated to result in impacts to ground safety at Nellis AFB.

During construction activities, the Proposed Action would be anticipated to result in short-term, negligible, adverse impacts to ground safety. Construction of new facilities and renovation of existing facilities 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 DAFMAN 91-203.

Explosives Safety

Under the Proposed Action, the improved driving course would pass through an ESQD arc associated with the MSA; roadways are an approved land use within ESQD arcs (DESR6055.09_AFMAN) 91-201). The proposed improvements to the driving course would occur on pre-existing, semi-improved roadways. No changes to existing ESQD arcs would be anticipated to occur with implementation of the Proposed Action, and grading and improvements would not be expected to affect any pre-existing munitions storage facilities. Should construction occurring under the Proposed Action affect facilities that handle explosive materials, new ESQD arcs would be established in compliance with DAF regulations. All storage and handling of munitions at Nellis 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. Grading and improvement activities for the proposed driving course under the Proposed Action would comply with established ESQD arcs as defined by the DAF Guidance Memo to DESR 6055.09_AFMAN 91-201, *Explosive Safety Standards*. Therefore, no impacts to explosives safety would be anticipated to occur with implementation of the Proposed Action.

3.13.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to safety and occupational health in the beyond baseline conditions.

3.13.3.4 Cumulative Impacts

The Proposed Action would be anticipated to result in 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 Nellis Master Plan and installation development, TASS beddown, CNLV-WRF, and completed MILCON projects, similarly would result in risks associated with construction activities. Cumulatively, 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 Nellis AFB, no significant cumulative impacts to safety and occupational health would be anticipated to occur with implementation of the Proposed Action.

3.14 SOCIOECONOMICS

3.14.1 Definition of the Resource

Socioeconomics is the relationship between economics and social elements, such as population levels and economic activity. Several factors can be used as indicators of economic conditions for a geographic area, such as demographics, median household income, unemployment rates, percentage of dependents living below the poverty level, employment, and housing data. Employment data identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on industrial, commercial, and other sectors of the economy provide baseline information about the economic health of a region. Socioeconomic data are typically presented at county, state, and national levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends.

The ROI for this socioeconomics is Nellis AFB and its environs; in particular, the six census tracts (CTs) that make up the base and overlap with the base boundary: CTs 36.49, 60.01, 62.04, 72, 78.01, and 78.02.

3.14.2 Existing Conditions

3.14.2.1 Population

Nellis AFB is located within Clark County, the most populated county in Nevada. It is home to an estimated 2,704,204 people: approximately 73 percent of the state's total population. The combined population of the 6 CTs in the ROI is an estimated 23,138 people or approximately 0.9 percent of Clark County's total population and approximately 0.7 percent of Nevada's total population (US Census Bureau [USCB], 2022a).

Table 3-17 shows the population estimates for the ROI in 2012 and 2022, as well as the total percent change in population growth (percent growth rate) and annual average population growth rates over this 10-year period. CT 36.28 and CT 78 were subdivided after 2012; therefore, the USCB does not provide 2022 population estimates for either tract. Instead, 2022 population estimates were calculated using the combined populations of the new tracts created by the subdivision. These values were used to calculate percent growth and average annual growth rates for CT 78. Former CT 36.28 was subdivided into multiple tracts aside from current CT 36.49 that are not part of the ROI for this Proposed Action and population growth rates for CT 36.49 are not provided.

Table 3-17
Population Estimates

Location	2012	2022	PGR	AAGR
United States	309,138,711	331,097,593	7.1	0.7
Nevada	2,704,204	3,104,817	14.8	1.5
Clark County	1,954,773	2,265,926	15.9	1.6
CT 36.49	(a)	2,616	-	-
CT 60.01	4,213	9,057	115.0	11.5
CT 62.04	4,916	4,984	1.4	0.1
CT 72	3,690	4,776	29.4	2.9
CT 78[b]	2,894	1,705	-41.1	-4.1

Source: USCB, 2012, 2022a
Notes:
a population growth rates not provided for CT 36.49 due to tract subdivisions occurring after 2012 and before 2022.
b 2022 values were calculated using the combined 2022 populations of CTs 78.01 and 78.02 as a comparison to the 2012 population of former CT 78.
AAGR = annual average growth rate; CT = Census Tract; PGR = percent growth rate

As can be seen in the table, three CTs for which population growth rates were calculated, as well as in Clark County and Nevada, saw population growth between 2012 and 2022. The remaining CT, former CT 78 (which has since been subdivided into CTs 78.01 and 78.02) experienced population decline (**Figure 3-11**). The largest increase in population over the 10-year period can be seen in CT 60.01, where the population grew by approximately 115 percent at rate of approximately 11.5 percent per year (USCB 2012, 2022a).

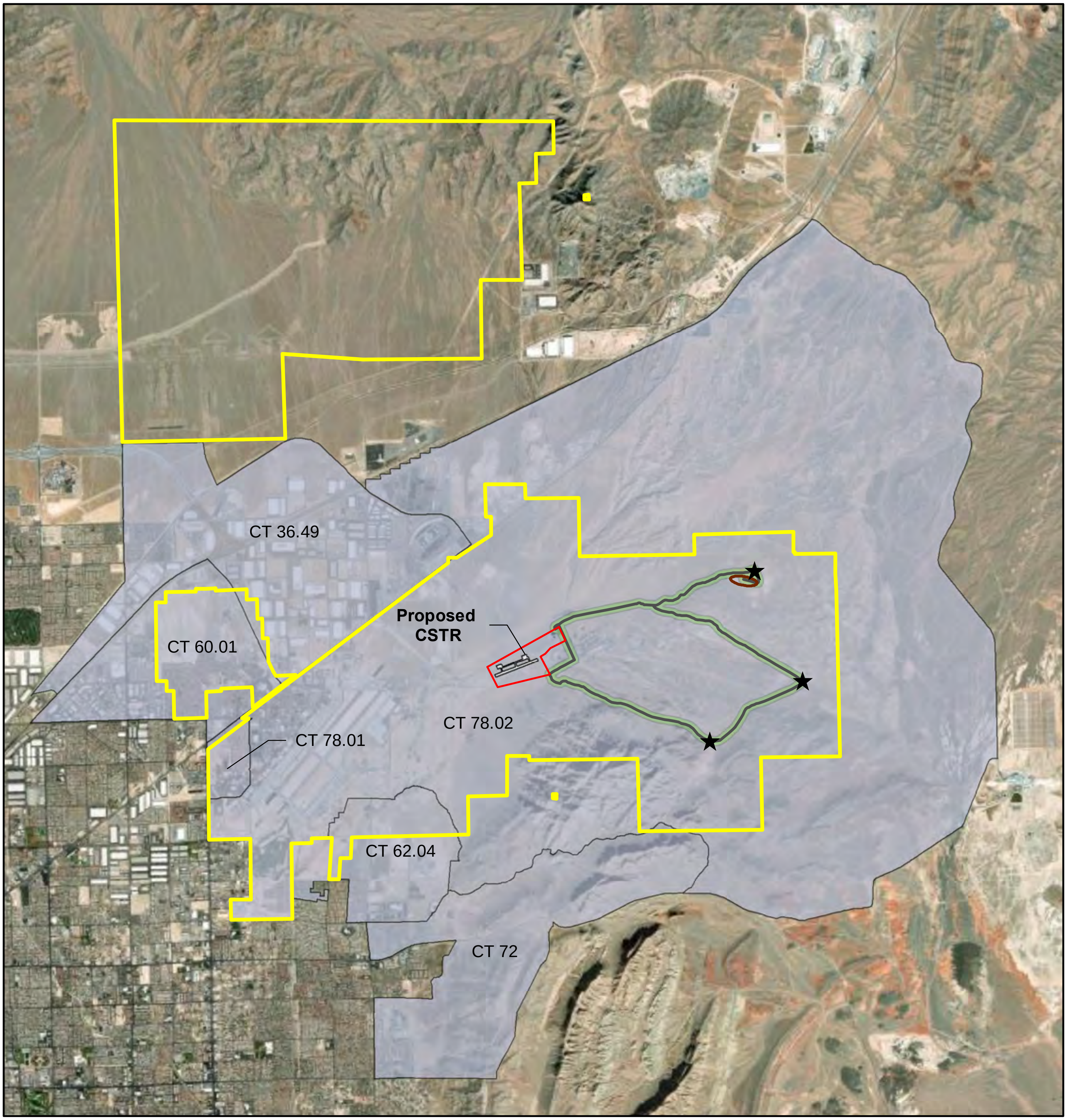
3.14.2.2 Employment

In Clark County, the top three industries by percentage of employment in 2022 were arts, entertainment and recreation and accommodation and food services; educational services and healthcare and social assistance; and professional, scientific, and management and administrative and waste management services. The top three industries by employment in 2022 Nevada were the same as those in Clark County. Approximately 99.2 percent of the labor force in Clark County consists of civilians, and approximately 0.8 percent consists of individuals in the Armed Forces. Approximately 11.2 percent of the employed civilian labor force in Clark County works for the government (USCB, 2022b).

Nellis AFB is responsible for approximately 36,500 jobs that directly and indirectly employ military and civilian personnel on and off the base (Nellis AFB, 2022a). In addition to providing employment that is directly tied to the DAF mission, Nellis AFB supports a variety of on-base businesses located near the housing areas on its western side that provide services to base residents.

Unemployment Rate

The estimated unemployment rate in Clark County in 2023 was 5.4, approximately 0.3 percent higher than the state of Nevada's estimated unemployment rate of 5.1, and approximately 1.8 percent higher than the national 2023 unemployment rate of 3.6 (Bureau of Labor Statistics, 2023a, 2023b).



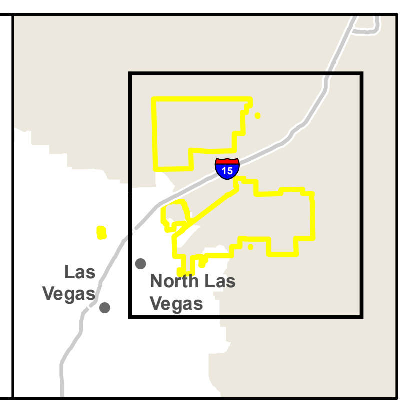


FIGURE 3-11
Census Tracts

- ★ Connex Village
- Driving Course/Foot Patrol Roads
- Proposed Airfield Road
- Existing Ranges
- Census Tract
- Proposed Airfield
- 100-Yard Foot Patrol Buffer

N

0 2 Mile

Imagery: ESRI, 2021.
Coordinate System: NAD 83 UTM Zone 11N

CT = Census Tract

3.14.2.3 Housing

Housing characteristics for the ROI are presented in **Table 3-18**. CT 78.01 consists entirely of on-base housing, while CT 60.01 consists partially of base housing. CT 78.02, which falls completely within the boundaries of Nellis AFB, was not factored into the housing analysis because it does not contain any base housing areas.

Table 3-18
Housing Characteristics

Location	Total Housing Units	Occupied Units (%)	Vacant Units (%)	Homeowner Vacancy Rate (%)	Rental Vacancy Rate (%)	Median Home Value ($)
United States	140,943,613	89.2	10.8	1.1	5.5	281,900
Nevada	1,288,357	90.3	9.7	9.7	6.9	373,800
Clark County	923,275	90.2	9.8	1.3	7.5	368,800
CT 36.49	688	93.3	6.7	0	0	336,900
CT 60.01	2,877	87.7	12.3	6.8	6.8	206,400
CT 62.04	1,694	92.6	7.4	2.2	0	282,400
CT 72	1,955	88.8	11.2	0	3.4	256,200
CT 78.01	701	81.5	18.5	(a)[a]	6.6	(a)
CT 78.02[b]	4	100	0	(a)	0	(a)

Source: USCB, 2022b
Notes:
a indicates that an estimate could not be computed because there was an insufficient number of sample observations.
b CT 78.02, which falls completely within the boundaries of Nellis AFB, was not factored into the housing analysis because it does not contain any base housing areas.

CT 36.49 had the highest percentage of occupied units at 93.3 percent (a higher percentage than in Clark County or Nevada) and CT 78.01 had the lowest percentage of occupied units at 81.5 percent (a lower percentage than in Clark County or Nevada). CT 78.01 (exclusively base housing) had the highest percentage of vacant units at 18.5 percent (a higher percentage than in Clark County or in Nevada) and CT 36.49 had the lowest percentage of vacant units with 6.7 percent (a lower percentage than in Clark County or Nevada). The CT with the highest homeowner and rental vacancy rates was CT 60.01 (partially base housing), with a rate of 6.8 for both (lower than rental vacancy rate in Clark County and lower than both rates in Nevada) (USCB, 2022b).

The highest median home value was $336,900 in CT 36.49, a value lower those of the county and state by more than $30,000.

There are approximately 2,360 active-duty personnel and their families living on the base. The housing on Nellis AFB, both dormitories and privatized housing, adequately meets existing mission requirements and has opportunities for development and mission expansion (Nellis AFB, 2018). The remainder of active-duty personnel and their families live off base and utilize housing resources in the surrounding community.

3.14.2.4 Schools

Nellis AFB is within the Clark County School District (CCSD), the fifth largest in the US with an enrollment of more than 296,000 students (Clark County School District, 2024). The CCSD operates 233 elementary schools, 61 middle schools, 53 high schools, and 34 specialized magnet schools (public schools with specialized courses of study) and career and technical academies. In addition, there are a variety of charter and private school options (DoD, 2024a). Primary and secondary education opportunities on the base consist of the Coral Academy of Science, a pre-Kindergarten through 8th grade charter school that accepts students based on a lottery system (DoD, 2024a). The new Lomie G. Heard Elementary School, Carroll M. Johnston Middle School, and Mojave High School are the schools in the northwest Las Vegas Valley area that are zoned for or generally serve the Nellis AFB area (Nellis AFB, 2024c).

Several higher education facilities and programs can be found at Nellis AFB, including the College of Southern Nevada, Embry-Riddle Aeronautical University, and University of Oklahoma (DoD, 2024b). There are also numerous higher education facilities in the surrounding area, including Nevada State University, the University of Nevada Las Vegas and its Reno Extension, and the Northwest Career College.

3.14.3 Environmental Consequences

3.14.3.1 Evaluation Criteria

Consequences to socioeconomic resources are assessed in terms of the potential impacts on the local economy from implementation of a proposed action. The level of impacts from expenditures associated with the Proposed Action was assessed in terms of direct impacts on the local economy and indirect impacts on other socioeconomic resources (e.g., housing, employment). Adverse impacts to socioeconomic resources would occur if the Proposed Action results in:

- adverse impacts to the local workforce or economy, including reductions in income or employment levels;
- adverse impacts to local supply of essential raw materials;
- adverse impacts to the availability of educational resources; or
- adverse impacts to the availability of livable housing.

The magnitude of potential impacts can vary greatly depending on the location of an action. For example, implementation of an action that creates employment positions might be unnoticed in an urban area but might have significant impacts in a rural region. In addition, if potential socioeconomic changes from a Proposed Action result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, such changes may be considered significant and adverse.

3.14.3.2 Proposed Action

Population

Under the Proposed Action, 20 personnel would be permanently assigned to Nellis AFB. This would equate to less than a 1-percent increase in the total number of military personnel associated with the base (Nellis AFB, 2022a). Therefore, long-term, negligible, beneficial impacts to population growth in the ROI would be anticipated to occur with implementation of the Proposed Action.

Employment

Under the Proposed Action, the 820 RHS at Nellis AFB would be responsible for all construction activities associated with the project and there would be no need to source construction labor from outside the base. Groups of temporary duty personnel staying at Nellis AFB to participate in temporary training events hosted at the proposed CSTR would have the potential to spend money in the local community on their way to and from training events, thereby supporting local businesses and their employees. Accordingly, long-term, negligible, beneficial impacts to employment in the ROI would be anticipated to occur with implementation of the Proposed Action.

Housing

Under the Proposed Action, space would be created at the Contingency Beddown Area to lodge temporary duty assignment personnel staying at Nellis AFB for participation in training events at the proposed CSTR. The use of pre-existing base housing on Nellis AFB would not be required. Additionally, Nellis AFB has adequate housing resources to accommodate the potential increase in personnel associated with the Proposed Action. Therefore, no impacts to housing resources would be anticipated to occur with implementation of the Proposed Action.

Schools

While the CCSD has recently been dealing with overcrowding challenges, both the elementary and middle schools zoned for Nellis AFB are operating below their enrollment capacity as of October 2024 (CCSD, 2024; Lane, 2024). The high school zoned for Nellis AFB is currently operating above capacity; however, there are multiple high schools in the CCSD that students living on base could attend, as well as charter and private school options. Overall, the CCSD has the capacity to accommodate any school-aged dependents that might accompany the maximum 20 personnel that would be reassigned to Nellis AFB under the Proposed Action, although educational resources in CCSD would generally be under strain until solutions are put in place to manage over-enrollment and capacity concerns. Therefore, long-term, negligible, adverse impacts to educational resources in the ROI could occur with implementation of the Proposed Action.

3.14.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to population, housing, or educational resources in the ROI beyond baseline conditions. However, the No Action Alternative could have the potential to result in long-term, negligible, adverse impacts to employment because there would be no increase in temporary duty personnel spending money in the local community while in the area for training activities hosted at the proposed CSTR.

3.14.3.4 Cumulative Impacts

The Proposed Action would have long-term, negligible, beneficial impacts to population and employment, and long-term, negligible, adverse impacts to educational resources in the ROI. The projects identified in **Table 3-1** evaluate the construction, demolition, and renovation activities within the ROI. The Nellis Master Plan and installation development projects would result in negligible-to-minor impacts to socioeconomic resources. The TASS beddown has been completed and beddown of personnel added a total of 293 personnel to the population at Nellis AFB, plus their dependents. A total of 751 personnel and their dependents would be added under the Nellis Aggressor project once that beddown has been completed. The CCA EOU beddown would contribute an additional 40 personnel at Nellis AFB. Beneficial impacts occurring as a result of economic stimulation from construction, demolition, and renovation activities would have the ability to compound if these actions occurred concurrently. Development on the west side of the installation evaluated in the Nellis IDP EA would also require short-term commitment of construction resources within the local area.

When considered in conjunction with other past, present, and reasonably foreseeable actions at Nellis AFB, no significant cumulative impacts to socioeconomic resources would be anticipated to occur due to implementation of the Proposed Action.

3.15 PROTECTION OF CHILDREN

3.15.1 Definition of the Resource

Federal agencies are directed by EO to assess environmental health and safety risks to children. EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

For the purposes of this analysis, youth populations are children under the age of 18 years. The ROI for this resource area is Nellis AFB and its environs.

3.15.2 Existing Conditions

Table 3-19 presents demographic characteristics for the population within the ROI, including percentages of children, and percent of those living below the poverty line.

CTs 36.49, 60.01, 62.04, and 72 reported higher percentages of children than Clark County, Nevada, and the US, with percentages ranging from 24.8 (2.1 percentage points higher than Clark County and 2.6 percentage points higher than Nevada) to 37.9 (15.2 percentage points higher than Clark County and 15.7 percentage points higher than Nevada). Nellis Family Housing is located in CT 60.01, which likely accounts for the higher percentage of children reported (USCB, 2022a).

Table 3-19
Demographic Characteristics

Geographic Area	Total Population	Children (%)[b]	Percent Living Below Poverty Line
United States	331,097,593	22.1	12.5
Nevada	3,104,817	22.2	12.7
Clark County	2,265,926	22.7	13.4
CT 36.49	2,616	24.8	6.5
CT 60.01	9,057	37.9	27.3
CT 62.04	4,984	23.7	11.5
CT 72	4,776	27	30.6
CT 78.01	1,235	20.8	22.6
CT 78.02	470	0.0	0.0

Source: USCB 2024a, 2024b
Notes:
a The USCB categorizes all people under the age of 18 as “youth”; this EA uses the term “children” to refer to the same group.

3.15.3 Environmental Consequences

Under 40 CFR § 989.27, the EIAP for an action must assess direct and indirect impacts of the proposed action and alternatives on the safety and health of DAF employees and others at a work site. Air Force Policy Directive 91-2, *Safety Programs,* is implemented by DAFI 91-202, *The Department of the Air Force (DAF) Mishap Prevention Program*, which manages risks to protect DAF personnel from occupational deaths, injuries, or illnesses and minimize loss of DAF resources. These standards apply to all DAF activities; adherence to the DAF’s Mishap Prevention Program ensures DAF workplaces meet federal safety and health requirements.

3.15.3.1 Evaluation Criteria

The protection of children analysis applies to potential disproportionate and adverse effects on children. Adverse effects to children would occur if the Proposed Action results in:

- adverse effects to air quality or water quality;
- adverse effects to investment in infrastructure or critical services;
- adverse effects resulting from a proposed action’s effects on climate change; or
- adverse effects resulting from severance of existing communities from essential services or support.

Significant protection of children issues could occur if an adverse health, environmental, or economic consequence to the human population fell disproportionately upon children.

3.15.3.2 Proposed Action

Under the Proposed Action, all construction activities would take place within the boundaries of Nellis AFB and would occur entirely within CT 78.02, which was not identified as containing children and does not contain any base housing areas. Construction activities would not occur in the vicinity of base housing areas where children or other community residents could be present. No disproportionate impacts to children would be anticipated to occur with implementation of the Proposed Action.

3.15.3.3 No Action Alternative

Under the No Action Alternative, the proposed training area at Nellis AFB would not be constructed. The DAF would not meet the requirement to locate a CSTR within a 10-hour drive from all CONUS installations and would continue to lack the capacity to meet combat support readiness throughput requirements. There would be no changes to impacts on children in the ROI beyond baseline conditions.

3.15.3.4 Cumulative Impacts

The Proposed Action would not be anticipated to result in disproportionate adverse impacts to children. The projects identified in **Table 3-1** evaluate the construction, demolition, and renovation activities within Nellis AFB and would not have the potential to result in impacts to children. When considered in conjunction with other past, present, and reasonably foreseeable actions at Nellis AFB, no significant cumulative disproportionate impacts to children would be anticipated to occur under implementation of the Proposed Action.

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APPENDIX A.
INTERGOVERNMENTAL COORDINATION, PUBLIC AND AGENCY PARTICIPATION

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West Las Vegas Library
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Sunrise Library
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DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE, NEVADA

January 27, 2025

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Field Manager
Bureau of Land Management
Las Vegas Field Office
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Las Vegas NV 89130

Dear Ms. Williams

The United States Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) for the development of a Combat Support Training Range (CSTR) at Nellis Air Force Base (AFB), Nevada. To take into account possible environmental concerns, DAF is engaging early in the *National Environmental Policy Act* (NEPA) process with all potentially affected resource agencies as it formulates the undertaking. Accordingly, DAF seeks coordination with your office.

Proposed Action

DAF's Proposed Action involves the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The Proposed Action would be located on and adjacent to the current location of Camp Cobra at Nellis AFB (see **Attachment 1**). Camp Cobra is an existing contingency training area located approximately 2 miles east-northeast of the north end of the main runway. Camp Cobra comprises approximately 54 acres of disturbed and developed areas. The Proposed Action would expand the existing Camp Cobra site by approximately 149 acres to create a 205-acre CSTR.

Overall, the development of the CSTR would establish approximately 952,000 square feet of new impervious surface, 21,120 linear feet of semi-improved roadways, 7,950 linear feet of fencing, and would require approximately 8 million square feet of grading. The mock airfield would be used solely for combat support training; no aircraft operations would occur.

Purpose and Need

The purpose of the Proposed Action is to establish a training platform to allow combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. Implementation of the Proposed Action would provide a setting that contains flexible infrastructure that would allow dynamic employment of expeditionary assets under a variety of training configurations in a minimalist, realistic environment that simulates contested operations. The CSTR would provide a location to facilitate exercises ranging from small, unit-led events to Major Command-directed, large-team certification exercises.

The Proposed Action is needed to meet DAF requirements for a Regional Training Site within the western contiguous United States (CONUS). DAF currently lacks the infrastructure and equipment required to facilitate robust combat support training exercises and certification in preparation for the high-end fight. In 2020, the Commander of the Air Force Civil Engineer Center (AFCEC) directed the establishment of Civil Engineer contingency training locations within a 10-hour drive from all CONUS installations. In 2022, the Commander of the Air Force Installation and Mission Support Center (AFIMSC) directed expansion of the Regional Training Site initiative into all combat support functions. Currently, there is a lack of adequate training locations in the western CONUS, and existing CONUS locations lack the capacity to meet combat support readiness throughput requirements. The Proposed Action would provide a facility that meets the 2020 and 2022 requirements set forth by AFCEC and AFIMSC.

Additionally, DAF does not currently have sufficient platforms to enable high-end certification exercises for combat support teams postured as "Force Elements" within the new Air Force Generation (AFFORGEN) model. AFFORGEN is a newly implemented model that aims to reconstitute manpower, aircraft, and equipment into Force Elements that train, deploy, and recover as cohesive units. The Proposed Action would facilitate the assembly of an entire Force Element and would allow the Force Element to train and certify in a realistic environment.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on land use and visual resources; air quality/climate change; soils and geological resources; biological, water, and cultural resources; noise; hazardous materials and wastes; public health and safety; infrastructure, including transportation and utilities; socioeconomics, and environmental justice and protection of children. The EA will also examine the cumulative effects when combined with past, present, and reasonably foreseeable actions at Nellis AFB. In support of this process, we request your input in identifying issues or areas of concern you believe should be addressed in the EA.

We intend to notify your agency when the Draft EA is completed and available for comment and welcome comments and input at that time as well. Please inform us if someone else within your agency other than you should receive such notification. So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response no later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Mr. Tod Oppenborn
Environmental Planning
6020 Beale Avenue
Nellis AFB, Nevada 89191
Email: tod.oppenborn@us.af.mil; phone at (702) 652-9366.

We appreciate your interest in and support of our military mission at Nellis AFB. Thank you in advance for your assistance in this effort.

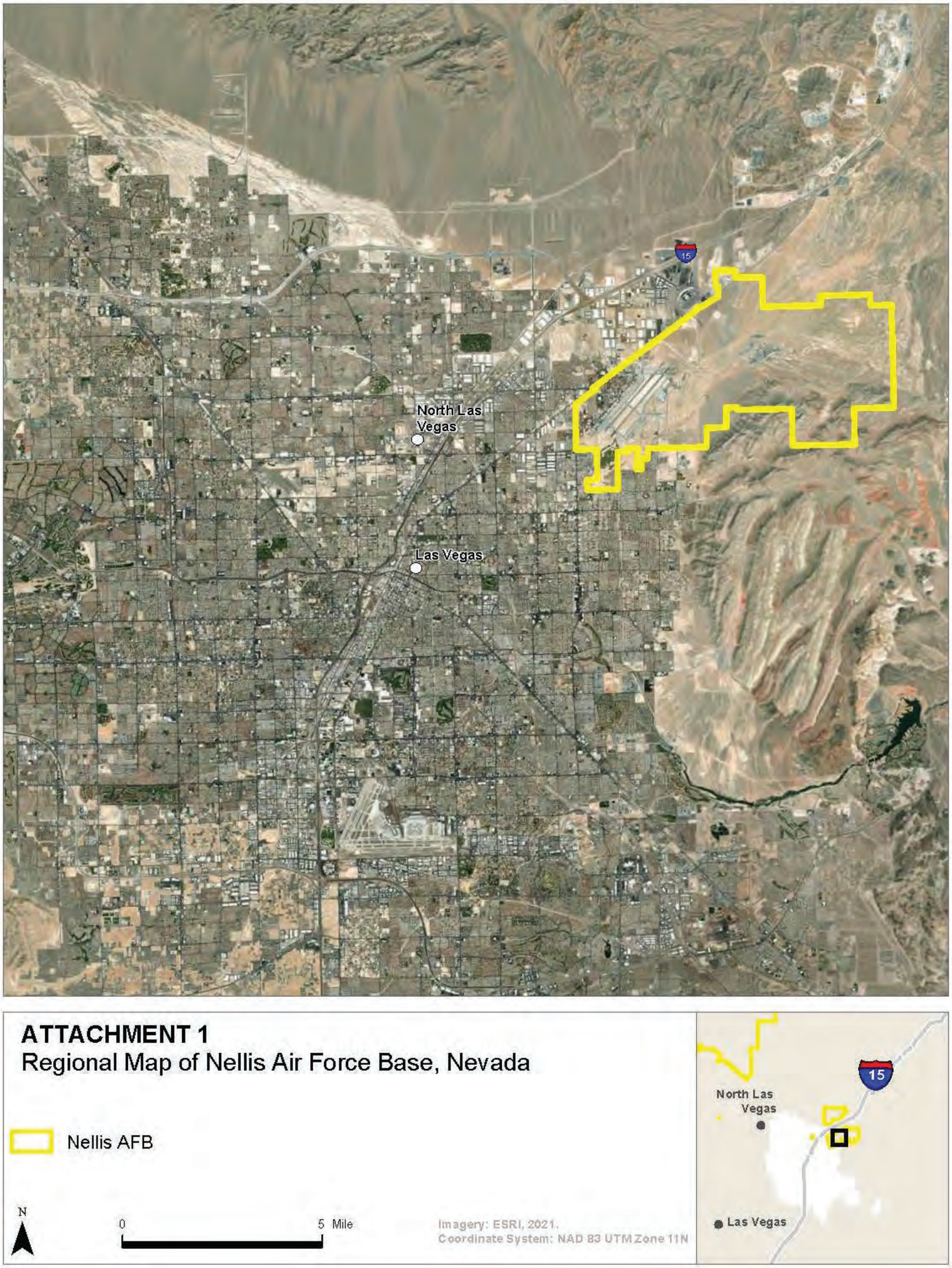
Sincerely,

ROWLAND.CHARLES.W.JR.1073438124 Digitally signed by ROWLAND.CHARLES.W.JR.1073438124 Date: 2024.11.19 10:07:37 -08'00'

CHARLES W. ROWLAND JR.
Chief, Portfolio Optimization

Attachment:
1. Figure showing the Proposed Action Area

Attachment 1 – Proposed Action Area



DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE NEVADA

January 27, 2024

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Nellis AFB NV 89191-7260

Ms. Robin Reed
Acting Administrator
Deputy State Historic Preservation Officer
Department of Conservation and Natural Resources
901 South Stewart Street, Suite 5004
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Dear Ms. Reed

The United States (US) Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) for the development of a Combat Support Training Range (CSTR) at Nellis Air Force Base (AFB), Nevada. To take into account possible environmental concerns, DAF is engaging early in the National Environmental Policy Act (NEPA) process with all potentially affected resource agencies and consulting parties as it formulates the undertaking. Pursuant to Title 36 *Code of Federal Regulations* Section 800.3(b), we are coordinating the consultation process under Section 106 of the National Historic Preservation Act (54 U.S.C. 306108) with the NEPA process. Accordingly, DAF seeks to initiate consultation with your office.

Proposed Action

DAF's Proposed Action involves the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The Proposed Action would be located on and adjacent to the current location of Camp Cobra at Nellis AFB (see Attachment 1). Camp Cobra is an existing contingency training area located approximately 2 miles east-northeast of the north end of the main runway. Camp Cobra comprises approximately 54 acres of disturbed and developed areas. The Proposed Action would expand the existing Camp Cobra site by approximately 149 acres to create a 205-acre CSTR.

Overall, the development of the CSTR would establish approximately 952,000 square feet of new impervious surface, 21,120 linear feet of semi-improved roadways, 7,950 linear feet of fencing, and would require approximately 8 million square feet of grading. The mock airfield would be used solely for combat support training; no aircraft operations would occur. Location maps of the Proposed Action and Alternative are attached for your review (**Attachments 2–4**).

Purpose and Need

The purpose of the Proposed Action is to establish a training platform to allow combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. Implementation of the Proposed Action would provide a setting that contains flexible infrastructure that would allow dynamic employment of expeditionary assets under a variety of training configurations in a minimalist, realistic environment that simulates contested operations. The CSTR would provide a location to facilitate exercises ranging from small, unit-led events to Major Command-directed, large-team certification exercises.

The Proposed Action is needed to meet DAF requirements for a Regional Training Site within the western contiguous United States (CONUS). DAF currently lacks the infrastructure and equipment required to facilitate robust combat support training exercises and certification in preparation for the high-end fight. In 2020, the Commander of the Air Force Civil Engineer Center (AFCEC) directed the establishment of Civil Engineer contingency training locations within a 10-hour drive from all CONUS installations. In 2022, the Commander of the Air Force Installation and Mission Support Center (AFIMSC) directed expansion of the Regional Training Site initiative into all combat support functions. Currently, there is a lack of adequate training locations in the western CONUS, and existing CONUS locations lack the capacity to meet combat support readiness throughput requirements. The Proposed Action would provide a facility that meets the 2020 and 2022 requirements set forth by AFCEC and AFIMSC.

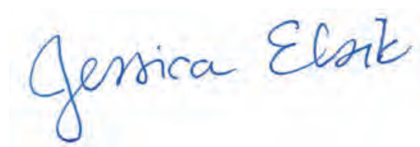
Additionally, DAF does not currently have sufficient platforms to enable high-end certification exercises for combat support teams postured as “Force Elements” within the new Air Force Generation (AFFORGEN) model. AFFORGEN is a newly implemented model that aims to reconstitute manpower, aircraft, and equipment into Force Elements that train, deploy, and recover as cohesive units. The Proposed Action would facilitate the assembly of an entire Force Element and would allow the Force Element to train and certify in a realistic environment.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on land use and visual resources; air quality/climate change; soils and geological resources; biological, water, and cultural resources; noise; hazardous materials and wastes; public health and safety; infrastructure, including transportation and utilities; socioeconomics, and environmental justice and protection of children. The EA will also examine the cumulative effects when combined with past, present, and reasonably foreseeable actions at Nellis AFB. In support of this process, we request your input in identifying issues or areas of concern you believe should be addressed in the EA.

In coordination with the NEPA process, we will be reaching out at a future date to consult on the definition of the APE for the Proposed Action, as well as identification and evaluation of historic properties and determination of effects. We intend to notify your agency when the Draft EA is completed and available for comment and welcome comments and input at that time as well. Please inform us if someone else within your agency other than you should receive such notification. If you have any comments, concerns, or input in the meantime, please direct them to one of the NAFB Cultural Resources Program Managers: Dr. Mark Toussaint at (702) 652-5813, mark.toussaint@us.af.mil, or Dr. Lucas R. M. Johnson at (702) 652-7429, lucas.martindale_johnson.3@us.af.mil.

Sincerely



JESSICA J. ELSIK, GS-14, DAF
Deputy Base Civil Engineer

Attachments:
1. Figure showing the Proposed Action area
2. Figure showing the project overview under Alternative 1
3. Figure showing the proposed CSTR footprint and general use areas
4. Figure showing the project overview under Alternative 2

DEPARTMENT OF THE AIR FORCE
99TH CIVIL ENGINEER SQUADRON (ACC)
NELLIS AIR FORCE BASE NEVADA

January 27, 2025

Ms. Jessica J. Elsik, DAF
Deputy Base Civil Engineer
99th Civil Engineer Squadron
6020 Beale Ave, Suite 101
Nellis AFB NV 89191-7260

Honorable Cheyenne Stone
Chairperson
Big Pine Paiute Tribe
PO Box 700
Big Pine CA 93513-0700

Dear Chairperson Stone

The United States (US) Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) for the development of a Combat Support Training Range (CSTR) at Nellis Air Force Base (AFB), Nevada. To take into account possible environmental concerns, DAF is engaging early in the National Environmental Policy Act (NEPA) process with all potentially affected resource agencies and consulting parties as it formulates the undertaking. Pursuant to Title 36 *Code of Federal Regulations* Section 800.3(b), we are coordinating the consultation process under Section 106 of the National Historic Preservation Act (54 U.S.C. 306108) with the NEPA process. Accordingly, DAF seeks to initiate consultation with the Big Pine Paiute Tribe regarding the Proposed Action.

Proposed Action

DAF's Proposed Action involves the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The Proposed Action would be located on and adjacent to the current location of Camp Cobra at Nellis AFB (see Attachment 1). Camp Cobra is an existing contingency training area located approximately 2 miles east-northeast of the north end of the main runway. Camp Cobra comprises approximately 54 acres of disturbed and developed areas. The Proposed Action would expand the existing Camp Cobra site by approximately 149 acres to create a 205-acre CSTR.

Overall, the development of the CSTR would establish approximately 952,000 square feet of new impervious surface, 21,120 linear feet of semi-improved roadways, 7,950 linear feet of fencing, and would require approximately 8 million square feet of grading. The mock airfield would be used solely for combat support training; no aircraft operations would occur. Location maps of the Proposed Action and Alternative are attached for your review (**Attachments 2–4**).

Purpose and Need

The purpose of the Proposed Action is to establish a training platform to allow combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. Implementation of the Proposed Action would provide a setting that contains flexible infrastructure that would allow dynamic employment of expeditionary assets under a variety of training configurations in a minimalist, realistic environment that simulates contested operations. The CSTR would provide a location to facilitate exercises ranging from small, unit-led events to Major Command-directed, large-team certification exercises.

The Proposed Action is needed to meet DAF requirements for a Regional Training Site within the western contiguous United States (CONUS). DAF currently lacks the infrastructure and equipment required to facilitate robust combat support training exercises and certification in preparation for the high-end fight. In 2020, the Commander of the Air Force Civil Engineer Center (AFCEC) directed the establishment of Civil Engineer contingency training locations within a 10-hour drive from all CONUS installations. In 2022, the Commander of the Air Force Installation and Mission Support Center (AFIMSC) directed expansion of the Regional Training Site initiative into all combat support functions. Currently, there is a lack of adequate training locations in the western CONUS, and existing CONUS locations lack the capacity to meet combat support readiness throughput requirements. The Proposed Action would provide a facility that meets the 2020 and 2022 requirements set forth by AFCEC and AFIMSC.

Additionally, DAF does not currently have sufficient platforms to enable high-end certification exercises for combat support teams postured as “Force Elements” within the new Air Force Generation (AFFORGEN) model. AFFORGEN is a newly implemented model that aims to reconstitute manpower, aircraft, and equipment into Force Elements that train, deploy, and recover as cohesive units. The Proposed Action would facilitate the assembly of an entire Force Element and would allow the Force Element to train and certify in a realistic environment.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on land use and visual resources; air quality/climate change; soils and geological resources; biological, water, and cultural resources; noise; hazardous materials and wastes; public health and safety; infrastructure, including transportation and utilities; socioeconomics, and environmental justice and protection of children. The EA will also examine the cumulative effects when combined with past, present, and reasonably foreseeable actions at Nellis AFB. In support of this process, we request your input in identifying issues or areas of concern you believe should be addressed in the EA.

Pursuant to Executive Order 13175, *Consultation and Coordination With Indian Tribal Governments*, and 36 CFR 800.3(f)(2), the DAF seeks to initiate government-to-government consultation with the Big Pine Paiute Tribe on the Proposed Action. We invite you to provide information on any properties of historic, religious, or cultural significance that may be affected by the Proposed Action. The DAF will make every effort, consistent with the law, to withhold from the public the disclosure of information that the Big Pine Paiute Tribe identifies as confidential.

In coordination with the NEPA process, we will be reaching out at a future date to consult on the definition of the APE for the Proposed Action, as well as identification and evaluation of historic properties and determination of effects. We intend to notify the Big Pine Paiute Tribe when the Draft EA is completed and available for comment and welcome comments and input at that time as well. Please inform us if someone else within your agency other than you should receive such notification. If you have any comments, concerns, or input in the meantime, please direct them to one of the NAFB Cultural Resources Program Managers: Dr. Mark Toussaint at (702) 652-5813, mark.toussaint@us.af.mil, or Dr. Lucas R. M. Johnson at (702) 652-7429, lucas.martindale_johnson.3@us.af.mil.

Sincerely

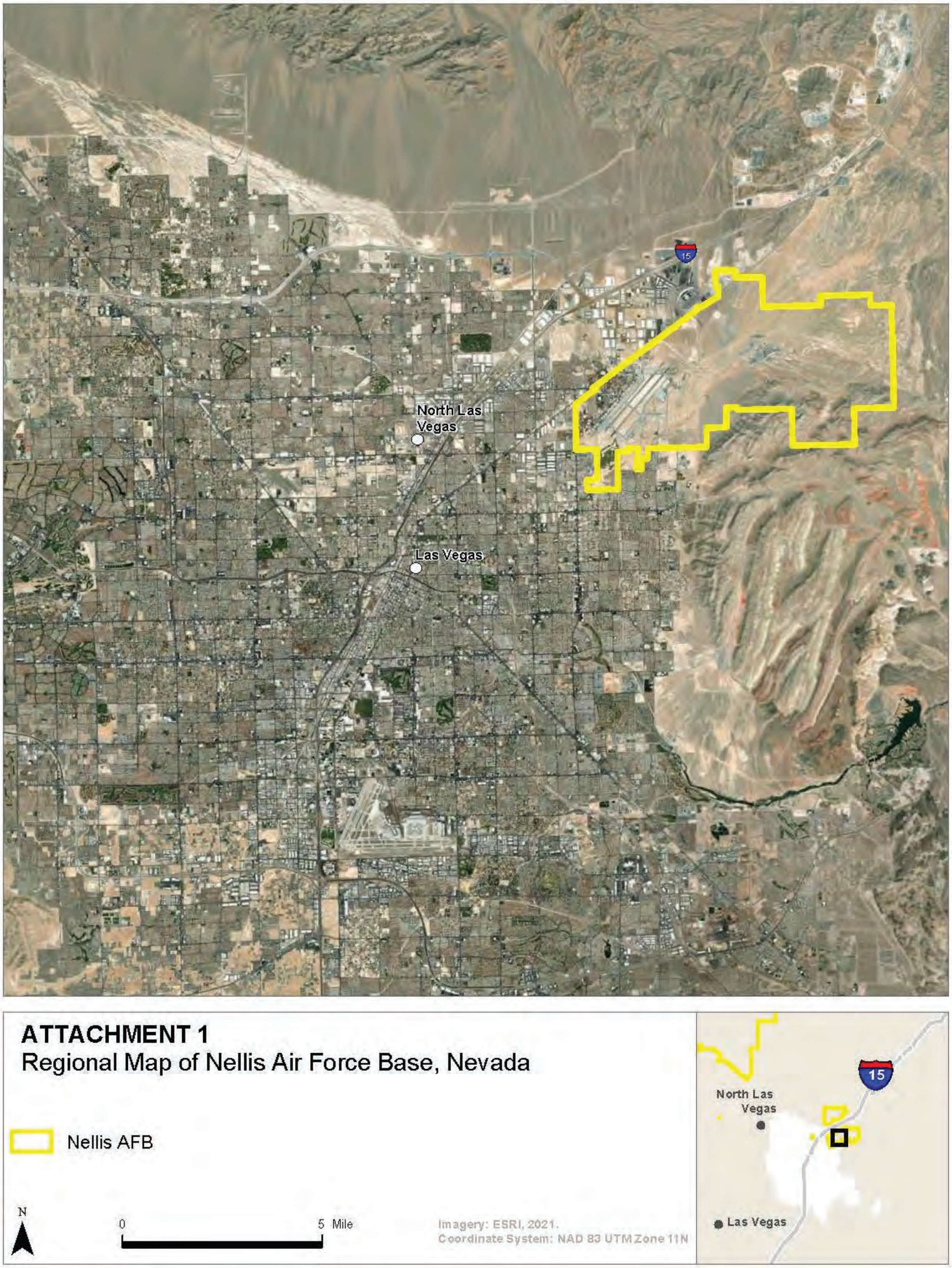
Jessica Elsik

JESSICA J. ELSIK, GS-14, DAF
Deputy Base Civil Engineer

Attachments:

1. Figure showing the Proposed Action area
2. Figure showing the project overview under Alternative 1
3. Figure showing the proposed CSTR footprint and general use areas
4. Figure showing the project overview under Alternative 2

Attachment 1 – Proposed Action Area



Attachment 2 – Project Overview – Alternative 1

Attachment 3 - Proposed CSTR Footprint (Alternative 1) and General Use Areas

Attachment 4 – Project Overview – Alternative 2

APPENDIX B.
PROGRAMMATIC BIOLOGICAL OPINION

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

IN REPLY REFER TO:
2022-0051434

September 28, 2023
Sent electronically

Anna Johnson
Department of the Air Force
Natural Resource Program Manager
99 CES/CEIEA
Nellis Air Force Base, Nevada 89191

Subject: Programmatic Biological Opinion on Implementation of Actions Proposed on Nellis Air Force Base and Small Arms Range, Clark County, Nevada

Dear Anna Johnson:

This document transmits the U.S. Fish and Wildlife Service's (Service) programmatic biological opinion based on our review of the programmatic activities proposed for implementation by the U.S. Air Force (USAF) at Nellis Air Force Base (NAFB) and Small Arms Range (SAR), as described in your April 2023, biological assessment (BA) (NAFB 2023), and its effects on the federally threatened Mojave desert tortoise (*Gopherus agassizii*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). We received your request for formal consultation on Friday, May 5, 2023. Because no critical habitat would be affected by the proposed action, critical habitat will not be discussed further.

We have based this biological opinion on information that accompanied your May 5, 2023 request for consultation, including the BA (NAFB 2023), correspondence between the Service and the USAF; interagency section 7 consultation regulations in 50 CFR Part 402; scientific publications, articles, and reports; and our files. This programmatic biological opinion (PBO) completely replaces the June 15, 2007, Programmatic Biological Opinion for Implementation of Actions Proposed on Nellis Air Force Base and Small Arms Range, Clark County, Nevada. A complete project file of this consultation is available in the Service's Southern Nevada Fish and Wildlife Office in Las Vegas.

BIOLOGICAL OPINION

Consultation History

Consultation history with U.S. Air Force (USAF) at Nellis Air Force Base (NAFB) and Small Arms Range (SAR) prior to 2023 is available in the consultation history of previous biological opinions. See Table 4 of this PBO for a complete list of biological opinions and biological assessments.

On May 5, 2023, the Service received a draft BA for proposed projects at Nellis Air Force Base and Small Arms Range.

On July 31, 2023, the Service requested revisions to the NAFB draft BA.

On August 8, 2023, the Service received the revised NAFB draft BA.

On August 30, 2023, the Service requested final revisions to the NAFB draft BA and submitted the Service's draft PBO for NAFB review.

On September 20, 2023, the Service received the final NAFB BA.

MIXED PROGRAMMATIC CONSULTATIONS

This PBO was prepared to address potential adverse effects to the Mojave desert tortoise (MDT) as a result of programs described in the USAF biological assessment (BA). This PBO analyzes the potential effects of implementing USAF actions, or actions funded or authorized by the USAF. This biological opinion addresses a mixed programmatic action which means, for purposes of an incidental take statement, a federal action that approves action(s) that would not be subject to further section 7 consultation (hereafter, referred to as ***program-level actions***), and also approves a framework for the development of future action(s) that are authorized, funded, or carried out at a later time and any take of a listed species would not occur unless and until those future action(s) are authorized, funded, or carried out and subject to further section 7 consultation (hereafter, referred to as ***framework programmatic actions***; 80 FR 26894). This PBO and the appended project-level documentation fulfill the consultation requirements for implementation of both ***program-level*** and ***framework programmatic actions***.

This biological opinion is valid for 10 years from the date of issuance unless one of the four reinitiation triggers is reached (see REINITIATION NOTICE) before the 10-year term of the biological opinion expires. In this PBO, the Service determined the overall anticipated incidental take of MDT for all proposed USAF activities in the Action Area by program at NAFB and SAR (including both ***program-level*** and ***framework programmatic actions***). As the USAF submits each action to the Service to be appended to this PBO, the Service would determine the anticipated incidental take for that specific action at the project level as a subset of the incidental take anticipated in the PBO. Except for those actions identified in the Proposed Action section, all estimates of proposed disturbance and incidental take are new to this PBO. The PBO supersedes and replaces earlier PBOs.

Reports prepared by the USAF and submitted to the Service for review assure that the effects analyses in the PBO are accurate including a comprehensive review of how the PBO is working, and whether the PBO implementing procedures are in compliance. The USAF would submit information on all projects and their effects to MDT in annual reports (due January 31st following each calendar year). The USAF would be responsible for accurately reporting any incidental take of listed species to the Service that occurs in association with actions covered under this PBO.

PROGRAM-LEVEL ACTIONS

Federal actions within the 10-year period that have been identified in the USAF BA may proceed without further review by the Service beyond this PBO, provided (1) the USAF requires appropriate protective measures in accordance with the measures outlined in this PBO and terms and conditions of the incidental take statement; (2) the USAF tracks this activity and includes it in the annual report provided to the Service within the required timeframe (see section 4 in Proposed Measures to Minimize Potential Effects of the Action); and (3) the USAF has discretion over the action and would provide sufficient oversight to ensure compliance with this PBO. Federal actions that have not been identified in the USAF BA would follow the appended procedures for ***framework programmatic actions*** described below. We are not providing take exemption at the program level for listed species other than the MDT.

FRAMEWORK PROGRAMMATIC ACTIONS

The USAF should follow these general steps for future actions to be appended to this PBO:

Step 1. The USAF would submit a request by hard copy to the Field Supervisor of the Service's Southern Nevada Fish and Wildlife Office, to append the action to the PBO. Part A of the Request to Append Action Form is provided in Appendix A. The USAF should complete a Request to Append Action Form for each action to be appended to the PBO.

Step 2. The Service would review the request and determine if the information is sufficient. If the information is insufficient, the Service would promptly notify the USAF. Incomplete information would likely delay the Service's response. If the information is sufficient, the Service would prepare a response for Part B of the form in Appendix A Request to Append Action Form. Prompt processing of appended actions would be dependent upon complete information on the project including all minimization measures and status of the MDT in the Action Area including recent MDT survey results unless agreed to otherwise during action development.

Step 3. The Service would send the USAF a completed copy of the Request to Append Action Form by email and mail. The regulatory timeframe to complete formal consultation and deliver the biological opinion to the Federal agency is 135 days. However, the estimated time required for the project-level consultation under programmatic consultation procedures is based on the scope of the action and the potential effects to listed species. For example, a project that would disturb 40 acres and relatively few MDT may require 30 days to complete while a 100-acre project with a complex effects analysis may require 90 days.

Step 4. Once the USAF receives the Service's response, it may proceed with the proposed action.

DESCRIPTION OF THE PROPOSED ACTION

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the Action Area as determined by the Service. Regulations implementing the Act define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the Action Area (50 CFR § 402.02). Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the Action Area that have undergone section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

The Action Area for this consultation includes the NAFB in Clark County, Nevada shown in Figure 1. The NAFB includes Area I, Area II, Area III, and the SAR and lies within the Mojave Desert spanning across townships 18, 19, and 20 south and ranges 62 and 63 east, with the Sierra Nevada Range approximately 90 miles to the west and the Wasatch Range 135 miles to the east. The NAFB elevation is approximately 1,900 feet above mean sea level and lies within the broad Las Vegas Valley, encompassed by alluvial fans that extend from the southern Las Vegas Range and northwest of Sunrise Mountain. The topography of the area surrounding NAFB includes Sunrise Mountain, Dry Lake Range, and Frenchman Mountain. The SAR is located northwest of I-15 and is bisected by a large levee and channel to guide floodwaters when the Las Vegas Range receives enough precipitation for runoff. The Action Area includes approximately 43.3 miles squared and includes approximately 32 miles squared of suitable MDT habitat. Suitable habitat is present in Area I on the eastern boundary with Area II. There may be indirect effects that result from proximity to developed areas and NAFB activities that take place within Area III and outside of and adjacent to habitat in Area I and Area II. The entire SAR is considered suitable MDT habitat.

The geology of the Action Area is predominantly sedimentary formations and alluvial deposits composed of a mixture of sandstone, shale, limestone, gypsum, dolomite, and interbedded quartzite. Alluvial deposits are created following precipitation events as water moves finer particles downgradient from higher elevations, spreading the material in a fan-like shape across the basin floor. The northern extent of the SAR and throughout Area II has intermittent desert bedrock and rock outcrops while the northern extent of Area II has active and stabilized sand dunes. The Action Area does not contain any permanent streams, springs, or lakes due to the climate in the region. The climate of the Action Area is characterized by approximately 4 inches of yearly precipitation, low humidity, high summer temperatures in excess of 100°F, and cool winter temperatures below 40°F. Vegetation in the Action Area is typical of the Mojave Desert and is dominated by creosote and white bursage desert scrub habitat.

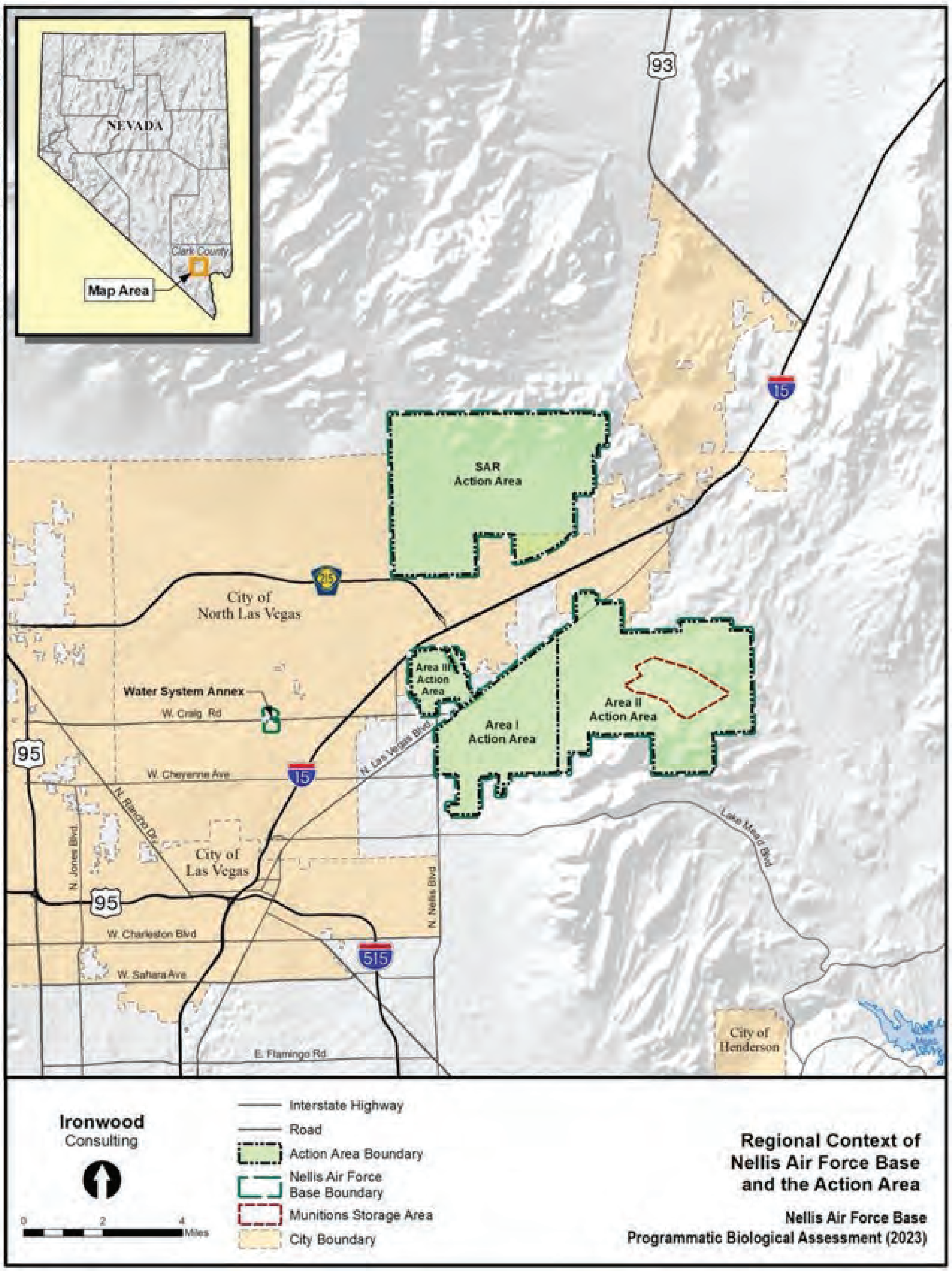

Figure 1. Location of the Action Area including the NAFB Area I, Area II, Area III, and the SAR.

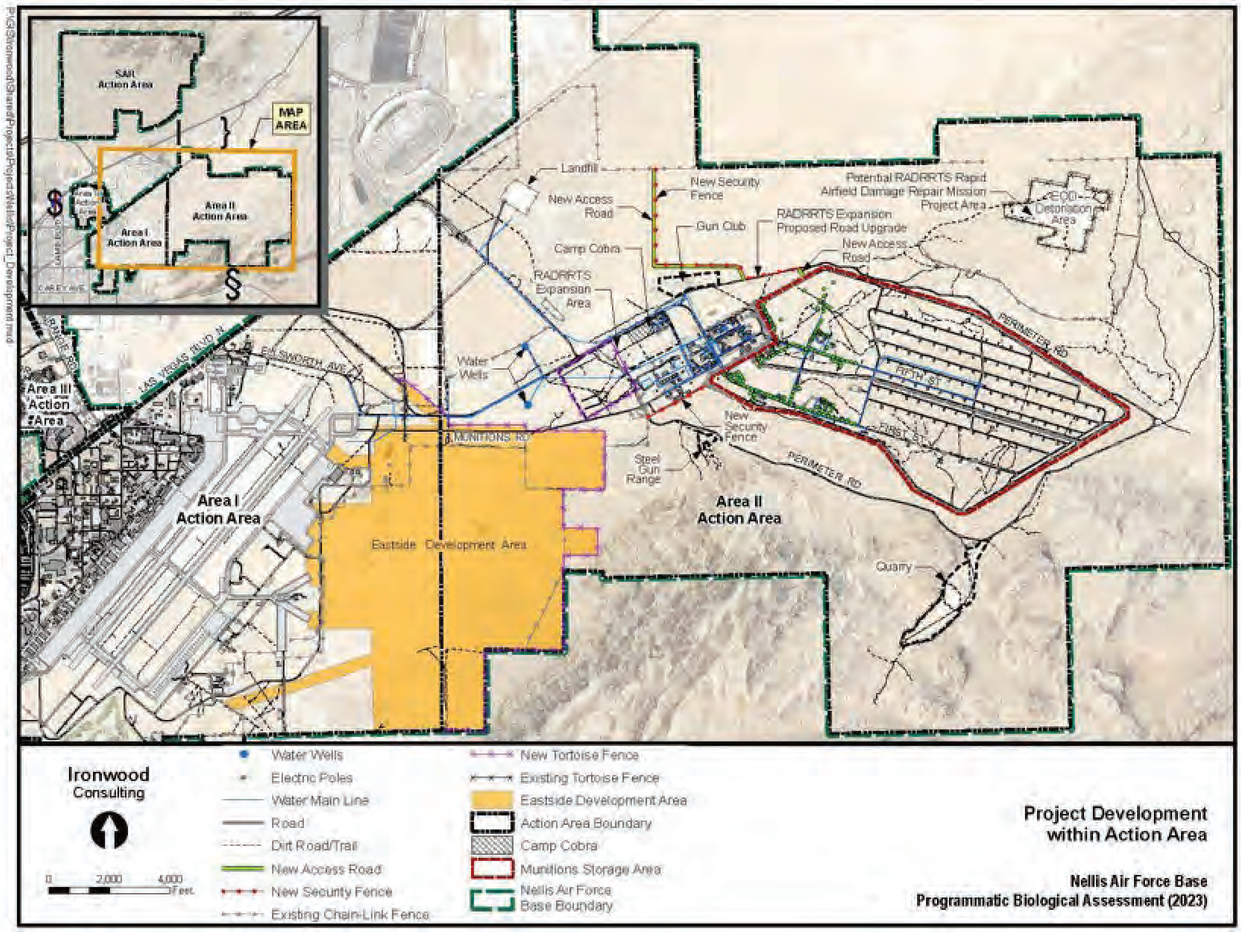

Figure 2. Proposed project locations on Area I and Area II of the NAFB.

PROPOSED PROGRAMS

The USAF proposes to authorize, fund, or carry out various actions and projects that may adversely affect the threatened MDT. The scope of the proposed action is established by acreage thresholds for each program and sub-program as identified in Table 1. The proposed action consists of 9 categories or programs of activities listed in Table 1. The proposed action is evaluated for a ten-year period. All projects would begin after all applicable approvals and permits are obtained, including compliance with the National Environmental Policy Act (NEPA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Clean Water Act (CWA); and National Historic Preservation Act (NHPA).

Table 1. Summary of adverse effect thresholds or limits for disturbance of MDT habitat which are covered in this PBO.

PROGRAM	**Maximum Number of Acres Affected by Program**
1) Roads	25
2) Utilities	170
3) Facilities	1,395
4) Environmental Remediation	400
5) Quarry Operations	0
6) Non-Native & Human-Subsidized Species Management	1,300
7) Training Activities	60
8) Non-Defense Activities	0
9) Security Control Operations	50
Total	3,400

Roads Program

The roads program includes road construction and maintenance. Roads may be improved, constructed, and/or connected as part of the other programs listed in Table 1. After construction, usage and maintenance of new roads would be included under this program. Routine work under this program would repair roadways, ensure the integrity of road edges, and remove or prevent vegetation growth that may cause fires. The USAF currently uses existing roads in the Action Area that occur in MDT habitat. All programs of work would continue to operate vehicles along travel routes to support continued operations. Following USAF requirements and Integrated Natural Resource Management Plan (INRMP) guidance, vehicle traffic is restricted to existing paved, graded, two-track, or utility access roads. The Action Area currently has approximately 360 acres of MDT habitat, but only 25 acres is expected to be impacted by road and trail use.

Utilities Program

The utilities program encompasses many aspects including the construction and maintenance of power distribution and transmission systems, water wells and distribution systems, wastewater systems, and communications systems that include communication towers, antennas, and utility lines such as fiber optic cables. Routine maintenance activities include repairs to existing water system distribution lines, leach fields, and sewer lines. Most routine utilities work occurs on previously disturbed land within MDT habitat. The utilities program in the Action Area may result in the disturbance of up to 150 acres of new temporary disturbance and 20 acres of new permanent disturbance.

Specific utility projects identified for implementation include power pole replacement, well water supply line repairs, and water wells repair and arsenic treatment plant construction, and Area II water system facility repair. In addition to these proposed utility upgrades listed in the previous sentence and described below, the USAF would perform routine maintenance on these systems and may construct or expand the utility infrastructure in areas not analyzed at this time.

- **Power Pole Replacements –** The USAF proposed to replace up to 300 power line poles within the Action Area. This project is expected to result in up to 5 acres of temporary ground disturbance within the munitions storage area (MSA) in Area II. Power poles would either be replaced or undergo repair to cross arms, air switches, insulators, and pole-mounted transformers. Proposed infrastructure for the project include a storage yard for power poles and construction equipment. The temporary disturbance would take place at existing pole locations and along the power line right-of-way in an approximate 60-foot wide buffer area.

- **Base Facility Well Water Supply Line Repair –** The USAF proposed to replace underground water main distribution and supply lines. This project is expected to result in up to 60 acres of temporary ground disturbance in previously disturbed areas. Construction activities would include trenching up to 15 feet deep and 15 feet wide in designated areas to excavate existing water lines to repair or replace lines prior to backfilling the trenches. The temporary disturbance would take place along the existing water line location using heavy construction equipment (e.g. backhoe and/or excavator) in an approximate 60-foot wide buffer area.

- **Water Wells Repair and Arsenic Treatment Plant Construction –** The USAF proposed to inspect the current well system to assess the cost or repairs and replacements. This project is expected to result in up to 10 acres of new permanent disturbance. No new wellheads would be built. A water treatment plant may be necessary to remove arsenic and other contaminants from well water to make the water potable. The exact location of the water treatment plant is undetermined at this time, but would be located within Area II. All activities would take place in previously disturbed areas using existing roads when possible, however, new road construction may also be necessary.

- **Area II Water System Facility Repair –** The USAF proposed to replace main water lines, fire hydrants, and water tanks. This project would result in up to 75 acres of temporary disturbance. Water system facility repairs would include replacing 52,000 linear feet of piping to resolve potable water issues. Construction activities would include trenching up to 15 feet deep and 30 feet wide in designated areas to excavate existing water lines to repair or replace lines. A second water line adjacent to the replaced water line would be added and used to operate fire hydrants on NAFB. In addition to new water lines, the USAF would also add new fire hydrants and valves, pressure regulator valves, backflow prevention valves, metering valves, a one-million-gallon water tank for firefighting, and a new chlorination facility. The location of the water tank has yet to be determined.

Facilities Program

The facilities program encompasses many aspects including new facilities and expansions or repairs to existing facilities. The type, size, and location of all new facilities is not currently known. The facilities program in the Action Area may result in the disturbance of up to 95 acres of new temporary disturbance and 1,300 acres of new permanent disturbance.

Specific facility projects identified for implementation and further described below include the continued operation and maintenance of current facilities, expansion of the Rapid Airfield Damage Repair Regional Training School (RADRRTS) training activities, construction of the RADRRTS Beddown Site 800 RHG, construction of the RADRRTS Rapid Airfield Damage Repair Mission facility, construction of a new vehicle storage and maintenance facility, and the construction of aircraft parking and hangar space in the Eastside Development Area.

- **Continued Operation and Maintenance of Facilities –** The USAF proposed to continue to operate and maintain buildings, support structures, and other facilities, including the explosive ordinance disposal (EOD) detonation area, the MSA, and the SAR. MDT exclusion fencing surrounds the EOD detonation area to prevent MDT from entering the area. Operations at the MSA and SAR include periodic access, maintenance activities, and operation of transport and service vehicles on existing roads.

- **RADRRTS Expansion and Training Activities –** The USAF proposed expansion of the RADRRTS would include additional shelter pads (beddown sites), an asphalt apron for training activities, an airfield runway for damage repair training, and a vehicle storage and maintenance facility. The RADRRTS expansion and training facilities in the Action Area may result in the disturbance 250 acres with approximately 115 acres of suitable MDT habitat. After these additions, the overall footprint of the RADRRTS facilities may be up to 500 acres including the existing facility.

    - **RADRRTS Beddown Site 800 RHG Construction –** The USAF proposed to construct 26 concrete shelter pads with utility hookups for new RADRRTS. The project is expected to result in the permanent loss of 3 acres with an additional area for staging equipment and supplies. Construction activities would include clearing, grubbing, grading, paving, and the installation of utilities for each shelter pad. MDT exclusion fencing would surround the beddown site and gates would be used for ingress and egress.

    - **RADRRTS Asphalt Apron 800 RHG Construction –** The USAF proposed the construction of a permanent equipment storage area. The asphalt apron would be approximately 29 acres in size and located in the RADRRTS expansion footprint.

The proposed area would contain a fenced and gated equipment storage area and an additional unfenced storage area. Existing roads would be used but additional access roads may be necessary. No artificial lighting would be used in the area once construction is complete.

- **RADRRTS Rapid Airfield Damage Repair Mission facility –** The USAF proposed to conduct operational testing, develop warfighting tactics, and train operators of USAF weapons system at a new Rapid Airfield Damage Repair Mission facility. The proposed actions are part of the RADRRTS and would include one runway for explosives and runway repair training within NAFB Area II. The runway would be used to train units on crater and spall repair, concrete saw use, heavy equipment operation, dowel drilling equipment, and command control. The facility would be in either the fenced EOD detonation area or in another location in Area II within MDT habitat. Operations and training activities, including noise and explosions, may occur in the surrounding areas.

  Construction of permanent facilities would involve the laying of a concrete pad with 12 inches of aggregate base and 16 inches of non-reinforced plain cement concrete for the RADDRRTS training course. Additional activities would include excavation, hauling, and dumping during both the initial construction and during repair. A laydown yard would be used to facilitate construction activities. Construction is proposed to begin in 2023. Existing roads would be used but additional access roads may be necessary. There would be no artificial lighting at the facility.

  The proposed Rapid Airfield Damage Repair Mission facility would undergo demolition by ordnance followed by rapid repair training exercises 25 to 50 times per year. During each training exercise, explosive ordnance would be dropped on top of the concrete runway, which would cause concrete, dust, and debris in the air and as far as 500 feet radially from the detonation location.

- **Vehicle Storage and Maintenance Facility Construction –** The USAF proposed the construction of a permanent vehicle storage and maintenance facility with roll-up doors, restrooms, offices, communication systems, and open storage to support the RADRRTS facility. The vehicle storage and maintenance facility would be approximately 0.2 acres and would be built on a concrete foundation. Construction is proposed to begin in 2024. Activities during the construction of the facility would include grading, grubbing, and clearing. The area would be accessed via existing roads.

- **Eastside Development Area –** The Eastside Development Area (Figure 2) is a phased expansion of the airfield and supporting facilities to provide aircraft parking and sun shelter hangar space. The Eastside Development Area would include the creation of expanded airfield pavements, hangars, aircraft maintenance unit, simulators, and other associated functions. Construction is proposed to begin in 2024 and last through 2030. The projects would cover approximately 1,650 acres within Area I and Area II.

Approximately 1,130 acres of the project footprint may be in MDT habitat with the majority of potential habitat occurring in Area II. Project components would include the construction of a vehicle maintenance facility, warehouse facility, large vehicle parking areas, consolidation of air traffic control facilities, and the demolition of some existing facilities. Activities would include the clearance of MDT and exclusion fencing and the installation of permanent MDT fencing along the boundary of the installation within MDT habitat. Additional projects may occur during the consultation timeframe and may need to be appended to the BO. New or improved road projects would include an upgrade to the Hollywood Gate, construction of an eastside transportation corridor (or "spine"), and road network upgrades.

Environmental Remediation Program

The Environmental Remediation Program would assess and remediate contaminated sites impacted by training and artillery use known as munitions response sites (MRS). MRS on NAFB impacted by training and artillery use include portions of the SAR including an adjoining area of BLM land and the Area II Gun Club (Figure 3). Environmental Remediation Program projects may result in up to 400 acres of new permanent disturbance within MDT habitat.

Specific Environmental Remediation Program projects include the SAR Munitions Clean Up and the Area II Gun Club Lead Clean Up. Both are described in further detail below. Methods identified for implementation of the Environmental Remediation Program and further described below include the munitions and explosives of concern clearance, source area removal, excavation and disposal, runoff controls, land use controls, and site restoration.

- **Munitions and Explosives of Concern Clearance –** Clearing munitions and explosives of concern (MEC) would include both surface and subsurface clearance activities. Methods for surface clearance may include a visual survey or a visual survey assisted by the use of an analog magnetometer to identify metallic anomalies. Methods for subsurface clearance may include digital investigative technologies, including digital geophysical mapping for the detection of ferrous and non-ferrous metals, and reacquisition and excavation of identified targets to locate MEC and other metallic items in the subsurface.

- **Source Area Removal –** Source area removal includes the removal of primary sources of contamination (e.g., lead contaminated berms or pits, as well as areas with clay target debris, which are a source of polycyclic aromatic hydrocarbons [PAH]). Contaminants would be removed and properly disposed of at permitted hazardous waste sites and municipal waste sites for non-hazardous materials. Contaminant removal would be accomplished by grading contaminated surface material and clearing the site. Topsoil removal depth varies depending on site conditions and the depth of contamination.

- **Excavation and Disposal –** Excavation and disposal activities would include soil removal, waste characterization sampling and analysis, disposal, and confirmation sampling. The methods for determining the extent and depth of contaminated soil to be excavated would be delineated using the remedial investigation (RI) and data gap investigation (DGI) results and would establish the soil volume planned for excavation. At the end of the soil removal effort, the sites would be confirmed to pose no risks to human health or the environment and could be closed and released for unlimited use/unrestricted exposure (UU/UE).

- **Runoff Controls –** Runoff control measures would include the creation of sedimentation basins or detention basins that are used to mitigate runoff and encourage entrained sediment to settle out before water is discharged. Included in runoff control measures are stormwater best management practices that would be part of any future project design and construction minimization measures.

- **Land Use Controls –** Land Use Controls (LUC) would include warning and restricted access signs for site visitors and workers and may include fencing to further restrict access. Chain link fencing would be used to prevent trespassing at some remediation sites. Where fencing is required, installation, monitoring, and repair or replacement would take place as needed. Existing fencing may be retrofitted with MDT fencing or MDT fencing may be installed separately. Signage would be installed around the perimeter of an MRS outside the elevated footprint, and along access roads to prevent inadvertent site access and to inform of the potential environmental hazards.

- **Site Restoration –** Site restoration activities would occur after ground disturbances associated with removal, excavation, and disposal of waste and contaminants. Restoration activities would include native species revegetation following backfilling and grading of disturbed areas to match previous contours. Site restoration activities are expected to occur at the SAR and the Area II Gun Club within the timeframe that is covered by this PBO. Additional unspecified environmental remediation projects that fall within the parameters and conditions of this PBO may occur during the consultation timeframe.

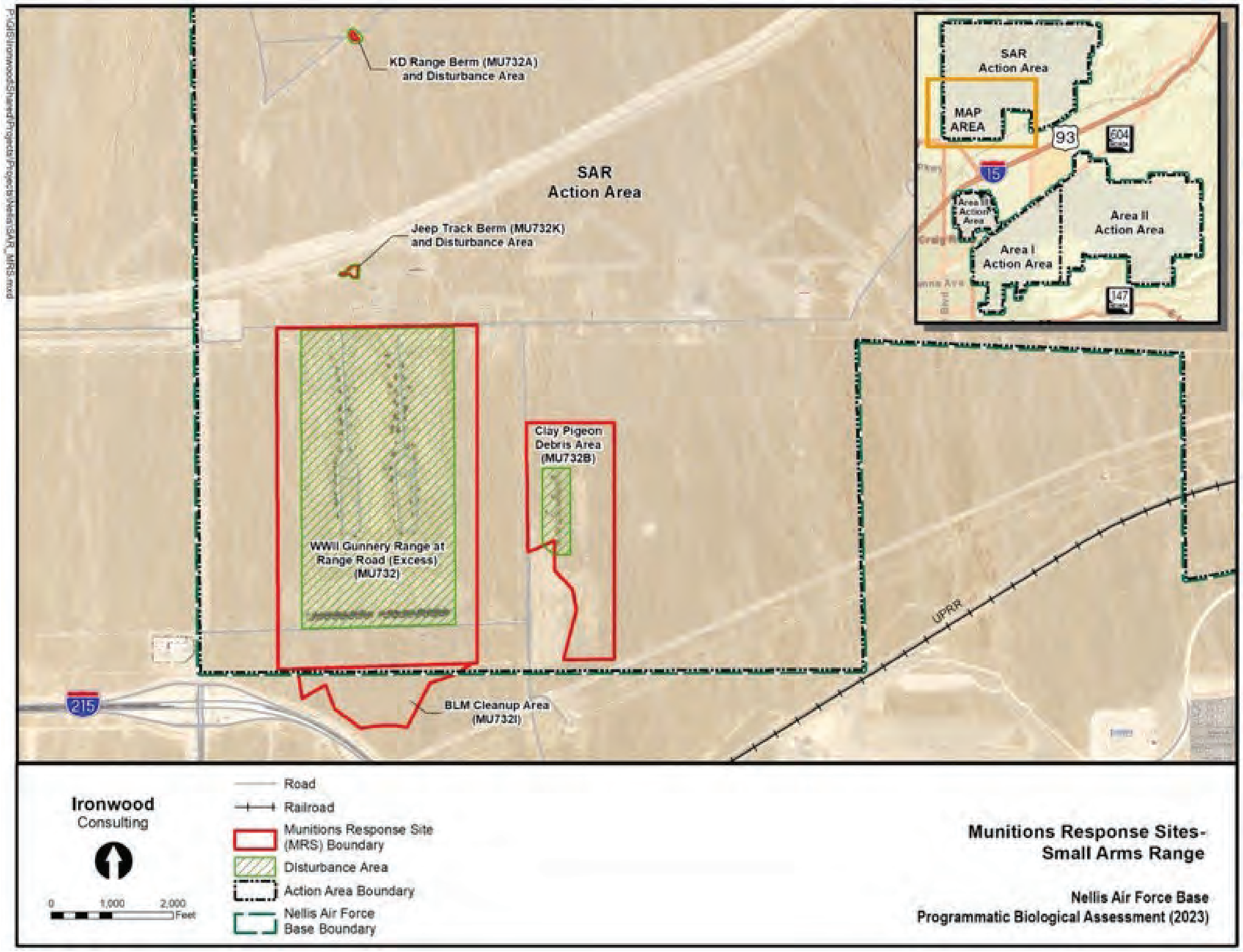

Figure 3. Location of environmental remediation and restoration on the SAR.

SAR Munitions Clean Up – Two Records of Decision (RODs) have been issued for remediation at five MRSs within the SAR and the adjacent BLM managed lands including Jeep Track Berm, World War II Gunnery Range at Range Road, KD Range Berm, Clay Pigeon Debris Area, and the PAH Contamination Area (located on BLM-managed lands). Up to 350 acres within the SAR would undergo a clean-up to reduce ground contamination including the removal of lead and skeet debris containing PAH pollutants. An additional 39.1 acres of adjacent BLM land have been contaminated via drainages and would be subject to remediation and restoration in an effort to remove lead and PAH from the environment.

Remediation activities would include a combination of MEC clearance; source area removal, excavation, and disposal; runoff controls; LUCs; and site restoration. Debris containing PAH and lead would be removed via topsoil excavation. Excavated soils would be deposited off-site. Topsoil removal depth would vary depending on the level of contamination. A sediment basin would be constructed to prevent further off-site contamination. The proposed basin would have a capacity of 133 cubic yards per acre of area drained. Site restoration measures would include leveling areas of excavation to natural contours and hydroseeding the area with an approved native seed mix. Existing roads would allow for most transportation, but new access roads may be constructed where necessary. Specific types of activities that would occur in each area are described below.

- **Jeep Track Berm MRS –** Remediation at Jeep Track Berm MRS would include excavation, disposal, and site restoration.
    - **Excavation and Disposal –** Activities would include the removal of contaminated soil identified during remedial investigation. Soil containing concentrations of lead greater than 400 milligrams per kilogram would be excavated across an area of approximately 2 acres to a depth of 1 foot below the ground surface. Excavated soil would be processed through a screen and magnet to remove any potential small arms debris or range-related debris that may be present. Approximately 1,300 cubic yards of lead-contaminated soil would be disposed off-site at a licensed solid waste landfill. Haul trucks and excavators would be used on an existing two-track road. Post-remediation soil sampling would be used to confirm lead contaminant levels fall within the targeted range. If sample concentrations remain greater than 400 milligrams per kilogram, additional excavations would be performed until the concentrations fall below the acceptable level.
    - **Site Restoration –** Jeep Track Berm MRS would be restored by grading the excavated area to restore natural contours prior to hydroseeding with native seed mix composed of species present in the surrounding area.
- **WWII Gunnery Range at Range Road MRS –** Remediation at WWII Gunnery Range includes MEC clearance, source area removal, runoff controls, LUCs, and site restoration.
    - **MEC Clearance –** The surface and subsurface MEC clearance would be required for 419.3-acre WWII Gunnery Range at Range Road MRS prior to conducting to the removal of source contaminants and the construction or runoff controls.

      The surface MEC clearance would be conducted by trained personnel who visually inspect the site for scrap metal and material potentially presenting an explosive hazard (MPPEH) prior to initiating a digital geophysical mapping of the subsurface. All items found would be inspected to ensure no residual explosives are present. Material documented as safe (MDAS) would be removed for disposal or recycling. Material found to contain explosives would be detonated in place prior to removal. All controlled detonations would require the establishment of a safety exclusion zone based upon the data for the munition item to be detonated. Following controlled detonation, remaining material would be inspected for residual explosives prior to removal or a second detonation.

      The subsurface MEC clearance would use analog or digital technologies. Analog subsurface MEC clearance would be performed simultaneously with surface MEC clearance. A grid and lane system would be used to establish complete coverage of the area. An analog magnetometer (e.g. Schonstedt or a White's all-metals detector) would be used to sweep the lane and any metallic anomalies would be excavated and identified. Digital geophysical mapping (DGM) uses electromagnetic induction sensors to measure the current induced by an underground metallic object. DGM usually employs a real-time kinematic global positioning system to track sensor position and produce a high-resolution map of anomalies within the MRS. Areas not covered are easily identified as gaps and can be reexamined to ensure complete coverage of the area. Items identified by DGM would be excavated by qualified personnel. All found items would be inspected, classified, and disposed of by scrapping, recycling, or detonating.

- **Source Area Removal –** Source area removal would remove the primary sources of contaminants (e.g. lead contaminated berms or pits and areas of clay debris containing PAH) at the WWII Gunnery Range at Range Road MRS. Contaminated media would be disposed of in a permitted facility, while non-hazardous waste would be disposed of in a local solid waste landfill. Excavation would remove the upper 3 inches of approximately 250 acres based on clay debris PAH found during the remedial investigation (RI) sampling. The volume of lead-contaminated soil estimated for removal is 1,762 cubic yards.

- **Runoff Controls –** Runoff controls would prevent or reduce further contamination of soils from the WWII Gunnery Range at Range Road MRS. Runoff controls would consist of a series of sedimentation basins or one detention basin to settle out entrained sediment before water is discharged. The basin would have a volume of at least 133 cubic yards per acre of area drained. The basin volume was estimated based on U.S. Department of Agriculture and other guidance. Run-on control measures would not be necessary as existing infrastructure already diverts all potential run-on away from the site and to the North Las Vegas Detention Basin.

- **LUCs –** LUCs would be implemented to reduce or eliminate exposure to site contaminants. All visitors would be required to have a trained escort to accompany them in the area. Signage posted approximately every 200 feet around the perimeter of the WWII Gunnery Range at Range Road MRS would warn workers and visitors of contaminated soil. The entire area would be surrounded by a 6-foot tall, chain link fence and a MDT exclusion fence to restrict access to the area.

- **Site Restoration –** WWII Gunnery Range at Range Road MRS would be restored by grading the excavated areas to restore natural contours prior to hydroseeding with native seed mix composed of species present in the surrounding area.

- **KD Range Berm –** Remediation at the KD Range Berm would include excavation, disposal, and site restoration.

  - **Excavation and Disposal –** Activities such as soil removal, waste characterization sampling and analysis, disposal, and confirmation sampling would result in approximately 2 acres of disturbance. Based on the remedial investigation results, a total volume of approximately 667 cubic yards of lead-contaminated soil was estimated. Excavated soil would undergo treatment and stabilization for lead prior to disposal in a permitted facility. Post-excavation testing of soil would determine if lead levels fall within an acceptable range or if more soil would need to be removed. Excavation, treatment, and disposal of lead-contaminated soils would continue until remaining soil would fall within acceptable levels.

  - **Site Restoration –** KD Range Berm would be restored by grading the excavated area to restore natural contours prior to hydroseeding with native seed mix composed of species present in the surrounding area.

- **Clay Pigeon Debris Area –** Remediation at the Clay Pigeon Debris Area MRS would include excavation, disposal, and site restoration.

  - **Excavation and Disposal –** Activities would result in up to 15 acres of disturbance, including soil removal, waste characterization sampling and analysis, disposal, and confirmation sampling. Based on the remedial investigation results, the estimated volume of PAH-contaminated soils to be removed is 55,117 cubic yards. Contaminated soil would be excavated to 0.5 feet deeper than the depth of contamination or to 1 foot greater than the deepest sampled depth for locations where the depth of contamination could not be defined. Excavation and sampling would be required until contaminant concentrations are less than cleanup levels. Post-excavation sampling would take place to confirm that all soil with concentrations exceeding acceptable levels has been removed.

  - **Site Restoration –** Clay Pigeon Debris Area would be restored by grading the excavated area to restore natural contours prior to hydroseeding with native seed mix composed of species present in the surrounding area.

- **Off-site PAH Contamination Area –** Remediation at off-site PAH Contamination Area would include LUC.

  - **LUC –** LUC for the off-site PAH contamination area would include signs warning personnel of contaminated soils. Signs would be posted every 200 feet along the approximate 4,500 feet perimeter of the MRS, excluding the northern boundary, which borders the WWII Gunnery Range MRS. No fencing or other barriers would be installed because this is BLM-managed land. The USAF and BLM would enter into an agreement delegating the USAF as the lead agency to complete consultation with the Service for the remedial action at the off-site PAH contamination area.

Area II Gun Club Lead Clean Up – The Area II Gun Club would undergo a munitions removal to locate and discard the lead shot from the grounds. 17 acres of developed grounds and approximately 30 acres of undeveloped MDT habitat contains lead contaminants. Soil sampling would determine the level of lead contamination and the course of remedial actions necessary.

Quarry Program

The quarry or burrow pit provides fill material and gravel to maintain roads and support infrastructure. There is one active burrow pit known as the "Quarry" in Area II totaling 64 acres (Figure 2). Quarry activities include rock blasting, soil disturbance, vehicular movement, and extensive excavation with heavy equipment. Water may be applied to minimize dust production. Quarry program projects are not anticipated to result in additional disturbances at this time.

Invasive and Non-Native Species Management Program

Invasive species management is a goal of the NAFB INRMP and the Integrated Pest Management Plan (IPMP) on USAF lands (NAFB et al. 2019). Both plans are subject to the provisions of the National Invasive Species Management Plan and the Federal Noxious Weed Act (7 USC 2814). The INRMP defines the responsibilities of the USAF and outside agencies regarding land and wildlife management, including control of pests and exotic species. The Invasive and Non-Native Species Management Program projects may result in up to 1,300 acres of new temporary disturbance within habitat.

Raven and Predator Management – Management of ravens currently takes place under a Federal and State Depredation permit within the 57th Wing Flight Safety flight line and wildlife exclusion zone. Under the permit, a limited number of lethal take of ravens is permitted within the Wildlife Exclusion zone. As an additional measure to limit ravens and other scavengers, roadkill is removed from roads on and surrounding NAFB to reduce subsidies.

Non-Native Plant Species Management – Non-native plant species management would be conducted under guidance issued in the IPMP (NAFB et al. 2019). The INRMP defines the responsibilities of the USAF and outside agencies regarding the control of pests and exotic species. No Federally listed noxious weeds have been found on NAFB. 3 state-listed noxious weeds (salt cedar [*Tamarix spp.*], Sahara mustard [*Brassica tournefortii*], and Malta starthistle [*Centaurea melitensis*]) have been found on NAFB (NAFB et al. 2019). Other invasive species that are not Federally or state listed as noxious weeds but have been detected on NAFB include cheatgrass (*Bromus tectorum*), red brome (*Bromus japonica*), salt lover (*Halogeton glomeratus*), and Russian thistle (*Salsola tragus*).

Non-native plant species management activities may include mechanical and chemical methods that inhibit non-native species from becoming established or remove individuals or populations. Mechanical control techniques include pulling, cutting and removing flowers before seeding occurs, mowing, plowing, or other non-chemical treatments that create unfavorable conditions for non-native plants. Chemical control techniques may include applying pre-emergent treatments and herbicides that inhibit non-native plant species growth and establishment. Revegetation activities may accompany non-native plant species control.

Due to anthropogenic influences, non-native plant species in Area II are of greatest concern (Figure 4). Non-native plant species treatments on NAFB are ongoing; specific locations, acreages, and priorities are outlined in the INRMP. Up to 250 acres of Sahara mustard would be treated via mechanical and chemical controls. An additional 1,300 acres may be treated for non-native plant species over the next 10 years.

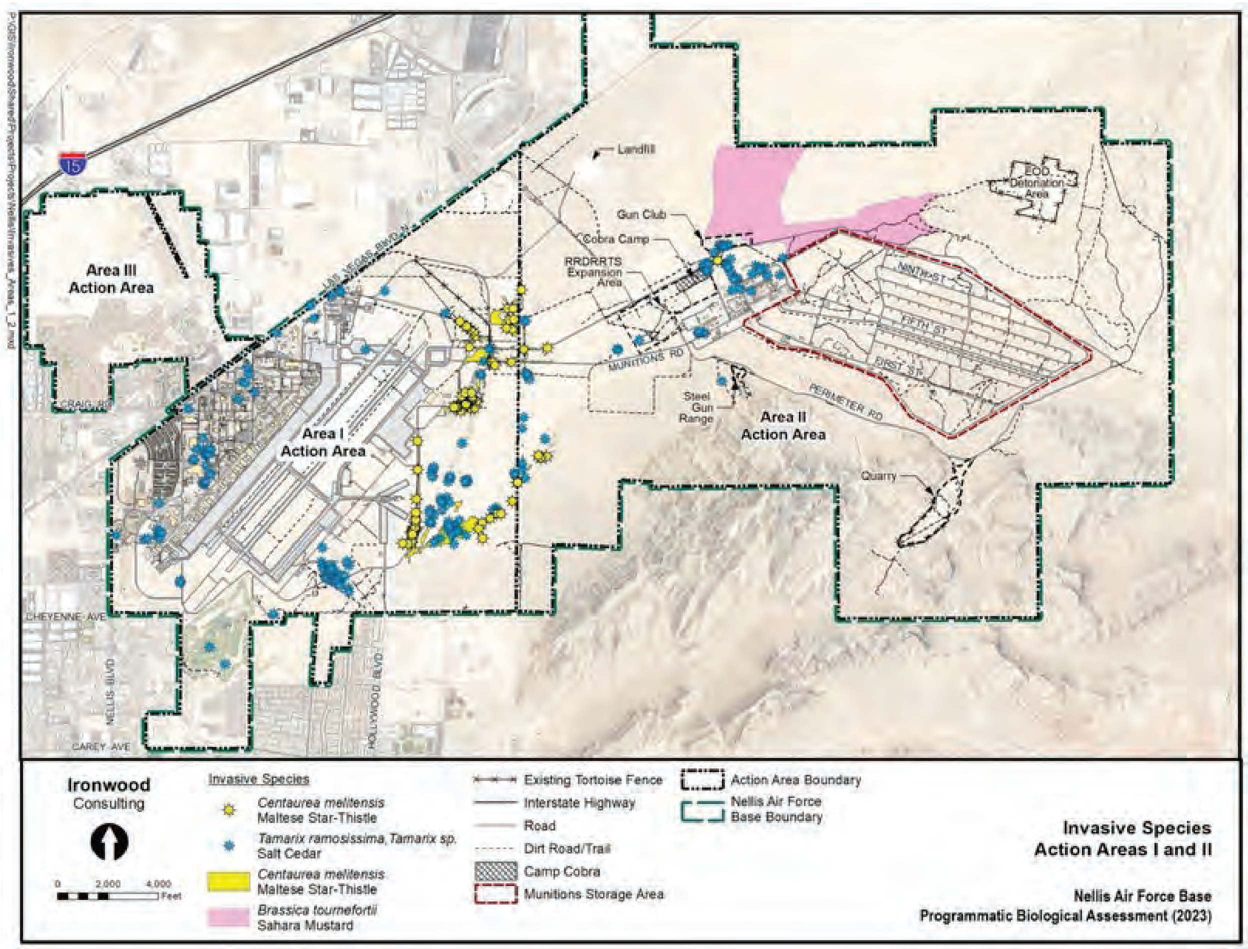

Figure 4. Populations of non-native plant species on NAFB

Ongoing Training Activities Program

General training activities on NAFB include rescue training, heavy machinery training, artillery use training, and activities with the use of air and vehicle operations support. Ground training includes several activities but generally involves small groups of soldiers moving from one objective to the next objective. To increase the realism of the training events, some training ammunition (blank small arms), hand flares, smoke grenades, or other training munitions (such as paint balls) are expended during certain operations. The training activities program may result in up to 40 acres of new temporary disturbance and 20 acres of new permanent disturbance within MDT habitat.

Ground training on foot involves movement under covert, clandestine conditions without leaving any evidence of troop presence. Troop movement is usually in small groups and large troop movements impacting large areas would not occur. Land navigation training would occur during the daytime or nighttime. Troop movement on foot would also be used for training in search and rescue, personnel recovery, and reconnaissance. Personnel movement usually occurs on established roads, along mountainous terrain, and in washes. Movements would occur in such limited frequency over the same area that the physical impact on the ground is expected to be negligible.

Typical troop movement training activities would include the following activities. Road marches conducted on existing roads for extended lengths of travel. 6-12 person team insertions and extractions. Insertions are clandestine activities and regardless of how an insertion is accomplished, personnel would often walk out of the insertion area. Clandestine movement by foot to training objective sites. Ground support vehicles are occasionally integrated into the training to deliver and retrieve the participating troops or provide support and logistics. Ground vehicle movement is restricted to existing roads and some training integrates the use of all-terrain vehicles.

Artillery use training includes conducting training exercises and target practice. There is one active gun range within Area II known as the Steel Gun Range (Figure 2 or 4). The Steel Gun Range is approximately 4.3 acres in size and is considered disturbed, but is not fenced to separate the area from the surrounding MDT habitat. The SAR is an 11,446-acre gun range complex with five ranges that enable qualification and proficiency training for 4 Department of Defense components, 17 units, and over 13,000 members.

Ongoing Non-Defense Related Program

NAFB supports a variety of research and development activities in cooperation with universities, industry, and other federal agencies. Examples include safety aspects of handling and responding to incidents, evaluation of solar energy technologies and options, and commercial use of unmanned aerial vehicles. In addition to these activities, a golf course is operated and maintained in Area I. Ongoing non-defense related activities are not anticipated to result in additional disturbance.

As part of the ongoing INRMP, the USAF would continue to assess baseline conditions for vegetation, unique habitats, and rare plants and wildlife including listed and sensitive species. This action has been ongoing since 2010. Surveys for MDT and other species including plants were conducted to build a comprehensive baseline of the plant community and wildlife in the Project Area. These surveys help to validate population estimates, monitor population trends, and are used to Inform natural resource managers and military planners of sensitive locations to avoid, when appropriate.

Security Control Operations Program

The NAFB boundary is partially fenced with subareas within the boundary fully fenced. Some subareas, such as the MSA and EOD have restricted entry. Under the Security Controls Operation Program, NAFB would install, maintain, and repair fences within and around NAFB and enforce security measures. Enforcement would include patrols along fence and barrier boundaries and surveillance activities. Ongoing Security Control Operations Program activities would result in up to 24 acres of new temporary disturbance and a total of 26 acres of new permanent disturbance of MDT habitat.

Northeastern Internal Securing Fencing – The USAF would install a new internal perimeter fence and graded dirt road within the northwestern extent of NAFB to provide an additional layer of security. An existing 11,200 linear foot gap in the existing fence along NAFB's northeastern perimeter and south of Camp Cobra would be fenced (Figure 2). This would result in the closure of area I and the western extent of Area II with fencing intended to prohibit human trespassing.

The new fence would be constructed 8-foot high from woven 9-gauge steel wire, chain link material with 2-inch square mesh, and triple strand barbed wire outriggers. Chain link fence would be constructed no higher than 2 inches above the ground. Access would be through two lockable swing-type gates. The northwestern end of the fence segment would be tied into existing MSA fencing (Figure 2). The project would also entail replacement of the current swing gate leading up the road towards the quarry. To traverse drainage ditches and maintain stormwater flow, concrete headwalls with security grates and culverts would be installed as necessary. The project would also include the construction of 6,300 feet of new access roads. The new roads would be 12 feet wide and would follow the new fencing to allow access for patrolling and maintaining the fence. The project to install new fence and road would result in approximately 6 acres of new disturbance.

PROPOSED MEASURES TO MINIMIZE POTENTIAL EFFECTS OF THE ACTION

To minimize adverse effects to the MDT that may result from proposed programs, operations, and activities described above, the USAF would implement the following protective measures during the duration of the proposed action. These measures would apply to ***program-level*** and ***framework programmatic actions***. If necessary, the USAF would develop and propose additional measures for future activities (***framework programmatic actions***) proposed to be appended under this programmatic biological opinion.

1. USAF NNRP (Natural Resources Program) managers and authorized biologists would ensure implementation of measures during project planning and implementation that minimize injury and mortality of MDT as a direct result of projects and activities within the range of the MDT.

1.1 Project Review

The USAF NNRP manager would review proposed projects to determine if and how they could affect the MDT and would recommend adjustments to projects if there is potential for take of the species. The NNRP manager would ensure that projects are compliant with applicable environmental laws and policies including the authorities identified in Table 1-1 of the INRMP (NAFB et al., 2019), the conservation and minimization measures outlined in the USAF BA, and the conservation and minimization measures in this PBO. When possible, construction, operation, and maintenance activities within MDT habitat would preferentially occur during less active times of the year for MDT, which includes the months of November through February and periods when ambient air temperatures typically fall outside of 60 to 95 degrees Fahrenheit.

1.2 Authorized Desert Tortoise Biologist (ADTB) and Desert Tortoise Monitors (DTM)

ADTB and DTM would be responsible for ensuring compliance with all conservation and minimization measures during construction and operations and maintenance (O&M) activities that may result in injury or mortality of MDT. Any incident occurring during project activities that was considered by a ADTB or DTM to be in non-compliance would be immediately documented by an ADTB. Documentation would include photos, GPS coordinates, details on the circumstances of the event, and actions taken to remedy the issue. The incident would be included in the annual report and post-project report. The ADTB and DTM would have a copy of all minimization measures when work is being conducted and would have authority to halt any activity that is in violation of the measures. Large scale projects with longer than a few days' duration would additionally require the USAF to include the necessary funding to meet all required protective measures for the entirety of the project. The use of ADTB and DTM would be in accordance with the most current Service guidance. NAFB would submit a résumé for each proposed ADTB, with at least three references and contact information, to the Service for confirmation that the applicant meets the minimum qualifications. The ADTB(s) must meet the following minimum qualifications:

- Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field.
- Thorough and current knowledge of MDT behavior, natural history, ecology, and physiology, and demonstrate substantial field experience and training to conduct their required duties safely and successfully.
- Three years of experience in field biology.
- Have at least 1 year of field experience with biological resources found in the Mojave desert region.
- Meet the Service's current ADTB qualifications criteria (Service 2009), demonstrate familiarity with protocols and guidelines for the MDT, and be approved by the Service.

1.3 Authorized Desert Tortoise Biologist Responsibilities

ADTB would comply with the conservation measures in the BA, this PBO, and the Service's guidelines on MDT surveys and handling procedures. The ADTB would be responsible for knowing the latest information on protocols and guidelines for the MDT and have the knowledge and experience to conduct all of the activities listed in Section 3.1 of the Desert Tortoise Field Manual (Service 2009). The ADTB would meet qualification requirements and would ensure proper implementation of conservation measures outlined in the PBO.

ADTB would also serve as mentors to train DTM and would approve DTM to conduct specific activities based on their demonstrated skills, knowledge, and qualifications. ADTB would only perform the duties as authorized by the Service. Responsibilities for the ADTB may include:

- Submit a Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) for each MDT handled.
- Perform a basic assessment of the physical condition of MDT (e.g., identify basic clinical signs of potential upper respiratory tract disease).
- Maintain approved biosecurity protocols when working with MDT, avoid cross-contamination of supplies and of MDT individuals, and disinfect all sampling gear.
- Move MDT away from situations where they are in danger of injury or death (e.g., move MDT out of harm's way from unfenced work areas, access roads, linear facilities).
- Translocate MDT prior to implementation of a project as per the most recent Service's translocation guidance, or the NAFB MDT translocation plan, if required.
- Successfully rehydrate MDT, if necessary.

1.4 Desert Tortoise Monitor Responsibilities

The DTM designated for projects would comply with conservation measures in the BA, this PBO, and the Service's guidelines on MDT surveys and handling procedures. The DTM would assist the ADTB in conducting surveys, monitoring site construction mobilization activities, construction related ground disturbance, grading, boring, or trenching. The DTM would assist ADTB during surveys and serve as apprentices to acquire experience. The DTM would report incidents of noncompliance to the ADTB. If a MDT is in harm's way (e.g., certain to immediately be injured or killed by equipment), a DTM may move the MDT to a designated safe area until an ADTB assumes care of the animal. The DTM would have a copy of all minimization measures when work is being conducted and would have the authority to halt any activity that is in violation of the minimization measures. DTM may not conduct field or clearance surveys or other specialized duties of the ADTB unless directly supervised by an ADTB; "directly supervised" means the ADTB has direct voice and sight contact with the DTM.

1.5 Desert Tortoise Translocation Plan

All translocation activities would follow the Service's current translocation guidance (2020) or any updated translocation guidance. If a project-specific translocation plan is required for NAFB, one would be developed at that time in coordination with the Service. Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

1.6 Desert Tortoise Awareness Training

NAFB would continue to implement and update, as necessary, a Desert Tortoise Awareness Training (DTAT) for all workers including military, civilians, and contractors involved in training, normal job duties, construction, and operation and maintenance. A PowerPoint presentation, video, or fact sheet, as approved by the Service, may be presented or provided in lieu of a presentation for projects with low impact potential as determined by the NNRP. The DTAT program would address the following:

- Types of activities that may affect the MDT and the required MDT protective measures.
- MDT life history and threats, including ravens and other subsidized predators.
- Legal protections, the definition of 'take,' and associated penalties.
- Responsibilities of workers and biologists.
- Participation reporting requirements.
- Proper techniques to handle and move MDT if in harm's way (e.g., on a busy road).

1.7 Equipment Checks

Any vehicle or equipment at a project site within MDT habitat would be checked underneath before moving. This includes in the morning, and before any construction activity begins. If a MDT is observed, the NNRP Manager or project specific ADTB would be contacted.

Vehicles and equipment operating in MDT habitat would be inspected and cleaned prior to being brought onto a project site, to prevent the movement of non-native invasive species into new habitats. Personnel would also clean personal equipment such as shoes and clothing.

1.8 Halting of Project Activities

Project personnel would halt activities when the continuation of such activities would endanger a MDT or if a MDT is encountered on a project site. The NNRP Manager or project specific ADTB would be contacted and would respond to the sighting as soon as feasible, ideally within 1 hour of notification during normal operating hours. Project activities can resume if a MDT moves out of the work area on its own, and is out of harms' way, after coordination with the ADTB. Project activities would resume after the NNRP Manager or ADTB assesses the situation and takes appropriate action to avoid, minimize, or mitigate the direct impact to the MDT.

1.9 Noise and Vibration

The USAF would minimize and avoid excessive noise and vibration associated with various construction and military operations where possible.

2. USAF NNRP managers and authorized biologists would ensure implementation of measures during MDT clearance, handling, and translocation procedures that minimize injury and mortality of MDT as a direct result of projects and activities within the range of the MDT.

2.1 Desert Tortoise Clearance Surveys

In areas where new disturbance to MDT habitat, or disturbance to recovered MDT habitat are likely to occur, the project site would be cleared of MDT prior to construction by ADTB using the Service's protocols (Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

During the active MDT season (April through May and September through October), clearance surveys would be conducted either the day prior to, or the day of, any surface-disturbing activity. During the less-active season (November through March and June through August), clearance surveys would be conducted within 7 days prior to any surface-disturbing activity. No surface-disturbing activities would begin until two consecutive surveys yield no MDT. Clearance surveys would be coordinated with the NNRP manager in advance of any project.

In addition to clearing the disturbance area, a perimeter around the project area would be surveyed, as determined by the NNRP manager. The determination to conduct perimeter surveys and the width of the perimeter would be made by the NNRP manager and would be based on the location of the project in MDT habitat according to the current MDT habitat map.

A DTM would oversee the project sites during all project construction and earth-moving activities until the project is complete to ensure compliance. Monitoring would consist of surveying new fence lines a minimum of three times per day and monitoring of construction activities with either full-time monitoring or spot-checks, as needed. At the discretion of the NNRP manager, other personnel may be trained by an ADTB to conduct fence line surveys. Any MDT or MDT eggs found within the project area would be properly removed by a qualified ADTB (Service 2009). If any MDT are found within the work area in harm’s way, the ADTB would translocate the MDT in accordance the Service’s current translocation guidance.

All MDT burrows and those constructed by other species that might be used by MDT would be examined to determine occupancy by MDT. Outside construction work areas (e.g., unfenced areas), all potential MDT burrows and pallets within 50 feet of the edge of the construction work area would be flagged. If a burrow is occupied by a MDT during the less-active season, the MDT would be temporarily penned. No stakes or flagging would be placed on the burrow mound or in the opening of a MDT burrow. MDT burrows would not be marked in a manner that facilitates disturbance. Avoidance flagging would be designed to be easily distinguished from access route or other flagging and would be designed in consultation with experienced construction personnel and ADTB. All flagging would be removed following construction activities. ADTB or DTM would inspect areas to be backfilled immediately prior to backfilling.

2.2 Excavation of Desert Tortoise Burrows

All burrows found within areas proposed for disturbance that cannot be avoided, whether occupied or vacant, would be excavated by an ADTB and collapsed or blocked to prevent occupation by MDT. All burrows would be excavated with hand tools to allow removal of MDT and MDT eggs. All MDT handling and burrow excavations, including nests, would be conducted in accordance with the Service's approved protocol (Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

2.3 Translocation of Tortoises and Tortoise Eggs

During clearance surveys, all handling of MDT and their eggs and excavation of burrows would be conducted solely by a ADTB in accordance with the most current Service-approved guidance

(Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

MDT may be relocated up to 984 feet into adjacent undisturbed suitable MDT habitat. If MDT are to be moved greater than 984 feet, the NNRP manager would consult with the Service to determine if the development of a project-specific translocation plan and identification of a recipient site is warranted.

MDT found aboveground would be placed under a marked bush in the shade. A MDT located in a burrow would be placed in an existing unoccupied burrow of the same size as the one from which it was removed. If a suitable natural burrow is unavailable, an ADTB would construct one of the same size and orientation as the one from which it was removed. The construction method would adhere to the Service's protocol for burrow construction. Any MDT found within 1 hour before nightfall would be placed individually in a clean cardboard box and kept overnight in a cool, predator-free location. To minimize stress to the MDT, the box would be covered and kept upright. Each box would be used only once and would then be discarded. The MDT would be released the next day in the same area from which it was collected and placed under a marked bush in the shade.

Each MDT moved would be identified by distinguishing marks, photography, or a temporary mark to facilitate reporting multiple captures and movement of the same animal. If MDT need to be permanently marked with a unique MDT ID tag, and/or radio-transmitter, the NNRP manager would consult with the Service. Prior to translocation, MDT would be examined for recent physical trauma, and given a basic health assessment (without sample collection) by an ADTB. MDT not deemed suitable for translocation by the ADTB would be removed for follow up care, which may include quarantine, and/or veterinary care.

Individual MDT would be determined eligible or ineligible for translocation based on their physical condition per the algorithm in Appendix G of the Service's guidelines (2019). Individual MDT eligible for translocation are those that exhibit an appropriate attitude and activity; an acceptable Body Condition Score of 4 through 7; no mucoid and not more than mild, serious nasal discharge; no oral lesions; and no other condition that may impact its survival (Appendix G of the Service's Health Assessment Procedures; Service 2019)

If translocations greater than 984 feet are necessary, a site-specific translocation plan may need to be developed in coordination with the Service. In that case, prior to translocation, a minimum of two health assessments would be completed 14-30 days apart. Additional assessments (outside of 30 days) may be conducted, but a narrow window is necessary to discover MDT with intermittent clinical signs. The final assessment would occur immediately prior to the translocation date, and the final assessment would serve as the baseline condition with which to compare post-translocation assessments and as a final check against the algorithm (Service 2019) that the MDT are suitable for translocation. Any MDT that were previously approved for translocation, but on the final assessment do not pass the health algorithm, would not be translocated and would remain in quarantine for a maximum of 12 months, until a final disposition is determined in coordination with the Service and Nevada Department of Wildlife (NDOW).

Translocations would occur in spring (April 1 through May 31) or fall (September 1 through September 30), which is the period identified in the Service's guidance (Service 2020). NAFB would plan to hold any MDT removed from project sites after the final date of translocation. In order to translocate a MDT, the following conditions would be observed:

- Releases would occur only when temperatures range from 65-85°F and are not forecasted to exceed 90°F within 3 hours of release or 95°F within 1 week of release.
- Forecasted daily low temperatures would not be cooler than 50°F for 1-week post-release.

Disturbance of MDT burrows would be avoided from May 15 to September 30 to prevent impacts to buried egg clutches and emerging hatchlings. If this is not possible, active burrows impacted by the action must be carefully excavated or inspected to determine if eggs are present. Eggs found in burrows must be removed and placed in a new burrow in suitable habitat according to the current recommendations found in Guidelines for Handling Desert Tortoise during Construction Projects (Service 2009). Following the inspection of burrows, all burrows must be collapsed to prevent future use.

2.4 Appropriate Handling of Tortoises

Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements. MDT would be handled in accordance with the most current Service-approved field guidance (Service 2009). MDT would be treated in a manner to ensure they do not overheat, exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. MDT would be kept shaded at all times until it is safe to release them. No MDT would be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above 95°F; an exception would be the need to capture a MDT in imminent danger, such as on the road. Ambient air temperature would be measured in the shade, protected from wind, at a height of 2 inches above the ground surface. No MDT would be handled if the ambient air temperature is anticipated to exceed 95°F before handling and/or translocation can be completed.

Unless in imminent danger, MDT would only be moved by a ADTB or a DTM solely for the purpose of moving the MDT out of harm's way. During construction, operation, and maintenance, an ADTB may pen, capture, handle, and relocate MDT from harm's way as appropriate and in accordance with the most current Service-approved guidance. Each MDT handled would be given a unique number in the database for record keeping, photographed, and the biologist would record all relevant data on a Desert Tortoise Handling and Take Report to be provided to NAFB in accordance with the project reporting requirements. MDT would not be physically marked with a unique identifier (e.g., ID tag).

If MDT need to be moved at a time of day when ambient temperatures could harm them (less than 40°F or greater than 95°F), they would be held overnight in a clean cardboard box. These MDT would be kept in the care of an ADTB under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes would be discarded after one use and never hold more than one MDT.

MDT located in an unfenced project area sheltering in a burrow during the less-active season may be temporarily penned at the discretion of a ADTB. MDT would not be penned in areas of moderate to heavy equipment use and would be moved from harm’s way in accordance with the most current Service-approved guidance (Service 2009).

Equipment or materials that contact MDT (including shirts and pants) would be sterilized, disposed of, or changed before contacting another MDT to prevent the spread of disease. All MDT would be handled using disposable surgical gloves and the gloves would be disposed of after handling each MDT. An ADTB would document each MDT handled by completing a Desert Tortoise Handling and Take Report.

If a MDT is encountered and appears to be experiencing heat stress, it would be placed in a tub, by an ADTB with 1 in. of water in an environment with an ambient temperature between 76°F and 95°F for several hours, until heat stress symptoms are no longer evident.

If a MDT voids its bladder, the individual would be offered water. The MDT would be rehydrated by offering the MDT water through nasal-oral administration or soaking it in water for 30 minutes by an ADTB.

2.5 Penning of Desert Tortoises

Penning would be accomplished by installing a circular fence that is approximately 20 feet in diameter to enclose and surround an adult MDT burrow. Pens may be smaller or larger depending on season, local topography, vegetation cover, and size of the MDT. Steel T-posts or rebar would be placed every 5 to 6 feet to support the pen material. The pen material would extend 18 inches to 24 inches above ground. The bottom of the enclosure would be buried 6 to 12 inches or bent toward the burrow, have soil mounded along the base, and other measures implemented to ensure zero ground clearance. Care would be taken to minimize visibility of the pen where disturbance by personnel occurs. An ADTB or DTM would check the pen at a frequency to ensure that the MDT is secure and not stressed. No MDT would be penned for more than 48 hours without written approval by the Service.

2.6 Quarantine Facilities

If any MDT do not meet the translocation criteria (e.g., due to injury or health indicators) quarantine pens would be constructed according to husbandry procedures in accordance with the most recent Service guidance. The location of the pens would be determined at that time, and an off-site facility may be considered in consultation with the Service. The pens would be at least 19 feet by 19 feet for adult MDT and 6 feet by 6 feet for juvenile MDT. Additional health examinations would be performed as necessary to determine their final disposition. Adult MDT found healthy and clinically disease-free after a period of quarantine, not to exceed 12 months, to be determined in coordination with the Service, would be moved to the selected translocation site. MDT assessed as clinically ill or diseased would not be placed in situations where contagion can spread to healthy MDT. If the MDT is unable to be returned to the wild, the final disposition would be determined by the Service. NAFB would identify a suitable quarantine facility and/or local veterinarian for use as needed.

3. USAF NNRP managers and authorized biologists would ensure implementation of authorized buffers and fences during project planning and implementation that minimize injury and mortality of MDT as a direct result of projects and activities within the range of the MDT.

3.1 Fencing and Land Use Controls

MDT clearance surveys (Service 2009) would be completed prior to both permanent and temporary fence installation. Additionally, an ADTB or DTM would be present during installation. Direct removal of vegetation and ground disturbance would be minimized when installing fencing. Bulldozer clearing or other major soil-disturbing methods would be avoided whenever possible. In areas with heavy vegetation, irregularly shaped fence line clearings would be used to minimize disturbance rather than fence lines with uniform clearing widths when feasible. Mechanical clearing can be used if accompanied by actions that minimize soil loss and allow restoration of native vegetation.

MDT shade structures may be installed along temporary and permanent fence lines, every 984 feet to provide cover for MDT pacing new fence lines (Service 2018). Shade structure installation would be dependent on the individual project circumstances and perceived risk to MDT. MDT gates would be placed at all road access points where MDT-proof fencing is interrupted, to exclude MDT from the facility (Service 2018). Gates would provide minimal ground clearance and deter entry by MDT. In general, fencing would be inspected according to the criteria and schedule outlined in Table 2 below.

Table 2. MDT exclusion fence inspection schedule.

Condition	Minimum Requirements
Quarterly	Inspect fencing perimeter, MDT gates, and gates once per quarter
Breach in fence observed, MDT guard or gate requires maintenance, during MDT less active season	Repair within one week of breach occurrence
Following a major storm event, MDT active season	Inspect fence perimeter, MDT gates, and gates within 72 hours
Breach in fence observed, guard or gate requires maintenance, MDT active season	Repair within 48 hours of breach occurrence

3.2 Temporary Fencing

In areas where permanent fencing is not installed, temporary MDT fencing would be installed around the perimeter of an excavation area during construction activities and removed after all activities are completed and the site is restored. All construction areas in MDT habitat, including open trenches, would be fenced with temporary MDT-proof fencing and inspected by an ADTB or DTM periodically throughout and at the end of the day and immediately the next morning to ensure that there are no breaches in the fencing and there are no MDT pacing the fence. Temporary fencing would be designed in a manner that reduces the potential for MDT and hatchlings to access the construction areas. Temporary fencing may be fabric cloth or plastic mesh, provided that the gaps in the mesh are 2 inches by 2 inches or less. Fencing would be buried either 4 inches deep, or 6 inches to 12 inches of fencing would be folded outward (i.e., away from the construction area), and covered with soil, rocks, and staking to maintain zero ground clearance and secure the bottom section of material. The above ground fencing would be between 18 to 24 inches above ground. Sections of fencing would be used for linear projects and moved along the line as the project progresses. The fencing would remain closed during any construction activities.

3.3 Permanent Fencing

At the NNRP manager's discretion, permanent MDT-proof fencing would be used around permanent above-ground facilities that are regularly accessed by vehicles, equipment, or other military activities. Permanent fencing would be installed around the perimeter of the RADRRTS mock runway, including a 500-foot buffer to protect MDT from explosive debris.

Permanent fence specifications would be consistent with those approved by the Service (Service 2009). Fences would be constructed with durable materials (i.e., 16 gauge or heavier) suitable to resist desert environments, alkaline and acidic soils, wind, and erosion. Fence material would consist of galvanized welded wire that measures 1 inch by 2 inches by 34 inches. Other materials include Hog rings, steel T-posts, and smooth or barbed livestock wire. Hog rings would be used to attach the fence material to existing strand fence. Steel T-posts (5 feet to 6 feet) are used for new fence construction. Standard smooth livestock wire fencing would be used for new fence construction, on which MDT-proof fencing would be attached. T-posts would be driven approximately 24 inches below the ground surface and spaced approximately 10 feet apart. Livestock wire would be stretched between the T-posts, 18 to 24 inches above the ground to match the top edge of the fence material; MDT-proof fencing would be attached to this wire with hog rings placed at 12 to 18-inch intervals. Smooth (barb-less) livestock wire would be used except where grazing occurs (Service 2009).

NAFB perimeter security fencing, which is described in the "Security Controls Operations Program" would not entirely exclude MDT; however, MDT passage may not be permissible if in conflict with securing NAFB from human trespassing (e.g. filling in large holes beneath fence).

Permanent MDT-proof fencing along the project area would be appropriately constructed, monitored, and maintained (see Table 2), and would be included in the NAFB Real Property database. Monitoring and maintenance would include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried, clearing of MDT gates as needed, and maintenance of shade structures to ensure they are functional for use by MDT.

3.4 Wildlife Escape Ramps

In areas where MDT have the potential to become trapped in trenches or open excavations, escape ramps would be placed on either side of the open trench or excavations at a distance no greater than every 0.25 miles. These distances would be reduced if the ADTB determines that the escape ramp spacing is insufficient to facilitate animal escape from a trench or excavation. Any MDT that is found in a trench or excavation would be promptly removed by an ADTB in accordance with the most current Service-approved guidance.

3.5 Buffers Around Blast Sites

If blasting is required in MDT habitat during remediation activities, detonation would only occur after the area has been surveyed and cleared by an ADTB no more than 24 hours prior. A minimum 200 foot-buffered area around the blasting site would be surveyed. A larger area would be surveyed depending on the anticipated size of the explosion as determined by the ADTB. All MDT above ground within the surveyed area would be moved 500 feet from the blasting site to a shaded location or placed in an unoccupied burrow. MDT that are moved would be monitored or penned to prevent returning to the buffered survey area. MDT located outside of the immediate blast zone and that are within burrows would be left in their burrows. All potential MDT burrows, regardless of occupied status, would be stuffed with newspapers, flagged, and their location recorded using a GPS unit. Immediately after blasting, the newspaper and flagging would be removed. If a burrow or cover site has collapsed that could be occupied, it would be excavated by an ADTB to ensure that no MDT have been buried and are in danger of suffocation. MDT removed from the blast zone would be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

4. USAF NNRP managers and authorized biologists would ensure implementation of road and vehicle use measures during project planning and implementation that minimize injury and mortality of MDT as a direct result of projects and activities within the range of the MDT.

4.1 General Vehicle and Road Use Parameters

Project personnel would exercise vigilance when commuting to the project area to minimize the risk for inadvertent injury or mortality of all wildlife species encountered on paved and unpaved roads leading to and from the project site. Speed limits would be clearly marked, and all workers would be made aware of these limits. A speed limit of 35 miles per hour would be maintained on paved roads in MDT habitat. Speed limits of 25 miles per hour would be maintained for all regular vehicle travel on gravel roads and 15 miles per hour on two-track roads and trails. For large linear projects, vehicles and construction equipment would operate in groups whenever feasible. A ADTB would escort or clear the area of MDT in front of each traveling construction equipment group. If a MDT is observed within harm’s way on or in the shoulder of a road, it would be moved out of harm’s way in the direction the MDT is facing when discovered. An event that involves a MDT being moved off a road would be reported to the NNRP manager and would be included in the annual report to the Service. Construction of roads, blading of existing roads, or other surface-disturbing activities would not exceed the minimum size required for safe usage.

4.2 Prohibition of Off-Road Vehicle Travel

NAFB would limit vehicle use to established roads. Ground-disturbing activities outside of existing graded, paved, or utility access roads during construction or O&M would be coordinated through the NNRP. Vehicle parking, material stockpiles, and construction related materials would be confined to designated laydown yards and previously established roads.

4.3 Strategic Water Use

Water would be used as a dust control measure during periodic road maintenance activities on major NAFB roads, such as repair and prevention of potholes forming. Water applied for dust control would not be allowed to accumulate in depressions and potholes in roads, which can attract MDT to the area to drink. Natural precipitation can also accumulate in these areas and bring MDT to the road to drink, especially during the hot summer months. Water trucks would be sealed, and not be overfilled. All workers would be directed to report any water leaks, and any leak causing surface water that could be available to predators would be promptly repaired. Construction personnel would be briefed on the potential for MDT to be attracted to pooled water at project sites. DTM would monitor areas where water is used for road repair and construction, and if MDT are observed, work would cease and the NNRP Manager would be notified.

5. USAF NNRP managers and authorized biologists would ensure implementation of measures to minimize predation on MDT by ravens or other MDT predators attracted to the project area.

5.1 Predator Minimization

NAFB would implement measures to discourage the presence of predators on site (e.g., coyotes, ravens, feral dogs, etc.), including elimination of available water sources, maintaining the litter control program, designing structures to discourage potential nest sites, and use of hazing to discourage raven presence.

5.2 Raven Management Plan Development

The NAFB would implement a Raven Management Plan to identify existing subsidies, describe minimization measures to reduce subsidies, document all raven sightings, and to monitor for the increased presence of ravens and other potential human-subsidized predators. The Raven Management Plan would include minimization measures outlined below. The raven management plan would include identifying raven subsidies and measures to minimize and reduce subsidies; and a description of the long-term monitor and reporting program to track the effectiveness of the plan.

5.3 Avian Predator Monitoring and Control Program

Raven monitoring would include reporting all raven observations (including date, location, number of ravens, and activity) during construction activities. Inactive raven nests would be removed. If sign of MDT predation (e.g., shell or carapace remains, MDT carcass) is observed below raven nests, the appropriate permits would be acquired to remove the nest. A summary of all raven nests that are removed and sign of MDT predation would be included in the USAF's annual report to the Service.

5.4 Litter Control Program

NAFB would implement a litter control program during outdoor program activities that would include the use of covered, predator-proof trash receptacles. The litter control program would be implemented to reduce the attractiveness of the area to opportunistic predators such as desert kit foxes, coyotes, and common ravens. Trash and food items would be disposed of properly in predator-proof containers with predator-proof lids and emptied daily. All trash and debris would be regularly collected and contained in covered containers to minimize attracting potential predators of the MDT (ravens). The only exception would be for temporary waste storage kept within closed vehicles until the end of a shift. This program would include the use of covered, predator-proof trash receptacles and proper disposal of trash in a designated solid waste disposal facility. Vehicles hauling trash to the landfill and leaving the landfill must be secured to prevent litter from being released along the road.

5.5 Landfill Control Program

Landfills would be properly managed and maintained to reduce the potential for scavengers such as ravens, dogs, and coyotes to congregate in areas used by MDT. Appropriate fencing maintained around these facilities would reduce the potential for terrestrial animals to access these facilities, and best management practices such as sorting trash with high organic matter (e.g., foodstuffs) and burying it immediately with sufficient cover would reduce the occurrence of potential predators of MDT. At the present time, no municipal or hazardous waste landfills (as opposed to construction and demolition landfills) are located in MDT habitat, and none are planned to be constructed.

5.6 Minimize Wildlife Food Subsidies

Predator food subsidies in the form of exposed, injured, or dead wildlife would be managed and maintained to reduce the potential for scavenging. Grading during site construction, operations, and decommissioning phases can injure or kill wildlife, especially small mammals and reptiles, and can unearth burrowing animals. Wildlife would be relocated from harm's way as feasible during ground-disturbing activities. The ADTB and DTM would collect and dispose of any animal remains found in any part of the work area. Road killed wildlife, including small to medium-sized mammals, reptiles, and (uncommonly) birds, all may serve as predator food subsidies. Workers would be directed to report any road-killed wildlife on roads or in work areas to the ADTB or DTM, and the ADTB or DTM would bury, or otherwise dispose of the remains. Currently, the U.S. Department of Agriculture Wildlife Services Biologist, patrols perimeter streets surrounding NAFB daily to remove any roadkill, to reduce bird air strike hazards.

5.7 Minimize Nesting, Roosting, and Perching Sites

New power poles installed in MDT habitat would be designed to discourage their use by raptors and ravens for nesting or perching in accordance with the most current Avian Power Line

Interaction Committee guidelines (APLIC 2023). Older poles where raven nests are found would be modified to discourage their use.

To minimize elevated perches for predators, signage, fencing, power poles, and antennas would only be installed where required. Projects that provide elevated perches for aerial predators such as towers, threat emitters, facility structures, or other aerial line support structures would be designed to discourage their use by ravens for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current Avian Power Line Interaction Committee.

5.8 Evaporation Ponds, Open Water Sources, Landscaping, and Irrigation

Use of evaporation ponds and open water sources would be minimized, as feasible, to reduce water subsidies for predators. Ponds would be covered to prevent wildlife access. MDT-proof fencing would be installed to prevent MDT from entering the ponds and to prevent predation of MDT at these sources.

Water subsidies from landscaping and irrigation features would be managed and minimized. If irrigation is used at any revegetation or landscaping sites, it would be managed to use only the minimum amount of water needed, and no accumulation of standing surface water would be allowed to occur. Any leaks would be repaired promptly. Landscaping features (e.g., golf course ponds) would be drained, and/or those maintained would have bird deterrent methods applied to prevent birds from aggregating (e.g., pond is filled with plastic blocks).

6. USAF NNRP managers would ensure implementation of measures to minimize MDT habitat loss and disturbance in the project area.

6.1 Habitat Disturbance and Habitat Loss

During project activities, NAFB would implement measures to minimize loss and long-term degradation and fragmentation of MDT habitat, such as soil compaction, erosion, crushed vegetation, or the introduction of non-native, invasive plant species. For areas that would be temporarily disturbed and were determined to be necessary by the NNRP manager, the top 6 inches of soil would be excavated separately from deeper soils and stockpiled in a separate location. Any excavations would be backfilled with deep soils first, with the topsoil being backfilled as the final layer. This allows the site to have a final layer of soil that approximates original soil conditions and that contains a relatively healthy seed bank for regrowth of vegetation; thus, rectifying potential soil displacement. Soils may be lightly rolled or compacted to reduce the potential for wind erosion.

6.2 Set Project Boundaries

The boundaries of disturbance areas proposed within MDT habitat would be delineated in the field before beginning any activities, and all disturbances would be confined to the delineated areas. Project personnel would be instructed that their activities must be confined within the surveyed areas. Off-road driving, travel outside flagged construction zones, and disturbance beyond the flagged areas would be prohibited.

6.3 Utilization of Previously Disturbed Land

To the greatest extent possible, all disturbances would be located in previously disturbed areas. If previously disturbed areas are not available, these activities would be restricted to the defined project area.

6.4 Non-native Invasive Plant Species Control

Equipment (e.g., road grader, bulldozer, scissor lift) brought onto the NAFB from off-site locations would be cleaned and inspected before the equipment is allowed to be used. Roadside vegetation surveys would be completed each year. If new invasive species (e.g., Malta starthistle and Sahara mustard) are noted, they would be spot treated with herbicides, preferentially before noxious weeds and non-native weeds have gone to seed. Herbicides would be sprayed along the major roadsides and around facilities to reduce wildland fire fuels. Only trained herbicide applicators would be allowed to spray herbicides, and herbicides would be used in accordance with product label requirements and restrictions.

Individuals applying herbicides would be instructed to stop work and notify the NNRP manager if they encounter a MDT. If conducting manual spot applications of herbicides to vegetation in upland habitats occupied by MDT, BLM would utilize the typical, rather than the maximum, application rate. If a MDT has been sprayed, an ADTB would rinse the animal with fresh water, including the plastron if needed.

6.5 Water and Dust Erosion Control

Erosion control measures would be used to reduce degradation of habitat by water and wind. Stormwater control measures would be implemented during construction, including installing temporary silt fencing and storm water control wattles along unvegetated ditches and slopes, soil rolling, and placing ground coverings over disturbed soils where wind and/or water erosion is possible.

Dust control measures would be implemented during ground disturbing activities if required, including soil rolling and wetting disturbed areas to reduce wind erosion. Spraying water is the primary method used for suppressing dust at project sites on NAFB.

6.6 Revegetation and Habitat Restoration

Passive restoration measures include minimizing perennial vegetation root removal, where possible, to retain soil stability and minimize soil erosion and fugitive dust pollution; and to aid in recovery of native vegetation. Where possible, mowing perennial vegetation would be used where topsoil removal and grading are not required as part of a project design.

The following active restoration measures would be implemented during and after ground disturbance: salvaging and stockpiling topsoil up to 6 inches for use in restoration where possible; decompacting soils; reseeding and revegetating disturbance areas with native species; treating non-native invasive plant species; applying mulches; and implementing stormwater control measures. Use of native plant species would minimize the need to water the vegetation, because native species are already adapted to the local climate and moisture regime of the area. Revegetation plans that emphasize restoration of MDT habitat to the extent possible would be prepared for all ground disturbing activities. The goals of revegetation would be to minimize soil loss and to restore native vegetative cover, so it resembles surrounding undisturbed land. The revegetation of sites would hasten plant succession. Successful reclamation within MDT habitat would restore disturbed habitat to suitable MDT habitat.

6.7 *Spill Prevention and Spill Response*

Hazardous and/or toxic materials, including but not limited to fuels, solvents, lubricants, etc., used during construction, or other military activities, would be properly stored and managed in accordance with the Nellis Hazardous Material Management Plan. Any leak or accidental release of hazardous and/or toxic material would be reported via 911 on a base landline or 702-652-9630 on a cell phone, mitigated in accordance with the Nellis Facility Response Plan 19-1, and reported to 99 CES/CEIEC via the Spill Phone: 702-277-1977 at the time of the occurrence.

7. USAF would ensure implementation of mitigation measures to compensate for effects to MDT due to program activities in the project area with remuneration fees and conservation actions.

The USAF proposes to compensate for effects to the MDT through habitat restoration or payment of fees to be used to contribute to the recovery of the species. Restoration means planning for the short-term, medium-term, and long-term recovery of the affected habitat. Restoration activities would include pre-monitoring and post-monitoring, re-establishment of native habitat structure by seeding, planting, vertical and horizontal mulching, and preventing the establishment of non-native invasive species with the use of preemergent herbicides. Any areas temporarily impacted by excavation and other activities would be returned to their original contours and allowed to naturally return to the original habitat. Fees or habitat restoration would only occur for new areas of soil disturbance and would be identified through monitoring (using geographic information systems [GIS], or other means available as agreed upon by USAF and the Service), annual reporting, and project-specific consultations.

The USAF would work with the Southern Nevada Fish and Wildlife Office in Las Vegas to determine areas on NAFB suitable for restoration activities and set these acreages aside for land-use controls (e.g., development restrictions); these compensation areas can serve as a “mitigation bank” for MDT habitat. MDT habitat projects would be developed and agreed to by the Service prior to implementation of activities covered under the PBO, but those habitat projects do not necessarily need to be completed before the covered activity begins.

If restoration is not feasible, the USAF would provide fees to contribute to the recovery of the MDT to offset destruction of habitat. Fees would be based on current rates at that time, as determined by the Service’s annual adjustment of MDT remuneration fees collected under the ESA Section 7 Biological Opinions.

8. USAF NNRP managers would ensure implementation of measures to minimize MDT habitat loss and disturbance in the project area due to the threat of wildland fires.

Wildland fires do not typically occur in MDT habitat on the NAFB, but the potential exists. NAFB currently has a wildland fire management plan to protect people, property, and minimize environmental damage, including the protection of MDT and their habitat (NAFB 2021). The plan is implemented by a coordinated approach to wildfire response and risk mitigation that includes Fire and Emergency Services, installation natural resources personnel, the Air Force Wildland Fire Branch, and cooperators including staff from the BLM and the Service.

The following proactive actions are in place to prevent or minimize the size of and damage caused by wildland fires:

- Wildfires, whether on or adjacent to lands administered by the USAF, which threaten life, improvements, or are determined to be a threat to natural and cultural resources under USAF jurisdiction, would be considered emergencies and their suppression given priority over other USAF programs.
- Installations would cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildfire situations, to establish processes for analyzing situations and establishing priorities, and for implementing management responses to these situations.
- Installations would enforce rules and regulations concerning the unauthorized ignition of wildfires and aggressively pursue violations.

The protection of human life, safety of firefighters, and protection of government property are the first priorities of wildland firefighting on NAFB. Because the potential adverse effects to MDT from a catastrophic wildfire outweigh the effects of fire suppression, all efforts to suppress and prevent catastrophic fires would be prioritized over efforts to minimize the impacts of suppression. Given these primary considerations, the following minimization measures would be used to minimize impacts on MDT and their habitat:

- Avoid spreading non-native plants by ensuring that all firefighting equipment has been cleaned before entering the area.
- Use the current map for potential MDT habitat as designated by the Service and mapped by the NNRP to determine where special consideration suppression tactics would be conducted.
- Minimize soil surface disturbances during fire suppression.
- Limit the use of mechanized equipment when possible.
- Restrict use of firefighting equipment and vehicles to existing roads and trails when possible.
- The use of aerial retardant is the preferred method of fire suppression. Foam or fugitive retardant is preferable to iron oxide retardant in MDT habitat.
- Establish fire camps, staging areas, and helispots in previously disturbed areas outside mapped MDT habitat. If possible, this would be accomplished in consultation with an assigned resource advisor.
- Provide all firefighters and support personnel with a briefing on MDT and their habitat to minimize MDT injuries and destruction, particularly those associated with vehicle use.

9. USAF NNRP managers and authorized biologists would ensure compliance with the proposed minimization measures, reasonable and prudent measures, terms and conditions, reporting requirements, and reinitiating requirements.

9.1 *Documentation of Mojave Desert Tortoises*

An ADTB would record each observation of MDT, including location, date, time of observation, whether the MDT was handled, the general health of the MDT, whether it voided its bladder, the location from which the MDT was moved and the location to which it was moved, and any unique physical characteristics. The ADTB would also include the names of all DTM approved for the project, their activities, and their level of involvement during the project. NAFB would continue to report numbers and locations of MDT moved off NAFB roads. MDT observed on NAFB by project personnel, or any other individual would be reported to the NNRP at (702) 652-4354 or (702) 652-7606. If a MDT is observed on a project site, the NNRP Manager would be notified immediately.

MDT deaths and injuries would be investigated as thoroughly as possible to determine their causes. The Service would be notified immediately by email or phone and within five business days in writing by email. The NNRP Manager would complete a Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) that would summarize the incidental MDT observations, handling, injury, and mortality.

9.2 *Annual Reporting*

NAFB would prepare an annual report and submit it to the Service by January 31 of the following year. The report would include information from the previously mentioned minimization measures, documentation of MDT, the project title of each appended action, the date the project began and ended, the actual number of acres disturbed, remuneration fees paid, number of acres rehabilitated, and the number of MDT taken (non-injury or non-mortality, and injury or mortality) during project activities. Additionally, permanent MDT-proof fence inspection reports would be included.

9.3 *Mojave Desert Tortoise Database*

NAFB biologists would maintain a database that contains records of MDT surveys and incidental sightings, including road observations or other encounters with MDT on NAFB. This may include records of MDT sign such as burrows and scat. The data contained within the NAFB geodatabase is available to federal, state, and other agencies upon request.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the current rangewide condition of the MDT, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the MDT in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the MDT; (3) the Effects of the Action, which determines all consequences to the MDT caused by the proposed action that are reasonably certain to occur in the action area; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the MDT.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the MDT, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the MDT in the wild by reducing the reproduction, numbers, and distribution of that species.

STATUS OF THE SPECIES

Listing History

The Service listed the Mojave population of the desert tortoise (all desert tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California) as threatened on April 2, 1990 [55 Federal Register 12178].

Recovery Plan

In the revised recovery plan for the MDT, the Service (2011) identified the need for "conservation areas" to protect existing MDT populations and habitat. Box 2 and Figure 2 in the recovery plan (Service 2011) describe and depict these areas in a generalized manner, respectively.

The revised recovery plan lists three objectives and associated criteria to achieve delisting. The first objective is to maintain self-sustaining populations of MDT within each recovery unit into the future. The criteria for delisting requires an increasing MDT population for at least 25 years (i.e., a single generation), as measured by extensive, range-wide monitoring across conservation areas within each recovery unit and by direct monitoring and estimation of vital rates (recruitment, survival) from demographic study areas within each recovery unit.

The second objective addresses the distribution of MDT. The goal is to maintain well-distributed populations of MDT throughout each recovery unit; the criteria for delisting requires the distribution of MDT, throughout each conservation area, increases over at least 25 years.

The final objective is to ensure that habitat within each recovery unit is protected and managed to support long-term viability of MDT populations. The criteria for delisting requires the quantity of MDT habitat within each conservation area be maintained with no net loss until population viability is ensured.

The revised recovery plan (Service, 2011) also recommends connecting blocks of MDT habitat, such as critical habitat units and other important areas, to maintain gene flow between populations. Linkages defined using least-cost path analysis (Averill-Murray et al., 2013) illustrate a minimum connection of habitat for MDT between blocks of habitat and represent priority areas for conservation of population connectivity.

Threats

The threats described in the listing rule and both recovery plans (Service, 1994; Service, 2011) continue to affect the species. The most apparent threats to the MDT are those that result in mortality and permanent habitat loss across large areas, such as urbanization and large-scale renewable energy projects and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle activity, wildfire, and habitat invasion by non-native invasive plant species.

We remain unable to precisely quantify how particular threats affect MDT populations relative to other threats. The assessment of the original recovery plan emphasized the need for a better understanding of the implications of multiple, simultaneous threats facing MDT populations and of the relative contribution of multiple threats on demographic factors (e.g., birth rate, survivorship, fecundity, and death rate; Tracy et al. 2004).

For example, we have long known that the construction of a transmission line can result in the death of MDT and loss of habitat. We have also known that common ravens, known predators of MDT, use transmission line pylons for nesting, roosting, and perching and that the access routes associated with transmission lines provide a vector for the introduction and spread of invasive weeds and facilitate increased human access into an area. Increased human access can accelerate illegal collection and release of MDT and their deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive plants (Service 2011). Changes in the abundance of native plants, because of invasive weeds, can compromise the physiological health of MDT, making them more vulnerable to drought, disease, and predation.

Five-Year Reviews

Section 4(c)(2) of the Act requires the Service to conduct a status review of each listed species once every 5 years. The purpose of a 5-year review is to evaluate whether the species' status has changed since listing (or since the most recent 5-year review); these reviews, at the time of their completion, provide the most up-to-date information on the range-wide status of the species.

The Service's (2022) second 5-year review of the status of the MDT summarizes the information from its initial 5-year review (Service 2010) and describes substantive new information since 2011 (from the release of the updated recovery plan) relative to changes in threats, conservation measures, and regulatory mechanisms that pertain to the five listing factors outlined in section

4(a)(1) of the Act. For this reason, we are incorporating the 5-year review of the status of the MDT (Service 2022) by reference to provide most of the information needed for this section of the biological opinion; because it contains background information that is not in the recent document, we have also incorporated the 2010 5-year review by reference. The following paragraphs provide a summary of the relevant information in the most recent 5-year review. All references to “the 5-year review” in this section of the biological opinion are to the most recent document (Service 2022), unless otherwise noted.

The 5-year review is replete with references to numerous studies and reports. We have not included references to those studies and reports in the following summary; the full citations are available in the 5-year review.

The 5-year review notes that while the Mojave distinct population segment of the MDT was elevated to species status in 2011 as *Gopherus agassizii*, with most desert tortoises east of the Colorado River recognized as *G. morafkai*, “nine local populations that include *G. agassizii* or hybrids with *G. morafkai* have been genetically identified east of the Colorado River in Arizona.” The 5-year review recommends evaluating the federal listing status of the MDT relative to its current taxonomy and distribution.

In the revised 5-year review, the Service concluded that the “condition of most threats is similar to that described in the previous (Service, 2010) status review” and summarized the new information within the context of the five listing factors outlined in section 4(a)(1) of the Act. We summarize that information below.

<u>Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range</u>

Various types of anthropogenic impacts continue to cause the loss of MDT habitat. The Service has issued biological opinions or incidental take permits for approximately 74,000 acres of utility-scale solar energy development in occupied MDT habitat. Solar development has largely occurred outside of MDT conservation areas, as described in the recovery plan (Service 2011).

The 5-year review also describes the Marine Corps’ expansion of training onto approximately 167,982 acres of public and private land the Department of Army’s plans to expand activities onto approximately 62,045 acres of its western training area in the near future. These activities are in the Western Mojave Recovery Unit.

Legal and illegal cannabis cultivation is causing smaller scale, more widely distributed losses of habitat, particularly in the Western Mojave Recovery Unit; illegal operations are likely to indirectly affect additional habitat because of various types of waste.

Wildfires fueled by invasive grasses have burned extensive areas of MDT habitat. For example, fires in 2020 occurred in MDT habitat in the Mojave National Preserve (Dome Fire, 43,273 acres), Nevada (Meadow Valley Fire, 23,500 acres), and the Red Cliffs Desert Reserve in the Upper Virgin River Recovery Unit (11,000 acres in several fires). The latter fire killed at least 25 MDT.

The 5-year review notes that MDT are “essentially absent” from habitat within 1 kilometer of areas with greater than 10 percent development; “development” includes urban areas, cultivated agriculture, energy facilities, mines and quarries, pipelines, transmission lines, roads and railroads. Approximately 5 percent of modelled MDT habitat within conservation areas had development levels that exceeded this threshold. See Table 3 and Figure 7 in the 5-year review. MDT populations declined in conservation areas where the density of paved and unpaved roads exceeded 0.75 kilometer per square kilometer; population trends varied at lower density of routes. See Figure 8 in the 5-year review.

Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The 5-year review notes that the Service continues to have little information on threats under Factor B. However, the potential for negative impacts to MDT populations exists from collection and deliberate maiming/killing as a result of human access, vehicles on paved/unpaved roads, and non-motorized recreation. The 5-year review also notes that the effects of research activities permitted for the purposes of enhancing the recovery and conservation of the MDT have been minor while providing valuable information that can be used to recover and improve management of the MDT.

Factor C: Disease or Predation

The 5-year review notes that “current research suggests that direct disease management of wild (desert) tortoise populations is less important … than managing factors that affect their habitat and its capacity to support healthy (desert) tortoises.” However, management of disease when translocating MDT between populations remains important. As an example of managing habitat, red brome (*Bromus rubens*), which is a non-native invasive plant, negatively affects the health and survival of juvenile MDT.

Badgers (*Taxidea taxus*), coyotes (*Canis latrans*), kit foxes (*Vulpes macrotis*), dogs (*Canis familiaris*), common ravens (*Corvus corax*), and red-tailed hawks (*Buteo jamaicensis*) prey on MDT. Badgers can have severe effects on MDT populations at the local level; DNA analysis of scats suggest that badgers, coyotes, kit foxes, dogs, and red-tailed hawks may prey on MDT more frequently than previously thought.

Common ravens, because their populations have greatly increased through human subsidies, severely affect the recruitment of MDT into the breeding population through predation on small individuals. In California, management includes the broad-scale removal of common ravens from critical habitat of the MDT.

Factor D: Inadequacy of Existing Regulatory Mechanisms

The BLM continues to face challenges in managing compliance with use of its off-highway vehicle network in the Western Mojave Recovery Unit. As of 2019, the BLM documented 24,518 kilometers of ground transportation linear features in this area, which is more than 2.5 times the 9,651 kilometers designated as open or limited. The BLM has an active program of restoring unauthorized routes and signing open routes.

Unauthorized cattle grazing continues within the Gold Butte National Monument in Nevada. We discussed cannabis farming in California previously in this section.

Factor E: Other Natural or Manmade Factors Affecting its Continued Existence

The 5-year review notes that, in the southwestern United States, 2000 through 2021 was the driest 22-year period in over 1,200 years; drought is likely to continue beyond 2022. Drought reduces the amount of annual plant forage for MDT and, over longer times, will kill shrubs that MDT rely on for cover.

Increased temperatures may affect hatchling sex ratios. Changes in climate may shift the timing of egg production and extend the egg-laying period. This change in egg production may not compensate for changes in the environment, such as the length of time eggs spend above their critical thermal maximum temperature and whether forage is available to support the production of eggs and forage for hatchlings. If climate change results in an overall decrease in reproduction, human-subsidized predation on young MDT, particularly by common ravens, would exacerbate issues with the recruitment of MDT into the breeding population.

Synthesis

Given the reproductive ecology of the MDT, measurable increases in the size of populations will require years.

The Management Oversight Group for the MDT "has taken steps to prioritize and implement actions that would be most effective at facilitating recovery across the range." The Departments of Defense and the Interior have initiated a Recovery and Sustainment Partnership with the goal of implementing actions that would accelerate recovery of the MDT while reducing the regulatory burden on military installations. The action plan focuses on identifying ways to accelerate habitat restoration, fencing conservation areas and roadways, and addressing unauthorized routes in the Western Mojave Desert Recovery Unit.

In California, the BLM's Desert Renewable Energy Conservation Plan Land Use Plan Amendment to the California Desert Conservation Act Plan of 1980 included numerous conservation and management actions that addressed issues relevant to the MDT. As part of the land use plan amendment, the BLM established new limits on ground-disturbing activities of 0.1–1.0 percent relative to its lands within MDT conservation areas and mapped linkages between these areas. The land-use plan amendment also increased the amount of land that the BLM manages for conservation in California (e.g., ACECs, California Desert National Conservation Lands, etc.) from 6,118,135 to 8,689,669 acres. All of these areas are not within MDT habitat; however, management as conservation areas will likely benefit MDT indirectly because conservation management would limit subsidies to common ravens and other indirect effects.

The threats that led to the listing of the MDT (i.e., the five-factor analysis required by section 4(a)(1) of the Act) continue. The status of the MDT has continued to decline and most of the previously identified threats continue to affect populations.

In the 5-year review, the Service concluded by recommending that the status of the MDT as a threatened species be maintained because of the large extent of its range and a total number in the "hundreds of thousands of individuals (all size classes) at last estimate."

Recommendations for Future Actions

The 5-year review provided eight recommendations for the highest priority actions over the next 5 years. These recommendations are from the revised recovery plan (Service 2011); their full text is in the 5-year review.

1. More aggressive implementation of habitat restoration, targeted predator control and limitation of subsidies, fencing priority stretches of highways, fire management planning and implementation, and environmental education;
2. Maintaining landscape connectivity and the resilience of MDT conservation areas by managing all MDT habitat for persistence and connectivity, limiting landscape-level disturbance across habitat managed for the MDT by extending surface-disturbance caps similar to those enacted by the BLM in California to the rest of the MDT range, maximizing passage under roads, and adapting management based on information from research on: the effects of climate change on MDT habitat, distribution, and population connectivity; the effects of large-scale fires, especially within repeatedly burned habitat, on MDT distribution and population connectivity; the ability of solar energy facilities or similar developments to support MDT movement and presence by leaving washes and native vegetation intact; and the design and frequency of underpasses necessary to maintain functional demographic and genetic connectivity across roads and highways;
3. Increasing law enforcement efforts across the range of the MDT, especially within conservation areas to minimize impacts of habitat destruction and degradation as a result of unauthorized off-highway vehicle use, unpermitted cannabis farms, and trespass grazing;
4. Using population augmentation to help achieve recovery criteria in each of the five recovery units according to the Service's population augmentation strategy;
5. Updating the taxonomy, distribution, and listed status of the species, which we discussed previously in this section;
6. Incorporating updated population trend analysis and climate change and land-use modeling into the next 5-year review to inform management strategies under a framework for ecological adaptation;
7. Sustaining and more fully implementing range-wide monitoring efforts; and
8. Developing a revised spatial decision support system to improve models of threats, recovery actions, and demographics, using up-to-date underlying geospatial data, evaluation of prior conceptual models, and improved operationalization of recovery action terminology.

Core Criteria for the Jeopardy Determination

When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would "reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50

Code of Federal Regulations 402.02). We have used the best available information to summarize the status of the MDT with respect to its reproduction, numbers, and distribution.

Reproduction

In the previous 5-year review, the Service (2010) notes that MDT increase their reproduction in high rainfall years; more rain provides MDT with more high-quality food (e.g., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave MDT vulnerable to disease and the reproductive rate of diseased MDT is likely lower than that of healthy animals. Young MDT also rely upon high-quality, low-fiber plants (e.g., native annual plants) with nutrient levels not found in the invasive weeds that have increased in abundance across its range. Compromised nutrition of young MDT likely represents an effective reduction in reproduction by reducing the number of animals that reaches adulthood. Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the MDT has the potential to affect the reproduction of MDT and recruitment into the adult population in a negative manner.

Various human activities have introduced numerous species of non-native invasive plants into habitat of the MDT. Routes that humans use to travel through the desert (paved and unpaved roads, railroads, motorcycle trails, etc.) serve as pathways for new species to enter habitat of the MDT and for species that currently occur there to spread. Other disturbances of the desert substrate also provide invasive species with entry points into the desert. The abundance and distribution of invasive weeds may compromise, at least to some degree in localized areas across its range, the reproductive capacity of the MDT; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species.

Numbers

In the previous 5-year review, the Service (2010) discussed various means by which researchers have attempted to determine the abundance of MDT and the strengths and weaknesses of those methods. Due to differences in area covered and especially to the non-representative nature of earlier study sites, data gathered by the Service’s current range-wide monitoring program cannot be reliably compared to information gathered through other means at this time.

Range-wide monitoring from any single year samples a portion of the MDT conservation areas; the conservation areas comprise only a portion of the recovery units. Additionally, any single-year estimate of the number of MDT should be viewed as a snapshot that several variables likely influence. Consequently, considering trends derived from years of range-wide monitoring provides a more accurate view of the status of MDT populations.

Allison and McLuckie (2018) used annual density estimates obtained from range-wide monitoring from 2004 through 2014 to evaluate range-wide trends in the density of MDT over time. Allison and McLuckie (2018) extrapolated the densities of large MDT derived by range-wide monitoring in the conservation areas to all modeled habitat in the recovery unit; the abundance columns in Table 3 contain these extrapolated numbers, which overestimate the number of MDT.

Table 3. Change in MDT abundance in recovery units (Allison and McLuckie 2018)*.

Recovery Units	Modeled Habitat (km^2)	Conservation Area (km^2)	2004 Abundance	2014 Abundance	Annual Trend (percent)
Western Mojave	23,139	6,873	131,540	64,871	-7.1
Colorado Desert	18,024	13,530	103,675	66,097	-4.5
Northeastern Mojave	10,664	4,889	12,610	46,701	-13.1
Eastern Mojave	16,061	3,720	75,342	24,664	-11.2
Upper Virgin River	613	115	13,226	10,010	-3.2
Total	68,501	29,127	336,393	212,343	

* Allison and McLuckie (2018) used modeled habitat within the entire range of the MDT for this estimate. In other discussions in this biological opinion, we used information only from areas of monitored habitat within the MDT conservation areas to estimate the number of MDT in the recovery unit.

Distribution

We discussed specific activities that have resulted or will result in the loss of MDT habitat in the Factor A portion of this section of the biological opinion. Here, we summarize their overall effect on the distribution of the MDT.

The 5-year review notes that the absolute amount of MDT range-wide decreased by approximately 163,700 acres between 2005 and 2017, based on sudden changes in LandSat imagery in the trend of the normalized difference vegetation index at image pixels over time. However, several utility-scale solar energy developments have been approved or constructed since 2017; additionally, LandSat imagery would not detect areas from which MDT have been or will be translocated that have not undergone changes in vegetation to date.

Attempting to quantify the amount of habitat lost is difficult because of the varying methods used in studies. Also, models depicting MDT habitat cannot differentiate between areas where MDT populations maintain the ability to recruit young animals to breeding age and areas where recruitment has likely not occurred for years.

In summary, human activities have continued to reduce the distribution of the MDT. Most of the losses of habitat have occurred outside of MDT conservation areas, with the exception of those associated with Fort Irwin. The large size of the potential range of the MDT and difficulties associated with determining areas that it actually occupies within that area (i.e., not including areas from which it has been extirpated or that are unsuitable habitat) precludes quantifying its distribution with precision.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as “the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline.”

Action Area

The implementing regulations for section 7(a)(2) of the Act (50 CFR 402.02) define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area for this programmatic consultation includes the NAFB (Figure 1) in Clark County, Nevada. Projects may be covered under this PBO only if (1) the USAF is designated the lead Federal agency for the consultation, (2) USAF retains discretion sufficient to ensure compliance with all applicable measures and terms and conditions required for the proposed action, and (3) the action is appended or exempted from appending procedures, as specified for this PBO.

Habitat Characteristics of the Action Area

The Action Area for this consultation includes the NAFB in Clark County, Nevada shown in Figure 1. The NAFB includes Area I, Area II, Area III, and the SAR and lies within the Mojave Desert spanning across townships 18, 19, and 20 south and ranges 62 and 63 east, with the Sierra Nevada Range approximately 90 miles to the west and the Wasatch Range 135 miles to the east. The NAFB elevation is approximately 1,900 feet above mean sea level and lies within the broad Las Vegas Valley, encompassed by alluvial fans that extend from the southern Las Vegas Range and northwest of Sunrise Mountain. The topography of the area surrounding NAFB includes Sunrise Mountain, Dry Lake Range, and Frenchman Mountain. The SAR is located northwest of I-15 and is bisected by a large levee and channel to guide floodwaters when the Las Vegas Range receives enough precipitation for runoff. The Action Area includes approximately 43.3 miles squared and includes approximately 32 miles squared of suitable MDT habitat. Suitable habitat is present in Area I on the eastern boundary with Area II. There may be indirect effects that result from proximity to developed areas and NAFB activities that take place within Area III and outside of and adjacent to habitat in Area I and Area II. The entire SAR is considered suitable MDT habitat.

The geology of the Action Area is predominantly sedimentary formations and alluvial deposits composed of a mixture of sandstone, shale, limestone, gypsum, dolomite, and interbedded quartzite. Alluvial deposits are created following precipitation events as water moves finer particles downgradient from higher elevations, spreading the material in a fan-like shape across the basin floor. The northern extent of the SAR and throughout Area II has intermittent desert bedrock and rock outcrops while the northern extent of Area II has active and stabilized sand dunes. The Action Area does not contain any permanent streams, springs, or lakes due to the climate in the region. The climate of the Action Area is characterized by approximately 4 inches of yearly precipitation, low humidity, high summer temperatures in excess of 100°F, and cool winter temperatures below 40°F. Vegetation in the Action Area is typical of the Mojave Desert and is dominated by creosote and white bursage desert scrub habitat.

Previous Consultations in the Action Area

The USAF at NAFB has completed several consultations with the Service beginning in 1991. The first PBO for the NAFB was implemented in 2007 (I-5-07-F-497). The 2007 PBO was extended by the Service in 2012, 2019, and 2022 and was amended in 2015 to include remediation activities and again in 2020 for the installation of an obstacle course in Area II. Table 4 shows all BA and BO from 1991 to 2020.

Table 4. List of all biological assessments and biological opinions since 1991.

Historical BAs and BOs			
Year	**File Number**	**Title**	**Project Descriptions**
1991	NA	BA for the Mojave Desert Tortoise, NAFB	Sierra Delta Corporation performed surveys on a 5,770-acre parcel on NAFB between January 5 and May 1, locating 14 individuals within the Main base complex and Area II.
1991	1-5-91-F-38	BO for the Proposed Construction of a Construction Debris Landfill on the NAFB	Determined that construction on a 10-acre parcel within NAFB is not likely to jeopardize the continued existence of the MDT. The BO was prepared using information in letters and existing files at the Reno Field Station.
1992	1-5-91-F-237	BO for the Proposed Operation of Existing Facilities and Development on the NAFB	NAFB requests to continue operations on existing facilities in Areas 1, 2, and 3 (Area II) and develop an additional 1,265 acres within Areas 4, 5, and 6 (Areas I and III). The BO was prepared using information from the 1991 BA for the MDT.
1993	1-5-93-F-080	BO for the Construction of a Sewer Pipeline on NAFB	BO issued for installation of sewer pipeline that disturbs 3.2 acres of MDT habitat. Determination that the project will not likely jeopardize the existence of the MDT. Information used for determination was based on the 1991 BA.
2004	1-5-04-TA-455 and AF6	BO for the Expansion of Military Housing on NAFB	BO stated that 86 acres of Mojave Desert scrub that could support Las Vegas bearpoppy and Las Vegas buckwheat habitat would be lost, and plant surveys are needed prior to construction. The document stated that there would be no impacts on the MDT based on the 1991 BA; however, surveys should be conducted prior to construction.

Historical BAs and BOs			
Year	File Number	Title	Project Descriptions
2005	1-5-05-1-416	BO for Upgrade of the Fuel System at NAFB	Based on a MDT survey conducted in 2003, upgrading the NAFB fuel system was determined to be unlikely to adversely affect the MDT.
2006	NA	BA for the Desert Tortoise NAFB, Nevada	The BA was created to continue operations on NAFB for a 5-year period beginning with an approval of the BO. The document lists potential projects and adverse impacts to the MDT on NAFB.
2007	1-5-07-F-497	PBO for Implementation of Actions Proposed on NAFB and the SAR, Clark County, Nevada	The PBO was issued to the Department of the Air Force and NAFB by USFWS upon review of the programmatic activities proposed in the 2006 BA. MDT habitat was not anticipated to be adversely affected by the proposed actions for 5 years and no further analysis was necessary.
2012	1-5-07-F-497	Request to Extend Timeframe for the PBO for NAFB, Clark County, Nevada	NAFB requested an extension of the 2007 PBO. USFWS approved an extension, determining that no critical habitat occurs in the Action Area and the environmental baseline was mostly unchanged since the 2007 PBO was issued.
2015	1-5-07-F-497	Request to Append the SAR Remediation Project to the PBO for NAFB and the SAR, Clark County, Nevada	NAFB requested to investigate and characterize a historic dump on the SAR which could contain unexploded ordinance. Project included excavation and inspection of the soil including piling and backfilling for removal of explosives. USFWS concluded that the proposed action is within the scope of the PBO.
2019	1-5-07-F-497	PBO Request for Extension	NAFB requested an extension on the PBO that ended in 2017. NAFB programmatic actions included building a firing range facility on SAR. The project was reviewed and approved by USFWS for a 5-year extension.
2020	1-5-07-F-497	Request to Append the 99 Rescue Squadron Turf Field and Obstacle Course to the PBO for NAFB and the SAR, Clark County, Nevada	NAFB requested to construct an obstacle course including a turf field on 6.57 acres within Area II. USFWS concluded that the proposed action is within the scope of the PBO.

Condition (Status) of the Species in the Action Area

Suitable MDT habitat is found in Area I, Area II, and the SAR. Surveys of these regions in the Action Area first occurred in 1990. Early surveys documented MDT presence and sign, but did not quantify abundance or density. Surveys were limited between 2005 until 2018 because activities on site typically occurred in previously disturbed area, however, surveys were conducted in support of the USAF 2006 biological assessment. Since 2018 several surveys have been conducted in support of annual reporting and for an Environmental Impact Statement for the Master Plan and Mission Rebalance at NAFB. Figures 5 and 6 show location of MDT individuals and sign found during surveys from 1993-2022, while Table 5 shows survey results from 1990-2022.

Presence/absence surveys were conducted from 2018-2022. Because presence/absence surveys do not produce statistically reliable estimates for extrapolating MDT density in areas not surveyed, density estimates from these surveys were combined with recovery unit density estimates and predicted occupancy models to examine the validity of the density estimates for the Action Area. Based on survey data from 2018, MDT density in Area I is 2.4 adult MDT per mile squared. Surveys of Area II and the SAR from 2019-2022 have resulted in very high-density estimates including 32.4 adult MDT per mile squared in 2019, 38.3 adult MDT per mile squared in 2020, and 20.9 adult MDT per mile squared in 2022.

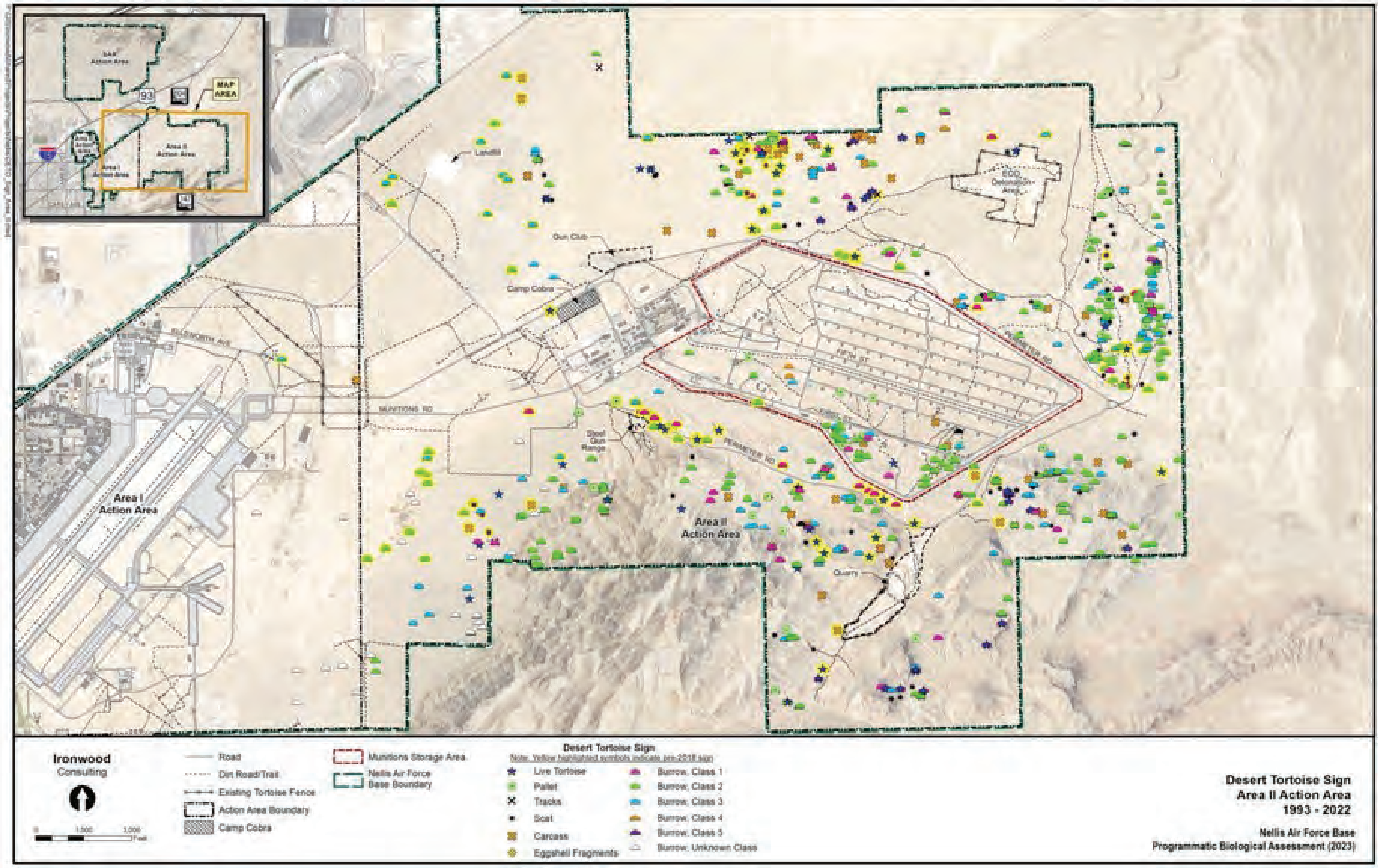

Figure 5. MDT and MDT sign in Area I and Area II of the NAFB from 1993-2022.

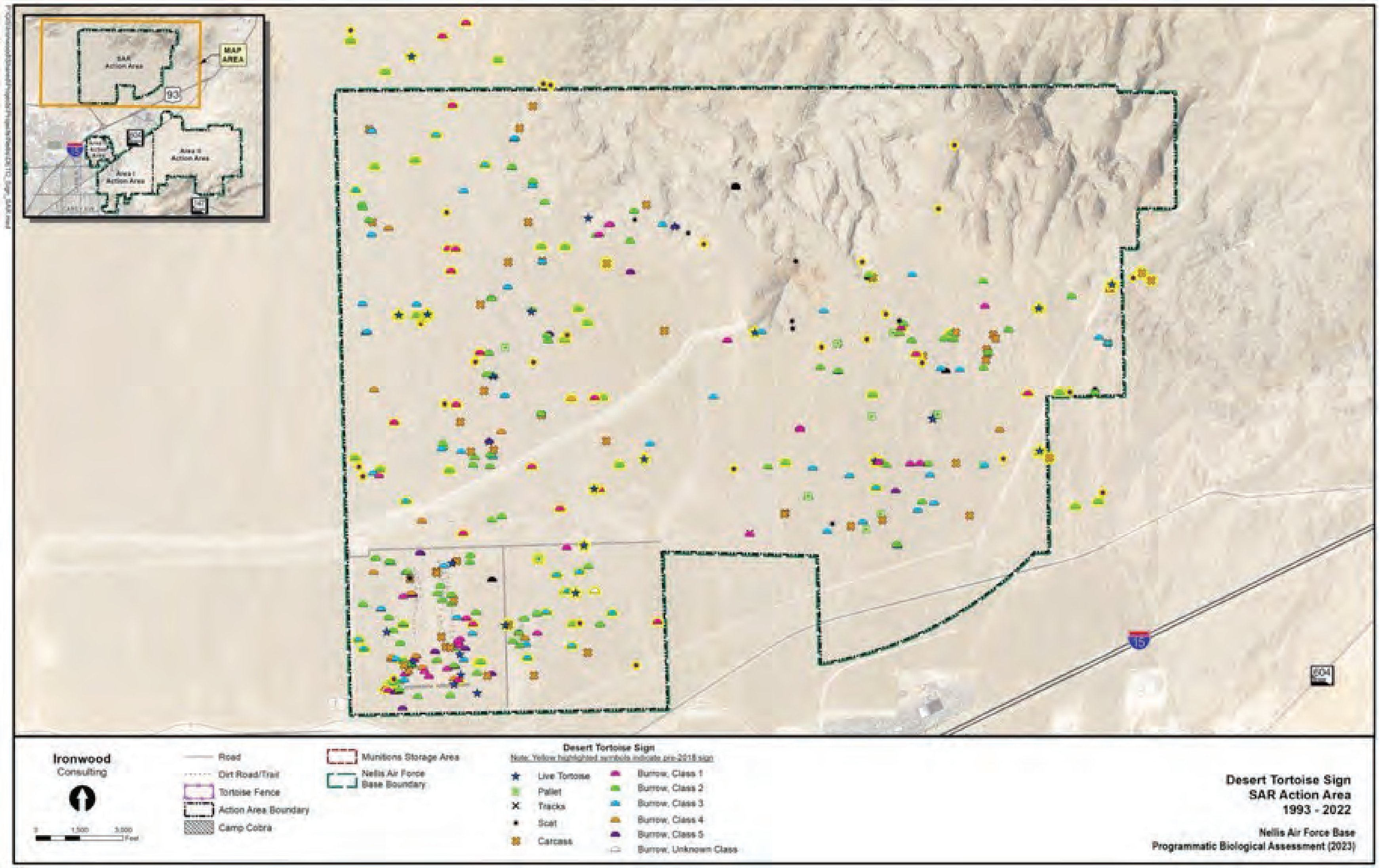

Figure 6. MDT and MDT sign in SAR of the NAFB from 1993-2022.

Table 5. Summary of MDT surveys on NAFB from 1990 until 2022.

Title of Report	Survey Dates	Areas Surveyed	Survey Methods	Survey Results
BA for the Mojave Desert Tortoise, NAFB (USDI Fish and Wildlife Service 1992)	1991	Main Base Complex and Area II on a 5,770 acres (23.4 sq km)	Trained survey personnel searching in organized transects, using flagging tape to mark limits of coverage each pass. Survey methods in accordance with the Field Survey Protocol recommended by the USFWS.	14 MDT in 14 active burrows 27 recently active MDT burrows 698 inactive MDT burrows 341 MDT scat locations 57 MDT carcasses or pieces 13 MDT eggshell fragment sites 2 MDT tracks
Desert Tortoise Survey on a Proposed Roadway at NAFB (USAF 2002)	2002	Areas I and II	6 “on-foot” transects for 3 mi (4.8 km) paralleling the proposed road and extended 100 ft (30.48 m) from the centerline. Each transect covered a 32-ft (approximately 10 m) width.	No MDT individuals or sign observed
Desert Tortoise Survey for Area III at NAFB, Nevada (USAF 2004)	2004	Area III	Trained survey personnel conducted "on-foot" linear transects approximately 30-45 ft (9-13 m) apart.	No MDT individuals or sign observed
Relative Abundance Surveys for Desert Tortoise at the SAR, NAFB, Nevada (Woodman 2006)	2005	SAR	Trained survey personnel conducted 42 "on-foot" linear transects approximately 1.5 mi (2.4 km) long and 32 ft (approximately 10 m) apart.	6 live MDT 67 MDT burrows 31 MDT scat 7 MDT carcasses 5 sets of MDT tracks
2013 Desert Tortoise Habitat and Survey Project Final Report (NAFB 2014)	2010-2013	Pre-project clearance and incidental observations on Areas I, II, and III.	Trained survey personnel conducted 1.5-mi (2.4-km) transects approximately 15-30 ft (4.57-9.1 m) apart per USFWS Pre-project Survey Protocol.	Most MDT were located in Area II Quarry Powerline Construction Project 2 MDT were located within a specific project area in Area III

Title of Report	Survey Dates	Areas Surveyed	Survey Methods	Survey Results
2014 Desert Tortoise Species and Habitat Survey Project Final Report (NAFB 2015)	2014	Pre-project clearance and incidental observations on Areas I, II, and III.	Trained survey personnel completed surveys on 784 acres (3.1 sq km) at 100% coverage per USFWS Pre-project Survey Protocol for clearance surveys on NAFB.	4 adult MDT 39 MDT burrows 1 pallet 5 MDT carcasses
2015 Desert Tortoise Surveys and Habitat Project (NAFB 2016)	2015	Pre-project clearance and incidental observations for tortoise fence repairs	Trained survey personnel completed 15- to 30-ft (4.57- to 9- m) transects on approximately 12 acres for pre-project site clearance.	A total of 63 areas along the fence required some repairs Fence repairs were completed on April 15, 2016 No MDT were observed, and work area was subjected to clearance surveys every morning There were no impacts on MDT
2018 Desert Tortoise Annual Report (NAFB et al. 2019)	2018	Area I and Area II	30 m belt transects	2 adult MDT 13 MDT burrows in the spring Incidental MDT observations included: 2 MDT scat 1 MDT burrow with scat 1 MDT carcass

Title of Report	Survey Dates	Areas Surveyed	Survey Methods	Survey Results
2019 Desert Tortoise Annual Report (NAFB et al 2020)	2018-2019	SAR and Area II	30 m belt transects	9 adult MDT 61 MDT burrows 9 possible MDT burrows 16 MDT scat 10 MDT carcasses Incidental MDT observations included: 3 adult MDT 4 MDT burrows 1 possible MDT burrow 4 MDT scat 3 MDT carcasses
2020 Desert Tortoise Annual Report (NAFB 2021a)	2020	SAR and Area II	30 m belt transects	15 adult MDT 2 MDT juveniles 133 MDT burrows 5 possible MDT burrows 23 observations of scat 16 MDT carcasses
2021 Desert Tortoise Annual Report (NAFB 2022)	2021	SAR and Area II	30 m belt transects USFWS line-distance sampling	8 adult MDT 106 MDT burrows 7 possible MDT burrows 56 observations of MDT scat 17 MDT carcasses Incidental MDT observations included: 4 adult MDT 30 MDT burrows 3 possible MDT burrows 18 MDT scat 15 MDT carcasses

Title of Report	Survey Dates	Areas Surveyed	Survey Methods	Survey Results
Desert Tortoise, Wildlife, and Habitat Survey Supporting the Environmental Impact Statement for Master Plan and Mission Rebalance at Nellis Air Force Base, Nevada (EAS 2021)	2020 and 2021	Area I and II (Proposed Eastside Development footprint)	10 m belt transects USFWS presence/absence surveys	2 adult MDT 39 MDT burrows: 3 active with sign 7 good condition, no sign 12 deteriorated 17 good condition, possibly MDT
2022 Desert Tortoise Survey Report (AECOM 2022)	2022	SAR	30 m belt transects USFWS line-distance sampling	8 adult MDT 1 juvenile MDT 79 MDT burrows 1 MDT scat 10 MDT carcasses
2022 Draft Desert Tortoise Annual Report (NAFB 2023)	2022	SAR and Area II	30 m belt transects USFWS line-distance sampling	3 adult MDT 107 MDT burrows 56 observations of MDT scat 12 MDT carcasses Incidental observations: 15 adult MDT 55 MDT burrows 37 scats 17 MDT carcasses

Recovery

NAFB is located in the southwestern section of the Northeastern Mojave Recovery Unit. The Northeastern Mojave Recovery Unit extends from southwestern Utah and northwestern Arizona into southern Nevada just north of Las Vegas (Figure 7). The east end of the unit extends south from the Beaver Dam Mountains, across the north end of the Virgin Mountains, down to the Colorado River. From the Colorado River at Las Vegas Bay, the southern boundary extends west generally along Las Vegas Wash through the city of Las Vegas to the Spring Mountains. From here, the western boundary extends north up the Sheep Mountains.

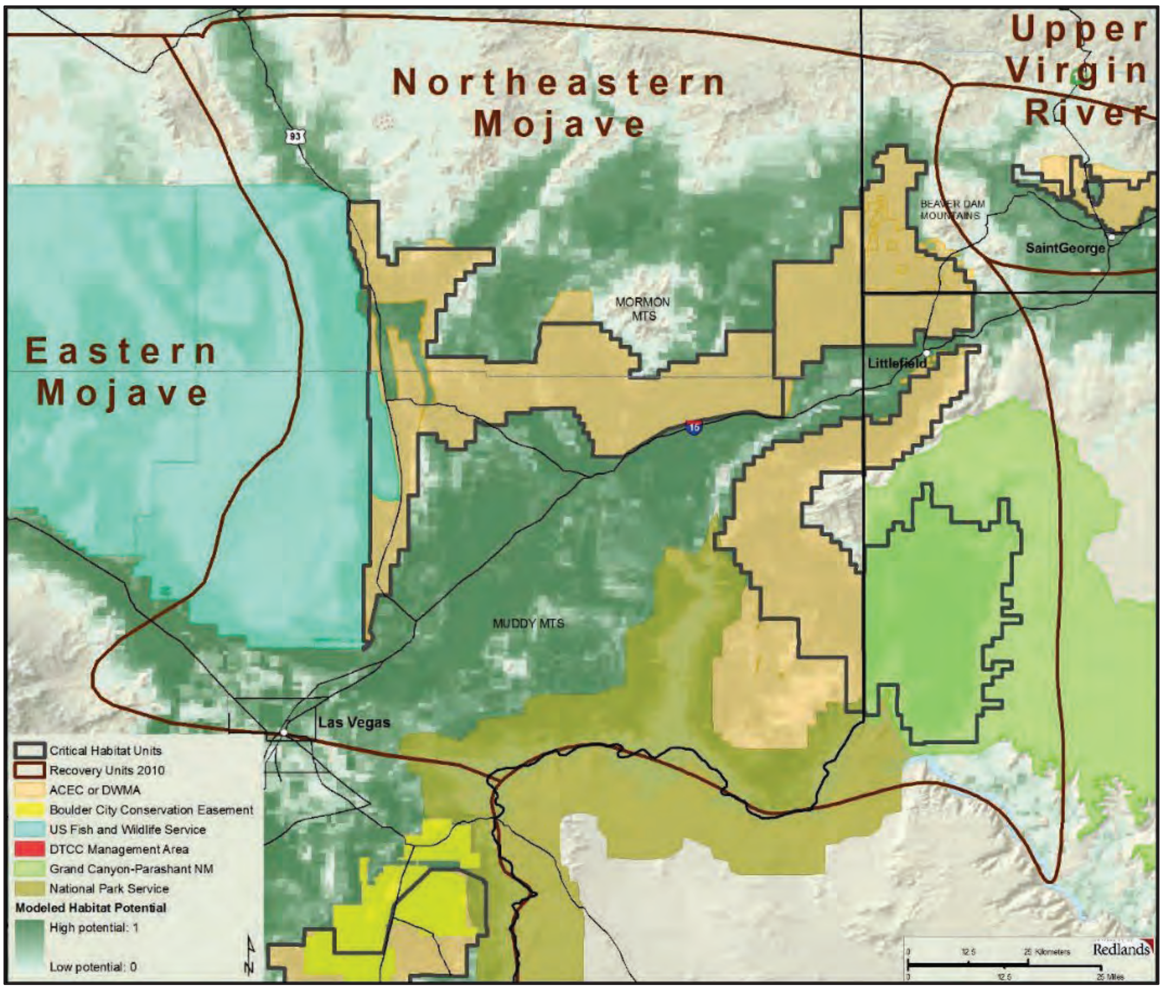

Figure 7. The Northeastern Mojave Recovery Unit and surrounding areas in Southern Nevada, Southwestern Utah, and Northwestern Arizona.

Recent DNA microsatellite data indicate that this unit is genetically similar to the Upper Virgin River Recovery Unit, but the Northeastern Mojave Recovery Unit does contain distinct microsatellite differences compared to the remainder of the range (Hagerty and Tracy 2010). The Sheep Mountains down to the Spring Mountains act as a near barrier for the western portion of this unit. Some variation may occur to the south and west from the Mormon Mesa, but genetic breaks appear to be ambiguous relative to at least semi-permeable topographic barriers to gene flow, such as the Muddy Mountains. An allozyme cluster at one locus from populations in the Mormon Mesa critical habitat unit overlaps another cluster identified from populations in Piute Valley in the Eastern Mojave Recovery Unit (Britten et al. 1997). A distinct shell phenotype also occurs in the Beaver Dam Slope region (Service 1994; Britten et al. 1997), but these MDT are not genetically isolated from adjacent populations within the recovery unit (Bury et al. 1994).

MDT in this recovery unit are generally found in creosote bush scrub communities of flats, valley bottoms, alluvial fans, and bajadas, but they occasionally use other habitats such as rocky slopes and blackbrush scrub. MDT are often active in late summer and early fall, in addition to spring, reflecting the fact that this region receives up to about 40 percent of its annual rainfall in summer and supports two distinct annual floras on which MDT can feed. Average daily winter temperatures usually fluctuate above freezing, and summer temperatures are typically a few degrees cooler than in the western Mojave and Colorado deserts. Two or more MDT often den together in caliche caves in bajadas and washes or caves in sandstone rock outcrops, and they typically eat summer and winter annuals, cacti, and perennial grasses.

This recovery unit includes the Beaver Dam Slope, Gold Butte-Pakoon, and Mormon Mesa critical habitat units. It also includes Lake Mead National Recreation Area south to Las Vegas Bay, Grand Canyon-Parashant National Monument on the Arizona Strip, and the eastern edge of Desert National Wildlife Range.

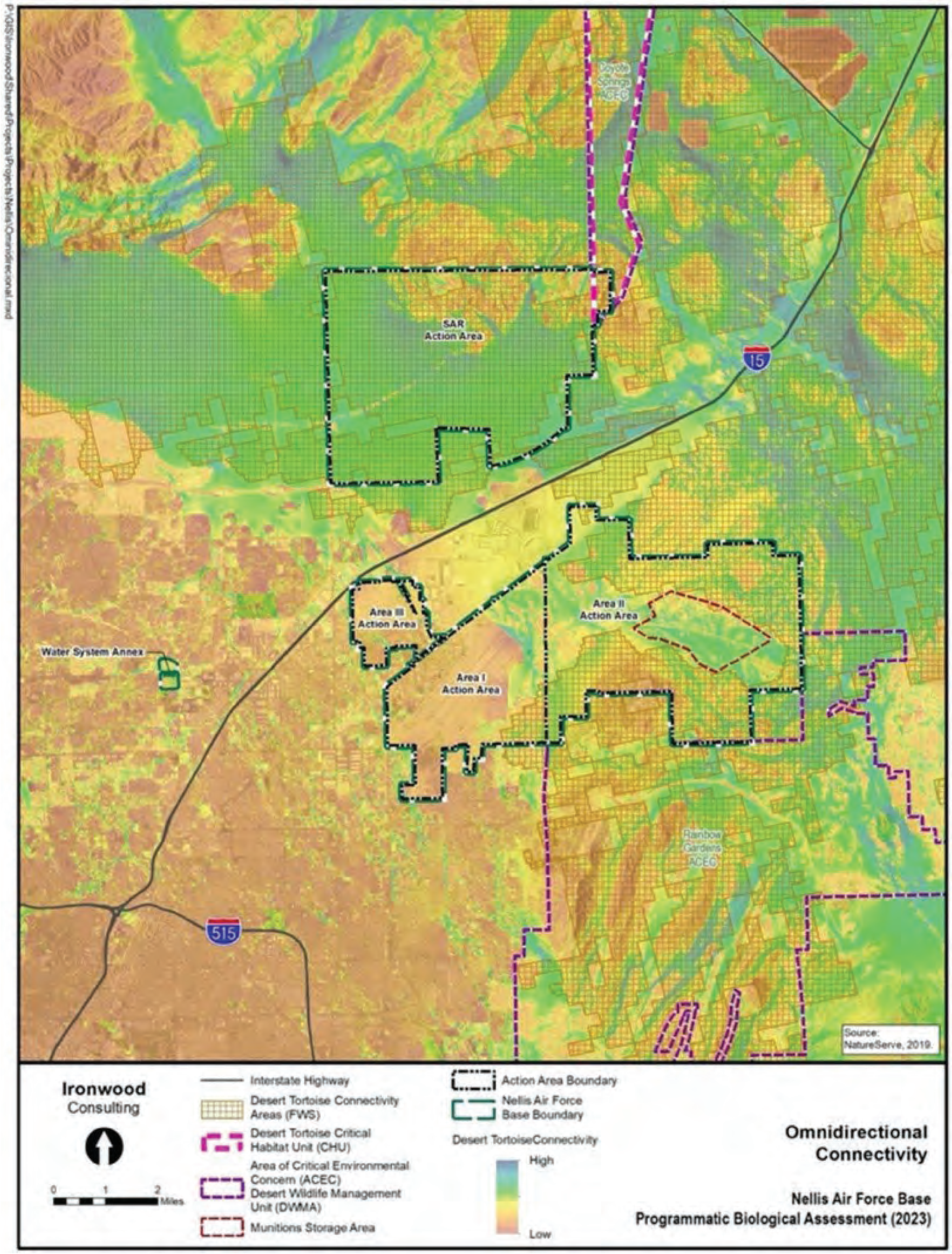

Figure 8. Map of the Action Area and the Coyote Springs critical habitat unit of the Northeastern Mojave Recovery Unit.

EFFECTS OF THE ACTION

The implementing regulations for section 7(a)(2) define effects of the action as “all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action” (50 CFR 402.02).

In conducting this analysis, we have considered factors such as previous consultations, 5-year reviews, conservation agreements, published scientific studies and literature, professional expertise of Service personnel, information obtained from other academic researchers or experts particularly dealing with aspects directly related to the sensitive species involved, species threats assessment or other related documents in determining whether effects are reasonably certain to occur. We have also determined that certain consequences are not caused by the proposed action, such as the increase or spread of disease, poaching, or collecting, because they are so remote in time, or geographically remote, or separated by a lengthy causal chain, so as to make those consequence not reasonably certain to occur.

Effects of the Proposed Action on the Mojave Desert Tortoise

General Effects of the Proposed Action on Mojave Desert Tortoises

The various activities proposed by the USAF at NAFB are anticipated to affect MDT in several ways. MDT will be captured, handled, and moved from harm’s way; they may be killed by heavy equipment and vehicles if not observed. Disturbance of MDT habitat will result in loss, degradation, and fragmentation of habitat; increased edge effects on MDT; and increased predation pressure from human-subsidized predators.

To analyze how the various activities of the proposed action may affect MDT, we will qualitatively describe effects and then consider the best available information with regard to the effects to the reproduction, numbers, and distribution of MDT in the action area and recovery units to determine whether the proposed action is likely to jeopardize the continued existence of the species.

We acknowledge that in every proposed activity, MDT are at risk of being killed or injured when workers (including authorized biologists and biological monitors) drive outside of areas that have been fenced or cleared of MDT. Small MDT are at greater risk than larger animals because they are more difficult to see. This will generally be the case for every proposed activity, regardless of whether MDT have previously been captured, handled, and moved out of harm’s way.

Up to 3,400 acres of MDT habitat are proposed to be directly affected by the USAF’s proposed action (Table 1). This will result in direct, long-term loss, degradation, and fragmentation of habitat that will adversely impact foraging, breeding, and sheltering of MDT. MDT abundance in the action area is estimated to be moderate to high. Recent estimates of MDT density in the action area and densities during the term of this PBO will likely fluctuate year to year. Range-wide annual density estimates for recovery units are determined through the Mojave Desert

Tortoise Range-wide Monitoring Project (Service 2022) and are completed at a landscape scale. The surveys specific to NAFB estimate densities based on a small sample size for a discrete area, which may be a subarea of the NAFB or a proposed project footprint. The methodologies for both surveys follow the Service's protocol for determining presence and absence and deriving density estimates (Service 2019).

We estimated density for adult MDT (>180 MCL). We did not attempt to estimate the number of juvenile MDT $\leq$ 180 MCL) and eggs that may be impacted by the proposed action because of the difficulty of locating juvenile MDT and eggs. We use the estimated mean NAFB MDT density, and the number of acres identified to be affected to estimate the number of adult MDT that may be directly affected by the proposed action and each program. Based on this, we anticipate approximately 203 adult MDT will be directly affected by the USAF's proposed action at NAFB (14.7 MDT per km^2 x 13.8 km^2). As described previously, the USAF has proposed measures that will reduce the number of these MDT likely to be killed or injured by the proposed action.

The Service (2019) estimates that 46,701 adult MDT occupy modeled habitat within the Northeastern Mojave Recovery Unit. The overall number of MDT would increase if we included individuals smaller than 180 millimeters. Consequently, the loss of 203 adult MDT potentially exposed to injury or mortality during construction, would comprise a very small portion (approximately 0.43%) of the overall population within the Eastern Mojave Recovery Unit. We expect that juvenile MDT and eggs within the project area are likely to be killed or injured during construction because of the difficulty in detecting juveniles and eggs. However, we expect that the applicants may find juveniles during the clearance survey and move them out of harm's way by translocating them to the recipient site. Few, if any, MDT are likely to die during operations and maintenance because the applicants proposed permanent MDT exclusion fencing will prevent their movement into the Project Area. MDT exclusion fencing inspection and maintenance will further minimize any effect to MDT within the Project Area.

The permanent loss of approximately 1,766 acres of MDT habitat would not appreciably reduce the distribution of the MDT. This will result in direct, long-term loss, degradation, and fragmentation of habitat that will adversely impact foraging, breeding, and sheltering of MDT. The Service (2019) estimates that 2,634,880 acres of MDT habitat remain in the Northeastern Mojave Recovery Unit. The permanent loss of 1,766 acres of MDT habitat (0.067% of MDT habitat in the Northeastern Mojave Recovery Unit) therefore will result in an insignificant reduction in the distribution of MDT relative to that available within the Northeastern Mojave Recovery Unit.

Effects of Capturing, Handling, and Moving Mojave Desert Tortoises

MDT observed in harm's way will be captured and moved to safe areas prior to ground-disturbing activities. MDT will be moved outside the perimeter of a project. These MDT may return to the point of capture and need to be moved again. Because of the difficulty in locating small MDT and eggs, an unknown number of MDT and eggs may not be observed prior to ground-disturbing activities and may consequently be killed by project activities. Capturing, handling, and moving MDT may result in accidental death or injury if performed improperly, such as during extreme temperatures, or if individuals void their bladders and are not rehydrated.

Averill-Murray (2001) determined MDT that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). To minimize these potential effects, the USAF proposed that an ADTB will follow the most current version of the Desert Tortoise Field Manual (Service 2009) when capturing, handling, and moving MDT. These personnel also will use appropriate protective measures and procedures to reduce the spread of pathogens among individual MDT by using new latex gloves for each MDT handled. If translocation is necessary, a translocation plan will be prepared for programs and specific projects that require translocation of MDT before ground disturbing activities occur. The translocation plan will outline the procedures for relocating and monitoring MDT removed from the site(s) and will be approved by the Service prior to implementation.

Effects of Habitat Disturbance and Loss on Mojave Desert Tortoises

The USAF determined that all programs and project-level actions except for ongoing non-defense related programs, may result in disturbance of, or other impacts to MDT habitat as identified in Table 1. The USAF proposed to minimize mortality and injury of MDT in disturbance areas by conducting preconstruction clearance surveys of previously undisturbed areas prior to activities that may disturb the ground and vegetation. USAF will capture, handle, and move MDT as described in the previous section (*Effects of Capturing, Handling, and Moving Desert Tortoises*).

Surface-disturbing activities may degrade the quality of MDT habitat in several ways. Mechanical disturbance of desert soils may cause the following: (1) changes in annual and perennial plant production and species composition including introduction of nonnative plants, including noxious weeds, or increases in the area of distribution of weeds; (2) outright soil loss due to increased rates of water and wind erosion; (3) reduced soil moisture; (4) reduced infiltration rates; (5) changes in soil thermal regime; and (6) compaction or an increase in surface strength (Adams, et al. 1982; Biosystems 1991; Burge 1983; Bury 1978; Bury and Luckenbach 1983 and 1986; Davidson and Fox 1974; Hinkley et al. 1983; Nakata 1983; Vollmer et al. 1976; Webb 1983; Wilshire 1977 and 1979; Wilshire and Nakata 1976; Woodman 1983). The USAF will implement the following measures to minimize potential effects from surface-disturbing activities: (1) set project boundaries; (2) utilize previously disturbed land where possible; (3) lightly wet excavation areas to minimize dust; and (4) salvage and stockpile the first 6 inches of topsoil to spread back over disturbed areas in areas that will be reclaimed.

Project vehicles and equipment driven in undisturbed habitat can destroy vegetation and damage soils. Vegetation that is destroyed reduces vegetation cover resulting in a decrease in the thermal insulation provided by the vegetative cover, which results in increased daytime temperatures. Higher temperatures decrease the soil moisture, which causes soil temperature to increase further because less heat is required to vaporize the water present. Revegetation is inhibited as a result of these processes (Webb et al. 1978). Project vehicles and equipment that drive over desert habitat often damage soils that are protected by fragile organic or inorganic crusts. The organic crust can be the result of various microflora such as algae, lichen, and fungi, which form cryptobiotic crusts or macroflora consisting of the remnants of fibrous root material from dead annual plants (Cooke and Warren 1973; Went and Stark 1968). The inorganic crust can be comprised of desert pavement, silt and clay, or chemicals. All of these crusts help prevent erosion and may increase infiltration and retard evaporation (Epstein et al. 1966). To minimize impacts to vegetation and soils in undisturbed habitat, the USAF will limit vehicle use to established roads. Ground-disturbing activities outside of existing graded, paved, or utility access roads during construction or O&M will be coordinated through the NNRP. Vehicle parking, material stockpiles, and construction related materials will be confined to designated laydown yards and previously established roads.

Because recovery of vegetation in the desert can take decades or longer, we consider most ground-disturbing impacts to be long-term. Vasek et al. (1975) documented transmission line projects in the Mojave Desert resulted in unvegetated maintenance roads, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers; these areas recovered significantly but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert could require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). A quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran deserts determined it takes 76 years for full reestablishment of total perennial plant cover and an estimated 215 years for the recovery of species composition typical of undisturbed areas (Abella 2010). This review also determined a number of variables likely affect vegetation recovery times, including but not limited to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance.

Projects that have the ability to retain the native root structure and seeds within the project area would help retain soil stability, minimize soil erosion, and minimize fugitive dust pollution. Retention of native seed and roots within the project site will also facilitate recovery of vegetative cover. Use of native plant species will minimize the need to water the vegetation, because native species are already adapted to the local climate and moisture regime of the area.

The USAF may propose to restore or reclaim MDT habitat during the term of this proposed action. Proposed USAF passive restoration measures include minimizing perennial vegetation root removal, where possible, to retain soil stability and minimize soil erosion and fugitive dust pollution and to aid in recovery of native vegetation. Where possible, mowing perennial vegetation will be used where topsoil removal and grading are not required as part of a project design.

USAF active restoration measures will be implemented during and after ground disturbance. Proposed USAF active restoration measures include salvaging and stockpiling topsoil up to 6 inches for use in restoration where possible; decompacting soils; reseeding and revegetating disturbance areas with native species; treating non-native invasive plant species; applying mulches; and implementing stormwater control measures. Use of native plant species will minimize the need to water the vegetation, because native species are already adapted to the local climate and moisture regime of the area. Revegetation plans that emphasize restoration of MDT habitat to the extent possible will be prepared for all ground disturbing activities. Revegetation efforts will minimize soil loss and help restore native vegetative cover to resemble surrounding undisturbed land.

Desert tortoises would not persist in areas where habitat is completely removed. The number of desert tortoises that may persist in areas where the habitat has been disturbed (but not completely removed) is a function of the type of habitat and the nature of the disturbance; we cannot predict how many desert tortoises are likely to persist in such areas over time.

Based on the USAF's estimate of the total disturbance of 3,400 acres of MDT habitat (permanent loss of approximately 1,766 acres MDT habitat and temporary loss of approximately 1,634 acres of MDT habitat) disturbance for the NAFB programs and the estimated densities of MDT in the NAFB, we estimate 203 adult MDT and an unknown number of small MDT and eggs may be killed by the NAFB program. The USAF proposes to complete MDT clearance surveys prior to construction in undisturbed or restored MDT habitat, which will minimize mortality risk during construction.

Because they are difficult to observe, proposed actions resulting in habitat disturbance are likely to kill juvenile MDT and eggs occurring in those areas, although the USAF would likely find some juvenile MDT and move them out of harm's way. This may reduce population recruitment or create demographic imbalances. The potential mortality of juvenile MDT in the action area will likely affect, to some degree, recruitment (i.e., individuals reaching reproductive age).

We did not attempt to estimate the number of juvenile MDT and eggs that may be impacted by the proposed action because the assumptions involved in such an estimate greatly affect its precision. However, we can reasonably assume that the estimate is a small percentage of the overall numbers of juvenile MDT and eggs within the action area, because the number of adult MDT affected by the proposed action is a small percentage of the population in the Northeastern Mojave Recovery Unit. Consequently, although actions that disturb habitat are likely to kill many juvenile MDT and eggs and some additional animals and eggs would be killed during operations, the proposed action is not likely to appreciably diminish the number of juvenile MDT or eggs in the action area or across the affected recovery unit.

To offset the disturbance and loss of MDT habitat from the proposed action, the USAF proposed to either pay remuneration fees, implement conservation actions approved by the Service, or implement site-specific habitat reclamation. Implementation of some of these activities has the potential to result in adverse effects to the MDT. Because we do not have specific information regarding these future activities, these actions may require future project-specific authorizations prior to implementation.

Effects of Roads, Vehicles, and Project Access on Mojave Desert Tortoises

The USAF proposed to continue to use a network of existing roads throughout the NAFB. The risk to MDT on access roads is affected by variables such as speed limits, weather conditions, the nature and condition of the roads, and activity patterns of MDT at the time the roads are in use. Use of roads on the NAFB may result in injury or mortality of MDT not observed by vehicles; habitat fragmentation; increased opportunities for disturbance; and introduction of non-native plants and animals.

Road mortality is a considerable, non-natural source of vertebrate mortality in urban as well as protected areas (Andrews et al. 2008). Roads may be crossed by dispersing MDT as well as those whose home range includes the road, resulting in mortality or injury if the animal is not observed (Bury and Luckenbach 2002, Nicholson 1978). Slow-moving animals, such as the MDT, are not capable of crossing roads quickly which further increases their mortality risk associated with roads. Vehicles on well-maintained and paved roads may travel at excessive speeds, preventing the operator from seeing MDT in time to avoid them. These long-lived species likely experience significant population impacts when adult females are killed. Additionally, MDT use depressions in roads as drinking sites, which may increase their risk to vehicular collisions. The USAF proposed several measures expected to minimize these effects: (1) providing desert tortoise awareness education, (2) establishing vehicular traffic controls (speed limits, signs, and travel restrictions), (3) checking for tortoises under vehicles prior to driving to reduce potential injury and mortality, and (4) establishing signs to identify where vehicles may drive and to increase awareness of vehicle operators.

Use of roads in the NAFB may also affect MDT activity in the vicinity of roads. Census data indicate that MDT numbers decline as vehicle use increases (Bury et al. 1977) and that MDT sign increases with increased distance from roads (Nicholson 1978). General road use, and road construction and maintenance activities (grading, paving, and graveling) may cause physiological stress, and disruption of movement, feeding, breeding, and sheltering behavior in MDT.

Roads can also contribute to increased abundance of introduced predators and invasive plants. Predators and invasive plants may migrate outward from roads, affecting MDT in adjacent areas. The total area affected, or the “road-effect zone,” can be substantial for species that either travel long distance or are vulnerable to predation by species introduced along road corridors (Boarman and Sazaki 1996). The combined environmental effects generated by roads (e.g., thermal, hydrological, pollutants, noise, light, invasive species, human access) within the "road-effect zone," extend outward from approximately 300 to 2,600 ft beyond the road edge. Additional effects and USAF-proposed minimization measures addressing invasive plants are described in more detail below (see Effects of Nonnative Plant Species on the Desert Tortoise).

Road kills and litter from vehicles may attract subsidized MDT predators. Roads are major attractants for common ravens, which are predators on juvenile MDT (Knight and Kawashima 1993, Boarman 1993). Ravens, being partly scavengers, are known for cruising road edges in search of road kills (Kristan et al. 2004). MDT using road depressions as drinking sites may be at increased risk from predation. Additional effects and USAF-proposed minimization measures addressing predator impacts are described in more detail below (see Effects of Subsidized Desert Tortoise Predators).

Effects to MDT will increase from baseline conditions where traffic volume increases on existing, improved, and new project roads. Increasing employee MDT awareness could increase the number of non-injury and non-mortality take as a result of MDT being moved from harm’s way. The majority of MDT impacted are likely those whose home ranges are intersected by or adjacent to these roads and trails. The NAFB program estimates for habitat disturbance include acres and estimates of adult MDT that may be affected (see Effects of Habitat Disturbance and Loss). USAF-proposed measures will minimize MDT mortality and injury risk.

Edge Effects on Mojave Desert Tortoises

Disturbance from USAF-proposed actions will likely result in edge effects that will impact MDT within habitat adjacent to the disturbance area (Zurita et al. 2012). MDT may be adversely affected by construction noise, ground vibrations, and artificial lighting. Increased noise levels and the presence of full-time facility lighting may affect MDT behavior. While limited data exists on the effects of noise on MDT, Bowles et al. (1997) demonstrated that the species has relatively sensitive hearing, but few physiological effects were observed with short-term exposures to jet aircraft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. Based on the ability of other species to adapt to noise disturbance, noise attenuation as distance from the project increases, and the fact that MDT do not rely on auditory cues for their survival, we do not expect any MDT to be injured or killed as a result of most project-related noise.

Because few data exist relative to edge effects from noise, light, vibration, and increased dust from project activities, we cannot determine how these potential impacts may affect MDT populations within and adjacent to project areas. Thus, the magnitude and extent of these edge effects cannot be articulated at this time, but conceivably could disturb individual MDT to the extent that they abandon all or a portion of their established home ranges and move elsewhere. The USAF proposed minimization measures specific to blast sites to address edge effects from noise. If blasting is required in MDT habitat, the area will be surveyed by an ADTB with a 200-foot buffer around the area 24 hours before detonation.

Non-Native Plant Species Effects on Mojave Desert Tortoises

Surface disturbance from NAFB-proposed actions will increase the potential introduction and spread of nonnative, potentially invasive plant species. Vehicles, roads, and other ground-disturbing activities contribute to the spread of nonnative species (or the displacement of native species) and the direct loss and degradation of habitats (Brooks 1995; Avery 1998). Project vehicles and equipment may transport nonnative propagules into the project area where they may become established and proliferate. In addition, the introduction of nonnative plant species may lead to increased wildfire risk, which ultimately may result in future habitat losses (Service 2011; Brooks et al. 2003) and changes in forage opportunities for MDT. If herbicides are used, MDT may be directly or indirectly affected.

Roadsides are widely considered to be one of the primary pathways for nonnative plant invasions into desert regions (Amor and Stevens 1976 and Brooks and Pyke 2001, cited in Brooks and Berry 2006). Roads facilitate dispersal of plant seeds (Trombulak and Frissell 2000 *in* Brooks and Berry 2006). Four-wheel drive vehicles carry significantly more seeds than two-wheel drive vehicles (Lonsdale and Lane 1994, cited in Brooks and Berry 2006). Roadsides not only experience high levels of disturbance, but they also have high levels of productivity from rainfall flow off of road surfaces and onto adjacent roadside verges (Johnson et al. 1975 and Starr 2002, cited in Brooks and Berry 2006). Where road densities are high, nonnative plant richness and biomass may increase from the combined effects of high nonnative plant biomass near roads, increased dispersal of seeds along and away from roads by vehicles, decreased distances from roads to other areas of the landscape, and locally high productivity levels along roadsides. The potential proliferation of nonnative plant species could also contribute to an increase in fire frequency within the action area. Fires in MDT habitat result in loss of habitat by altering plant composition and structure.

Invasion of non-native plants can affect the quality and quantity of plant foods available to MDT. Nonnative species generally do not provide adequate nutrition to MDT; when they out-compete native forage plants, they reduce the amount of food available to MDT. Such outcomes may decrease MDT health and therefore, survivorship and reproduction potential. Females may lay fewer eggs although we are unaware of any research that demonstrates this effect; many other factors influence egg production in MDT.

The USAF proposed the following conservation measures to address the potential effects from nonnative plant species: (1) all off-site equipment will be cleaned and inspected prior to use; (2) keeping the top 6 inches of soil and putting this soil back on the top layer in disturbed areas when revegetation is planned; (3) seeding or planting native plants where habitat reclamation is implemented; (4) minimizing vehicles from off-road travel; (5) roadside surveys for non-native plants and (6) mechanical, hand, or chemical treatment of non-native plants.

Effects of Population Connectivity on Mojave Desert Tortoises

The USAF proposed up to 3,400 acres of disturbance in MDT habitat, which may affect connectivity between local MDT populations occurring in the action area. Genetic variability of the species and sufficient ecological heterogeneity within and among populations must be maintained to ensure MDT recovery (Murphy et al. 2007; Hagerty and Tracy 2010). This variation is necessary to allow MDT to adapt to changes in the environment over time (Service 1994, 2011).

Landscape genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced MDT gene flow of a local population. Although they found a higher correlation of genetic distance with slope compared to roads, MDT pairs from the same side of a road exhibited significantly less genetic differentiation than MDT pairs from opposite sides of a road. Some project actions may decrease population connectivity beyond the existing conditions.

As discussed in the revised recovery plan (Service 2011) and elsewhere, habitat linkages are essential to maintaining rangewide genetic variation (Edwards et al. 2004, Segelbacher et al. 2010) and the ability to shift distribution in response to environmental stochasticity, such as climate change (Ricketts 2000, Fischer and Lindenmayer 2007). Natural and anthropomorphic constrictions (e.g., I-15 at the Nevada-California border) can limit gene flow and the ability of MDT to move between larger blocks of suitable habitat and populations.

Because little research exists relative to effects of habitat disturbance on MDT genetics and population connectivity, we cannot at this time articulate the magnitude and extent of these potential effects on MDT from NAFB-proposed activities. It is conceivable that connectivity between local MDT populations, and linkages within and to the action area may be impacted by proposed actions, particularly road use; however, the action area has not been identified to contain linkage habitat important for MDT recovery (Averill-Murray et al. 2013).

While some level of impact to population connectivity and habitat linkages may occur from the proposed action, the loss and disturbance of 3,400 acres of MDT habitat represents a small percentage (approximately 0.1 percent) of the total MDT habitat in the Northeastern Mojave Recovery Unit (2,634,880 acres). Based on this, we do not anticipate the loss of habitat will result in significant fragmentation or loss of connectivity over the entirety of the Eastern Mojave recovery unit.

Effects of Subsidized Desert Tortoise Predators on Mojave Desert Tortoises

The common raven is a known predator of the MDT. Human activities in MDT habitat potentially subsidize limited resources available for ravens and other MDT predators. Habitat disturbance may remove shrubs and cover for MDT exposing them to avian and other predators. Animals killed by vehicles on roads provide food for MDT predators. Other human sources of MDT predator subsidies include trash and discarded food, ponded water, and raven roosting and nesting sites.

Most raven predation on MDT appears to occur during the raven breeding season (Boarman 2002). By one estimate, ravens probably do most (75 percent) of their foraging within 0.25 miles of their nest (Sherman 1993) and raven predation pressure is notably intense near their nests (Kristan and Boarman 2001). Therefore, ravens nesting on towers or other infrastructure, where no other nesting substrate exists within 0.5 miles, may significantly reduce juvenile MDT populations within 0.25 miles of the corridor, but this effect is quite localized.

Natural predation rates may be altered or increased when natural habitats are disturbed or modified and human presence in otherwise remote desert areas increases. During the past few decades, the population of the common raven has increased substantially in the desert southwest, primarily in response to human-provided subsidies of food, water, and nest sites. There is documentation of numerous carcasses of hatchling and juvenile MDT under the nests of common ravens and a reduction in the proportion of hatchling and juvenile MDT at several locations in the Mojave Desert. Human activities that attract common ravens, desert kit foxes, feral dogs, and coyotes by providing resources in the form of food or water that would otherwise be unavailable may substantially increase predation of MDT in the area (Berry 1986). Roadkill of wildlife provides additional attractants and subsidies for opportunistic predators and scavengers. The use of water to control dust on construction sites and access roads result in ponding of water would provide a subsidized resource for ravens and other MDT predators.

To avoid and minimize the availability of predator subsidies, the NAFB proposed measures to control trash and other subsidized resources including (1) strategic water use that prevents the puddling of water, (2) avoiding the creation of artificial nesting sites for predators, (3) monitoring for and hazing ravens, (4) development of a raven management plan that reduces subsidies, perching, nesting, roosting, and monitors ravens and the effectiveness of management measures, (5) managing trash for NAFB and each project so that it is contained and secured in containers inaccessible to ravens and other MDT predators and removed periodically, (6) implementation of a landfill control program that limits subsidies to MDT predators, (7) prevention of road-kill subsidies to MDT predators by the removal of road-kill from the road or roadside, and (8) implementation of a MDT education program.

Effects of Construction, Operation and Maintenance on Mojave Desert Tortoises

Effects of construction, operation, and maintenance would primarily be from capture and habitat loss as described in the "Effects of Capturing, Handling, and Moving Mojave Desert Tortoises" and "Effects of Habitat Disturbance and Habitat Loss of Mojave Desert Tortoises" sections of this PBO, although all of the effects described above in the "Effects of the Proposed Action on the Mojave Desert Tortoise" section of this PBO could occur from each program. Specific avoidance and minimization measures for each program are listed below.

Effects of the Road Program

Activities associated with the road program could affect up to a total of 25 acres of temporary disturbance to MDT habitat. To avoid and minimize effects from the road program, the USAF proposed the following measures:

1) Project planning and implementation measures for all projects and activities will use existing roads or require the improvement or construction of roads, including review by the NNRP Manager, implementation of a DTAT, halting project activities when necessary to reduce or avoid harm to MDT, and equipment checks prior to operation. Approved DTM will be present at all construction activities occurring in suitable MDT habitat. All equipment operators will be educated about the identification and proper procedures for removal of tortoises if they are observed during road maintenance activities.
2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of road grading on and adjacent to roads. Road and shoulders should be visually inspected to ensure that it is cleared of any MDT prior to grading.
3) Road and vehicle use measures, including implementing and enforcing speed limits for all project-related and general traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
4) Subsidized predator reduction measures including implementing litter control protocols and monitoring structures near roads for avian predator nests and roadsides for roadkill and pooling water.
5) Habitat disturbance and loss minimization measures, including siting new access roads in previously disturbed areas or outside of suitable MDT habitat, setting and adhering to project boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
6) Wildland fire prevention and minimization measures will apply to all Roads Program activities.

Effects of the Utilities Program

Activities associated with the utilities program could affect up to a total of 170 acres of MDT habitat. To avoid and minimize effects from the utilities program, the USAF proposed the following measures:

1) Project planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, halting project activities to reduce or avoid harm to MDT, and pre-job equipment checks. Approved ADTB and/or DTM will be present at all

construction activities.

2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) Establishment of buffers and fences where necessary, and fences around active construction areas and trenches.
4) Road and vehicle use measures, including implementing and enforcing speed limits for all project-related traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols and monitoring of new and existing power poles, fence lines, access roads, and other structures for avian predator nests during and after construction.
6) Habitat disturbance and loss minimization measures, including siting new utilities infrastructure in previously disturbed areas or outside of suitable habitat, setting and adhering to project boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
7) Wildland fire prevention and minimization measures will apply to all Utilities Program activities.

Effects of the Facilities Program

Activities associated with the facilities program could affect up to a total of 1,395 acres of MDT habitat. To avoid and minimize effects from the facilities program, the USAF proposed the following measures:

1) Project planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, halting project activities to reduce or avoid harm to MDT, and pre-job equipment checks. Approved DTM will be present at all construction activities.
2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) Establishment of buffers and fences where necessary and fences around active construction areas and trenches. If applicable, LUC may be established around environmental remediation sites, and the areas cleared for MDT to reduce risk of future injury or mortality during construction and future maintenance and operations. Buffers may be used around facilities where noise impacts from blasting and other activities may impact nearby MDT populations.
4) Road and vehicle use measures, including implementing and enforcing speed limits for all project-related traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols

and monitoring of fence lines, access roads, and other structures for avian predator nests during and after construction.

6) Habitat disturbance and loss minimization measures, including siting new facilities in previously disturbed areas or outside of suitable habitat, setting and adhering to project boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
7) Projects that result in large habitat loss or fragmentation may be subject to remuneration fees and conservation actions.
8) Wildland fire prevention and minimization measures will apply to all Facilities Program activities.

Effects of the Environmental Remediation Program

Activities associated with the environmental remediation program could affect up to a total of 400 acres of MDT habitat. To avoid and minimize effects from the environmental remediation program, the USAF proposed the following measures:

1) Project planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, halting project activities to reduce or avoid harm to MDT, and pre-job equipment checks. Approved DTM will be present at all remediation activities in MDT habitat.
2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) Establishment of buffers and fences where necessary, and fences around active construction areas and trenches. If applicable, LUCs may be established around remediation sites, and the areas cleared for MDT to reduce risk of future injury or mortality during remediation activities and future operations. Buffers may be used around facilities where noise impacts from blasting and other activities may impact nearby MDT populations.
4) Road and vehicle use measures, including implementing and enforcing speed limits for all project-related traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols and monitoring fence lines, access roads and other structures for avian predator nests during and after project activities.
6) Habitat disturbance and loss minimization measures, including siting new facilities in previously disturbed areas or outside of suitable habitat, setting and adhering to project boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
7) Wildland fire prevention and minimization measures will apply to all Environmental Remediation Program activities.

Effects of the Quarry Operations Program

Activities associated with the quarry operations program are not expected to affect any MDT habitat. To avoid and minimize effects from the quarry operations program, the USAF proposed the following measures:

1) Project planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, halting project activities to reduce or avoid harm to MDT, and pre-job equipment checks.
2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) Establishment of buffers and fences where necessary, and fences around active construction areas and trenches. If applicable, LUC may be established around the quarry, and the area cleared for MDT to reduce risk of future injury or mortality during future operations. Buffers may be established if noise impacts from blasting and other activities may impact nearby MDT populations.
4) Road and vehicle use measures, including implementing and enforcing speed limits for all quarry related traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols and monitoring fence lines, access roads and other structures for avian predator nests during and after project activities.
6) Habitat disturbance and loss minimization measures, including adhering to project boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
7) Wildland fire prevention and minimization measures will apply to all Quarry Program activities.

Effects of the Non-native and Human-Subsidized Species Management Program

Activities associated with the non-native and human subsidized species program could affect up to a total of 1,300 acres of MDT habitat. To avoid and minimize effects from the non-native and human subsidized species program, the USAF proposed the following measures:

1) Project management action planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, and pre-job equipment checks for non-native species.
2) Road and vehicle use measures prohibiting or minimizing project and operations off-road travel in areas.
3) Subsidized predator reduction measures including implementing litter control protocols, pooing water, access roads and other structures for avian predator nests during and after project activities.
4) Habitat disturbance and loss minimization measures, including siting new facilities in

previously disturbed areas or outside of suitable habitat; setting and adhering to project boundaries including off-road vehicle use; implementing invasive species control; revegetation and habitat restoration planning and implementation including saving the top 6 inches of soil for reuse during revegetation and implementing mechanical and chemical weed control measures.

5) Wildland fire prevention and minimization measures will apply to all Non-Native and Invasive Species Management Program activities.

Effects of the Training Activities Program

Activities associated with the training activities program could affect up to a total of 60 acres of MDT habitat. To avoid and minimize effects from the training activities program, the USAF proposed the following measures:

1) Planning and implementation measures including review by the NNRP Manager, implementation of a DTAT, halting training activities to reduce or avoid harm to MDT, and pre-job equipment checks.
2) Proper protocols for MDT clearance, handling, and translocation, including protocol clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) Establishment of buffers and fences where necessary, and fences around training areas if applicable. If applicable, LUC may be established around, and training areas cleared for MDT to reduce risk of future injury or mortality during future training. Buffers may be established if noise impacts from blasting and other activities may impact nearby MDT populations.
4) Road and vehicle use measures, including implementing and enforcing speed limits for all training related traffic, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols and monitoring fence lines, access roads and other structures for avian predator nests during and after project activities.
6) Habitat disturbance and loss minimization measures, including conducting training in previously disturbed areas or outside of suitable habitat if possible, setting and adhering to training area boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocols.
7) Wildland fire prevention and minimization measures will apply to all Ongoing Training Activities Program activities.

Effects of the Non-Defense Activities Program

Activities associated with the non-defense activities program are not expected to affect any MDT habitat. All non-defense related activities on NAFB are subject to all PBO conservation and minimization measures.

Effects of the Security Control Operations Program

Activities associated with the security control operations program could affect up to a total of 50 acres of MDT habitat. To avoid and minimize effects from the security control operations program, the USAF proposed the following measures:

1) Planning and implementation measures will be reviewed by the NNRP Manager, implementation of a DTAT, halting construction activities to reduce or avoid harm to MDT, and pre-job equipment checks.
2) Proper protocols for MDT protection prior to construction will include clearance surveys ahead of ground disturbance, excavation of burrows, translocation of MDT and eggs found onsite during clearance, appropriate handling of MDT, and appropriate penning of MDT if required.
3) All applicable buffer and fence minimization measures will apply to security control operations activities. If applicable, LUC may be established and fenced areas cleared for MDT to reduce risk of future injury or mortality during security operations activities.
4) Road and vehicle use measures, including implementing and enforcing speed limits, prohibiting off-road travel in areas where clearance has not been conducted and without the presence of a DTM, and monitoring of project-caused water pooling on roads and adjacent areas.
5) Subsidized predator reduction measures including implementing litter control protocols and monitoring fence lines, access roads, and other structures for avian predator nests during and after project activities. If predator nests are found, inactive nests will be destroyed immediately. Active nests will be allowed to complete the breeding cycle, unless the nest puts MDT at a heightened risk of predation, then the NNRP manager may apply for a predator management take permit with the Service's Migratory Bird Program.
6) Habitat disturbance and loss minimization measures, including conducting activities in previously disturbed areas or outside of suitable habitat if possible, setting and adhering to established boundaries, implementing invasive species control, conducting water and dust erosion control, revegetation and habitat restoration planning and implementation, and spill prevention and cleanup protocol.
7) Wildland fire prevention and minimization measures will apply to all Security Control Operations Program activities.

Effects on Recovery

Reproduction

We did not attempt to estimate the number of juvenile MDT and eggs that may be impacted by the proposed action, however, we acknowledge some number are likely to be killed. Because they are difficult to observe, proposed actions resulting in habitat disturbance are likely to kill juvenile MDT and eggs occurring in those areas, although USAF would likely find some small animals and move them out of harm's way. This may reduce population recruitment or create demographic imbalances. Although we are not comparing the overall estimate of the numbers of juvenile MDT and eggs likely to be killed or injured to the overall numbers within the recovery units, we can reasonably conclude that the estimate is a very small percentage of the overall numbers of juvenile MDT and eggs, because the number of adult MDT affected by the proposed action is a small percentage of the population in the Northeastern Mojave Recovery Unit. Consequently, although actions that disturb habitat are likely to kill some juvenile MDT and eggs, the proposed action is not likely to appreciably diminish the number of juvenile MDT or eggs in the action area. For these reasons, we expect that the proposed action is likely to have a negligible effect on the reproductive capacity of MDT in the action area.

Numbers

MDT abundance in the action area is estimated to be low. We estimate approximately 203 adult MDT may occur in areas of MDT habitat that may be disturbed. The Service estimates that 46,701 adult MDT (i.e., those greater than 180 millimeters in length) occupy modeled habitat within the Northeastern Mojave Recovery Unit. Consequently, the loss of 203 adult MDT potentially exposed to injury or mortality during construction would comprise a very small portion (approximately 0.43%) of the overall population within the Northeastern Mojave Recovery Unit (Allison and McLuckie 2018). Most MDT are likely to be captured and moved prior to project activities. For these reasons, we expect that the proposed action is likely to have a negligible effect on the numbers of MDT in the action area.

Distribution

Direct impacts to MDT habitat from implementation of the project would be no more than 3,400 acres of MDT habitat. The proposed project will result in the permanent loss of approximately 1,766 acres of MDT habitat. This will result in direct, long-term loss, degradation, and fragmentation of habitat that will adversely impact foraging, breeding, and sheltering of MDT. The Service (2019) estimates that 2,634,880 acres of MDT habitat remain in the Northeastern Mojave Recovery Unit. The permanent loss of 1,766 acres of MDT habitat (0.067% of MDT habitat in the Northeastern Mojave Recovery Unit) therefore will result in an insignificant reduction in the distribution of MDT relative to that available within the Northeastern Mojave Recovery Unit, and an even smaller percentage range wide (Allison and McLuckie 2018). This loss would not appreciably reduce the distribution of the MDT in the Northeastern Mojave recovery unit or range wide. For these reasons, we expect that the proposed action is likely to have a negligible effect on the distribution of MDT in the action area.

Summary of Effects on Recovery

To achieve recovery, each recovery unit must contain well distributed, self-sustaining populations across a sufficient amount of protected habitat to maintain long-term population viability and persistence (Service 2011). The proposed action area will not significantly affect MDT connectivity across the Northeastern Mojave Recovery Unit because it is not located within an important linkage corridor (see figures in Averill-Murray et al. 2013).

We do not have the ability to place a numerical value on edge effects, habitat degradation, impacts to habitat connectivity, and overall fragmentation that the proposed action may cause. As a result, the percentage of habitat within the recovery units that would be affected may be greater than the area physically disturbed; however, we still expect the direct and indirect disturbance would not constitute a numerically significant portion of the three affected recovery units. Therefore, we anticipate adequate intact habitat will remain in which MDT will be able to forage, breed, and shelter.

Based on these considerations, the proposed action is expected to have a negligible effect on the reproduction, numbers, and distribution of MDT in the action area, will not appreciably diminish the ability of the MDT to reach stable or increasing population trends in the future.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act.

We are unaware of any non-Federal activities proposed to be conducted in the action area. The majority of the lands adjacent to the action area are administered by BLM. Therefore, any actions on these adjacent lands would likely include a Federal action and be subject to consultation under section 7 of the Act. Lands to the west of NAFB are within the boundaries of the City of Las Vegas, and do not include suitable MDT habitat.

CONCLUSION

Jeopardy Conclusion

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the MDT status as the basis to assess the overall effect of the proposed action on the species.

After reviewing the current status of MDT, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the proposed action, as proposed, is not likely to jeopardize the continued existence of the MDT because:

1) The number of MDT anticipated to be killed or injured is low and small relative to the estimated number of tortoises occurring within the action area and impacted recovery unit.
2) The project would have a minor effect on reproduction of the species and would not appreciably reduce reproduction of the species rangewide.
3) The amount of MDT habitat proposed to be disturbed is small relative to the amount available in the action area and within the Northeastern Mojave Recovery Unit.
4) The project would not reduce the species’ distribution rangewide.
5) The project would not cause any effects that would preclude our ability to recover the species.
6) Additional actions not outlined in this PBO that may adversely affect MDT will require additional project-specific consultation between the USAF and the Service. Approved actions not outlined in this PBO will be appended after review and approval.

INCIDENTAL TAKE STATEMENT

Each USAF action at NAFB that may result in incidental take must have an incidental take statement, whether the action is preparing planning documents for future projects or the implementation of specific activities under the plan. The take anticipated as a result of a specific action would be a subset of the programmatic incidental take statement. Though the intent in the appended programmatic approach is for the programmatic incidental take statement to contain all necessary reasonable and prudent measures and associated terms and conditions, due to the lack of available information regarding the specifics of individual projects, it may be necessary to develop project-specific reasonable and prudent measures and terms and conditions to ensure the minimization of the impacts of the incidental take associated with the specifics of each individual project. However, if this is the case, the Service would carefully consider whether the individual proposed project is beyond the scope of the programmatic consultation.

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such [an] act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The Service hereby incorporates by reference the conservation measures proposed by the USAF from the Description of the Proposed Action into this incidental take statement as part of these terms and conditions to be applied to those actions for which incidental take of MDT is exempted. The terms and conditions below and any additional measures proposed by the USAF or included by the Service may be applied to future actions appended to this biological opinion. Where action-specific terms and conditions (i.e., terms and conditions developed for each action to be appended and covered under this programmatic opinion in the future) vary from or contradict the minimization measures proposed under the Description of the Proposed Action or general terms and conditions below, the action-specific terms and conditions will apply. The measures described below are general in nature and may or may not apply to future actions proposed for appendage to this PBO.

The measures proposed by USAF as part of this incidental take statement are nondiscretionary and must be implemented by USAF, or other jurisdictional Federal agencies as appropriate, so that they become binding conditions of any project, contract, grant, or permit issued by USAF, or other jurisdictional Federal agencies as appropriate, in order for the exemption in section 7(o)(2) to apply. The Service's evaluation of the effects of the proposed actions includes consideration of the measures developed by USAF, to minimize the adverse effects of the proposed action on the MDT. Any subsequent changes in the minimization measures proposed by USAF, or other jurisdictional Federal agencies as appropriate, may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16.

The USAF, or other jurisdictional Federal agency, has a continuing duty to regulate the activity that is covered by this incidental take statement as long as the affected area is retained in Federal ownership or control. If USAF, or other jurisdictional Federal agency, (1) fails to require the project proponent to adhere to the action-specific terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document or (2) fails to retain oversight to ensure compliance with action-specific terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

Based on the analysis of the proposed action, effects analysis, and measures proposed by USAF, the Service anticipates the following take, listed in Table 6, could occur as a result of the proposed action.

Table 6. Anticipated level of incidental take of large desert tortoises for proposed program-level and framework programmatic actions of the proposed action and over 10-year duration of the action.

Program	**Non-injury or Non-mortality (Capture)** [1]	**Detected Injury or Mortality** [2]	**Estimated Total of Injury or Mortality Take**
Roads	2/year	2	2
Utilities	2/year	2	13
Facilities	10/year	2	78
Environmental Remediation	5/year	2	34
Quarry Operation	0	0	0
Non-native & Human-Subsidized Species Management	10/year	4 total during the term of the PBO or 2 in a given year	78
Training Activities	2/year	2	6
Non-Defense Activities	0	0	0
Security Control Operations	1/year	2	6
Total	**32/year**	**16**	**217**

[1] All MDT observed in harm's way may be moved to a safe location as outlined in this PBO. These are estimates of the number we expect will need to be moved. Unless otherwise specified, the number is the total for duration of the proposed action.
[2] The numbers in this column represent triggers that if exceeded require reinitiation of this PBO. Unless otherwise specified, the number is the total for duration of the proposed action.

Our estimate of the number of MDT that are likely to occur within the action area is derived from historic survey data and from estimates based on MDT abundance data. We cannot quantify the precise number of MDT that may be taken as a result of the action that the USAF has proposed because MDT move over time; for example, MDT may have entered or departed the action area since the time of pre-construction surveys. We acknowledge that more individuals may be killed or injured during construction, operation, and maintenance activities than is in the incidental take statement because they will not be detected. The inability to detect all MDT is largely due to the cryptic nature of MDT, their fossorial habits, and their limited abundance; and in the case of juveniles and eggs, their small size and location underground that reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove carcasses before biologists or monitors can locate them. The number of MDT eggs taken as a result of the proposed action is unknown. We exempt the incidental take of all eggs. The protective measures proposed by the USAF are likely to prevent mortality or injury of most individuals. In addition, finding a dead or injured MDT is unlikely.

We considered the following factors to determine the amount of estimated take of desert tortoise (Table 6) that could occur as a result of mixed and ***framework programmatic actions*** that may be authorized, carried out, or funded by the USAF at NAFB under this PBO: described effects; proposed thresholds of habitat disturbance (Table 1); history of effects from similar actions including the previous PBO covering the same action area; minimization measures proposed by the USAF; historic surveys within the action area and described in the BA (NAFB 2023); and estimated desert tortoise abundance in the action area.

Consequently, we are unable to reasonably anticipate the actual number of MDT that would be taken by the proposed action; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to MDT would likely be low given the nature of the proposed activities, and we, therefore, anticipate that take of MDT would also be low. We also recognize that for every MDT found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level, we are anticipating that the actual take would be higher, and we set the number below that level.

Similarly, for estimating the number of MDT that would be taken by capture, we cannot predict how many may be encountered for reasons stated earlier. While the benefits of relocation (i.e., minimizing mortality) outweigh the risk of capture, we must provide a limit for take by capture at which consultation would be reinitiated because high rates of capture may indicate that some important information about the species in the action area was not apparent (e.g., it is much more abundant than thought). Conversely, because capture can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinitiation would be triggered before the effects of the activity were greater than what we determined in the Effects Analysis.

Therefore, if incidental take of MDT listed in Table 6 is exceeded, the USAF must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9.

REASONABLE AND PRUDENT MEASURES

The USAF will implement the proposed minimization measures, incorporated by reference into the Terms and Conditions, to minimize the incidental take of MDT. All Terms and Conditions are measures proposed by the USAF to minimize take of MDT. The Service believes these measures are adequate and appropriate to minimize the incidental take of MDT. Therefore, we are not including any additional Reasonable and Prudent Measures with Terms and Conditions in this incidental take statement that have not already been part of the proposed action and the effects analyses. The Service determined that no additional Reasonable and Prudent Measures and associated Terms and Conditions are necessary and appropriate to minimize take of MDT for program-level actions described in the USAF programs. Because these actions may proceed without further consultation with the Service, we expect the USAF to require all appropriate protective measures for the proposed actions. Additionally, the USAF has proposed to coordinate with the Service for any future actions proposed to be appended under this programmatic biological opinion.

The measures described below are non-discretionary and must be undertaken by the USAF or made binding conditions of any grant or permit issued to the USAF, as appropriate, for the exemption in section 7(o)(2) to apply. The USAF has a continuing duty to regulate the activity covered by this incidental take statement. If the USAF (1) fails to assume and implement the terms and conditions or (2) fails to require the USAF to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the USAF must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

Reasonable and Prudent Measures with Terms and Conditions will apply towards all future USAF actions (framework programmatic actions) that may result in adverse effects to the MDT. The measures below may or may not apply to future appended actions, and additional measures may or may not be required when specific actions are proposed to be appended to this PBO. The Service considers MDT sign in a project action area as an indicator that MDT potentially or likely occur there. The USAF at NAFB and SAR, and other jurisdictional Federal agencies as appropriate, shall implement or ensure implementation of measures to minimize injury or mortality of MDT due to project construction, operation, and maintenance; and most actions involving habitat disturbance.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the USAF must comply with the following terms and conditions, which implement the Reasonable and Prudent Measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. *General Conservation Measures* – The following measures would be implemented during project planning and implementation of project activities.

1.a. *Natural Resources Program (NNRP) manager* – the USAF shall ensure a NNRP manager would review proposed projects to determine if and how they could affect the MDT and would recommend adjustments to projects if there is potential for take of the species. The NNRP manager would ensure that projects are compliant with applicable environmental laws and policies, the conservation and minimization measures outlined in the USAF BA, and the proposed minimization measures, and Terms and Conditions in this PBO. The NNRP manager will serve as an agent of the USAF at NAFB and the Service to ensure that all instances of non-compliance or incidental take are documented (i.e., photo, GPS coordinate, and description of event) and included in annual reporting and post-project reporting. The USAF has discretion over appointment of NNRP managers, however, those who also may be acting as an ADTB must be approved by the Service to serve as an ADTB. (see Term and Condition 1.b.). All NNRP managers will report directly to the USAF and the Service. The NNRP manager, ADTB, and DTM (see Term and Condition 1.b. and 1.c.) shall have a copy of all stipulations when work that may affect the MDT is being conducted on the site and will be responsible for overseeing compliance with terms and conditions of the project. The USAF shall ensure the NNRP manager and ADTB has authority to halt any activity that is in violation of the stipulations of this PBO and the USAF BA.

1.b. *Authorized Desert Tortoise Biologist (ADTB)* – All ADTB will be approved by the Service and will act as representatives of the USAF and the Service. Potential ADTB must submit their statement of qualifications to the Service's Southern Nevada Fish and Wildlife Office in Las Vegas for approval, allowing a minimum of 30 days for the Service's response. The statement from is available in the Desert Tortoise Field Manual on the internet at fws.gov by using the search function on the website with search terms "Desert Tortoise Field Manual." ADTB will serve as mentors to train DTM and will approve monitors if required on a project. ADTB would approve DTM to conduct specific activities based on their demonstrated skills, knowledge, and qualifications.

The ADTB would be responsible for knowing the latest information on protocols and guidelines for the MDT and have the knowledge and experience to conduct all of the activities listed in Section 3.1 of the Desert Tortoise Field Manual (Service 2009). The ADTB would meet qualification requirements and would ensure proper implementation of conservation measures outlined in the PBO, the conservation measures in the BA, and the Service's guidelines on MDT surveys and handling procedures. ADTB responsibilities include: (1) perform a basic assessment of the physical condition of MDT (e.g., identify basic clinical signs of potential upper respiratory tract disease); (2) maintain approved biosecurity protocols when working with MDT, avoid cross-contamination of supplies and of MDT individuals, and disinfect all sampling gear; (3) move MDT away from situations where they are in danger of injury or death (e.g., move MDT out of harm's way from unfenced work areas, access roads, linear facilities); (4) translocate MDT prior to implementation of a project as per the most recent Service's translocation guidance, or the NAFB MDT translocation plan, if required; (5) successfully rehydrate MDT, if necessary; (6) ensuring that all DTM (including the ADTB) have a copy of the required conservation and minimization measures in their possession, have read them, and they are readily available when on the project site.

Any incident occurring during project activities that was considered by a ADTB or DTM to be in non-compliance would be immediately documented by an ADTB (i.e., photo, GPS coordinate, description of event, and actions taken to remedy the issue) and included in annual reporting and post-project reporting. The ADTB and DTM would have a copy of all minimization measures when work is being conducted and would have authority to halt any activity that is in violation of the measures. Large scale projects with longer than a few days' duration would additionally require the USAF to include the necessary funding to meet all required protective measures for the entirety of the project. The use of ADTB and DTM would be in accordance with the most current Service guidance.

An ADTB will record each observation of MDT handled on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report). This information will be provided directly to the USAF and the Service.

1.c. *Desert Tortoise Monitors (DTM)* – DTM may assist an ADTB during surveys and serve as apprentices to acquire experience. The DTM designated for projects would comply with conservation measures in the BA, this PBO, and the Service's guidelines on MDT surveys and handling procedures. No DTM would be on the project site unless supervised and approved by an ADTB. The DTM would assist the ADTB in conducting surveys, monitoring site construction mobilization activities, construction related ground disturbance, grading, boring, or trenching. The DTM would assist the ADTB during surveys and serve as apprentices to acquire experience. The DTM would report incidents of noncompliance to the ADTB. If a MDT is in harm's way (e.g., certain to immediately be injured or killed by equipment), a DTM may move the MDT to a designated safe area until an ADTB assumes care of the animal. The DTM would have a copy of all minimization measures when work is being conducted and would have the authority to halt any activity that is in violation of the minimization measures. DTM may not conduct field or clearance surveys or other specialized duties of the ADTB unless directly supervised by a ADTB; "directly supervised" means the ADTB has direct voice and sight contact with the DTM.

1.d. *Desert tortoise translocation plan* – All translocation activities would follow the Service's current translocation guidance (2020) or any updated translocation guidance. If a project-specific translocation plan is required for NAFB, one would be developed at that time in coordination with the Service. Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

1.e. *Desert tortoise awareness training* (DTAT) – A DTAT would be necessary for all workers including military, civilians, and contractors involved in training, normal job duties, construction, and operation and maintenance. The DTAT must be approved by the Service and may consist of a PowerPoint presentation, video, or fact sheet. At a minimum, the DTAT must include (1) types of activities that may affect the MDT and the required MDT protective measures; (2) MDT life history and threats, including ravens and other subsidized predators; (3) legal protections, the definition of ‘take,’ and associated penalties; (4) responsibilities of workers and biologists; (5) participation reporting requirements; (6) proper techniques to handle and move MDT if in harm’s way (e.g., on a busy road).

1.f. *Equipment checks* – Any vehicle or equipment at a project site within MDT habitat would be checked underneath before moving. This includes in the morning, and before any construction activity begins. If a MDT is observed, the NNRP Manager or project specific ADTB would be contacted. Vehicles and equipment operating in MDT habitat would be inspected and cleaned prior to being brought onto a project site, to prevent the movement of non-native invasive species into new habitats. Personnel would also clean personal equipment such as shoes and clothing.

1.g. *Halting of project activities* – Project personnel would halt activities when the continuation of such activities would endanger a MDT or if a MDT is encountered on a project site. The NNRP Manager or project specific ADTB would be contacted and would respond to the sighting as soon as feasible, ideally within 1 hour of notification during normal operating hours. Project activities can resume if a MDT moves out of the work area on its own, and is out of harms’ way, after coordination with the ADTB. Project activities would resume after the NNRP Manager or ADTB assesses the situation and takes appropriate action to avoid, minimize, or mitigate the direct impact to the MDT.

1.h. *Noise and vibration* – The USAF would minimize and avoid excessive noise and vibration associated with various construction and military operations where possible.

1.i. *Wildlife escape ramps* – In areas where MDT have the potential to become trapped in trenches or open excavations, escape ramps would be placed on either side of the open trench or excavations at a distance no greater than every 0.25 miles. These distances would be reduced if the ADTB determines that the escape ramp spacing is insufficient to facilitate animal escape from a trench or excavation. Any MDT that is found in a trench or excavation would be promptly removed by an ADTB in accordance with the most current Service-approved guidance.

2. *Handling of Mojave desert tortoises* – The following measures will be implemented for all activities requiring the handling of MDT.

2.a. *Mojave desert tortoise clearance surveys* – In areas where new disturbance to MDT habitat, or disturbance to recovered MDT habitat are likely to occur, the project site would be cleared of MDT prior to construction by ADTB using the Service’s protocols (Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise

Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

During the active MDT season (April through May and September through October), clearance surveys would be conducted either the day prior to, or the day of, any surface-disturbing activity. During the less-active season (November through March and June through August), clearance surveys would be conducted within 7 days prior to any surface-disturbing activity. No surface-disturbing activities would begin until two consecutive surveys yield no MDT. Clearance surveys would be coordinated with the NNRP manager in advance of any project.

In addition to clearing the disturbance area, a perimeter around the project area would be surveyed, as determined by the NNRP manager. The determination to conduct perimeter surveys and the width of the perimeter would be made by the NNRP manager and would be based on the location of the project in MDT habitat according to the current MDT habitat map.

A DTM would oversee the project sites during all project construction and earth-moving activities until the project is complete to ensure compliance. Monitoring would consist of surveying new fence lines a minimum of three times per day and monitoring of construction activities with either full-time monitoring or spot-checks, as needed. At the discretion of the NNRP manager, other personnel may be trained by an ADTB to conduct fence line surveys. Any MDT or MDT eggs found within the project area would be properly removed by a qualified ADTB (Service 2009). If any MDT are found within the work area in harm's way, the ADTB would translocate the MDT in accordance the Service's current translocation guidance.

All MDT burrows and those constructed by other species that might be used by MDT would be examined to determine occupancy by MDT. Outside construction work areas (e.g., unfenced areas), all potential MDT burrows and pallets within 50 feet of the edge of the construction work area would be flagged. If a burrow is occupied by a MDT during the less-active season, the MDT would be temporarily penned. No stakes or flagging would be placed on the burrow mound or in the opening of a MDT burrow. MDT burrows would not be marked in a manner that facilitates disturbance. Avoidance flagging would be designed to be easily distinguished from access route or other flagging and would be designed in consultation with experienced construction personnel and ADTB. All flagging would be removed following construction activities. ADTB or DTM would inspect areas to be backfilled immediately prior to backfilling.

2.b. *Excavation of Mojave desert tortoise burrows* – All burrows found within areas proposed for disturbance that cannot be avoided, whether occupied or vacant, would be excavated by an ADTB and collapsed or blocked to prevent occupation by MDT. All burrows would be excavated with hand tools to allow removal of MDT and MDT eggs. All MDT handling and burrow excavations, including nests, would be conducted in accordance with the Service's approved protocol

(Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

2.c. *Translocation of Mojave desert tortoise and eggs* – All During clearance surveys, all handling of MDT and their eggs and excavation of burrows would be conducted solely by a ADTB in accordance with the most current Service-approved guidance (Service 2009). Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements.

MDT may be relocated up to 984 feet into adjacent undisturbed suitable MDT habitat. If MDT are to be moved greater than 984 feet, the NNRP manager would consult with the Service to determine if the development of a project-specific translocation plan and identification of a recipient site is warranted.

MDT found aboveground would be placed under a marked bush in the shade. A MDT located in a burrow would be placed in an existing unoccupied burrow of the same size as the one from which it was removed. If a suitable natural burrow is unavailable, an ADTB would construct one of the same size and orientation as the one from which it was removed. The construction method would adhere to the Service's protocol for burrow construction. Any MDT found within 1 hour before nightfall would be placed individually in a clean cardboard box and kept overnight in a cool, predator-free location. To minimize stress to the MDT, the box would be covered and kept upright. Each box would be used only once and would then be discarded. The MDT would be released the next day in the same area from which it was collected and placed under a marked bush in the shade.

Each MDT moved would be identified by distinguishing marks, photography, or a temporary mark to facilitate reporting multiple captures and movement of the same animal. If MDT need to be permanently marked with a unique MDT ID tag, and/or radio-transmitter, the NNRP manager would consult with the Service. Prior to translocation, MDT would be examined for recent physical trauma, and given a basic health assessment (without sample collection) by an ADTB. MDT not deemed suitable for translocation by the ADTB would be removed for follow up care, which may include quarantine, and/or veterinary care.

Individual MDT would be determined eligible or ineligible for translocation based on their physical condition per the algorithm in Appendix G of the Service's guidelines (2019). Individual MDT eligible for translocation are those that exhibit an appropriate attitude and activity; an acceptable Body Condition Score of 4 through 7; no mucoid and not more than mild, serious nasal discharge; no oral lesions; and no other condition that may impact its survival (Appendix G of the Service's Health Assessment Procedures; Service 2019)

If translocations greater than 984 feet are necessary, a site-specific translocation plan may need to be developed in coordination with the Service. In that case, prior to translocation, a minimum of two health assessments would be completed 14-30 days apart. Additional assessments (outside of 30 days) may be conducted, but a narrow window is necessary to discover MDT with intermittent clinical signs. The final assessment would occur immediately prior to the translocation date, and the final assessment would serve as the baseline condition with which to compare post-translocation assessments and as a final check against the algorithm (Service 2019) that the MDT are suitable for translocation. Any MDT that were previously approved for translocation, but on the final assessment do not pass the health algorithm, would not be translocated and would remain in quarantine for a maximum of 12 months, until a final disposition is determined in coordination with the Service and Nevada Department of Wildlife (NDOW).

Translocations would occur in spring (April 1 through May 31) or fall (September 1 through September 30), which is the period identified in the Service's guidance (Service 2020). NAFB would plan to hold any MDT removed from project sites after the final date of translocation. In order to translocate a MDT, the following conditions would be observed:

1. Releases would occur only when temperatures range from 65-85°F and are not forecasted to exceed 90°F within 3 hours of release or 95°F within 1 week of release.
2. Forecasted daily low temperatures would not be cooler than 50°F for 1-week post-release.

Disturbance of MDT burrows would be avoided from May 15 to September 30 to prevent impacts to buried egg clutches and emerging hatchlings. If this is not possible, active burrows impacted by the action must be carefully excavated or inspected to determine if eggs are present. Eggs found in burrows must be removed and placed in a new burrow in suitable habitat according to the current recommendations found in Guidelines for Handling Desert Tortoise during Construction Projects (Service 2009). Following the inspection of burrows, all burrows must be collapsed to prevent future use.

2.d. *Appropriate handling of Mojave desert tortoises* – Each MDT handled will be given a unique number, photographed, and the biologist would record all relevant data on the Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) to be provided to the USAF in accordance with the project reporting requirements. MDT would be handled in accordance with the most current Service-approved field guidance (Service 2009). MDT would be treated in a manner to ensure they do not overheat, exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. MDT would be kept shaded at all times until it is safe to release them. No MDT would be captured, moved, transported, released, or purposefully caused to leave its burrow for whatever reason when the ambient air temperature is above

95°F; an exception would be the need to capture a MDT in imminent danger, such as on the road. Ambient air temperature would be measured in the shade, protected from wind, at a height of 2 inches above the ground surface. No MDT would be handled if the ambient air temperature is anticipated to exceed 95°F before handling and/or translocation can be completed.

Unless in imminent danger, MDT would only be moved by a ADTB or a DTM solely for the purpose of moving the MDT out of harm's way. During construction, operation, and maintenance, an ADTB may pen, capture, handle, and relocate MDT from harm’s way as appropriate and in accordance with the most current Service-approved guidance. Each MDT handled would be given a unique number in the database for record keeping, photographed, and the biologist would record all relevant data on a Desert Tortoise Handling and Take Report to be provided to NAFB in accordance with the project reporting requirements. MDT would not be physically marked with a unique identifier (e.g., ID tag).

If MDT need to be moved at a time of day when ambient temperatures could harm them (less than 40°F or greater than 95°F), they would be held overnight in a clean cardboard box. These MDT would be kept in the care of an ADTB under appropriate controlled temperatures and released the following day when temperatures are favorable. All cardboard boxes would be discarded after one use and never hold more than one MDT.

MDT located in an unfenced project area sheltering in a burrow during the less-active season may be temporarily penned at the discretion of a ADTB. MDT would not be penned in areas of moderate to heavy equipment use and would be moved from harm’s way in accordance with the most current Service-approved guidance (Service 2009).

Equipment or materials that contact MDT (including shirts and pants) would be sterilized, disposed of, or changed before contacting another MDT to prevent the spread of disease. All MDT would be handled using disposable surgical gloves and the gloves would be disposed of after handling each MDT. An ADTB would document each MDT handled by completing a Desert Tortoise Handling and Take Report.

If a MDT is encountered and appears to be experiencing heat stress, it would be placed in a tub, by an ADTB with 1 in. of water in an environment with an ambient temperature between 76°F and 95°F for several hours, until heat stress symptoms are no longer evident.

If a MDT voids its bladder, the individual would be offered water. The MDT would be rehydrated by offering the MDT water through nasal-oral administration or soaking it in water for 30 minutes by an ADTB.

2.e. *Penning of Mojave desert tortoises* – All Penning would be accomplished by installing a circular fence that is approximately 20 feet in diameter to enclose and surround an adult MDT burrow. Pens may be smaller or larger depending on season, local topography, vegetation cover, and size of the MDT. Steel T-posts or rebar would be placed every 5 to 6 feet to support the pen material. The pen material would extend 18 inches to 24 inches above ground. The bottom of the enclosure would be buried 6 to 12 inches or bent toward the burrow, have soil mounded along the base, and other measures implemented to ensure zero ground clearance. Care would be taken to minimize visibility of the pen where disturbance by personnel occurs. An ADTB or DTM would check the pen at a frequency to ensure that the MDT is secure and not stressed. No MDT would be penned for more than 48 hours without written approval by the Service.

2.f. *Quarantine facilities for Mojave desert tortoises* – If any MDT do not meet the translocation criteria (e.g., due to injury or health indicators) quarantine pens would be constructed according to husbandry procedures in accordance with the most recent Service guidance. The location of the pens would be determined at that time, and an off-site facility may be considered in consultation with the Service. The pens would be at least 19 feet by 19 feet for adult MDT and 6 feet by 6 feet for juvenile MDT. Additional health examinations would be performed as necessary to determine their final disposition. Adult MDT found healthy and clinically disease-free after a period of quarantine, not to exceed 12 months, to be determined in coordination with the Service, would be moved to the selected translocation site. MDT assessed as clinically ill or diseased would not be placed in situations where contagion can spread to healthy MDT. If the MDT is unable to be returned to the wild, the final disposition would be determined by the Service. NAFB would identify a suitable quarantine facility and/or local veterinarian for use as needed.

3. *Buffers and fencing* – The following measures will be implemented for all activities requiring authorized buffers and fencing during project planning and implementation.

3.a. *Fencing and land use controls* – MDT clearance surveys (Service 2009) would be completed prior to both permanent and temporary fence installation. Additionally, an ADTB or DTM would be present during installation. Direct removal of vegetation and ground disturbance would be minimized when installing fencing. Bulldozer clearing or other major soil-disturbing methods would be avoided whenever possible. In areas with heavy vegetation, irregularly shaped fence line clearings would be used to minimize disturbance rather than fence lines with uniform clearing widths when feasible. Mechanical clearing can be used if accompanied by actions that minimize soil loss and allow restoration of native vegetation.

MDT shade structures may be installed along temporary and permanent fence lines, every 984 feet to provide cover for MDT pacing new fence lines (Service 2018). Shade structure installation would be dependent on the individual project circumstances and perceived risk to MDT. MDT gates would be placed at all road access points where MDT-proof fencing is interrupted, to exclude MDT from the facility (Service 2018). Gates would provide minimal ground clearance and deter entry by MDT. In general, fencing would be inspected according to the criteria and schedule outlined in Table 2.

3.b. *Temporary fencing* – In areas where permanent fencing is not installed, temporary MDT fencing would be installed around the perimeter of an excavation area during construction activities and removed after all activities are completed and the site is restored. All construction areas in MDT habitat, including open trenches, would be fenced with temporary MDT-proof fencing and inspected by an ADTB or DTM periodically throughout and at the end of the day and immediately the next morning to ensure that there are no breaches in the fencing and there are no MDT pacing the fence. Temporary fencing would be designed in a manner that reduces the potential for MDT and hatchlings to access the construction areas. Temporary fencing may be fabric cloth or plastic mesh, provided that the gaps in the mesh are 2 inches by 2 inches or less. Fencing would be buried either 4 inches deep, or 6 inches to 12 inches of fencing would be folded outward (i.e., away from the construction area), and covered with soil, rocks, and staking to maintain zero ground clearance and secure the bottom section of material. The above ground fencing would be between 18 to 24 inches above ground. Sections of fencing would be used for linear projects and moved along the line as the project progresses. The fencing would remain closed during any construction activities.

3.c. *Permanent fencing* – At the NNRP manager's discretion, permanent MDT-proof fencing would be used around permanent above-ground facilities that are regularly accessed by vehicles, equipment, or other military activities. Permanent fencing would be installed around the perimeter of the RADRRTS mock runway, including a 500-foot buffer to protect MDT from explosive debris.

Permanent fence specifications would be consistent with those approved by the Service (Service 2009). Fences would be constructed with durable materials (i.e., 16 gauge or heavier) suitable to resist desert environments, alkaline and acidic soils, wind, and erosion. Fence material would consist of galvanized welded wire that measures 1 inch by 2 inches by 34 inches. Other materials include Hog rings, steel T-posts, and smooth or barbed livestock wire. Hog rings would be used to attach the fence material to existing strand fence. Steel T-posts (5 feet to 6 feet) are used for new fence construction. Standard smooth livestock wire fencing would be used for new fence construction, on which MDT-proof fencing would be attached. T-posts would be driven approximately 24 inches below the ground surface and spaced approximately 10 feet apart. Livestock wire would be stretched between the T-posts, 18 to 24 inches above the ground to match the top edge of the fence material; MDT-proof fencing would be attached to this wire with hog rings placed at 12 to 18-inch intervals. Smooth (barb-less) livestock wire would be used except where grazing occurs (Service 2009).

NAFB perimeter security fencing, which is described in the "Security Controls Operations Program" would not entirely exclude MDT; however, MDT passage may not be permissible if in conflict with securing NAFB from human trespassing (e.g. filling in large holes beneath fence).

Permanent MDT-proof fencing along the project area would be appropriately constructed, monitored, and maintained (see Table 2), and would be included in the NAFB Real Property database. Monitoring and maintenance would include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried, clearing of MDT gates as needed, and maintenance of shade structures to ensure they are functional for use by MDT.

3.d. *Buffers around blast sites* – If blasting is required in MDT habitat during remediation activities, detonation would only occur after the area has been surveyed and cleared by an ADTB no more than 24 hours prior. A minimum 200 foot-buffered area around the blasting site would be surveyed. A larger area would be surveyed depending on the anticipated size of the explosion as determined by the ADTB. All MDT above ground within the surveyed area would be moved 500 feet from the blasting site to a shaded location or placed in an unoccupied burrow. MDT that are moved would be monitored or penned to prevent returning to the buffered survey area. MDT located outside of the immediate blast zone and that are within burrows would be left in their burrows. All potential MDT burrows, regardless of occupied status, would be stuffed with newspapers, flagged, and their location recorded using a GPS unit. Immediately after blasting, the newspaper and flagging would be removed. If a burrow or cover site has collapsed that could be occupied, it would be excavated by an ADTB to ensure that no MDT have been buried and are in danger of suffocation. MDT removed from the blast zone would be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

4. *Road and vehicle use* – The following measures will be implemented for all activities requiring use of roads and vehicles during project planning and implementation.

4.a. *General vehicle and road use parameters* – Project personnel would exercise vigilance when commuting to the project area to minimize the risk for inadvertent injury or mortality of all wildlife species encountered on paved and unpaved roads leading to and from the project site. Speed limits would be clearly marked, and all workers would be made aware of these limits. A speed limit of 35 miles per hour would be maintained on paved roads in MDT habitat. Speed limits of 25 miles per hour would be maintained for all regular vehicle travel on gravel roads and 15 miles per hour on two-track roads and trails. For large linear projects, vehicles and construction equipment would operate in groups whenever feasible. A ADTB would escort or clear the area of MDT in front of each traveling construction equipment group. If a MDT is observed within harm’s way on or in the shoulder of a road, it would be moved out of harm’s way in the direction the MDT is facing when discovered. An event that involves a MDT being moved off a road would be reported to the NNRP manager and would be included in the annual report to the

Service. Construction of roads, blading of existing roads, or other surface-disturbing activities would not exceed the minimum size required for safe usage.

4.b. *Prohibition of off-road vehicle use* – NAFB would limit vehicle use to established roads. Ground-disturbing activities outside of existing graded, paved, or utility access roads during construction or O&M would be coordinated through the NNRP. Vehicle parking, material stockpiles, and construction related materials would be confined to designated laydown yards and previously established roads.

4.c. *Water use for dust control* – Water would be used as a dust control measure during periodic road maintenance activities on major NAFB roads, such as repair and prevention of potholes forming. Water applied for dust control would not be allowed to accumulate in depressions and potholes in roads, which can attract MDT to the area to drink. Natural precipitation can also accumulate in these areas and bring MDT to the road to drink, especially during the hot summer months. Water trucks would be sealed, and not be overfilled. All workers would be directed to report any water leaks, and any leak causing surface water that could be available to predators would be promptly repaired. Construction personnel would be briefed on the potential for MDT to be attracted to pooled water at project sites. DTM would monitor areas where water is used for road repair and construction, and if MDT are observed, work would cease and the NNRP Manager would be notified.

5. *Predator control* – The following measures will be implemented for all activities to minimize predation of MDT by ravens and other MDT predators attracted to the project area.

5.a. *Predator minimization* – NAFB would implement measures to discourage the presence of predators on site (e.g., coyotes, ravens, feral dogs, etc.), including elimination of available water sources, maintaining the litter control program, designing structures to discourage potential nest sites, and use of hazing to discourage raven presence.

5.b. *Raven management plan development* – The NAFB would implement a Raven Management Plan to identify existing subsidies, describe minimization measures to reduce subsidies, document all raven sightings, and to monitor for the increased presence of ravens and other potential human-subsidized predators. The Raven Management Plan would include minimization measures outlined below. The raven management plan would include identifying raven subsidies and measures to minimize and reduce subsidies; and a description of the long-term monitor and reporting program to track the effectiveness of the plan.

5.c. *Avian predator monitoring and control program* – Raven monitoring would include reporting all raven observations (including date, location, number of ravens, and activity) during construction activities. Inactive raven nests would be removed. If sign of MDT predation (e.g., shell or carapace remains, MDT carcass) is observed below raven nests, the appropriate permits would be acquired to remove the nest. A summary of all raven nests that are removed and sign of

MDT predation would be included in the USAF's annual report to the Service.

5.d. *Litter control program* – NAFB would implement a litter control program during outdoor program activities that would include the use of covered, predator-proof trash receptacles. The litter control program would be implemented to reduce the attractiveness of the area to opportunistic predators such as desert kit foxes, coyotes, and common ravens. Trash and food items would be disposed of properly in predator-proof containers with predator-proof lids and emptied daily. All trash and debris would be regularly collected and contained in covered containers to minimize attracting potential predators of the MDT (ravens). The only exception would be for temporary waste storage kept within closed vehicles until the end of a shift. This program would include the use of covered, predator-proof trash receptacles and proper disposal of trash in a designated solid waste disposal facility. Vehicles hauling trash to the landfill and leaving the landfill must be secured to prevent litter from being released along the road.

5.e. *Landfill control program* – Landfills would be properly managed and maintained to reduce the potential for scavengers such as ravens, dogs, and coyotes to congregate in areas used by MDT. Appropriate fencing maintained around these facilities would reduce the potential for terrestrial animals to access these facilities, and best management practices such as sorting trash with high organic matter (e.g., foodstuffs) and burying it immediately with sufficient cover would reduce the occurrence of potential predators of MDT. At the present time, no municipal or hazardous waste landfills (as opposed to construction and demolition landfills) are located in MDT habitat, and none are planned to be constructed.

5.f. *Minimize wildlife food subsidies* – Predator food subsidies in the form of exposed, injured, or dead wildlife would be managed and maintained to reduce the potential for scavenging. Grading during site construction, operations, and decommissioning phases can injure or kill wildlife, especially small mammals and reptiles, and can unearth burrowing animals. Wildlife would be relocated from harm's way as feasible during ground-disturbing activities. The ADTB and DTM would collect and dispose of any animal remains found in any part of the work area. Road killed wildlife, including small to medium-sized mammals, reptiles, and (uncommonly) birds, all may serve as predator food subsidies. Workers would be directed to report any road-killed wildlife on roads or in work areas to the ADTB or DTM, and the ADTB or DTM would bury, or otherwise dispose of the remains. Currently, the U.S. Department of Agriculture Wildlife Services Biologist, patrols perimeter streets surrounding NAFB daily to remove any roadkill, to reduce bird air strike hazards.

5.g. *Minimize nesting, roosting, and perching sites* – New power poles installed in MDT habitat would be designed to discourage their use by raptors and ravens for nesting or perching in accordance with the most current Avian Power Line Interaction Committee guidelines (APLIC 2023). Older poles where raven nests are found would be modified to discourage their use.

To minimize elevated perches for predators, signage, fencing, power poles, and antennas would only be installed where required. Projects that provide elevated perches for aerial predators such as towers, threat emitters, facility structures, or other aerial line support structures would be designed to discourage their use by ravens for perching or nesting (e.g., by use of anti-perching devices) in accordance with the most current Avian Power Line Interaction Committee.

5.h. *Evaporation ponds, open water sources, landscaping, and irrigation* – Use of evaporation ponds and open water sources would be minimized, as feasible, to reduce water subsidies for predators. Ponds would be covered to prevent wildlife access. MDT-proof fencing would be installed to prevent MDT from entering the ponds and to prevent predation of MDT at these sources.

Water subsidies from landscaping and irrigation features would be managed and minimized. If irrigation is used at any revegetation or landscaping sites, it would be managed to use only the minimum amount of water needed, and no accumulation of standing surface water would be allowed to occur. Any leaks would be repaired promptly. Landscaping features (e.g., golf course ponds) would be drained, and/or those maintained would have bird deterrent methods applied to prevent birds from aggregating (e.g., pond is filled with plastic blocks).

6. *Preventing the loss of Mojave desert tortoise habitat* – The following measures would be implemented for all activities to minimize the loss of MDT habitat in the project area.

6.a *Habitat disturbance and habitat loss* – During project activities, NAFB would implement measures to minimize loss and long-term degradation and fragmentation of MDT habitat, such as soil compaction, erosion, crushed vegetation, or the introduction of non-native, invasive plant species. For areas that would be temporarily disturbed and were determined to be necessary by the NNRP manager, the top 6 inches of soil would be excavated separately from deeper soils and stockpiled in a separate location. Any excavations would be backfilled with deep soils first, with the topsoil being backfilled as the final layer. This allows the site to have a final layer of soil that approximates original soil conditions and that contains a relatively healthy seed bank for regrowth of vegetation; thus, rectifying potential soil displacement. Soils may be lightly rolled or compacted to reduce the potential for wind erosion.

6.b *Project boundaries* – The boundaries of disturbance areas proposed within MDT habitat would be delineated in the field before beginning any activities, and all disturbances would be confined to the delineated areas. Project personnel would be instructed that their activities must be confined within the surveyed areas. Off-road driving, travel outside flagged construction zones, and disturbance beyond the flagged areas would be prohibited.

6.c *Utilization of previously disturbed lands* – To the greatest extent possible, all disturbances would be located in previously disturbed areas. If previously disturbed areas are not available, these activities would be restricted to the defined project area.

6.d *Non-native invasive plant species control* – Equipment (e.g., road grader, bulldozer, scissor lift) brought onto the NAFB from off-site locations would be cleaned and inspected before the equipment is allowed to be used. Roadside vegetation surveys would be completed each year. If new invasive species (e.g., Malta starthistle and Sahara mustard) are noted, they would be spot treated with herbicides, preferentially before noxious weeds and non-native weeds have gone to seed. Herbicides would be sprayed along the major roadsides and around facilities to reduce wildland fire fuels. Only trained herbicide applicators would be allowed to spray herbicides, and herbicides would be used in accordance with product label requirements and restrictions.

Individuals applying herbicides would be instructed to stop work and notify the NNRP manager if they encounter a MDT. If conducting manual spot applications of herbicides to vegetation in upland habitats occupied by MDT, BLM would utilize the typical, rather than the maximum, application rate. If a MDT has been sprayed, an ADTB would rinse the animal with fresh water, including the plastron if needed.

6.e. *Water and dust control* – Erosion control measures would be used to reduce degradation of habitat by water and wind. Stormwater control measures would be implemented during construction, including installing temporary silt fencing and storm water control wattles along unvegetated ditches and slopes, soil rolling, and placing ground coverings over disturbed soils where wind and/or water erosion is possible.

Dust control measures would be implemented during ground disturbing activities if required, including soil rolling and wetting disturbed areas to reduce wind erosion. Spraying water is the primary method used for suppressing dust at project sites on NAFB.

6.f. *Revegetation and habitat restoration* – Passive restoration measures include minimizing perennial vegetation root removal, where possible, to retain soil stability and minimize soil erosion and fugitive dust pollution; and to aid in recovery of native vegetation. Where possible, mowing perennial vegetation would be used where topsoil removal and grading are not required as part of a project design.

The following active restoration measures would be implemented during and after ground disturbance: salvaging and stockpiling topsoil up to 6 inches for use in restoration where possible; decompacting soils; reseeding and revegetating disturbance areas with native species; treating non-native invasive plant species; applying mulches; and implementing stormwater control measures. Use of native plant species would minimize the need to water the vegetation, because native species are already adapted to the local climate and moisture regime of the area. Revegetation plans that emphasize restoration of MDT habitat to the extent possible would be prepared for all ground disturbing activities. The goals of revegetation would be to minimize soil loss and to restore native vegetative cover, so it resembles surrounding undisturbed land. The revegetation of sites would hasten plant succession. Successful reclamation within MDT habitat would restore disturbed habitat to suitable MDT habitat.

6.g *Spill prevention and spill response* – Hazardous and/or toxic materials, including but not limited to fuels, solvents, lubricants, etc., used during construction, or other military activities, would be properly stored and managed in accordance with the Nellis Hazardous Material Management Plan. Any leak or accidental release of hazardous and/or toxic material would be reported via 911 on a base landline or 702-652-9630 on a cell phone, mitigated in accordance with the Nellis Facility Response Plan 19-1, and reported to 99 CES/CEIEC via the Spill Phone: 702-277-1977 at the time of the occurrence.

7. *Compensation for the effects to Mojave desert tortoise* – Remuneration fees and conservation actions would be implemented to compensate for effects to MDT due to program activities in the project area.

7.a *Restoration or remuneration fees* – The USAF proposes to compensate for effects to the MDT through habitat restoration or payment of fees to be used to contribute to the recovery of the species. Restoration means planning for the short-term, medium-term, and long-term recovery of the affected habitat. Restoration activities would include pre-monitoring and post-monitoring, re-establishment of native habitat structure by seeding, planting, vertical and horizontal mulching, and preventing the establishment of non-native invasive species with the use of preemergent herbicides. Any areas temporarily impacted by excavation and other activities would be returned to their original contours and allowed to naturally return to the original habitat. Fees or habitat restoration would only occur for new areas of soil disturbance and would be identified through monitoring (using geographic information systems [GIS], or other means available as agreed upon by USAF and the Service), annual reporting, and project-specific consultations.

The USAF would work with the Southern Nevada Fish and Wildlife Office in Las Vegas to determine areas on NAFB suitable for restoration activities and set these acreages aside for land-use controls (e.g., development restrictions); these compensation areas can serve as a “mitigation bank” for MDT habitat. MDT habitat projects would be developed and agreed to by the Service prior to implementation of activities covered under the PBO, but those habitat projects do not necessarily need to be completed before the covered activity begins.

If restoration is not feasible, the USAF would provide fees to contribute to the recovery of the MDT to offset destruction of habitat. Fees would be based on current rates at that time, as determined by the Service’s annual adjustment of MDT remuneration fees collected under the ESA Section 7 Biological Opinions.

8. *Wildland fire prevention* – The following measures would be implemented to minimize MDT

habitat loss and disturbance in the project area due to the threat of wildland fires.

8.a. *Wildland fire prevention measures* – Wildland fires do not typically occur in MDT habitat on the NAFB, but the potential exists. NAFB currently has a wildland fire management plan to protect people, property, and minimize environmental damage, including the protection of MDT and their habitat (NAFB 2021). The plan is implemented by a coordinated approach to wildfire response and risk mitigation that includes Fire and Emergency Services, installation natural resources personnel, the Air Force Wildland Fire Branch, and cooperators including staff from the BLM and the Service.

The following proactive actions are in place to prevent or minimize the size of and damage caused by wildland fires:

- Wildfires, whether on or adjacent to lands administered by the USAF, which threaten life, improvements, or are determined to be a threat to natural and cultural resources under USAF jurisdiction, would be considered emergencies and their suppression given priority over other USAF programs.
- Installations would cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildfire situations, to establish processes for analyzing situations and establishing priorities, and for implementing management responses to these situations.
- Installations would enforce rules and regulations concerning the unauthorized ignition of wildfires and aggressively pursue violations.

The protection of human life, safety of firefighters, and protection of government property are the first priorities of wildland firefighting on NAFB. Because the potential adverse effects to MDT from a catastrophic wildfire outweigh the effects of fire suppression, all efforts to suppress and prevent catastrophic fires would be prioritized over efforts to minimize the impacts of suppression. Given these primary considerations, the following minimization measures would be used to minimize impacts on MDT and their habitat:

- Avoid spreading non-native plants by ensuring that all firefighting equipment has been cleaned before entering the area.
- Use the current map for potential MDT habitat as designated by the Service and mapped by the NNRP to determine where special consideration suppression tactics would be conducted.
- Minimize soil surface disturbances during fire suppression.
- Limit the use of mechanized equipment when possible.
- Restrict use of firefighting equipment and vehicles to existing roads and trails when possible.
- The use of aerial retardant is the preferred method of fire suppression. Foam or fugitive retardant is preferable to iron oxide retardant in MDT habitat.
- Establish fire camps, staging areas, and helispots in previously disturbed areas outside mapped MDT habitat. If possible, this would be accomplished in

consultation with an assigned resource advisor.

- Provide all firefighters and support personnel with a briefing on MDT and their habitat to minimize MDT injuries and destruction, particularly those associated with vehicle use.

9. *Reporting requirements* – The following reporting requirements would be implemented for all projects.

9.a. *Documentation of Mojave desert tortoises* – An ADTB would record each observation of MDT, including location, date, time of observation, whether the MDT was handled, the general health of the MDT, whether it voided its bladder, the location from which the MDT was moved and the location to which it was moved, and any unique physical characteristics. The ADTB would also include the names of all DTM approved for the project, their activities, and their level of involvement during the project. NAFB would continue to report numbers and locations of MDT moved off NAFB roads. MDT observed on NAFB by project personnel, or any other individual would be reported to the NNRP at (702) 652-4354 or (702) 652-7606. If a MDT is observed on a project site, the NNRP Manager would be notified immediately.

MDT deaths and injuries would be investigated as thoroughly as possible to determine their causes. The Service would be notified immediately by email or phone and within five business days in writing by email. The NNRP Manager would complete a Desert Tortoise Handling and Take Report (Appendix B. Desert Tortoise Handling and Take Report) that would summarize the incidental MDT observations, handling, injury, and mortality.

9.b. *Annual reporting* – NAFB would prepare an annual report and submit it to the Service by January 31 of the following year. The report would include information from the previously mentioned minimization measures, documentation of MDT, the project title of each appended action, the date the project began and ended, the actual number of acres disturbed, remuneration fees paid, number of acres rehabilitated, and the number of MDT taken (non-injury or non-mortality, and injury or mortality) during project activities. Additionally, permanent MDT-proof fence inspection reports would be included.

9.c. *Mojave desert tortoise database* – NAFB biologists would maintain a database that contains records of MDT surveys and incidental sightings, including road observations or other encounters with MDT on NAFB. This may include records of MDT sign such as burrows and scat. The data contained within the NAFB geodatabase is available to federal, state, and other agencies upon request.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the USAF must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. Mortality or injuries to MDT from actions covered by this PBO must be reported immediately (Appendix B. Desert

Tortoise Handling and Take Report). The USAF must submit all interim reports by their due dates and the final report to the Service's Southern Nevada Fish and Wildlife Office via electronic mail within 90 days following completion of the proposed project. The USAF will prepare an annual report to be submitted annually on January 31 (Appendix C. Report to the Fish and Wildlife Service). The reports should be sent to the contact identified in this document and must describe all activities that were conducted under this biological opinion, including activities and conservation measures that were described in the proposed action and required under the terms and conditions, and discuss any problems that were encountered in implementing conservation measures or terms and conditions and any other pertinent information. The report must also include the following information:

- The number of MDT observed, captured and relocated during the project.
- The number killed or injured during project activities, if any.
- The dates and times of capture, mortality, or injury.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured MDT, initial notification within 3 working days of its finding must be made by telephone and in writing (Appendix B Desert Tortoise Handling and Take Report) to the Southern Nevada Fish and Wildlife Office (702-515-5230). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

The USAF must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The USAF must transport injured animals to a qualified veterinarian. Should any treated MDT survive, the USAF must contact the Service regarding the final disposition of the animal(s). The USAF shall bear the cost of any required treatment of injured MDT, euthanasia of sick MDT, or cremation of dead MDT.

Dead MDT suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions. Should no institutions want the MDT specimens, or if it is determined that they are too damaged (crushed, spoiled, etc.) for preparation as a museum specimen, then they may be disposed of, upon authorization by the Service.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The conservation recommendations below are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information and can be used by the USAF to fulfill their 7(a)(1) obligations.

1. We recommend that the USAF salvage plants for proposed projects resulting in

permanent habitat disturbance for use in habitat enhancement or restoration. If the USAF chooses to salvage plants from 1,766 acres of permanent disturbance on the project site, these plants may be held in a nursery or other temporary holding location until needed. No monitoring or other requirements would be required for these plants.

2. We recommend that the USAF mark any MDT that it translocates in accordance with the Desert Tortoise Recovery Office's protocol (Service 2009). This marking will allow the Service to identify the translocated MDT in the future, if we encounter them during range-wide sampling.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your request received May 5, 2023. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Vance Imhoff of my staff at (702) 515-5253, or by electronic mail at vance_imhoff@fws.gov.

Sincerely,

GLEN KNOWLES

Digitally signed by GLEN KNOWLES
Date: 2023.09.28 12:56:38 -07'00'

Glen Knowles
Field Supervisor

cc: *Supervisory Biologist* – Habitat, Nevada Department of Wildlife, Las Vegas, Nevada
Project Leader – Desert Refuges Complex, U.S. Fish and Wildlife Service, Las Vegas, Nevada
Natural Resources Supervisor – Division of Resources, Bureau of Land Management, Las Vegas, Nevada

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APPENDIX A. REQUEST TO APPEND ACTION FORM

ACTION APPENDED TO THE USAF NELLIS AIR FORCE BASE AND SMALL ARMS RANGE PROGRAMMATIC BIOLOGICAL OPINION (File No. 2022-0051434)
This consultation consists of the programmatic biological opinion (PBO), the USAF request to append the proposed action to the PBO with project-specific information (Part A, below), and the Fish and Wildlife Service's response (Part B, below).

USFWS No. for Proposed Action: ____
(provided by Fish and Wildlife Service)

Part A: Information provided by the USAF

Date of request:	
USAF Contact [Name and phone no.]:	
Project/action title:	
USAF Project No.	
Proponent/applicant:	
Program:	
Species/critical habitat affected:	
No. of acres to be affected:	

Description of Proposed Action (Direct and Indirect Effects):

Proposed Minimization Measures and Remuneration Fees:

[Terms and conditions for desert tortoise (or other species) in the PBO may be referenced by number with a brief summary (*e.g.*, T&C 1.a. Designate and require a field contact representative or Proposed Minimization measures 1.1, 1.2,…); additional measures may be proposed by the USAF beyond those in the PBO.]

Habitat Description and Survey Summary and Results (attach data sheets, map, etc):

Description of existing factors affecting the species in the project (action) area not discussed in the PBO:

Part B: Fish and Wildlife Service Response
Date received:
USFWS No.   Date of response:

1. Environmental baseline

a. The status of the species and factors affecting the species in the action area are described in the PBO and information provided by the USAF (Part A).

b. See Part A for factors affecting the species in the action area. The incremental effects (previous activities in the action area covered under this PBO) are provided in the table at the end of this document. The PBO provides acres of maximum habitat disturbance for each program and sub-program and provides the incidental take exemption limits.

2. Project-specific effects of proposed action

In addition to the general, programmatic-level effects described in the PBO, the proposed action is anticipated to result in the following effects.

   a. Large/Adult tortoise (>180 mm MCL):

   b. Small tortoise ≤180 mm MCL):

   c. Habitat:

   d. Critical habitat unit

   e. Other effects

3. Conclusion

4. Incidental Take Statement (desert tortoise)

a. Amount or Extent of Take Exempted

Based on the analysis of effects provided above, minimization measures, and anticipated project duration, implementation of the proposed project is anticipated to result in the following take of Mojave desert tortoise:

Exempted Injury or Mortality	Exempted Non-injury – Non-Mortality (Capture)	Anticipated Habitat Loss (acres)
Large/Adult	Large/Adult	Non-critical

Additional take (*e.g.*, number of tortoises taken by ravens attracted to the project site, tortoises disturbed by noise and general project activities).

b. Project-Specific Reasonable and Prudent Measures and Terms and Conditions (complete list to be provided to biologists and monitors):

Signature: ______________________________ ______________

Field Supervisor Date
Southern Nevada Fish and Wildlife Office
Las Vegas, Nevada

APPENDIX B. DESERT TORTOISE HANDLING AND TAKE REPORT

If a Mojave desert tortoise is killed or injured, immediately contact the U.S. Fish and Wildlife Service and the USAF, by phone at the numbers below and complete Section 1 of the form.

Natural Resource Program Manager, USAF
99 CES/CEIEA
Nellis Air Force Base
Las Vegas, Nevada 89191
702-652-4354

U.S. Fish and Wildlife Service
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130
702-515-5230

Completed forms should be submitted to the USAF and Fish and Wildlife Service:

Project Name:	Report Date:
Fish and Wildlife Service Append File No.	
Authorized Desert Tortoise Biologist: ____ Employed by:	
Section 1: Complete all information below if a desert tortoise is injured or killed in addition to initial contact described above.	
If tortoise was injured ☐ or killed ☐ (check appropriate box):	
Date and time found: ________________________________ Found by: ____ GPS location (NAD 83): easting: ______________________ northing: ______________________ No. of photos taken: _______ Disposition: ____ ____ ____ Attach report with photos that describe in detail, the circumstances and potential cause of injury or mortality. For injuries include name of veterinarian and detailed assessment of injuries.	

Section 2: Complete all information below for each desert tortoise handled.
All instances of desert tortoise handling must be reported in this section and be included in the quarterly, annual, and final project reports. Desert tortoise number: _________________ Date and time found: ____________________________ Sex of tortoise: _______ Air temperature when found: _________ Air temperature when released: _________ Tortoise activity when found: ____ Handled by: ___________________________________ Approx. carapace length ________ GPS location (NAD 83) found: easting: ________________ northing: _________________ GPS location released: easting: ________________ northing: _________________ Approximate distance moved: _________________ Did tortoise void bladder; if so state approximate volume and actions taken: ____ ____ ______________________ Post handling or movement monitoring and observations: ____ ____ ____ _________________________________

APPENDIX C. REPORT TO THE FISH AND WILDLIFE SERVICE

PROGRAMMATIC BIOLOGICAL OPINION (FILE NO. 2022-0051434)

The information below should be completed by the USAF or Authorized Desert Tortoise Biologist for the project/action. Reports for all appended actions are required annually (due January 31 of each year for prior calendar year activities) and upon completion of the project/action.

☐ Annual Report ☐ Project Completion Report

1. Date: ____________________

2. Fish and Wildlife Service File No (for appended actions): ____________________

3. Project/action status:

☐ Not begun ☐ In progress* ☐ Completed date ____________________

If in progress, state approximate percent complete and estimated completion date:

____

4. Desert tortoise habitat disturbed:

Proposed disturbance (acres)	Actual disturbance (acres)

5. Summary of individual desert tortoises taken:

Size Class	**Adult (>180 mm)**	**Juvenile (< 180 mm)**	**Eggs**
Exempted (identified in appended action, as applicable)		N/A	N/A
Actual			

Describe other individuals taken:

6. Name of authorized desert tortoise biologists and monitors on the project and the dates they were on the project.

7. Describe all non-compliance issues and events.

APPENDIX C.
AIR CONFORMITY APPLICABILITY MODEL ANALYSIS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform a net change in emissions analysis to assess the potential air quality impact/s associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention*; the *Environmental Impact Analysis Process* (EIAP, 32 CFR 989); the *General Conformity Rule* (GCR, 40 CFR 93 Subpart B); and the *USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide*. This report provides a summary of the ACAM analysis.

a. Action Location:

Base: NELLIS AFB
State: Nevada
County(s): Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

b. Action Title: Combat Support Training Range

c. Project Number/s (if applicable):

d. Projected Action Start Date: 6 / 2025

e. Action Description:

The DAF proposes to repurpose existing structures as well as construct new, austere (or minimalist) buildings, such as basic concrete block and prefabricated steel structures. The primary infrastructure feature of the Installation would be a new 3,000-foot training airfield with taxiway system and associated logistics area. The training location would be connected to a new training airfield with a taxiway system. The new airfield would include a driving course using existing roads and a foot patrol area located outside of the footprint. This EA evaluates the potential environmental impacts that could arise from the development and operation of a CSTR at the existing site.

The project includes the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The 820 RHS, a self-sufficient engineering and logistics unit located at Nellis AFB, would be responsible for all clearing, grading, paving, and construction associated with the project.

The Proposed Action would establish a small, permanent-party presence of up to 20 personnel and would support additional personnel during temporary training events. Flexible CSTRs would be used to train teams in base defense, urban operations, local population engagement, and distributed operations. In order to meet the training requirements, CSTRs should support modifications to the natural infrastructure, such as grading and compaction for helicopter landing zones, erection of temporary structures, placement and mitigation of unexploded ordnance below grade, and construction of berms.

The CSTR would provide a location to facilitate integrated civil engineer training exercises ranging from small, unit-led events to major command-directed, large-team certification efforts. The mock airfield and associated accessory structures primarily would function as a setting for the 801 RHTS to host Rapid Airfield Damage Recovery (RADR) training. The mock airfield would be 12-inch-thick concrete, 150 feet wide by 1,000 feet long. The airfield would be used solely for combat support training; no aircraft operations would occur. The CSTR would be used to host temporary training events for groups up to 60 personnel 5–10 times per month, groups up to 200 personnel 1–2 times per month, and groups up to 750 personnel 3–5 times per year. Training events would last 1–12 days.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

f. Point of Contact:

Name:	J. Michael Nied, PE(WI)
Title:	Project Manager/Environmental Engineer
Organization:	Environmental Assessment Services, LLC
Email:	mnied@easbio.com
Phone Number:	608.797.1326

2. Analysis: Total reasonably foreseeable net change in direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" (highest annual emissions) and "steady state" (no net gain/loss in emission stabilized and the action is fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

All emissions estimates were derived from various sources using the methods, algorithms, and emission factors from the most current *Air Emissions Guide for Air Force Stationary Sources*, *Air Emissions Guide for Air Force Mobile Sources*, and/or *Air Emissions Guide for Air Force Transitory Sources*. For greater details of this analysis, refer to the Detail ACAM Report.

__X__ applicable
_____ not applicable

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

Conformity Analysis Summary:

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Clark Co, NV			
VOC	0.851		
NOx	1.400		
CO	1.830		
SOx	0.077		
PM 10	26.796	100	No
PM 2.5	0.053		
Pb	0.000		
NH3	0.003		
Las Vegas, NV			
VOC	0.851	100	No
NOx	1.400	100	No
CO	1.830		
SOx	0.077		
PM 10	26.796		
PM 2.5	0.053		
Pb	0.000		
NH3	0.003		
Las Vegas, NV			
VOC	0.000		
NOx	0.000		
CO	0.000	100	No
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
Las Vegas, NV			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000		
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Clark Co, NV			
VOC	17.909		
NOx	179.516		
CO	71.991		
SOx	11.791		
PM 10	42.909	100	No
PM 2.5	16.165		
Pb	0.000		
NH3	0.004		
Las Vegas, NV			
VOC	17.909	100	No
NOx	179.516	100	Yes
CO	71.991		
SOx	11.791		
PM 10	42.909		
PM 2.5	16.165		
Pb	0.000		
NH3	0.004		
Las Vegas, NV			
VOC	17.052		
NOx	178.138		
CO	70.009	100	No
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		
Las Vegas, NV			
VOC	17.052	100	No
NOx	178.138	100	Yes
CO	70.009		
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Clark Co, NV			
VOC	17.904		
NOx	179.510		
CO	71.990		
SOx	11.918		
PM 10	42.908	100	No
PM 2.5	16.162		
Pb	0.000		
NH3	0.004		
Las Vegas, NV			
VOC	17.904	100	No
NOx	179.510	100	Yes
CO	71.990		
SOx	11.918		
PM 10	42.908		
PM 2.5	16.162		
Pb	0.000		
NH3	0.004		
Las Vegas, NV			
VOC	17.052		
NOx	178.138		
CO	70.009	100	No
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		
Las Vegas, NV			
VOC	17.052	100	No
NOx	178.138	100	Yes
CO	70.009		
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2028 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Clark Co, NV			
VOC	17.088		
NOx	178.333		
CO	70.459		
SOx	11.968		
PM 10	16.127	100	No
PM 2.5	16.120		
Pb	0.000		
NH3	0.003		
Las Vegas, NV			
VOC	17.088	100	No
NOx	178.333	100	Yes
CO	70.459		
SOx	11.968		
PM 10	16.127		
PM 2.5	16.120		
Pb	0.000		
NH3	0.003		
Las Vegas, NV			
VOC	17.052		
NOx	178.138		
CO	70.009	100	No
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		
Las Vegas, NV			
VOC	17.052	100	No
NOx	178.138	100	Yes
CO	70.009		
SOx	11.587		
PM 10	16.115		
PM 2.5	16.115		
Pb	0.000		
NH3	0.000		

The Criteria Pollutants (or their precursors) with a General Conformity threshold listed in the table above are pollutants within one or more designated nonattainment or maintenance area/s for the associated National Ambient Air Quality Standard (NAAQS). These pollutants are driving this GCR Applicability Analysis. Pollutants exceeding the GCR thresholds must be further evaluated potentially through a GCR Determination.

The pollutants without a General Conformity threshold are pollutants only within areas designated attainment for the associated NAAQS. These pollutants have an insignificance indicator for VOC, NOx, CO, SOx, PM 10, PM 2.5, and NH3 of 250 ton/yr (Prevention of Significant Deterioration major source threshold) and 25 ton/yr for Pb (GCR de minimis value). Pollutants below their insignificance indicators are at rates so insignificant that they will not cause or contribute to an exceedance of one or more NAAQSs. These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Refer to the *Level II, Air Quality Quantitative Assessment Insignificance Indicators* for further details.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

Some annual net change in estimated emissions associated with this action are above the GCR threshold values established at 40 CFR 93.153 (b); therefore, the requirements of the GCR are applicable and further evaluation is required (potentially through a GCR Determination).

J. Michael Nied, PE(WI), Project Manager/Environmental Engineer	Feb 24 2025
Name, Title	**Date**

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to estimate GHG emissions and assess the theoretical Social Cost of Greenhouse Gases (SC GHG) associated with the action. The analysis was performed in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the USAF Air Quality Environmental Impact Analysis Process (EIAP) Guide. This report provides a summary of GHG emissions.

a. Action Location:
Base: NELLIS AFB
State: Nevada
County(s): Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

b. Action Title: Combat Support Training Range

c. Project Number/s (if applicable):

d. Projected Action Start Date: 6 / 2025

e. Action Description:

The DAF proposes to repurpose existing structures as well as construct new, austere (or minimalist) buildings, such as basic concrete block and prefabricated steel structures. The primary infrastructure feature of the Installation would be a new 3,000-foot training airfield with taxiway system and associated logistics area. The training location would be connected to a new training airfield with a taxiway system. The new airfield would include a driving course using existing roads and a foot patrol area located outside of the footprint. This EA evaluates the potential environmental impacts that could arise from the development and operation of a CSTR at the existing site.

The project includes the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The 820 RHS, a self-sufficient engineering and logistics unit located at Nellis AFB, would be responsible for all clearing, grading, paving, and construction associated with the project.

The Proposed Action would establish a small, permanent-party presence of up to 20 personnel and would support additional personnel during temporary training events. Flexible CSTRs would be used to train teams in base defense, urban operations, local population engagement, and distributed operations. In order to meet the training requirements, CSTRs should support modifications to the natural infrastructure, such as grading and compaction for helicopter landing zones, erection of temporary structures, placement and mitigation of unexploded ordnance below grade, and construction of berms.

The CSTR would provide a location to facilitate integrated civil engineer training exercises ranging from small, unit-led events to major command-directed, large-team certification efforts. The mock airfield and associated accessory structures primarily would function as a setting for the 801 RHTS to host Rapid Airfield Damage Recovery (RADR) training. The mock airfield would be 12-inch-thick concrete, 150 feet wide by 1,000 feet long. The airfield would be used solely for combat support training; no aircraft operations would occur. The CSTR would be used to host temporary training events for groups up to 60 personnel 5–10 times per month, groups up to 200 personnel 1–2 times per month, and groups up to 750 personnel 3–5 times per year. Training events would last 1–12 days.

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

f. Point of Contact:

Name:	J. Michael Nied, PE(WI)
Title:	Project Manager/Environmental Engineer
Organization:	Environmental Assessment Services, LLC
Email:	mnied@easbio.com
Phone Number:	608.797.1326

2. Analysis: Total combined direct and indirect GHG emissions associated with the action were estimated through ACAM on a calendar-year basis from the action start through the expected life cycle of the action. The life cycle for Air Force actions with "steady state" emissions (SS, net gain/loss in emission stabilized and the action is fully implemented) is assumed to be 10 years beyond the SS emissions year or 20 years beyond SS emissions year for aircraft operations related actions.

GHG Emissions Analysis Summary:

GHGs produced by fossil-fuel combustion are primarily carbon dioxide (CO2), methane (CH4), and nitrous oxide (NO2). These three GHGs represent more than 97 percent of all U.S. GHG emissions. Emissions of GHGs are typically quantified and regulated in units of CO2 equivalents (CO2e). The CO2e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO2. All GHG emissions estimates were derived from various emission sources using the methods, algorithms, emission factors, and GWPs from the most current Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and/or Air Emissions Guide for Air Force Transitory Sources.

The Air Force has adopted the Prevention of Significant Deterioration (PSD) threshold for GHG of 75,000 ton per year (ton/yr) of CO2e (or 68,039 metric ton per year, mton/yr) as an indicator or "threshold of insignificance" for NEPA air quality impacts in all areas. This indicator does not define a significant impact; however, it provides a threshold to identify actions that are insignificant (de minimis, too trivial or minor to merit consideration). Actions with a net change in GHG (CO2e) emissions below the insignificance indicator (threshold) are considered too insignificant on a global scale to warrant any further analysis. Note that actions with a net change in GHG (CO2e) emissions above the insignificance indicator (threshold) are only considered potentially significant and require further assessment to determine if the action poses a significant impact. For further detail on insignificance indicators see Level II, Air Quality Quantitative Assessment, Insignificance Indicators (April 2023).

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

The following table summarizes the action-related GHG emissions on a calendar-year basis through the projected life cycle of the action.

Action-Related Annual GHG Emissions (mton/yr)						
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**	**Threshold**	**Exceedance**
2025	338	0.01361167	0.0040664	339	68,039	No
2026	10,433	0.42019025	0.08742962	12,003	68,039	No
2027	10,493	0.42258333	0.08985438	12,063	68,039	No
2028 [SS Year]	10,238	0.4126362	0.08859626	11,808	68,039	No
2029	10,238	0.4126362	0.08859626	11,808	68,039	No
2030	10,238	0.4126362	0.08859626	11,808	68,039	No
2031	10,238	0.4126362	0.08859626	11,808	68,039	No
2032	10,238	0.4126362	0.08859626	11,808	68,039	No
2033	10,238	0.4126362	0.08859626	11,808	68,039	No
2034	10,238	0.4126362	0.08859626	11,808	68,039	No
2035	10,238	0.4126362	0.08859626	11,808	68,039	No
2036	10,238	0.4126362	0.08859626	11,808	68,039	No
2037	10,238	0.4126362	0.08859626	11,808	68,039	No
2038	10,238	0.4126362	0.08859626	11,808	68,039	No

The following U.S. and State's GHG emissions estimates (next two tables) are based on a five-year average (2016 through 2020) of individual state-reported GHG emissions (Reference: State Climate Summaries 2022, NOAA National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://statesummaries.ncics.org/downloads/).

State's Annual GHG Emissions (mton/yr)				
YEAR	**CO2**	**CH4**	**N2O**	**CO2e**
2025	39,602,863	85,229	6,288	39,694,380
2026	39,602,863	85,229	6,288	39,694,380
2027	39,602,863	85,229	6,288	39,694,380
2028 [SS Year]	39,602,863	85,229	6,288	39,694,380
2029	39,602,863	85,229	6,288	39,694,380
2030	39,602,863	85,229	6,288	39,694,380
2031	39,602,863	85,229	6,288	39,694,380
2032	39,602,863	85,229	6,288	39,694,380
2033	39,602,863	85,229	6,288	39,694,380
2034	39,602,863	85,229	6,288	39,694,380
2035	39,602,863	85,229	6,288	39,694,380
2036	39,602,863	85,229	6,288	39,694,380
2037	39,602,863	85,229	6,288	39,694,380
2038	39,602,863	85,229	6,288	39,694,380

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

U.S. Annual GHG Emissions (mton/yr)				
YEAR	CO2	CH4	N2O	CO2e
2025	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2026	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2027	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2028 [SS Year]	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2029	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2030	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2031	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2032	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2033	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2034	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2035	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2036	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2037	5,136,454,179	25,626,912	1,500,708	5,163,581,798
2038	5,136,454,179	25,626,912	1,500,708	5,163,581,798

GHG Relative Significance Assessment:

A Relative Significance Assessment uses the rule of reason and the concept of proportionality along with the consideration of the affected area (yGba.e., global, national, and regional) and the degree (intensity) of the proposed action’s effects. The Relative Significance Assessment provides real-world context and allows for a reasoned choice against alternatives through a relative comparison analysis. The analysis weighs each alternative’s annual net change in GHG emissions proportionally against (or relative to) global, national, and regional emissions.

The action’s surroundings, circumstances, environment, and background (context associated with an action) provide the setting for evaluating the GHG intensity (impact significance). From an air quality perspective, context of an action is the local area’s ambient air quality relative to meeting the NAAQSs, expressed as attainment, nonattainment, or maintenance areas (this designation is considered the attainment status). GHGs are non-hazardous to health at normal ambient concentrations and, at a cumulative global scale, action-related GHG emissions can only potentially cause warming of the climatic system. Therefore, the action-related GHGs generally have an insignificant impact to local air quality.

However, the affected area (context) of GHG/climate change is global. Therefore, the intensity or degree of the proposed action’s GHG/climate change effects are gauged through the quantity of GHG associated with the action as compared to a baseline of the state, U.S., and global GHG inventories. Each action (or alternative) has significance, based on their annual net change in GHG emissions, in relation to or proportionally to the global, national, and regional annual GHG emissions.

To provide real-world context to the GHG and climate change effects on a global scale, an action’s net change in GHG emissions is compared relative to the state (where action will occur) and U.S. annual emissions. The following table provides a relative comparison of an action’s net change in GHG emissions vs. state and U.S. projected GHG emissions for the same time period.

AIR CONFORMITY APPLICABILITY MODEL REPORT
GREENHOUSE GAS (GHG) EMISSIONS

Total GHG Relative Significance (mton)					
		CO2	**CH4**	**N2O**	**CO2e**
2025-2038	State Total	554,440,075	1,193,208	88,033	555,721,316
2025-2038	U.S. Total	71,910,358,506	358,776,764	21,009,907	72,290,145,176
2025-2038	Action	133,887	5.395383	1.155909	154,291
Percent of State Totals		0.02414806%	0.00045217%	0.00131305%	0.02776403%
Percent of U.S. Totals		0.00018619%	0.00000150%	0.00000550%	0.00021343%

J. Michael Nied, PE(WI), Project Manager/Environmental Engineer Feb 24 2025

Name, Title **Date**

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: NELLIS AFB
State: Nevada
County(s): Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Action Title: Combat Support Training Range

- Project Number/s (if applicable):

- Projected Action Start Date: 6 / 2025

- Action Purpose and Need:

The purpose of the Proposed Action is to establish a training platform to allow civil engineer combat support teams to develop skills needed to establish, operate, protect, and recover an expeditionary airbase. An expeditionary airbase is a mobile installation that can be established rapidly in the field under a variety of conditions. Such installations often consist of simple structures such as concrete block buildings, K-spans, and tents. The concept of an expeditionary airbase allows DAF to set up an airfield where it is needed, rather than limiting air support to locations where permanent infrastructure exists. Expeditionary airbases support the DAF mission through being ready to set up on the fly and establish a site in the field through small teams that are flexible and trained in a wide variety of jobs, ready to deploy at any time.

Implementation of the Proposed Action would provide a setting that contains flexible infrastructure that would allow dynamic employment of expeditionary assets under a variety of training configurations in a minimalist, realistic environment that simulates contested operations.

The Proposed Action is needed to meet DAF requirements for a Regional Training Site (RTS) within the western contiguous US (CONUS). DAF currently lacks the infrastructure and equipment required to facilitate robust civil engineer combat support training exercises and certification in preparation for the high-end fight. In 2020, the Commander of AFCEC directed the establishment of Civil Engineer CSTR locations within a 10-hour drive from all CONUS installations. Currently, there is a lack of adequate training locations in western CONUS, and existing CONUS locations lack the capacity to meet combat support readiness throughput requirements. The Proposed Action would provide a facility that meets the 2020 requirements set forth by AFCEC and AFIMSC.

Additionally, the DAF currently does not have sufficient platforms to enable high-end certification exercises for combat support teams postured as “Civil Engineer Force Elements” within the new Air Force Generation (AFFORGEN) model. AFFORGEN is a newly implemented model that aims to reconstitute manpower, aircraft, and equipment into Force Elements that train, deploy, and recover as cohesive units. The Proposed Action would facilitate the assembly of an entire Force Element and would allow the Force Element to train and certify in a realistic environment.

- Action Description:

The DAF proposes to repurpose existing structures as well as construct new, austere (or minimalist) buildings, such as basic concrete block and prefabricated steel structures. The primary infrastructure feature of the Installation would be a new 3,000-foot training airfield with taxiway system and associated logistics area. The training location would be connected to a new training airfield with a taxiway system. The new airfield would include a driving course using existing roads and a foot patrol area located outside of the footprint. This EA evaluates the potential environmental impacts that could arise from the development and operation of a CSTR at the existing site.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

The project includes the construction of new facilities, renovation and repair of existing facilities, implementation of infrastructure improvements, demolition and removal of obsolete equipment, as well as significant amounts of grading, paving, and semi-improved (compacted gravel material) road building and repair. The 820 RHS, a self-sufficient engineering and logistics unit located at Nellis AFB, would be responsible for all clearing, grading, paving, and construction associated with the project.

The Proposed Action would establish a small, permanent-party presence of up to 20 personnel and would support additional personnel during temporary training events. Flexible CSTRs would be used to train teams in base defense, urban operations, local population engagement, and distributed operations. In order to meet the training requirements, CSTRs should support modifications to the natural infrastructure, such as grading and compaction for helicopter landing zones, erection of temporary structures, placement and mitigation of unexploded ordnance below grade, and construction of berms.

The CSTR would provide a location to facilitate integrated civil engineer training exercises ranging from small, unit-led events to major command-directed, large-team certification efforts. The mock airfield and associated accessory structures primarily would function as a setting for the 801 RHTS to host Rapid Airfield Damage Recovery (RADR) training. The mock airfield would be 12-inch-thick concrete, 150 feet wide by 1,000 feet long. The airfield would be used solely for combat support training; no aircraft operations would occur. The CSTR would be used to host temporary training events for groups up to 60 personnel 5–10 times per month, groups up to 200 personnel 1–2 times per month, and groups up to 750 personnel 3–5 times per year. Training events would last 1–12 days.

- Point of Contact

Name: J. Michael Nied, PE(WI)
Title: Project Manager/Environmental Engineer
Organization: Environmental Assessment Services, LLC
Email: mnied@easbio.com
Phone Number: 608.797.1326

- Activity List:

Activity Type		Activity Title
2.	Personnel	Personnel added
3.	Heating	Heating Added 2025
4.	Heating	Heating Added 2026
5.	Heating	Heating Added 2027
6.	Construction / Demolition	Construction and Rennovation 2025
7.	Construction / Demolition	Construction and Rennovation 2026
8.	Construction / Demolition	Construction and Renovation 2027
9.	Emergency Generator	800 kW Generator; continuous use
10.	Emergency Generator	4 - 30kW generators; continuous use
11.	Emergency Generator	12 - 60kW generators; continuous use

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2. Personnel

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Personnel added

- Activity Description:
The proposed action would establish a small, permanent-party presence of up to 20 personnel and would support additional personnel during temporary training events.

- Activity Start Date
Start Month: 6
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.033368
SO_x	0.000277
NO_x	0.019450
CO	0.405714

Pollutant	Emissions Per Year (TONs)
PM 10	0.000752
PM 2.5	0.000665
Pb	0.000000
NH_3	0.002916

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.002117
N_2O	0.000686

Pollutant	Emissions Per Year (TONs)
CO_2	41.704602
CO_2e	41.961824

2.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 20
Civilian Personnel: 0
Support Contractor Personnel: 0
Air National Guard (ANG) Personnel: 0
Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule
Active Duty Personnel: 5 Days Per Week (default)
Civilian Personnel: 5 Days Per Week (default)
Support Contractor Personnel: 5 Days Per Week (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Air National Guard (ANG) Personnel: 4 Days Per Week (default)
Reserve Personnel: 4 Days Per Month (default)

2.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

2.4 Personnel Emission Factor(s)

- On Road Vehicle Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- On Road Vehicle Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

2.5 Personnel Formula(s)

- Personnel Vehicle Miles Travel for Work Days per Year
$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year)
NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

- Total Vehicle Miles Travel per Year
$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

- Vehicle Emissions per Year
$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Heating Added 2025

- Activity Description:
Heating Added 2025

- Activity Start Date
Start Month: 6
Start Year: 2025

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000998
SO_x	0.126783
NO_x	0.058696
CO	0.014674

Pollutant	Emissions Per Year (TONs)
PM 10	0.003639
PM 2.5	0.001350
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.002679
N_2O	0.002679

Pollutant	Emissions Per Year (TONs)
CO_2	66.035613
CO_2e	66.261592

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 9050
Type of fuel: Fuel Oil No. 2
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)

Heat Value (MMBtu/gal): 0.14
Energy Intensity (MMBtu/ft^2): 0.0908

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1000 gal)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.34	43.2	20	5	1.24	0.46		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1000 gal)

CH_4	N_2O	CO_2	CO_2e
0.913	0.913	22501	22578

3.4 Heating Formula(s)

- Heating Fuel Consumption gallons per Year

FC_{HER}= HA * EI / HV / 1000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBtu/gal)
1000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Heating

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Heating Added 2026

- Activity Description:
Heating Added 2026

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- Activity Start Date
Start Month: 6
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000998
SO_x	0.126783
NO_x	0.058696
CO	0.014674

Pollutant	Emissions Per Year (TONs)
PM 10	0.003639
PM 2.5	0.001350
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.002679
N_2O	0.002679

Pollutant	Emissions Per Year (TONs)
CO_2	66.035613
CO_2e	66.261592

4.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 9050
Type of fuel: Fuel Oil No. 2
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/gal): 0.14
Energy Intensity (MMBtu/ft^2): 0.0908

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

4.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1000 gal)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.34	43.2	20	5	1.24	0.46		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1000 gal)

CH_4	N_2O	CO_2	CO_2e
0.913	0.913	22501	22578

4.4 Heating Formula(s)

- Heating Fuel Consumption gallons per Year

FC_{HER}= HA * EI / HV / 1000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value (MMBtu/gal)
1000: Conversion Factor

- Heating Emissions per Year
$HE_{POL} = FC * EF_{POL} / 2000$

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Heating Added 2027

- Activity Description:
Heating Added 2027

- Activity Start Date
Start Month: 6
Start Year: 2027

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	0.000998
SO_x	0.126783
NO_x	0.058696
CO	0.014674

Pollutant	Emissions Per Year (TONs)
PM 10	0.003639
PM 2.5	0.001350
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.002679
N_2O	0.002679

Pollutant	Emissions Per Year (TONs)
CO_2	66.035613
CO_2e	66.261592

5.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 9050
Type of fuel: Fuel Oil No. 2
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/gal): 0.14
Energy Intensity (MMBtu/ft^2): 0.0908

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Criteria Pollutant Emission Factors (lb/1000 gal)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.34	43.2	20	5	1.24	0.46		

- Heating Greenhouse Gasses Pollutant Emission Factors (lb/1000 gal)

CH_4	N_2O	CO_2	CO_2e
0.913	0.913	22501	22578

5.4 Heating Formula(s)

- Heating Fuel Consumption gallons per Year
FC_{HER}= HA * EI / HV / 1000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBtu/gal)
1000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Construction and Rennovation 2025

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Description:
Year 1 of an aggregation of Construction and Demolition Projects spread out over a 3 year period.

- Activity Start Date
Start Month: 6
Start Month: 2025

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.830759
SO_x	0.002811
NO_x	1.354825
CO	1.584301

Pollutant	Total Emissions (TONs)
PM 10	26.793147
PM 2.5	0.052082
Pb	0.000000
NH_3	0.001532

- Activity Emissions of GHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012207
N_2O	0.002519

Pollutant	Total Emissions (TONs)
CO_2	309.246598
CO_2e	310.302329

- Global Scale Activity Emissions for SCGHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012203
N_2O	0.002518

Pollutant	Total Emissions (TONs)
CO_2	309.168854
CO_2e	310.224118

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

6.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8784
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.43930	0.00743	3.63468	4.34820	0.10060	0.09255
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02333	0.00467	575.01338	576.98668
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02159	0.00432	532.17175	533.99803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

6.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Site Grading Phase

6.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

6.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 2685413
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

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- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	2	8
Other Construction Equipment Composite	5	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.33951	0.00490	2.85858	3.41896	0.15910	0.14637
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.29762	0.00487	2.89075	3.51214	0.17229	0.15851
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.56682	0.00541	3.67816	4.11298	0.16639	0.15308
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.37086	0.00491	3.50629	2.90209	0.15396	0.14165
Scrapers Composite [HP: 423] [LF: 0.48]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.20447	0.00489	1.90932	1.57611	0.07394	0.06803
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02155	0.00431	531.19419	533.01712
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02141	0.00428	527.74261	529.55369
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02381	0.00476	586.90234	588.91644
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02159	0.00432	532.17175	533.99803
Scrapers Composite [HP: 423] [LF: 0.48]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02146	0.00429	528.94235	530.75755
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.86270	531.68105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

6.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2025

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- Phase Duration
Number of Month: 3
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 57500
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

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- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.20113	0.00487	1.94968	1.66287	0.07909	0.07277
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.26944	0.00487	2.55142	3.59881	0.13498	0.12418
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.54223	0.00793	4.34662	2.86938	0.17681	0.16267
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.19600	0.00489	2.00960	3.48168	0.07738	0.07119
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.49757	0.00735	3.67618	4.52476	0.11274	0.10373

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02140	0.00428	527.58451	529.39505
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02138	0.00428	527.10822	528.91712
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.32220	570.27253
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.86270	531.68105
Welders Composite [HP: 46] [LF: 0.45]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.30078	570.25105

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 57500
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6.5 Paving Phase

6.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 4
Number of Days: 0

6.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 265417

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.24787	0.00486	2.64574	3.44523	0.13933	0.12819
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.20238	0.00487	2.21583	3.41771	0.08945	0.08229
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.56682	0.00541	3.67816	4.11298	0.16639	0.15308

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- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02136	0.00427	526.53742	528.34436
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02141	0.00428	527.68636	529.49724
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02381	0.00476	586.90234	588.91644

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.23044	0.00204	0.10763	3.12454	0.00496	0.00439	0.02397
LDGT	0.24130	0.00265	0.19029	3.49222	0.00699	0.00618	0.02553
HDGV	0.99902	0.00612	0.94216	14.15429	0.02811	0.02486	0.05130
LDDV	0.06633	0.00104	0.08492	3.33155	0.00258	0.00238	0.00813
LDDT	0.07211	0.00121	0.12758	2.26422	0.00323	0.00297	0.00847
HDDV	0.10861	0.00419	2.58627	1.56413	0.04231	0.03892	0.03235
MC	3.09322	0.00258	0.74487	13.32152	0.02480	0.02194	0.05320

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01451	0.00460	306.69955	308.43212
LDGT	0.01731	0.00696	398.46266	400.96653
HDGV	0.08300	0.02866	920.71025	931.31084
LDDV	0.03737	0.00069	310.87097	312.00927
LDDT	0.02941	0.00101	361.49098	362.52660
HDDV	0.02530	0.00326	1248.84433	1250.44732
MC	0.13158	0.00309	388.91969	393.13117

6.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Construction and Rennovation 2026

- Activity Description:
Year 2 of an aggregation of Construction and Demolition Projects spread out over a 3 year period.

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- Activity Start Date
Start Month: 6
Start Month: 2026

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.822227
SO_x	0.002806
NO_x	1.265621
CO	1.552488

Pollutant	Total Emissions (TONs)
PM 10	26.787675
PM 2.5	0.047046
Pb	0.000000
NH_3	0.001503

- Activity Emissions of GHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012123
N_2O	0.002510

Pollutant	Total Emissions (TONs)
CO_2	308.460943
CO_2e	309.511807

- Global Scale Activity Emissions for SCGHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012120
N_2O	0.002509

Pollutant	Total Emissions (TONs)
CO_2	308.384899
CO_2e	309.435321

7.1 Demolition Phase

7.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 2
Number of Days: 0

7.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8784
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.41257	0.00743	3.52633	4.31513	0.08509	0.07828
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35280	0.00491	3.22260	2.72624	0.14205	0.13069
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.18406	0.00489	1.88476	3.48102	0.06347	0.05839

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02330	0.00466	574.35707	576.32812
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02160	0.00432	532.54993	534.37751
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02149	0.00430	529.70686	531.52468

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- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.20459	0.00199	0.08915	2.94305	0.00496	0.00439	0.02326
LDGT	0.21486	0.00259	0.14896	3.22831	0.00693	0.00613	0.02490
HDGV	0.90884	0.00614	0.83613	13.15579	0.02678	0.02369	0.05100
LDDV	0.06042	0.00100	0.07323	2.98276	0.00250	0.00230	0.00813
LDDT	0.06110	0.00119	0.10659	2.13336	0.00320	0.00294	0.00847
HDDV	0.09687	0.00410	2.43298	1.51380	0.03540	0.03257	0.03222
MC	3.08778	0.00258	0.74290	13.17924	0.02481	0.02195	0.05354

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01318	0.00446	299.44308	301.09935
LDGT	0.01502	0.00666	390.29640	392.65328
HDGV	0.07719	0.02835	924.97103	935.33462
LDDV	0.03477	0.00069	299.00026	300.07347
LDDT	0.02883	0.00101	356.10817	357.12937
HDDV	0.02488	0.00326	1222.13952	1223.73400
MC	0.12992	0.00308	389.02446	393.19099

7.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.2 Site Grading Phase

7.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

7.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 2685413
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	2	8
Other Construction Equipment Composite	5	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.31292	0.00490	2.52757	3.39734	0.14041	0.12918
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.28160	0.00487	2.73375	3.50416	0.15811	0.14546
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.54202	0.00541	3.61396	4.09268	0.15387	0.14156
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.35280	0.00491	3.22260	2.72624	0.14205	0.13069
Scrapers Composite [HP: 423] [LF: 0.48]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19606	0.00488	1.74061	1.53912	0.06788	0.06245
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.18406	0.00489	1.88476	3.48102	0.06347	0.05839

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02153	0.00431	530.81500	532.63663
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02140	0.00428	527.54121	529.35159
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02381	0.00476	586.91372	588.92786
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02160	0.00432	532.54993	534.37751
Scrapers Composite [HP: 423] [LF: 0.48]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02145	0.00429	528.85412	530.66901
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.70686	531.52468

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.20459	0.00199	0.08915	2.94305	0.00496	0.00439	0.02326
LDGT	0.21486	0.00259	0.14896	3.22831	0.00693	0.00613	0.02490
HDGV	0.90884	0.00614	0.83613	13.15579	0.02678	0.02369	0.05100
LDDV	0.06042	0.00100	0.07323	2.98276	0.00250	0.00230	0.00813
LDDT	0.06110	0.00119	0.10659	2.13336	0.00320	0.00294	0.00847
HDDV	0.09687	0.00410	2.43298	1.51380	0.03540	0.03257	0.03222
MC	3.08778	0.00258	0.74290	13.17924	0.02481	0.02195	0.05354

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01318	0.00446	299.44308	301.09935
LDGT	0.01502	0.00666	390.29640	392.65328
HDGV	0.07719	0.02835	924.97103	935.33462
LDDV	0.03477	0.00069	299.00026	300.07347
LDDT	0.02883	0.00101	356.10817	357.12937
HDDV	0.02488	0.00326	1222.13952	1223.73400
MC	0.12992	0.00308	389.02446	393.19099

7.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.3 Building Construction Phase

7.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2026

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- Phase Duration
Number of Month: 3
Number of Days: 0

7.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 57500
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

7.3.3 Building Construction Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.19758	0.00487	1.83652	1.63713	0.07527	0.06925
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.24594	0.00487	2.34179	3.57902	0.11182	0.10287
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.53947	0.00793	4.32399	2.85973	0.17412	0.16019
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.18406	0.00489	1.88476	3.48102	0.06347	0.05839
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.46472	0.00735	3.57020	4.49314	0.09550	0.08786

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02140	0.00428	527.46069	529.27080
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02138	0.00428	527.09717	528.90603
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.32694	570.27730
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02149	0.00430	529.70686	531.52468
Welders Composite [HP: 46] [LF: 0.45]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.29068	570.24091

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.20459	0.00199	0.08915	2.94305	0.00496	0.00439	0.02326
LDGT	0.21486	0.00259	0.14896	3.22831	0.00693	0.00613	0.02490
HDGV	0.90884	0.00614	0.83613	13.15579	0.02678	0.02369	0.05100
LDDV	0.06042	0.00100	0.07323	2.98276	0.00250	0.00230	0.00813
LDDT	0.06110	0.00119	0.10659	2.13336	0.00320	0.00294	0.00847
HDDV	0.09687	0.00410	2.43298	1.51380	0.03540	0.03257	0.03222
MC	3.08778	0.00258	0.74290	13.17924	0.02481	0.02195	0.05354

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01318	0.00446	299.44308	301.09935
LDGT	0.01502	0.00666	390.29640	392.65328
HDGV	0.07719	0.02835	924.97103	935.33462
LDDV	0.03477	0.00069	299.00026	300.07347
LDDT	0.02883	0.00101	356.10817	357.12937
HDDV	0.02488	0.00326	1222.13952	1223.73400
MC	0.12992	0.00308	389.02446	393.19099

7.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

7.4 Architectural Coatings Phase

7.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 2
Number of Days: 0

7.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 57500
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.20459	0.00199	0.08915	2.94305	0.00496	0.00439	0.02326
LDGT	0.21486	0.00259	0.14896	3.22831	0.00693	0.00613	0.02490
HDGV	0.90884	0.00614	0.83613	13.15579	0.02678	0.02369	0.05100
LDDV	0.06042	0.00100	0.07323	2.98276	0.00250	0.00230	0.00813
LDDT	0.06110	0.00119	0.10659	2.13336	0.00320	0.00294	0.00847
HDDV	0.09687	0.00410	2.43298	1.51380	0.03540	0.03257	0.03222
MC	3.08778	0.00258	0.74290	13.17924	0.02481	0.02195	0.05354

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01318	0.00446	299.44308	301.09935
LDGT	0.01502	0.00666	390.29640	392.65328
HDGV	0.07719	0.02835	924.97103	935.33462
LDDV	0.03477	0.00069	299.00026	300.07347
LDDT	0.02883	0.00101	356.10817	357.12937
HDDV	0.02488	0.00326	1222.13952	1223.73400
MC	0.12992	0.00308	389.02446	393.19099

7.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

7.5 Paving Phase

7.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

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Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 4
Number of Days: 0

7.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 265417

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

7.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.23717	0.00486	2.53335	3.43109	0.12904	0.11872
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.18995	0.00487	2.06537	3.40278	0.08031	0.07388
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.54202	0.00541	3.61396	4.09268	0.15387	0.14156

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02133	0.00427	525.80405	527.60847
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02141	0.00428	527.70636	529.51732
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02381	0.00476	586.91372	588.92786

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.20459	0.00199	0.08915	2.94305	0.00496	0.00439	0.02326
LDGT	0.21486	0.00259	0.14896	3.22831	0.00693	0.00613	0.02490
HDGV	0.90884	0.00614	0.83613	13.15579	0.02678	0.02369	0.05100
LDDV	0.06042	0.00100	0.07323	2.98276	0.00250	0.00230	0.00813
LDDT	0.06110	0.00119	0.10659	2.13336	0.00320	0.00294	0.00847
HDDV	0.09687	0.00410	2.43298	1.51380	0.03540	0.03257	0.03222
MC	3.08778	0.00258	0.74290	13.17924	0.02481	0.02195	0.05354

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01318	0.00446	299.44308	301.09935
LDGT	0.01502	0.00666	390.29640	392.65328
HDGV	0.07719	0.02835	924.97103	935.33462
LDDV	0.03477	0.00069	299.00026	300.07347
LDDT	0.02883	0.00101	356.10817	357.12937
HDDV	0.02488	0.00326	1222.13952	1223.73400
MC	0.12992	0.00308	389.02446	393.19099

7.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL} * 0.002205) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV

- Activity Title: Construction and Renovation 2027

- Activity Description:
Year 3 of an aggregation of Construction and Demolition Projects spread out over a 3 year period.

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- Activity Start Date
Start Month: 6
Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.816147
SO_x	0.002804
NO_x	1.201174
CO	1.536781

Pollutant	Total Emissions (TONs)
PM 10	26.783108
PM 2.5	0.042844
Pb	0.000000
NH_3	0.001492

- Activity Emissions of GHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012081
N_2O	0.002503

Pollutant	Total Emissions (TONs)
CO_2	307.702835
CO_2e	308.750700

- Global Scale Activity Emissions for SCGHG:

Pollutant	Total Emissions (TONs)
CH_4	0.012078
N_2O	0.002502

Pollutant	Total Emissions (TONs)
CO_2	307.628322
CO_2e	308.675760

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 2
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8784
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.38980	0.00742	3.42957	4.29108	0.07071	0.06505
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.34288	0.00492	3.09108	2.65644	0.13550	0.12466
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17717	0.00489	1.80740	3.48712	0.05440	0.05005

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Concrete/Industrial Saws Composite [HP: 33] [LF: 0.73]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02330	0.00466	574.33236	576.30332
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02160	0.00432	532.55942	534.38703
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02148	0.00430	529.61807	531.43559

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.19651	0.00194	0.08153	2.79017	0.00489	0.00433	0.02307
LDGT	0.20378	0.00255	0.13169	3.07762	0.00688	0.00608	0.02470
HDGV	0.86777	0.00616	0.74592	12.28258	0.02573	0.02277	0.05074
LDDV	0.05464	0.00096	0.06098	2.62903	0.00240	0.00220	0.00813
LDDT	0.05515	0.00118	0.09471	2.06930	0.00319	0.00293	0.00847
HDDV	0.08693	0.00400	2.29951	1.46936	0.02954	0.02718	0.03208
MC	3.07458	0.00258	0.74109	13.04706	0.02482	0.02195	0.05386

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01247	0.00437	292.50495	294.11848
LDGT	0.01396	0.00642	383.34847	385.60774
HDGV	0.07227	0.02680	926.64521	936.42673
LDDV	0.03218	0.00069	287.75658	288.76488
LDDT	0.02832	0.00101	351.77586	352.78430
HDDV	0.02452	0.00327	1192.70860	1194.29635
MC	0.12837	0.00308	389.11778	393.24576

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Site Grading Phase

8.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

8.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 2685413
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	2	8
Other Construction Equipment Composite	5	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20

Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.29535	0.00490	2.28401	3.40565	0.12705	0.11688
Other Construction Equipment Composite [HP: 82] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.25231	0.00487	2.49971	3.48392	0.13245	0.12186
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.52865	0.00542	3.57666	4.10537	0.14602	0.13434
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.34288	0.00492	3.09108	2.65644	0.13550	0.12466
Scrapers Composite [HP: 423] [LF: 0.48]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.19058	0.00488	1.60937	1.52212	0.06336	0.05829
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.17717	0.00489	1.80740	3.48712	0.05440	0.05005

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour)

Graders Composite [HP: 148] [LF: 0.41]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02155	0.00431	531.25291	533.07604
Other Construction Equipment Composite [HP: 82] [LF: 0.42]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02140	0.00428	527.44206	529.25211
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02382	0.00476	587.12246	589.13732
Rubber Tired Dozers Composite [HP: 367] [LF: 0.4]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02160	0.00432	532.55942	534.38703
Scrapers Composite [HP: 423] [LF: 0.48]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02145	0.00429	528.70476	530.51914
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	N_2O	CO_2	CO_2e
Emission Factors	0.02148	0.00430	529.61807	531.43559

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.19651	0.00194	0.08153	2.79017	0.00489	0.00433	0.02307
LDGT	0.20378	0.00255	0.13169	3.07762	0.00688	0.00608	0.02470
HDGV	0.86777	0.00616	0.74592	12.28258	0.02573	0.02277	0.05074
LDDV	0.05464	0.00096	0.06098	2.62903	0.00240	0.00220	0.00813
LDDT	0.05515	0.00118	0.09471	2.06930	0.00319	0.00293	0.00847
HDDV	0.08693	0.00400	2.29951	1.46936	0.02954	0.02718	0.03208
MC	3.07458	0.00258	0.74109	13.04706	0.02482	0.02195	0.05386

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01247	0.00437	292.50495	294.11848
LDGT	0.01396	0.00642	383.34847	385.60774
HDGV	0.07227	0.02680	926.64521	936.42673
LDDV	0.03218	0.00069	287.75658	288.76488
LDDT	0.02832	0.00101	351.77586	352.78430
HDDV	0.02452	0.00327	1192.70860	1194.29635
MC	0.12837	0.00308	389.11778	393.24576

8.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Building Construction Phase

8.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2027

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- Phase Duration
Number of Month: 3
Number of Days: 0

8.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 57500
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.3.3 Building Construction Phase Emission Factor(s)

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- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.19464	0.00487	1.74774	1.62852	0.07179	0.06605
Forklifts Composite [HP: 82] [LF: 0.2]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.22849	0.00487	2.15229	3.56761	0.09240	0.08501
Generator Sets Composite [HP: 14] [LF: 0.74]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.53730	0.00793	4.30480	2.85227	0.17170	0.15796
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.17717	0.00489	1.80740	3.48712	0.05440	0.05005
Welders Composite [HP: 46] [LF: 0.45]						
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**
Emission Factors	0.43501	0.00735	3.46616	4.46084	0.07894	0.07263

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Cranes Composite [HP: 367] [LF: 0.29]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02140	0.00428	527.45492	529.26501
Forklifts Composite [HP: 82] [LF: 0.2]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02138	0.00428	527.06992	528.87869
Generator Sets Composite [HP: 14] [LF: 0.74]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.30624	570.25652
Tractors/Loaders/Backhoes Composite [HP: 84] [LF: 0.37]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02148	0.00430	529.61807	531.43559
Welders Composite [HP: 46] [LF: 0.45]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02305	0.00461	568.29664	570.24689

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.19651	0.00194	0.08153	2.79017	0.00489	0.00433	0.02307
LDGT	0.20378	0.00255	0.13169	3.07762	0.00688	0.00608	0.02470
HDGV	0.86777	0.00616	0.74592	12.28258	0.02573	0.02277	0.05074
LDDV	0.05464	0.00096	0.06098	2.62903	0.00240	0.00220	0.00813
LDDT	0.05515	0.00118	0.09471	2.06930	0.00319	0.00293	0.00847
HDDV	0.08693	0.00400	2.29951	1.46936	0.02954	0.02718	0.03208
MC	3.07458	0.00258	0.74109	13.04706	0.02482	0.02195	0.05386

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01247	0.00437	292.50495	294.11848
LDGT	0.01396	0.00642	383.34847	385.60774
HDGV	0.07227	0.02680	926.64521	936.42673
LDDV	0.03218	0.00069	287.75658	288.76488
LDDT	0.02832	0.00101	351.77586	352.78430
HDDV	0.02452	0.00327	1192.70860	1194.29635
MC	0.12837	0.00308	389.11778	393.24576

8.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.4 Architectural Coatings Phase

8.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 2
Number of Days: 0

8.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 57500
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	NH_3
LDGV	0.19651	0.00194	0.08153	2.79017	0.00489	0.00433	0.02307
LDGT	0.20378	0.00255	0.13169	3.07762	0.00688	0.00608	0.02470
HDGV	0.86777	0.00616	0.74592	12.28258	0.02573	0.02277	0.05074
LDDV	0.05464	0.00096	0.06098	2.62903	0.00240	0.00220	0.00813
LDDT	0.05515	0.00118	0.09471	2.06930	0.00319	0.00293	0.00847
HDDV	0.08693	0.00400	2.29951	1.46936	0.02954	0.02718	0.03208
MC	3.07458	0.00258	0.74109	13.04706	0.02482	0.02195	0.05386

- Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	N_2O	CO_2	CO_2e
LDGV	0.01247	0.00437	292.50495	294.11848
LDGT	0.01396	0.00642	383.34847	385.60774
HDGV	0.07227	0.02680	926.64521	936.42673
LDDV	0.03218	0.00069	287.75658	288.76488
LDDT	0.02832	0.00101	351.77586	352.78430
HDDV	0.02452	0.00327	1192.70860	1194.29635
MC	0.12837	0.00308	389.11778	393.24576

8.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.5 Paving Phase

8.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

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Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

8.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 265417

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Criteria Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.22921	0.00486	2.45013	3.43821	0.11941	0.10986
Paving Equipment Composite [HP: 89] [LF: 0.36]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.18341	0.00488	2.01586	3.40316	0.07465	0.06867
Rollers Composite [HP: 36] [LF: 0.38]						
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5
Emission Factors	0.52865	0.00542	3.57666	4.10537	0.14602	0.13434

- Construction Exhaust Greenhouse Gasses Pollutant Emission Factors (g/hp-hour) (default)

Pavers Composite [HP: 81] [LF: 0.42]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02133	0.00427	525.80912	527.61356
Paving Equipment Composite [HP: 89] [LF: 0.36]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02142	0.00428	528.06776	529.87995
Rollers Composite [HP: 36] [LF: 0.38]				
	CH_4	**N_2O**	**CO_2**	**CO_2e**
Emission Factors	0.02382	0.00476	587.12246	589.13732

- Vehicle Exhaust & Worker Trips Criteria Pollutant Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**NH_3**
LDGV	0.19651	0.00194	0.08153	2.79017	0.00489	0.00433	0.02307
LDGT	0.20378	0.00255	0.13169	3.07762	0.00688	0.00608	0.02470
HDGV	0.86777	0.00616	0.74592	12.28258	0.02573	0.02277	0.05074
LDDV	0.05464	0.00096	0.06098	2.62903	0.00240	0.00220	0.00813
LDDT	0.05515	0.00118	0.09471	2.06930	0.00319	0.00293	0.00847
HDDV	0.08693	0.00400	2.29951	1.46936	0.02954	0.02718	0.03208
MC	3.07458	0.00258	0.74109	13.04706	0.02482	0.02195	0.05386

- Vehicle Exhaust & Worker Trips Greenhouse Gasses Emission Factors (grams/mile)

	CH_4	**N_2O**	**CO_2**	**CO_2e**
LDGV	0.01247	0.00437	292.50495	294.11848
LDGT	0.01396	0.00642	383.34847	385.60774
HDGV	0.07227	0.02680	926.64521	936.42673
LDDV	0.03218	0.00069	287.75658	288.76488
LDDT	0.02832	0.00101	351.77586	352.78430
HDDV	0.02452	0.00327	1192.70860	1194.29635
MC	0.12837	0.00308	389.11778	393.24576

8.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * HP * LF * EF_{POL}* 0.002205) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
HP: Equipment Horsepower
LF: Equipment Load Factor
EF_{POL}: Emission Factor for Pollutant (g/hp-hour)
0.002205: Conversion Factor grams to pounds
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)

0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Emergency Generator

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV; Las Vegas, NV; Las Vegas, NV

- Activity Title: 800 kW Generator; continuous use

- Activity Description:

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1 - 800 kW permanent generator; continuous use 8670 hours/year

- Activity Start Date
Start Month: 1
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	3.365014
SO_x	0.058747
NO_x	121.723266
CO	32.334211

Pollutant	Emissions Per Year (TONs)
PM 10	3.802090
PM 2.5	3.802090
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.217584
N_2O	0.043515

Pollutant	Emissions Per Year (TONs)
CO_2	5404.701000
CO_2e	6250.654200

9.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1073
Average Operating Hours Per Year (hours): 8760

9.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.15	1.33

9.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

10. Emergency Generator

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV; Las Vegas, NV; Las Vegas, NV

- Activity Title: 4 - 30kW generators; continuous use

- Activity Description:
4 - 30 kW permanent generator; continuous use 8670 hours/year

- Activity Start Date
Start Month: 1
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	1.955232
SO_x	1.646880
NO_x	8.059200
CO	5.382144

Pollutant	Emissions Per Year (TONs)
PM 10	1.759008
PM 2.5	1.759008
Pb	0.000000
NH_3	0.000000

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.032445
N_2O	0.006489

Pollutant	Emissions Per Year (TONs)
CO_2	805.920000
CO_2e	932.064000

10.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 4

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 40
Average Operating Hours Per Year (hours): 8760

10.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.15	1.33

10.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

11. Emergency Generator

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Clark
Regulatory Area(s): Clark Co, NV; Las Vegas, NV; Las Vegas, NV; Las Vegas, NV

- Activity Title: 12 - 60kW generators; continuous use

- Activity Description:
12- 60 kW permanent generator; continuous use 8670 hours/year

- Activity Start Date
Start Month: 1
Start Year: 2026

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions of Criteria Pollutants:

Pollutant	Emissions Per Year (TONs)
VOC	11.731392
SO_x	9.881280
NO_x	48.355200
CO	32.292864

Pollutant	Emissions Per Year (TONs)
PM 10	10.554048
PM 2.5	10.554048
Pb	0.000000
NH_3	0.000000

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Global Scale Activity Emissions of Greenhouse Gasses:

Pollutant	Emissions Per Year (TONs)
CH_4	0.194670
N_2O	0.038932

Pollutant	Emissions Per Year (TONs)
CO_2	4835.520000
CO_2e	5592.384000

11.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 12

- Default Settings Used: No

- Emergency Generators Consumption

Emergency Generator's Horsepower: 80
Average Operating Hours Per Year (hours): 8760

11.3 Emergency Generator Emission Factor(s)

- Emergency Generators Criteria Pollutant Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251		

- Emergency Generators Greenhouse Gasses Pollutant Emission Factor (lb/hp-hr)

CH_4	N_2O	CO_2	CO_2e
0.000046297	0.000009259	1.15	1.33

11.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

APPENDIX D.
DESERT TORTOISE AND HABITAT SURVEY

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Desert Tortoise and Habitat Survey Supporting the Environmental Assessment for the Combat Support Training Range at Nellis Air Force Base, Nevada

Final Survey Report

Prepared for

United States Air Force
Nellis Air Force Base, Las Vegas, Nevada

Prepared by

Environmental Assessment Services
350 Hills Street, Suite 112
Richland, WA 99354

December 2024

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Acronyms

AFB	Air Force Base
CSTR	Combat Support Training Range
DAF	Department of the Air Force
EA	Environmental Assessment
EAS	Environmental Assessment Services, LLC
e.g.	for example
et seq.	and the following
GPS	Global Positioning System
i.e.	that is
MBTA	Migratory Bird Treaty Act
SOCP	Species of Conservation Priority
spp.	species
US	United States
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
vs	versus

1 Introduction

The United States (US) Department of the Air Force (DAF) and the Air Force Civil Engineer Center, with the support of Air Combat Command and Nellis Air Force Base (AFB), proposes to develop a Combat Support Training Range (CSTR) at Nellis AFB. The site will be established and operated as a training platform for civil engineer combat support teams to train on skills needed to construct, operate, protect, and recover an expeditionary airbase. The DAF is preparing an Environmental Assessment (EA) to analyze the potential environmental effects associated with the CSTR. To support the assessment of potential impacts to biological resources, the DAF conducted surveys for desert tortoises within the proposed action area (**Figure 1**). Under contract with the US Army Corps of Engineers, Los Angeles District, Environmental Assessment Services, LLC (EAS), on behalf of Nellis AFB, surveyed 151 acres of desert tortoise habitat on October 22–23, 2024.

The Mojave desert tortoise (*Gopherus agassizii*), referred herein as "desert tortoise," is the only species listed under the *Endangered Species Act of 1973* (ESA), as amended (16 United States Code [USC] § 1531 et seq.) known to occur on Nellis AFB (Nellis AFB, 2024). The desert tortoise is currently listed by the United States Fish and Wildlife Service (USFWS) as threatened (USFWS, 1990). Previous surveys for the desert tortoise on Nellis AFB have identified desert tortoises in Area II, the eastern part of Area I, and on the Small Arms Range. The Proposed Action would occur in the western part of Area II. This final report describes the findings of the desert tortoise and habitat surveys. Observations of other wildlife species or their sign (e.g., burrows and scat) were also recorded and documented in this report.

1.1 Survey Objectives

The objectives of the survey were to: 1) determine the presence or absence of desert tortoises; 2) assess the habitat conditions in the proposed action area, and 3) document the presence of other wildlife species. The results of the survey will be used to assess the potential impacts to desert tortoises and support any ESA Section 7 consultations between Nellis AFB and the USFWS with respect to the Proposed Action. This information also will be integrated into the CSTR EA.

1.2 Survey Area

The desert tortoise survey area within the proposed action area was defined by the DAF and consisted of areas deemed potential tortoise habitat that had not been previously surveyed. The survey area included one large land parcel (143 acres) and a small parcel (7.9 acres) near the existing Camp Cobra (**Figure 1**). The large survey area is located southwest of the Red Horse Squadron area in Area II between Ammunition Road to the south and O'Bannon Road to the north. The small survey area is located between the Red Horse Squadron area and Camp Cobra.

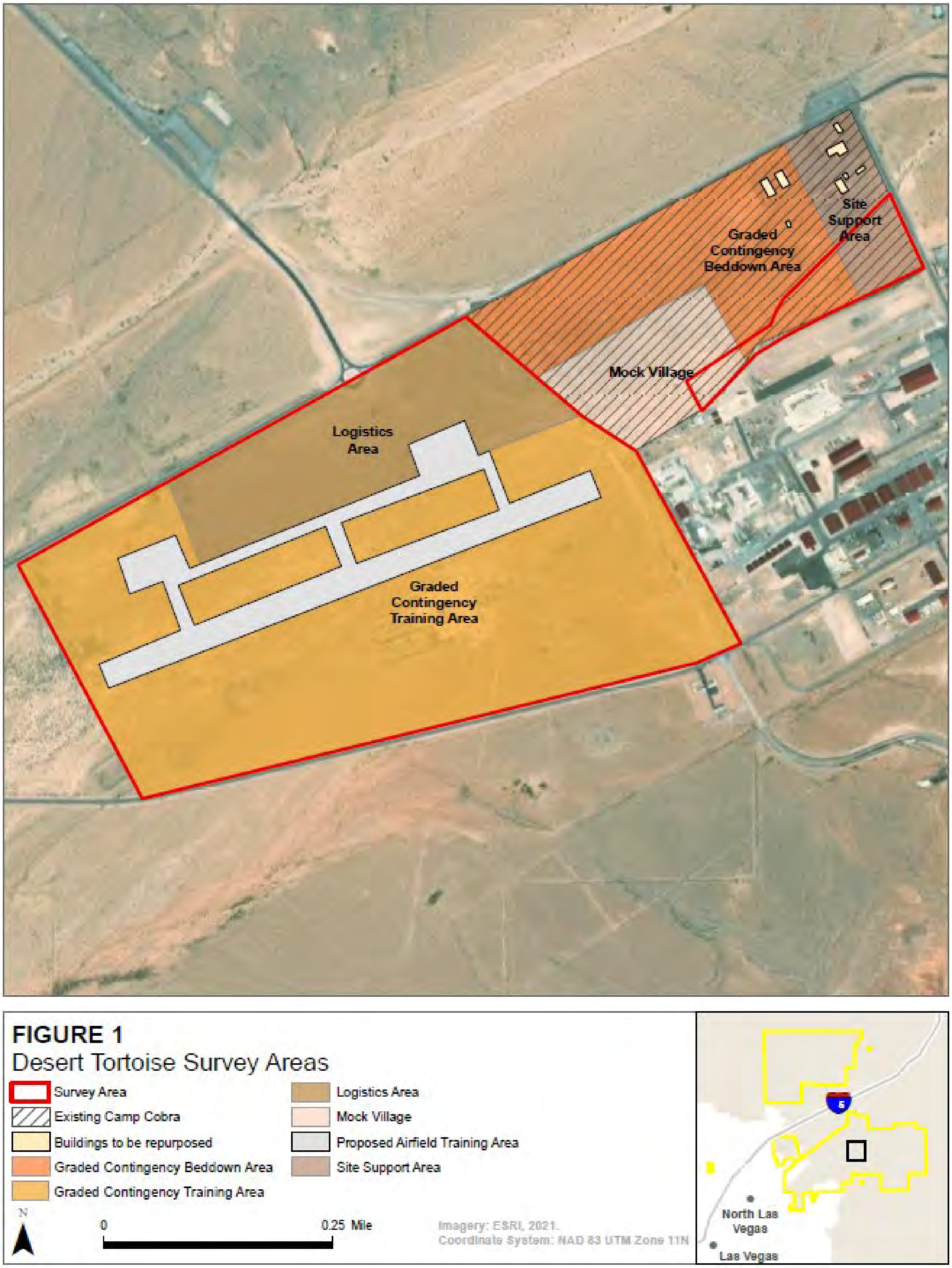

Figure 1 Desert Tortoise Survey Areas

2 Methods

All methods followed USFWS guidance for preparing for actions that may occur within the range of the desert tortoise (USFWS, 2009, 2019). Given that this field survey was a pre-construction survey designed to estimate the presence or absence of desert tortoises based on either tortoise observations or presence of tortoise sign, there was no need to handle any tortoises, therefore, no federal or state permits were required. The survey was led by a qualified desert tortoise biologist authorized by the USFWS.

2.1 Field Survey Procedures

The proposed action area met the USFWS requirements for a small project survey (i.e., less than 500 acres) (USFWS, 2019). The survey covered 100% of the designated survey area with 10-meter (m)-wide belt transects.[1] Surveyors walked the centerline of transects searching for desert tortoises, burrows, and other desert tortoise sign such as scat and carcasses. Any potential desert tortoise burrow was visually inspected for desert tortoise presence. The overall condition of the burrow was evaluated, and the entrance and apron were visually inspected for sign of recent tortoise activity such as scat and fresh soil disturbance. Burrows were identified as tortoise burrows based on the characteristic half-moon shape of the entrance although all burrows were searched for tortoises. Three surveyors completed the walking transects together. For the purposes of survey navigation, 30 m wide transects were created in Geographic Information System software from Environmental Systems Research Institute on a map of the survey area (**Figure 2**). Transects were downloaded into two Trimble® Global Positioning System (GPS) units for field navigation. The biologists on the outside edge of each 30 m used the GPS unit to maintain the survey crew's position on each transect. Biologists were spaced at 10 m transect intervals. The biologist in the center covered an approximate 10-m wide transect between the two GPS units. Observations were recorded on data forms provided by the Nellis Natural Resources Program to maintain consistency with Nellis AFB data procedures. In addition to desert tortoises and burrows, surveyors also recorded other wildlife and habitat features present in the area. Habitat features and species were recorded with a Trimble GPS.

[1] The USFWS protocols use metric measurements for the transects. Ten and 30 meters are approximately equal to 32 and 98 feet, respectively.

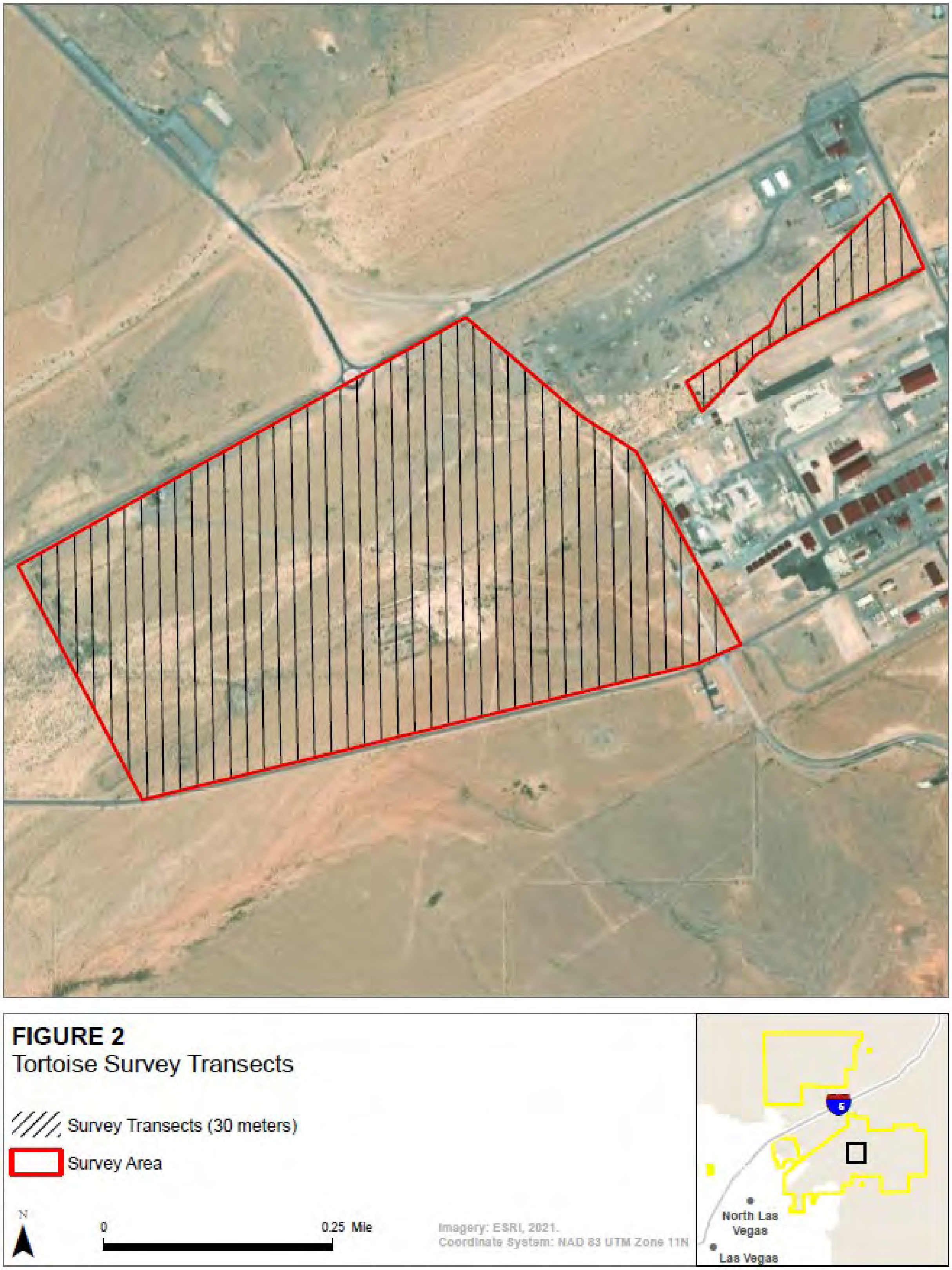

Figure 2 Tortoise Survey Transects

2.2 Habitat Condition Assessment

As part of the desert tortoise survey process, habitat conditions for desert tortoises were assessed within the survey area (USFWS, 2019). The habitat assessment considered the following physical and biological features:

- natural or anthropogenic features that would prevent tortoises from moving through or occupying the area,
- evidence of past or ongoing disturbance from human activity including the presence of feral or free-ranging dogs,
- presence of soils or substrate conducive to tortoises for constructing burrows or nests,
- presence of tortoise burrows and/or caliche outcrops,
- description of the dominant perennial plant species and characteristics of the plant community (e.g., size and spacing of shrubs),
- description of herbaceous annual/perennial plant species (native vs. introduced) on which desert tortoises forage and soil conditions, and
- presence and abundance of ravens and, if so, any natural or anthropogenic features that appear to attract ravens.

For the purposes of habitat assessment, the two survey areas were individually evaluated.

3 Habitat Conditions

The DAF has completed mapping of vegetation communities on Nellis AFB consistent with the United States Natural Vegetation Classification system (Wion and Olech, 2022). Vegetation communities were mapped to the Alliance level of classification and, when identifiable, to the Association level. Information on vegetation communities within the two survey areas was also recorded during desert tortoise surveys.

Given that the survey areas are on Nellis AFB is a secured facility, human activity is restricted and feral or free-ranging dogs are not known to occur. During the two survey days, no ravens were observed. Wooden power or communication line poles exist along O'Bannon Road on the north side of the large survey area and are potential perching sites for ravens and raptor species. Nellis AFB facilities and structures exist on the east side of the large survey area and surround the small survey area and contain potential perching sites. Habitat characteristics are described in **Sections 3.1** and **3.2** for each of the survey areas.

3.1 Survey Location 1 – West of the Red Horse Squadron Area

The large survey area contains approximately 143 acres and is located southwest of the Red Horse Squadron area and Camp Cobra. The east boundary of the survey area is a chain-link fence that separates the site from the Red Horse Squadron facilities and Camp Cobra. The site slopes from the northeast to the southwest. Soils are alluvial deposits from stormwater flow that flows from the north-northeast to the south-southwest on the east side of the Nellis AFB flightline. The soil surface is typically gravelly which is conducive for the construction of burrows by desert tortoises. Several stormwater channels occur throughout the central part of the survey area. These channels carry stormwater runoff originating on site and upgradient to the northeast. The channels are typically shallow, 1- to 3-feet deep in most locations. There was evidence of broader shallow surface water flow in areas near the channels. No caliche layers or outcrops are exposed in any of the channels. Several gravel roads cross the survey area, but there was no evidence of frequent use of the roads. Other disturbances include a series of small catchment basins for stormwater that have been constructed through the central part of the survey area. These basins consist of earthen berms (circular or square) with openings facing upgradient. The basins are at least more than 35 years old and are vegetated (**Appendix A**).

Vegetation in the area consists of three mapped associations and small areas of bare ground (**Figure 3**). The vegetation in stormwater channels and several catchment basins is classified as Parry's saltbush (*Atriplex parryi*) wet shrubland alliance. Due to water collecting in the channels and stormwater

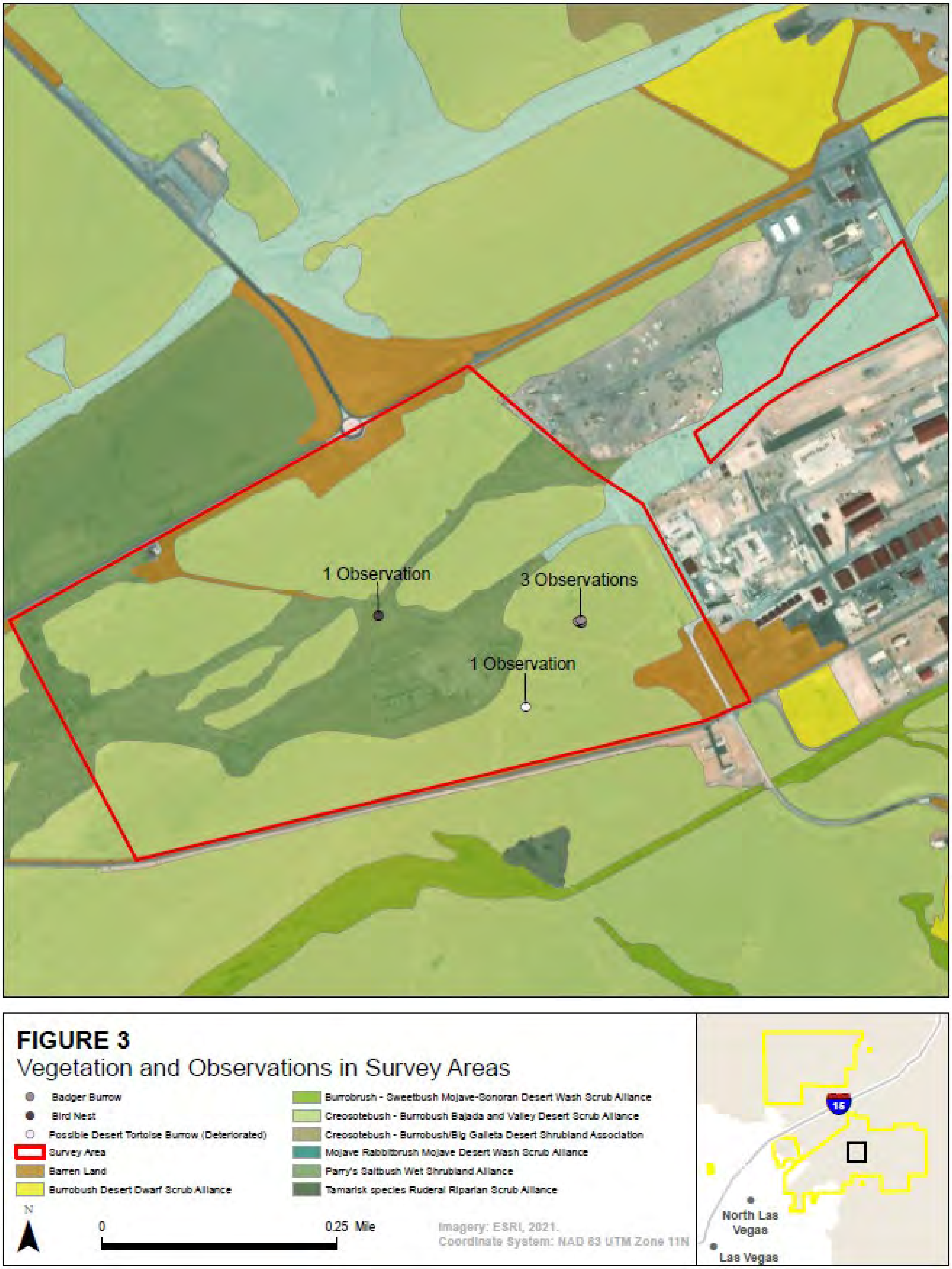

Figure 3 Vegetation and Observations in Survey Areas

catchment basins, vegetation was well developed and in a healthy condition. This vegetation association covers approximately 25 percent (35.5 acres) of the survey area. The common plant species in this association are listed in **Table 1**.

Table 1 Common plant species observed in the Parry's saltbush wet shrubland alliance.

Scientific Name	Common Name
Ambrosia dumosa	burrobush
Atriplex parryi	Parry's saltbush
Atriplex canescens	fourwing saltbush
Chilopsis linearis	desert willow
Cucurbita palmata	coyote gourd
Encelia spp.	brittlebush
Ephedra nevadensis	Nevada jointfir
Ericameria spp.	rabbitbrush
Krameria erecta	littleleaf ratany
Larrea tridentata	creosote bush
Physalis crassifolia	thick leaf ground cherry
Pleuraphis rigida	big galleta
Schismus arabicus	Arabian schismus
Sphaeralcea ambigua	desert globemallow

The vegetation on the upland sites outside of the stormwater channels is classified as *Larrea tridentata* – *Ambrosia dumosa* bajada and valley desert scrub alliance. This vegetation association covers approximately 69 percent (98.3 acres) of this survey area. The creosote bush-burrobush association is common throughout the Mojave Desert. This association is drier than the Parry's saltbush wet shrubland alliance, and the creosote bushes are shorter (approximately 1.5–5 feet) and shrubs are more widely spaced (**Appendix A**). The herbaceous layer is sparse, consisting mostly of dormant Arabian schismus, an introduced grass, and devil's spineflower (*Chorizanthe rigida*). Common species in the creosote bush-burrobush association are listed in **Table 2**.

Table 2 Common species in the *Larrea tridentata* – *Ambrosia dumosa* bajada and valley desert scrub alliance.

Scientific Name	Common Name
Ambrosia dumosa	burrobush
Atriplex spp.	saltbush
Chorizanthe rigida	devil's spineflower
Larrea tridentata	creosote bush
Schismus arabicus	Arabian schismus

A small area of *Ericameria paniculata* Mojave Desert wash scrub vegetation covering approximately 1 percent (1.2 acres) of this survey area occurs on the east end of the survey area. This vegetation association extends out of the Camp Cobra site and is described in Section 3.2. Barren ground (i.e., roads and cleared areas) cover approximately 7.3 acres in the survey area. Based on physical and biotic characteristics of the site, the survey area would be considered fair to good desert tortoise habitat. However, the upland sites have short and sparse vegetation that provides minimal cover for desert tortoises. The well vegetated wash channels likely are frequently flooded to prevent long-term use by desert tortoises.

3.2 Survey Location 2 – Camp Cobra

The second survey area was a 7.9-acre site located between the Red Horse Squadron area on the south and Camp Cobra on the north. The east side is bounded by a chain-link fence and paved road. The site is relatively isolated from other natural habitat areas (see **Figure 1**). The dominant features in the area are two stormwater channels. One channel forms the south edge of the survey area. The other channel starts in the northeast corner and receives stormwater through three culverts under the paved road to the east (**Appendix A**). Both channels merge toward the west end and form a shallow, wide channel area that eventually flows into the large survey area (see **Section 3.1**).

Vegetation in the survey area has been mapped as Mojave rabbitbrush (*Ericameria paniculata*) Mojave Desert wash scrub alliance (**Figure 3**). The vegetation association is found in wash areas that may collect water during rainfall events (**Appendix A**). The areas between the two stormwater channels contain creosote bush and burrobush, vegetation typical of the Mojave Desert. Plant species observed in the survey area are listed in **Table 3**.

Table 3 Common plant species observed in the Mojave rabbitbrush Mojave Desert wash scrub alliance.

Scientific Name	Common Name
Ambrosia dumosa	burrobush
Baccharis sarothroides	desertbroom
Chilopsis linearis	desert willow
Cucurbita palmata	coyote gourd
Ericameria paniculata	Mojave rabbitbrush
Larrea tridentata	creosote bush
Schismus arabicus	Arabian schismus

Based on the physical and biotic characteristics in this survey area, the site is considered poor desert tortoise habitat. The area is isolated from other desert tortoise habitat by disturbed areas, active Nellis AFB facilities, chain-link fences, and paved roads. Approximately half of the area has stormwater flow when it rains.

4 Mojave Desert Tortoise

4.1 Survey Transects

In total, 38 miles of 10-m-wide belt transects were walked on 151 acres of potential desert tortoise habitat.

4.2 Desert Tortoises and Tortoise Sign

Observations were recorded on data forms provided by the Nellis Natural Resources (**Appendix B**). No live tortoises, desert tortoise burrows, or scat were observed during the surveys. One collapsed burrow may have been a tortoise burrow in the past, but it was weathered and filled with dormant vegetation and vegetation litter (**Figures 3** and **4a**).

5 Other Wildlife

While searching for desert tortoises, surveyors recorded observations or sign of other species in the proposed action area (**Table 4**). Very few birds were observed. Several sage sparrows (*Amphispiza belli*) were observed. Two birds were flushed from a nest from a desert willow but were not identified (**Figures 3** and **4b**). A dead rock wren (*Salpinctes obsoletus*) was found in the small survey area near Camp Cobra. One desert horned lizard (*Phrynosoma platyrhinos*) and two black-tailed jackrabbits (*Lepus californicus*) were observed. A complex of four burrows was found in the large survey area, potentially dug by a badger (*Taxidea taxus*) (**Figures 3** and **4c**). Rodent burrows were abundant throughout both survey areas. These burrows likely are occupied by nocturnal fossorial rodents, such as Merriam's kangaroo rat (*Dipodomys merriami*), chisel-tooth kangaroo rat (*Dipodomys microps*), and desert pocket mouse (*Chaetodipus penicillatus*).

Figure 4 **Possible old tortoise burrow a), bird nest b), and badger burrow c) observed during the surveys**

Table 4 Other wildlife documented in the project area during wildlife surveys.

Class	Species	Observation Type	Status
Aves	Rock Wren	Direct (Carcass)	MBTA
Aves	Sagebrush Sparrow	Direct	MBTA
Insecta	darkling beetle (spp.)	Direct	none
Mammalia	black-tailed jackrabbit (*Lepus californicus*)	Direct	none
Mammalia	kangaroo rat (*Dipodomys* spp.)	Burrows	none
Mammalia	pocket mice (*Chaetodipus* spp.)	Burrows	none
Mammalia	badger	Burrows	none
Reptilia	desert horned lizard (*Phrynosoma platyrhinos*)	Direct	SOCP

a. MBTA are birds protected by the Migratory Bird Treaty Act.
b. SOCP refers to Nevada Department of Wildlife's designation of Species of Conservation Priority.

6 References

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APPENDIX A. PLANT COMMUNITIES IN DESERT TORTOISE SURVEY AREA

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a) Creosote bush – Burrobush Bajada and Valley Desert Scrub vegetation alliance in survey area.

b) Parry’s Saltbush Wet Shrubland vegetation alliance in survey area.

c) Mojave Rabbitbrush Mojave Desert Wash Scrub vegetation alliance in stormwater wash.

d) Mojave Rabbitbrush Mojave Desert Wash Scrub vegetation alliance near Camp Cobra.

APPENDIX B. DESERT TORTOISE TRANSECT SURVEY SHEETS

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Nellis Desert Tortoise Transect Survey Data Sheet

NNRP: 01/11/2020

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Date: 10/22/24 Location: Nellis AFB - Area II CSTR Observers: Ron, Matt + Tony Start Temp: 59 ºF Precipitation: YES / NO

Township: 19S Start Time: 0700 Start- Easting: 114.998 W Northing: 36.249 N Trimble/GPS ID: ____

Range: 62 End Time: 1030 End- Easting: 114.99 W Northing: 36.252 N End Temp: 83 ºF

Section: 36 Cloud Cover: 0 %

West 2/3 of large survey area

Burrow/Den Condition Codes:
1. Active w/DT or recent DT sign
2. Good condition; DT; but no recent
3. Deteriorated; definitely DT
4. Deteriorated; possibly DT
5. Good condition; possibly DT

Scat Condition Codes:
1. Wet or freshly dried, obvious odor
2. Dried w/glaze; some odor; dark brown
3. Dried, no glaze or odor; signs of bleaching, tightly packed
4. Dried; light light brown to pale yellow loose mat'l; scaly appearance
5. Bleached; or consisting only of plant fiber

Shell Remains Condition Codes:
1. Fresh or putrid
2. Normal color; scutes adhere to bone
3. Scutes peeling off bone
4. Shell bone falling apart; growth rings on scutes are peeling
5. Disarticulated and scattered

LIVE TORTOISE

#	GPS PT #	Easting	Northing	Time	Tortoise location (in burrow: all tortoise beneath plain sight of burrow opening; not in burrow	Approx MCL >160-mm? Y|N	Photo Number/ Comments
1					N/A – none observed		
2							
3							

TORTOISE SIGN (burrow, scat, carcasses, etc)

#	GPS PT #	Easting	Northing	Type of Sign (burrows, scat, carcass, etc)	Condition Code	Description / Comments / Habitat
1				N/A – none observed		
2						
3						
4						
5						
6						

Incidental Observations: Sage sparrows, small desert horned lizard, numerous rodent burrows throughout survey area, one bird nest in a desert willow shrub – 2 birds flushed but weren't identified

Nellis Desert Tortoise Transect Survey Data Sheet

NNRP: 01/11/2020

Page 1 of 1

Date: 10/23/24 Location: Nellis AFB Area II - CSTR Observers: Ron, Matt + Tony Start Temp: 60 ºF Precipitation: YES / NO

Township: 14S Start Time: 0700 Start- Easting: 114.99 W Northing: 36.246 N Trimble/GPS ID: ______

Range: 63 End Time: 1200 End- Easting: 114.985 W Northing: 36.247 N End Temp: 80 ºF

Section: 6 Cloud Cover: 0 %

East End of large survey area

Burrow/Den Condition Codes:
1. Active w/DT or recent DT sign
2. Good condition; DT; but no recent
3. Deteriorated; definitely DT
4. Deteriorated; possibly DT
5. Good condition; possibly DT

Scat Condition Codes:
1. Wet or freshly dried, obvious odor
2. Dried w/glaze; some odor; dark brown
3. Dried, no glaze or odor; signs of bleaching, tightly packed
4. Dried; light light brown to pale yellow loose mat'l; scaly appearance
5. Bleached; or consisting only of plant fiber

Shell Remains Condition Codes:
1. Fresh or putrid
2. Normal color; scutes adhere to bone
3. Scutes peeling off bone
4. Shell bone falling apart; growth rings on scutes are peeling
5. Disarticulated and scattered

LIVE TORTOISE

#	GPS PT #	Easting	Northing	Time	Tortoise location (in burrow: all tortoise beneath plain sight of burrow opening; not in burrow	Approx MCL >160-mm? Y|N	Photo Number/ Comments
1			~~36.24~~ RG		N/A - none		
2							
3							

TORTOISE SIGN (burrow, scat, carcasses, etc)

#	GPS PT #	Easting	Northing	Type of Sign (burrows, scat, carcass, etc)	Condition Code	Description / Comments / Habitat
1	2	-114.988549	36.247446	possible tortoise	4	deteriorated, partially collapse -
2				burrow		dormant vegetation grown on entrance
3						- shrub stick blocking entrance
4						Photo 4605 + 4606
5						
6						

Incidental Observations: one black-tailed jackrabbit, badger holes

Nellis Desert Tortoise Transect Survey Data Sheet

NNRP: 01/11/2020

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Date: 10/23/24 Location: Nellis AFB - CSTR - Small Area Observers: Ron, Matt, + Tony Start Temp: 80 ºF Precipitation: YES / NO

Township: 19S Start Time: 1100 Start- Easting: 114.981 W Northing: 36.254 N Trimble/GPS ID: ____

Range: 63 End Time: 1230 End- Easting: 114.935 W Northing: 36.252 End Temp: 83 ºF

Section: 31 Cloud Cover: 0 %

Small survey area

Burrow/Den Condition Codes:
1. Active w/DT or recent DT sign
2. Good condition; DT; but no recent
3. Deteriorated; definitely DT
4. Deteriorated; possibly DT
5. Good condition; possibly DT

Scat Condition Codes:
1. Wet or freshly dried, obvious odor
2. Dried w/glaze; some odor; dark brown
3. Dried, no glaze or odor; signs of bleaching, tightly packed
4. Dried; light light brown to pale yellow loose mat'l; scaly appearance
5. Bleached; or consisting only of plant fiber

Shell Remains Condition Codes:
1. Fresh or putrid
2. Normal color; scutes adhere to bone
3. Scutes peeling off bone
4. Shell bone falling apart; growth rings on scutes are peeling
5. Disarticulated and scattered

LIVE TORTOISE

#	GPS PT #	Easting	Northing	Time	Tortoise location (in burrow: all tortoise beneath plain sight of burrow opening; not in burrow	Approx MCL >160-mm? Y|N	Photo Number/ Comments
1					N/A none observed		
2							
3							

TORTOISE SIGN (burrow, scat, carcasses, etc)

#	GPS PT #	Easting	Northing	Type of Sign (burrows, scat, carcass, etc)	Condition Code	Description / Comments / Habitat
1				N/A none observed		
2						
3						
4						
5						
6						

Incidental Observations: one black-tailed jackrabbit
one Rock Wren carcass photo 4628 + 4629