ENVIRONMENTAL ASSESSMENT

Range Road 13 Improvements
White Sands Missile Range, New Mexico

Prepared For:

White Sands Missile Range
Directorate of Public Works
Environmental Division
Building 163 Springfield Avenue
White Sands Missile Range, NM 88002

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POC: USARMYGarrisonWSMREnvironmentalAssessments@army.mil

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

Name of the Proposed Action: Range Road 13 Improvements – White Sands Missile Range, New Mexico

Description of the Proposed Action: White Sands Missile Range (WSMR) proposes to rebuild a 0.75-mile (1.2-km) entrenched segment of Range Road 13, lifting the road surface as much as 5 ft (1.5 m) over the existing elevation. Drainage ditches along the rebuilt segment would be cleaned out and recontoured. Outside the entrenched segment, WSMR would install a combination of measures to move water across the road and minimize erosion and sedimentation.

Purpose and Need: The purpose of the Proposed Action is to:

- Stabilize and reinforce the road network in the vicinity of Range Road 13;
- Create safer conditions for drivers;
- Reduce road maintenance needs; and
- Reduce road degradation due to erosion and sedimentation.

The Proposed Action is needed because:

- Segments of the road network are rendered unusable due to wind and water erosion during extreme weather events;
- A portion of Range Road 13 has become entrenched after years of road grading, ditch cleaning, and general wear and tear on the road, creating a channel for stormwater runoff; and
- Drivers on Range Road 13 tend to drive too fast, resulting in multiple accidents with injuries.

Environmental Consequences: The EA investigated potential environmental effects in the resource areas of soils and erosion effects, cultural resources, natural resources, and land use/infrastructure. Other valued environmental components were incorporated by reference. Implementation of the Proposed Action could affect local soil erosion and sedimentation. Installation of drainage control measures and application of best management practices would reduce these impacts, resulting in beneficial impacts on Range Road 13.

Conclusion: The Action Alternative is the preferred alternative. This alternative would install and maintain drainage control measures, which would reduce observed erosion effects. Based on the analysis in this EA and consideration of the mitigation measures listed in Section 3.5, and in accordance with the guidelines for determining the significance of proposed federal actions (32 CFR §651 [2002]; 40 CFR §1508.27) and Environmental Protection Agency criteria for initiating an Environmental Impact Statement (40 CFR §6.207), WSMR has concluded that installation and maintenance of drainage control measures will not result in a significant effect on the environment. Mitigation measures include conducting surveys for bird nests if vegetation removal is to occur during the migratory bird nesting season, Applicable federal, state, and local laws and regulations would be followed. WSMR has determined that an Environmental Impact Statement pursuant to the National Environmental Policy Act is not required, and this Finding of No Significant Impact is hereby submitted.

Draft Availability and Points of Contact:

White Sands Missile Range invites members of the public to comment on the draft EA. The draft EA and FNIS are available digitally at https://home.army.mil/wsmr/index.php/about/garrison/directorate-

public-works-dpw/environmental. Hardcopies are available to the public by sending a request using the contact information below, or at the following public repositories.

- Thomas Branigan Memorial Library, 200 E. Picacho Avenue, Las Cruces, New Mexico 88001; and
- White Sands Missile Range Post Library, Building 465, White Sands Missile Range, New Mexico 88002

Written comments concerning the Draft EA should be directed to the U.S. Army Directorate of Public Works-Environmental Division at White Sands Missile Range, or by e-mail at *usarmy.wsmr.imcom-central.mbx.dpw-nepa-support@mail.mil.* Comments may also be submitted via fax at (575) 674-2048. Comments must be postmarked or received within 30 days of publication of the draft document. Comments can be sent to the following address:

Department of Army
U.S. Garrison White Sands
Environmental Division (Bldg. 163/DPW)
Range Road 13 Improvements EA Comments
BLDG 163
White Sands Missile Range, NM 88002

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U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS MISSILE RANGE, NEW MEXICO 88002-5048
ENVIRONMENTAL ASSESSMENT

TITLE:
PROPONENT:

_____ _____
ROBERT LOPEZ Date
CHIEF, ENGINEERING SERVICES DIVISION
DIRECTORATE OF PUBLIC WORKS

REVIEWED:

_____ _____
Date
BRIAN KNIGHT
CHIEF, ENVIRONMENTAL DIVISION
DIRECTORATE OF PUBLIC WORKS

CONCURRENCE:

_____ _____
DEAN ASH Date
DIRECTOR
DIRECTORATE OF PUBLIC WORKS

APPROVED:

_____ _____
DONYEILL A. MOZER Date
COL, LG
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14. ABSTRACT

This environmental assessment (EA) evaluates possible environmental effects on the human and natural environment associated with maintenance, repair, improvement, and construction of unpaved roads on White Sands Missile Range (WSMR), New Mexico.

Impacts on the affected environment (including soils and erosion effects, cultural resources, biological resources, and land use/infrastructure) were investigated. No significant impacts to the environment have been identified for implementation of the preferred alternative, the Action Alternative – Rebuild the Existing Road.

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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
ARMS	Archaeological Records Management Section
ARPA	Archaeological Resources Protection Act
BMP	Best management practice
CFR	Code of Federal Regulations
cm	Centimeter
CRM	Cultural Resources Manager
DPW	Department of Public Works
DPW-E	DPW Environmental Division
E	Endangered
EA	Environmental assessment
EIS	Environmental impact statement
ESA	Endangered Species Act
EXPN	Experimental
FEIS	Final environmental impact statement
FNSI	Finding of No Significant Impact
ft	Foot
ha	Hectare
HCPI	Historic Cultural Property Inventory
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
JDETC	Joint Directed Energy Test Center
km	Kilometer
LA	Laboratory of Anthropology
LWC	Low-water crossing
m	Meter
MBTA	Migratory Bird Treaty Act
MPF	Maximum probable flood
NEP	Nonessential experimental population
NEPA	National Environmental Policy Act
NMCRIS	New Mexico Cultural Resources Information System
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMERT	New Mexico Environmental Review Tool
No.	Number
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
RDT&E	Research, development, testing, and evaluation
ROI	Region of influence
SHPO	State Historic Preservation Officer
SGCN	Species of Greatest Conservation Need
T	Threatened
T&E	Threatened and endangered

TCP	Traditional cultural property
TPF	The Peregrine Fund
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WSMR	White Sands Missile Range

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CHAPTER 1 INTRODUCTION

This environmental assessment (EA) evaluates possible environmental effects on the human and natural environment associated with maintenance, repair, improvement, and construction of unpaved roads on White Sands Missile Range (WSMR), New Mexico. This EA has been prepared to fulfill the requirements of the National Environmental Policy Act ([NEPA], 42 United States Code [USC] §§4321 et seq.) in accordance with U.S. Army NEPA regulations and guidance provided in AR 200-2 – Environmental Effects of Army Actions (32 CFR Part 651, 29 March 2002).

1.1 BACKGROUND

White Sands Missile Range is located in south-central New Mexico, encompassing over 2,000,000 acres (809,000 hectares [ha]) in the five counties of Doña Ana, Socorro, Lincoln, Otero, and Sierra. The Main Post area is approximately 45 miles (72 kilometers [km]) north of El Paso, Texas, and 20 miles (32 km) east-northeast of Las Cruces, New Mexico. U.S. Highway 70 crosses WSMR from east to west and serves as the main access route to the Main Post area (Figure 1-1).

Range Road 13 is located in the north-central portion of WSMR and provides access to multiple research development, testing, and evaluation (RDT&E) facilities, as well as access for military training at a small arms range. Range Road 13, as it extends south from the intersection of Range Road 24, is comprised largely of unpaved (gravel) roads, with the southernmost 5 miles (8 km) of Range Road 13 being paved. As shown in Figure 1-1, the project area is outside the Trinity Site historic district near the northeast corner of the historic site, which is the location for the first atomic bomb test.

Over the past several years, rain events at WSMR have become more extreme, with greater rainfall observed with high frequency. As a result, increased erosion and sedimentation have occurred, leading to the following:

- Washout of corrugated metal culverts and other conveyance structures;
- Entrenchment of road segments;
- Formation of potholes as water resides below the road surface;
- Gullies cutting across roadways;
- Sedimentation across roadways making them impassable; and
- Loss of base course and gravel.

One segment, approximately 0.75 mile- (1.2 km-) long, has become entrenched after years of road grading, ditch cleaning, and general wear and tear. The road segment has sunken to a depth of 4 feet ([ft]; 1.2 meters [m]) below the natural surface elevation and has become channelized during heavy rain events, increasing the loss of gravel and base coat due to erosion and sedimentation.

Range Road 13 is remote with long straight stretches, leading to drivers exceeding the speed limit on the mostly gravel road. Many accidents have occurred, resulting in injuries and damage to vehicles and equipment.

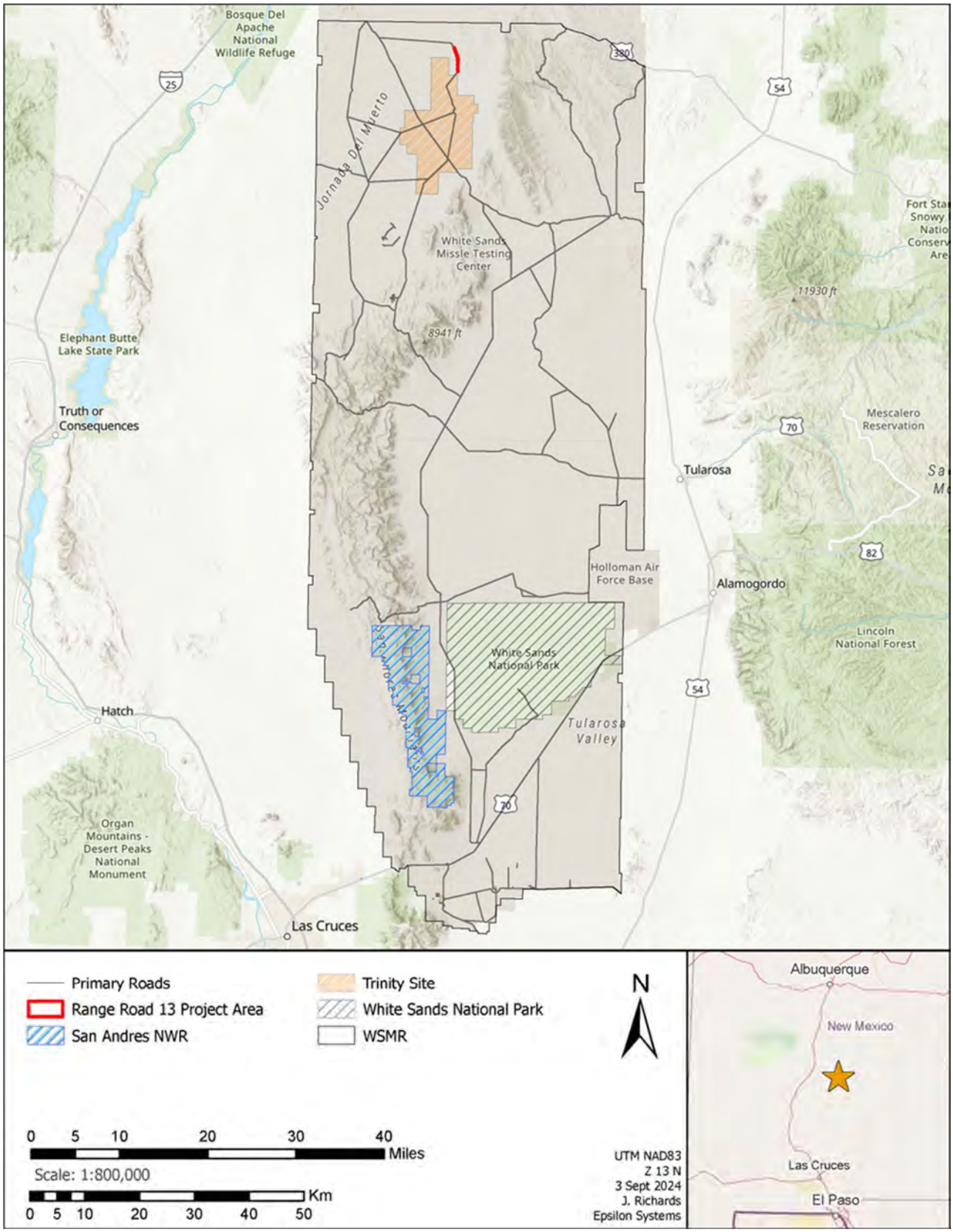

Figure 1-1. WSMR Location

1.2 PROJECT LOCATION

For the purposes of this EA, the project area includes Range Road 13 as it extends south from the Mine Site to an intersection approximately 2.8 miles (4.5 km) from the origin. The roadway is unpaved within the project area and is entrenched for roughly 0.75 miles (1.2 km), extending south from a drainage crossing to a gentle turn veering south-southwest. The project area includes the 2.8-mile (4.5-km) length of road plus the adjacent areas beyond the roadway, wherever installation of the appropriate stormwater control measures would occur. WSMR Department of Public Works (DPW) Engineering and Roads and Grounds Services surveyed Range Road 13 within the project area and identified eight sections where the road is eroding and in need of repair. The extent of the project and these eight locations are summarized in Figure 1-2. The eight locations for repair are designated on the map as "bumps" or protrusions along the road alignment.

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to:

- Stabilize and reinforce the road network in the vicinity of Range Road 13;
- Create safer conditions for drivers;
- Reduce road maintenance needs; and
- Reduce road degradation due to erosion and sedimentation.

The Proposed Action is needed because:

- Segments of the road network are rendered unusable due to wind and water erosion during extreme weather events;
- A portion of Range Road 13 has become entrenched after years of road grading, ditch cleaning, and general wear and tear on the road, creating a channel for stormwater runoff; and
- Drivers on Range Road 13 tend to drive too fast, resulting in multiple accidents with injuries.

1.4 DECISIONS TO BE MADE

The decision to be made by WSMR, based on analysis within this EA, is whether the Proposed Action would result in significant impacts on the environment. If significant impacts are anticipated, WSMR would evaluate mitigations or best management practices (BMPs) to determine if impacts would be reduced below levels of significance. If these measures would not reduce impacts to a satisfactory level, WSMR would undertake the preparation of an environmental impact statement (EIS) addressing the Proposed Action, or would abandon the Proposed Action.

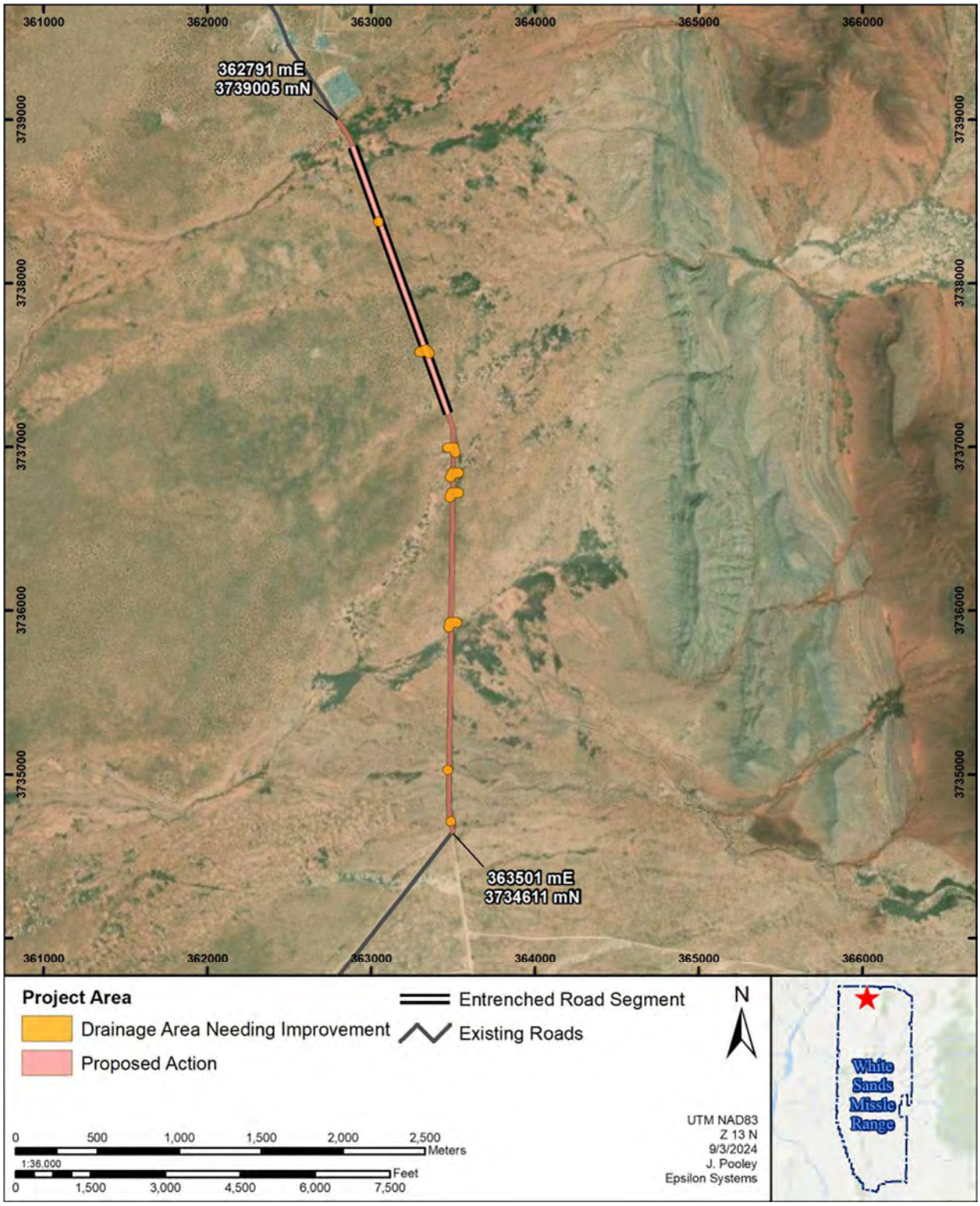

Figure 1-2. Project Location

1.5 RELATED ENVIRONMENTAL DOCUMENTATION

Existing relevant environmental documents have been reviewed. As permitted through Army policy and Council of Environmental Quality guidelines (40 CFR 1501.11 and 1501.12 [2022]), the analysis completed has been incorporated to keep the document brief. Incorporation of previous analysis eliminates repetitive discussions of the same issues while focusing on the key issues of this action. Documents that have been reviewed and incorporated by references include:

1. Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico (WSMR FEIS; WSMR 2010);

   This FEIS examines the environmental effects of developing new test and training capabilities to meet current and future mission requirements. The FEIS was examined for material relevant to the description and analysis of resource areas considered in this EA. From a military operations standpoint, the project area is designated as "augmented test zone," which supports a wide variety of test and management activities, including airborne and surface-based weapons firing, impact zones, and danger zones, directed energy systems, aircraft operations, dismounted operations, communications and instrumentation, field operations, and off-road travel using all types of vehicles (heavy/light, tracked/wheeled).

2. White Sands Missile Range Integrated Cultural Resources Management Plan and Environmental Assessment 2024-2029 ([ICRMP], WSMR 2025).

   This plan is a guide for how WSMR will manage cultural resources in a way that supports and sustains the operational military mission of WSMR. The plan was reviewed for information relevant to the description of existing conditions of resource areas addressed in the EA.

3. White Sands Missile Range Integrated Natural Resources Management Plan (INRMP; WSMR 2023).

   This plan provides a description of the installation and its surrounding environments and presents various management practices designed to mitigate negative impacts of the installation's mission on regional ecosystems. It is a practical guide for the management, sustainment, and stewardship of natural resources in an effort to ensure no net loss in mission capabilities.

4. White Sands Missile Range Record of Environmental Consideration Request 000954 – Repair RR 13 and McDonald Ranch Roads (WSMR 2020).

   This Record of Environmental Consideration (REC) analyzes the potential environmental effects of proposed repair and improvement of Range Road 13 and a drainage control pond adjacent to the road near the southern terminus of an entrenched road. Borrow soils from the pond improvements would be used to build up the entrenched road. Basecourse would be transported to the project area from a mill near Mockingbird Gap.

1.6 AGENCY AND PUBLIC COORDINATION

Public participation in the NEPA process promotes informed decision-making and open communication between the public and the government. Based upon the analysis conducted in this EA, adoption and implementation of the Proposed Action, as written, would not constitute a major federal action significantly affecting the equality of the human environment. A draft Finding of No Significant Impact (FNSI) has been issued along with this EA.

This draft finding was made available for public review and comment for 30 days. It was published digitally in the WSMR Garrison Publication website under Environmental Documents at https://home.army.mil/wsmr/index.php/about/garrison/directorate-public-works-dpw/environmental. Notices with links to the FNSI were published on the WSMR social media sites including Facebook, Instagram, and X. Hardcopies of the Draft EA and FNSI were made available by request. Additionally, hardcopies of the document were provided at the following libraries:

- Thomas Branigan Memorial Library, 200 E. Picacho Avenue, Las Cruces, New Mexico 88001; and
- White Sands Missile Range Post Library, Building 465, White Sands Missile Range, New Mexico 88002

Following the 30-day public review period, the Army will address all relevant comments received. If the review process does not identify additional significant impacts, the Army will finalize the EA and sign the FNSI.

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

2.1 SCREENING CRITERIA FOR ALTERNATIVES

The range of reasonable alternatives considered in this EA has been constrained to those that would meet the purpose and need for the Proposed Action as described in Section 1.3. Alternatives must also meet technical, engineering, and economic threshold requirements to ensure that each is environmentally sound and economically viable while complying with existing standards and regulations.

For this EA, the following selection criteria were developed and applied to assist in determining suitable locations, engineered solutions, and other important factors. Through application of screening criteria, the Proposed Action would:

1. Reduce automobile accidents within the project area along Range Road 13;
2. Avoid impacts to local natural and cultural resources;
3. Reconstruct an entrenched 0.75-mile (1.2-km) segment of road near the northern end of the project area;
4. Minimize future erosion and sedimentation effects of the road network through application of engineered solutions (e.g., low-water crossings [LWCs]); and
5. Reduce the need for further maintenance and repair along Range Road 13 and its vicinity.

2.2 THE NO-ACTION ALTERNATIVE

Under the No-Action Alternative, maintenance and repair activities would continue on an ad hoc basis. DPW Engineering, and DPW Roads and Grounds Services would coordinate with the WSMR DPW Environmental Division (DPW-E) to complete an environmental review to determine the level of NEPA review to be applied.

The entrenched road segment near the southern end of the project area would not be modified. Any activities regarding traffic control or implementation of traffic calming would be conducted independently, requiring additional NEPA review.

2.3 ACTION ALTERNATIVE – REBUILD EXISTING ROAD

The Proposed Action would rebuild the 0.75-mile (1.2-km) entrenched road segment, lifting the road surface as much as 5 ft (1.5 m) over the existing elevation. Drainage ditches along the rebuilt segment would be cleaned out and recontoured.

Outside the entrenched segment, WSMR would install a combination of measures provided in Section 2.3.1 to move water across the road and minimize erosion and sedimentation.

2.3.1 Unpaved Road Construction Methods and Practices

The sections below describe construction methods and practices considered for implementation in the Proposed Action of this EA. The final road construction would use a combination of these construction practices in a manner that extends the lifetime of the roadway while minimizing impacts to the environment.

2.3.1.1 Raising the Road Profile

Due to routine maintenance (e.g., surface grading, removal of debris, and ditch cleaning) combined with normal wear and tear and natural erosion, there is a 0.75-mile (1.2-km) segment of road that has eroded below the grade in relation to the surrounding terrain. The entrenched road concentrates stormwater resulting in water running downslope, forming a channel.

In some sections, the road would be lifted as much as 5 ft (1.5 m) over the existing surface elevation. The road would be built up using fill material suitable for engineering design imported from another location. The fill material would be laid in layers between 6 and 8 inches (15 to 20 centimeters [cm]) deep and compacted.

2.3.1.2 Crowning the Road

Crowning a road creates slopes on both the left and right sides of the centerline. Cross slopes would ideally range between 2% and 4% to convey water to the sides of the roadbed. Care should be taken if a water bar or rolling dip is installed on a crowned road, as wheel ruts can form along the control measure (Zeedyk 2006). Gravel would be applied to the crowned road surface.

2.3.1.3 Roadside Ditches

Roadside ditches run parallel with the roadway, collecting water from the road surface and hillslope and conveying water for removal. Ditches should be installed with at least 1% gradient insure proper flow. The flow in ditches should not erode the ditch itself or weaken the adjoining shoulder. Vegetation can keep the soil in place in ditches, minimizing erosion (USFS 2012). Other materials (e.g., riprap, geotextiles, and concrete interlocking blocks) can be used on steep slopes to minimize ditch erosion. The drainage ditches along the rebuilt segment would be cleaned out and recontoured to effectively carry runoff away from the roadbed.

2.3.1.4 Stormwater Basin

Detention basins are designed to manage stormwater runoff by storing and releasing water gradually until completely drained. In contrast, retention basins are designed to permanently hold water and often include installation of an impermeable liner. Retention basins are commonly used when the groundwater is near the surface of the ground. A retention basin will not have an outlet structure. The water collected by a retention basin will either infiltrate into the ground or evaporate.

Groundwater in the project area is approximately 300 ft below ground surface, so use of unlined detention ponds is recommended, as contamination of groundwater from the detention pond is highly unlikely.

Any detention basin utilized in the vicinity of Range Road 13 would be dry in most situations. Following precipitation events, storm runoff will accumulate in the detention pond and slowly percolate through the basin soils. There is an existing cattle tank serving as a detention basin on the west side of Range Road 13, near the northern boundary of the project area. Drainage control measures installed on the northern portions of the project area can direct runoff to the existing channel, connecting to the detention basin.

Detention basins require periodic removal of sediment, which may fill in the excavated basin. Vegetation management may also be needed (i.e., mowing or noxious weed removal).

2.3.1.5 Low-Water Crossings

LWCs are road-stream crossings designed to be overtopped by high water flows or flows laden with debris or ice. LWCs are generally less expensive to construct than bridges but can be more expensive than simple culvert installations due to higher design and installation costs. However, maintenance and repair costs make LWCs more economical in the long term.

There are three types of LWCs: unvented ford, vented ford, and low-water bridge.

Unvented Fords

Unvented fords are structures that cross streams which are dry most of the year or where normal stream flow is less than 6 inches (15 cm) in depth. They are usually used for ephemeral streams or streams with shallow flows and cross streams at or slightly above the streambed. The crossing may be constructed of crushed stone, riprap, precast concrete slabs, or cast-in-place concrete.

An unvented ford may be improved or unimproved. The stream bottoms (also known as substrates) of improved fords are strengthened or otherwise stabilized using rock, concrete, asphalt, concrete blocks; planks, gabions, geotextiles; or a combination of these materials. Unimproved fords are unaltered or natural crossings, which are placed at stable locations where appropriate substrate already exists.

Unvented fords are considered to be "at-grade" if the LWC is placed directly on the channel bottom. "Above-grade" unvented fords are raised to a height of about the channel bottom (Gautam and Bhattarai 2018). Figure 2-1 provides a schematic of an at-grade improved unvented ford.

Unvented fords are useful in naturally unstable channels with highly variable flows such as alluvial fans or braided streams (i.e., a network of stream channels separated by small temporary islands or sand bars). Unvented fords allow water and debris to flow over the road surface and are less likely to cause flow diversions or accelerations, when compared to other LWC types.

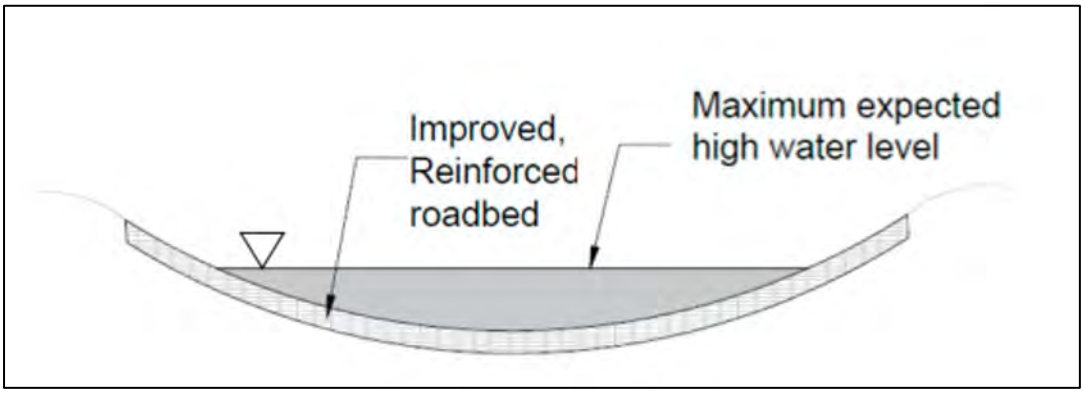

Figure 2-1. Improved Unvented Ford

Cable Concrete Block Ford

Cable concrete blocks, or articulating concrete block fords, are considered as at-grade fords made of 1-ft (0.3-m) square concrete blocks held together with a light cable. The concrete-block mats come in dimensions of 4- to 8-ft (1.2- to 2.4-m) wide by 8- to 16-ft (2.4- to 4.9-m) long sheets. Block thickness varies from 2.5 to 8 inches (6.4 to 20.3 cm). The mats are placed upon a shaped, compacted subgrade, at or

near the stream channel bottom elevation, but are dug in deeper to accommodate the thickness of the concrete blocks. Some blocks come with a geotextile backing. Otherwise, a layer of geotextile should be placed upon the prepared subgrade before placement of the cable concrete block mats. Gravel may be placed into the voids between the blocks to produce a smoother driving surface immediately, or they can be left to fill naturally (Figure 2-2).

Figure 2-2. Interlocking Concrete Block Crossing with Riprap Apron

Gabion Ford

Gabions, concrete walls, or other materials can be used to hold the road structure in place. It is recommended practice to partially bury gabions on the road's downstream edge to form a sill. The gabion barriers should be placed to form a gentle U-shaped weir across the channel, with the "U" facing downstream to concentrate the flow midchannel (USFS 2012; Figure 2-3).

Figure 2-3. Gabion Ford View from Downstream

Vented Fords

Vented fords have a driving surface elevated above the channel bottom with vents that allow low flows to pass beneath, keeping vehicles out of the water during low flow. The vents can be one or more pipes, box culverts, or open-bottom arches, which may be embedded in earth fill, aggregate, riprap, or concrete (USFS 2006).

High water will periodically flow over the crossing. Typically, vented fords are designed to allow 1% exceedance flow or 1-year flow and higher flows pass over the structure. However, parts of the crossing (e.g., approach roads, embankments, etc.) are designed for higher flows such as 10- or 25-year flow, depending upon the desired lifetime of the structure (Gautam and Bhattarai 2018). Figure 2-4 provides an overview of a typical vented ford with corrugated metal culverts.

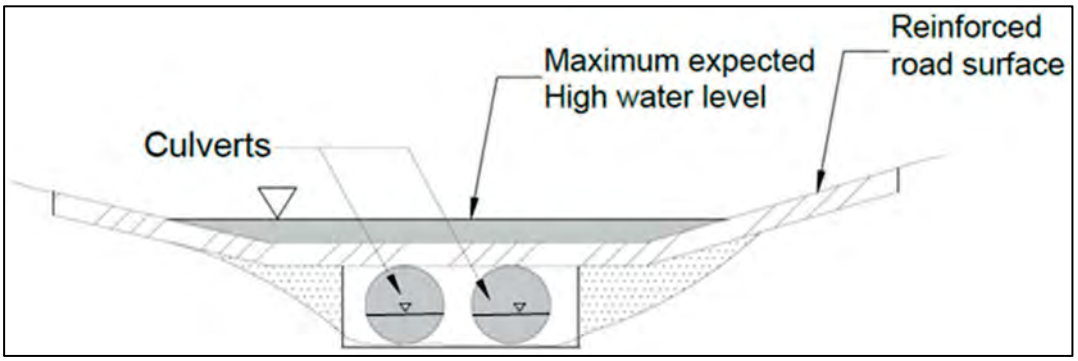

Figure 2-4. Vented Ford with Corrugated Metal Culverts

Concrete Box Culvert

Pre-cast concrete box culverts are generally constructed as a raised road over streams and arroyos. Box culverts are designed to keep water off the road surface at all times except during high flows, in which water and debris is allowed to flow over the road surface without washing out the pre-cast concrete structure. Although these structures are similar to vented fords with culvert pipes, they commonly have a larger waterway open area across the channel. These structures are formed offsite and transported directly to the crossing and placed on the prepared soil surface. Pre-cast concrete box culverts also tend to be shorter in the along-stream direction than crossings with pipes. They readily pass small debris through the structure but can still plug with large woody debris in a major storm event (USFS 2006). Road surfaces would need to be raised to an elevation at least 7 ft (2.1 m) above the channel bottom to allow a small excavator to clean out the box culvert (Figure 2-5).

Figure 2.5 Concrete Box Culvert Installation

2.3.1.6 Scour Prevention and Bank Stabilization

Scouring is defined as the localized erosion of streambed materials around piers and bridge abutments due to water flow. Bank stabilization is the construction or modification of structures for the purpose of controlling scouring and bank erosion. Stabilization measures include bulkheads, retaining walls, levees, riprap, and other structures. There are three categories of prevention measures to be employed:

1. **Vegetative cover** in the form of erosion control mats or small riprap for control at low velocities;
2. **Soft armored systems** that incorporate use of biotechnical treatments (e.g., vegetated geotextile material rolls, woody mats, vegetated riprap, and root wads) for moderate velocity streams; and
3. **Hard armored systems** such as concrete blocks, gabions, large riprap, grouted riprap, or concrete. These measures should be applied where flow is turbulent or eroding the streambank.

Figure 2-6 demonstrates how vegetative cover can be added to a hard armored system using rip-rap.

Figure 2-6 Vegetated Riprap Bank Protection

2.3.1.7 Water Bars

A water bar is a mound or hump that is built up to direct water across the roadway. These structures are similar to speed humps and should be built at an angle close to 30% compared to the road grade. Water bars are usually built to a height between 6 and 24 inches (15 to 61 cm).

Water bars tend to flatten under heavy traffic conditions, and this is made worse during rain events. Water bars are very effective on low traffic volume roads that are closed or effectively excluded from use during wet weather (Zeedyk 2006).

2.3.1.8 Turnouts

Turnouts, also known as leadoff ditches or turnout ditches, are an inexpensive option to culvert cross drains which have failed on Range Road 13 and its vicinity. Use of turnouts can eliminate the need for culverts, as water is directed over and across the roadway, instead of under it through culverts or drainage systems.

Turnouts should be used on relatively flat terrain with no cutbank present at approaching drainage crossings at fill areas across an arroyo or ravine. These measures work best with an elevated roadway and are often used at switchbacks where the road quickly changes direction across the slope to divide the water flow. Turnouts should discharge on vegetated areas or areas with other erosion control measures (e.g., a riprap apron; Zeedyk 2006). Figure 2-7 provides a view of a roadside ditch discharging through a turnout.

Figure 2.7. Turnout Collecting and Discharging Water from a Roadside Ditch

2.3.1.9 Signage

The LWCs and other measures described in this EA would effectively reduce sedimentation and erosion of WSMR roads; however, these features can create safety issues for drivers. The altered terrain can modify stormwater flow, collecting and transporting the water near or over the road surfaces.

Installation of signs like those provided in Figure 2.8 would notify drivers of the upcoming control measures and would recommend slow travel through the area. Traffic signs can also be installed to alert drivers when water is present on the roadway. Solar-powered lighted signs could be used to warn drivers when skies are darker.

Figure 2-8. Suggested Traffic Signs

2.3.2 Maintenance and Repair

Road maintenance and repair would include reactive maintenance and repair activities (e.g., resolving damage from use or severe weather events) and preventive/scheduled maintenance and repair activities designed to ensure ongoing operability and environmental sustainability (e.g., erosion and sedimentation control measures). All maintenance and repair would occur via a periodic work plan based on anticipated situations and funding availability. Maintenance and repair requirements could change over time based on changes in usage or priority, but would likely occur at least annually.

Maintenance and repair would consist of grading and resurfacing existing areas of the roads that have been eroded by surface water flows, filling potholes, and removing protruding boulders.

2.3.3 Buried Utilities Access

Under the Proposed Action, there would be no change in the existing road network alignment. Buried communications lines on the western side of Range Road 13 would continue to be repaired and accessed as needed.

2.4 Alternatives Considered but Not Carried Forward

2.4.1 Eastern Road Realignment

Under this alternative, the 0.75-mile (1.2 km) entrenched road segment would be bypassed through construction of a new unpaved road running east of the current alignment. The new alignment would result in the construction of approximately 1.5 miles (2.4 km) of 20-ft (6.1-m) wide roadway, for a total of 3.6 acres (1.5 ha) of new land disturbance. The new roadway would be crowned and would utilize erosion and sedimentation control methods to convey water away from the road surface.

Once completed, the entrenched roadway would be recontoured to match the existing topography to the extent possible prior to abandoning in place. The recontoured land surface would be reseeded with a native plant seed mix, if necessary.

After investigation of Natural Resource Conservation Service (NRCS) soil data (NRCS 2024) for the project area (east and west of the current alignment), it was determined that the surrounding soils were more or less homogenous and there would be no benefit to constructing a bypass alignment. Additionally, an abandoned roadway east of the current alignment was found, indicating that an unpaved road in that area failed or that the current alignment was found to be a better route. A search of historic aerial photos indicate that this abandoned route was the primary access road for the area up until the 1980s. Considering this, the eastern road alignment was determined to be unviable and was removed from further analysis in this EA.

2.4.2 Paving of Range Road 13

Under this alternative, the portion of Range Road 13 within the project area would be paved. This would create more resilient road surfaces, but the road network would still be susceptible to below grade impacts (i.e., potholes, pooling of water, and unstable cut slopes). Additionally, construction and maintenance of a paved road is prohibitively expensive when compared to construction and upkeep of an unpaved road. Because of this, this alternative was removed from further consideration in this EA.

2.4.3 Expanded Area of Influence

During the planning phases, WSMR considered including improvements on other roadways into the Proposed Action for this EA. These roads include an extension of Range Road 13 south to its intersection with Range Road 7 (approximately 13.5 miles [21.7 km]), Range Road 341 which is a spur road off Range Road 13 connecting to the McDonald Ranch House and points beyond, including an unnamed unpaved road that provides access to the Fairview Gunnery Range that connects to Range Road 13.

This alternative was removed from further consideration due to lack of data and resources needed to evaluate potential solutions to the erosion and sedimentation issues associated with these roadways. It would also be difficult to complete all needed repairs during the generally accepted 5-year lifespan of an EA document.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a summary of the valued environmental components (VECs), a description of the environmental conditions potentially affected by the Proposed Action, and an analysis of potential impacts associated with the Proposed Action. Additionally, potential mitigation measures are identified to minimize potential impacts identified.

3.0 VALUED ENVIRONMENTAL COMPONENTS

Army NEPA Analysis Guidance (Army 2007) provides an approach to screen VECs based on information from tiered NEPA analysis and Proposed Action. A VEC analysis was conducted to identify environmental resource areas potentially impacted by the Proposed Action. This analysis considered natural and human environmental resources which are applicable to WSMR and could be impacted by combinations of past, present, and reasonably foreseeable future actions. Potentially useful federal EISs and EAs prepared for WSMR were identified and analyzed to establish regional issues, impacts, and their sources. If the screening approach determines that the cumulative impacts of this action were no greater than anticipated from previously completed analysis, then no further analysis for that VEC was captured in this document. In addition to actions and impacts, useful references and potential mitigation measures were identified for possible inclusion.

Based on this approach, regionally important VECs were identified and ranked as to the likelihood of impact from the Proposed Action. Regionally important VECs at WSMR, as characterized by incorporated EAs, were ranked based on the likelihood of potential impacts caused by the Proposed Action. Each of the VEC categories to include air quality, cultural resources, the Migratory Bird Treaty Act ([MBTA], 16 USC §§ 703-712), and the Bald and Golden Eagle Protection Act (16 USC § 668, [the Eagle Act]), human health, etc. are described in the Army NEPA Guidance Manual (Army 2007) will be assigned to one of five impact potential categories:

- Very Low (VL) – No impact or minor impacts are anticipated;
- Low (L) – Minor impact anticipated;
- Medium (M) – Moderate impact anticipated (less than significant);
- High (H) – Significant impact potential anticipated (likely to be mitigated to less than significant); and

In support of this EA, a VEC analysis was conducted in accordance with The U.S. Army Environmental Command NEPA Analysis Guidance Manual (Army 2007). Components rated moderate to high for the Proposed Action include:

- Cultural resources;
- Soil erosion effects;
- Biological resources (includes the topics of threatened and endangered species, MBTA, Bald and Golden Eagle Protection Act, and general biological resources); and
- Human health and safety.

Table 3-1 provides a review of a VEC analysis conducted by WSMR Test Center and Garrison personnel.

Table 3-1 Valued Environmental Components Considered in this Environmental Assessment

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
Land Use	Area within and adjacent to the project area	Significant impacts could occur if the land use were incompatible with existing military (WSMR, Holloman Air Force Base, Fort Bliss) or institutional (National Aeronautics and Space Administration, BLM) land uses and designations (including recreation). Additionally, significant impacts could occur if certain natural land cover types (wetlands and forests of particular interest) were to be converted to other land cover (such as built environment).	Yes	Construction activities associated with the Proposed Action could be delayed due to mission-driven closures. The project area is often used for recreational land users, including hunters.
Visual Aesthetics	Area within and adjacent to the project area	The Proposed Action would be considered to have a significant effect to visual impacts if: long-term alteration of the viewshed would occur that would require mitigation; negative alterations to the viewshed of a historical resource would be expected; and it was not compliant with the overall viewshed of adjacent areas.	No	The project area is not part of a sensitive viewshed. Also, there are no sensitive viewshed receptors present at the project area.
Air Quality	El Paso-Las Cruces-Alamogordo Air Quality Control Region 153	Significant impact would occur if the Proposed Action were to affect the achievement or maintenance of National Ambient Air Quality Standards (NAAQS).	No	The project area is in attainment for all NAAQS and the Proposed Action would not exceed CAA General Conformity *de minimis* emission standards.
Noise (soundscape)	Area within and adjacent to the project area	Impacts would be considered significant if noise from the Proposed Action were to cause harm or injury to personnel, members of nearby communities, or wildlife communities. Significant impacts would also occur if noise levels exceed any applicable noise limit guidelines.	Yes, for wildlife receptors	The Proposed Action would not affect any human receptors and would result in temporary, localized effects. Noise effects will be considered in biological resources analysis.
Soil Erosion Effects	Land surfaces where construction will occur	Impacts of geology, topography, and soils would be significant if: the surrounding landscape were affected in a manner that would not support existing land uses, excessive soil	Yes	The area soils are subject to wind and water erosion. Water erosion has led to entrenchment of road segment.

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
		loss impairs plant growth, or federal, state, or local laws pertaining to geology and soils are violated.		
Cultural Resources	Area within and adjacent to the project area	Impacts would be significant if an action adversely affects any National Register of Historic Places (NRHP)-eligible property or resource.	Yes	Surveys of the project area identify one site that can be avoided by project design.
Biological Resources	Area within and adjacent to the project area and associated habitat	For federally-listed threatened or endangered (T&E) species, a significant impact occurs when the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service determines that the action would be likely to jeopardize the continued existence of a federally-listed T&E species, or would result in the destruction or adverse modification of federally-designated critical habitat.	Yes	The project area has been surveyed, and no T&E species were found to be present. However, MBTA and transient T&E species may be affected by the Proposed Action.
Wetlands	U.S. Army Corps of Engineers jurisdictional wetland resources within the project area	Impacts to wetlands would be considered significant if Proposed Action activities do not comply with policies, regulations, and permits related to wetlands conservation and protection.	No	No wetland habitats are present in the project area.
Water Resources	For surface water resources, the area of influence includes the drainage basins of local streams and arroyos. Groundwater resources are defined by the aquifers that underlie the project area.	Impacts would be significant if an action results in exceedance of water quality standards established by federal, state, local, and tribal agencies or if contamination of public drinking water supply occurs that may adversely affect public health.	Yes	Monsoonal rains create wide variation in seasonal precipitation. The Proposed Action could affect local washes, arroyos, and gullies.
Human Health and Safety	For worker safety, the immediate area of interest includes the construction areas associated with the Proposed Action. Additionally, effects to non-involved WSMR personnel must be considered in the analysis. Public health analysis considers the impacts to the communities surrounding WSMR (e.g., Las Cruces, Alamogordo, and others).	Public health impacts are considered significant if the Proposed Action would result in the conditions that could negatively affect the health of involved workers or members of the public. Public safety impacts are considered significant if the general public is substantially endangered as a result of Proposed Action activities on the WSMR ranges.	No	All road construction work would be performed in accordance with U.S. Army and DoD safety regulations and directives.

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
Traffic and Transportation	Traffic is the flow of motor vehicles on local (WSMR) and regional road networks. Transportation systems include the regional network, traffic control equipment, and public transportation vehicles.	Factors considered in assessing significance included the extent or degree to which implementation of an alternative would result in traffic increases that would exceed the design capacity of an affected portion of the roadway system or the level of service (LOS) of a key intersection. Significant impacts to the transportation system would occur if the Proposed Action negatively impacts the regional road network through degradation (wear and tear on the roads due to increased traffic) or construction activities that may temporarily affect traffic on the roadway	Yes	The Proposed Action involves construction on a road that provides access to facilities that conduct mission activities. Road construction may lead to traffic delays or rerouting. Additionally, road construction activities could be delayed due to mission-driven range closures.
Airspace Management	Airspace is a three-dimensional resource defined by latitude, longitude, and altitude. There are six classes of airspace—A, B, C, D, E (controlled), and G (uncontrolled)—available to all users (civilian and military). The airspace classes dictate pilot qualification requirements, rules of flight that must be followed, and the type of equipment necessary to operate within that airspace.	Significant impact would occur if the Proposed Action were to affect the flight patterns, times of flight, or general use of the airspace by military, commercial, or general aviation aircraft.	No	The Proposed Action would not extend over 200 feet above ground level, and would not affect the National Airspace System.
Facilities	In general, federal facilities are defined as buildings, installations, structures, land, public works, equipment, aircraft, vessels, other vehicles, and property, owned, constructed or manufactured for leasing to the federal government.	Impacts would be considered significant if implementation of the Proposed Action results in undesirable effects to existing facilities (i.e., impacts on function and/or accessibility).	Yes	Temporary loss of access or use of facilities during construction. Buried utilities (i.e., communications and natural gas) could be affected as access is lost/impeded.
Energy Demand, Generation, Transmission, and Use	The facilities and infrastructure needed to generate and transmit electricity. The resource area also considers the local generating capacity and use of electricity.	A significant impact would occur if the Proposed Action results in disruption of power generation or transmission/distribution of electricity. Impacts may include physical impact on the distribution system (utility poles,	No	Temporary increase in usage and demand during construction. No impact anticipated.

Valued Environmental Component	Area of Interest	Significance Threshold	Further Analysis?	Rationale for Level of Assessment
		conductors, support equipment) or disruption of power generation.		
Hazardous Materials and Waste	Hazardous materials management refers to the handling of hazardous materials and includes the purchase, storage, and distribution of hazardous materials such as paints, solvents, lubricants, and batteries. Hazardous waste management refers to the handling of hazardous wastes generated as part of industrial activities. These wastes must be containerized, labeled, stored, and transported in accordance with EPA, state, and Army/WSMR requirements.	Factors considered in assessing impacts associated with hazardous materials and hazardous wastes are the extent or degree to which an action would significantly increase the volume of hazardous materials used or the amount of hazardous waste generated (including waste generated from spills).	No	The potential for significant spills is low. All spills, regardless of volume, will be reported to DPW-E in accordance with WSMR procedures.

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3.1 SOILS AND EROSION EFFECTS

Soil erosion effects are generally dependent upon a variety of factors, including soil structure and composition, climate, topography, and vegetative cover. The structure and composition refer to the physical features of soil, such as compaction, moisture, and composition, based on the bedrock material and mineral deposits. Climactic soil erosion effects primarily revolve around the abundance and intensity of precipitation in each environment. Topographic descriptions are typically in respect to the elevation, slope, aspect, and surface features (e.g., surface roughness) found within a given area. Vegetative cover is an interface between the atmosphere and soil surface; therefore, influencing the overall permeability and potential runoff. When considered together, these factors determine a soil's potential for wind and water erosion.

Descriptions of the WSMR geology and topography, seismicity and geologic hazards, geologic resources, and soils can be found in the WSMR FEIS, Section 3.6 Earth Sciences (WSMR 2010).

3.1.1 Affected Environment

3.1.1.1 Soils/Geology/Topography

Soils

The project area is comprised of two soil map units. The first soil map unit is the Marconi-Prelo-Fluventic Haplocambids complex, accounting for approximately 55 percent of the project. These soils are relatively deep, well-drained, and originate from clayey alluvium derived from shale and siltstone. This complex is associated with drainageways and toe slopes.

The second soil map unit is the Whitlock-Pajarito-Nations complex, accounting for 45% of the project area. These soils are relatively deep, well-drained, and derived from eolian deposits over calcareous basin alluvium. This complex is commonly associated with sand sheets and toe slopes (NRCS 2024).

Soil erosion from wind, water, and road use is a concern due to its impacts on the surrounding plant communities and the resulting cost of road maintenance. The NRCS uses several factors to evaluate soil erodibility:

- Surface Water Erosion The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.
- Wind Erosion A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.
- Erosion Hazards Erosion hazard ratings are based on soil erosion factor K, slope, and content of rock fragments from manmade linear features such as roads and trails.

A rating of “slight” indicates that little or no erosion is likely. “Moderate” indicates that some erosion is likely, that the roads or trails may require periodic maintenance. “Severe” indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed. Table 3-2 provides a summary of the soil erodibility for the predominant soil types present on the project area.

The Marconi-Prelo-Fluventic Haplocambids complex is more susceptible to sheet or rill erosion, while the Whitlock-Pararito-Nations complex is more susceptible to wind erosion.

Table 3-2 Soil Erodibility by Type

Map Unit Name	Erosion Hazard (Road, Trail)	Wind Erodibility Group	K factor, Whole Soil
Marconi-Prelo-Fluventic Haplocambids complex, 0 to 8% slopes	**Slight** Little or no erosion likely	4L	0.49
Whitlock-Pajarito-Nations complex, 1 to 8% slopes	**Slight** Little or no erosion likely	2	0.20

Source: NRCS 2024.

Geology

The project area is within the Rio Grande Rift physiographic province. The Rio Grande Rift is a north-south trending zone that roughly bisects the state of New Mexico. The Rift separates the Colorado Plateau from the High Plains, as the rift grows. The NRCS 2022 Major Land Resource Area database defines the area as in the Southern Rio Grande Rift, which is part of the larger southern desertic basin, plains, and mountains, within the Western Range and Irrigated Region (USDA 2022).

The underlying geologic formations are from the quaternary and are classified by the New Mexico Bureau of Geology and Mineral Resource as Piedmont alluvial deposits (Holocene to Lower Pleistocene) that includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. Localized areas may include uppermost Pliocene deposits (NMBGMR 2022).

Topography

WSMR lies within the Mexican Highland Section of New Mexico's Basin and Range Province. This province is characterized by narrow mountain ranges that separate internally drained structural basins and valleys of major drainages (Hawley 1986). WSMR is primarily located within the Tularosa Basin, a graben basin bounded by the Organ, San Andres, and Oscura Mountains to the west and the Sacramento Mountains to the east. The San Andres and Oscura Mountains form a natural boundary that divides the North Range of WSMR from its Middle and South Range areas.

The project area is located in the northern region of WSMR, along the west-trending bajada slope of the Oscura Mountains, on the eastern edge of the Jornada del Muerto Basin. Drainage from the Oscura Mountains is the main source of erosion and sedimentation within the project area. A 5-m Digital Terrain Map of the general vicinity was generated in ArcGIS and projected in degrees slope. The project area was found to occupy a low-lying area ranging from approximately 5,025 to 5,100 ft (1,532 to 1,554 m) in elevation. The project area is relatively flat, with little relief. Ground surface slopes are generally within 0 to 1.5 degrees slope.

3.1.1.2 Surface Water and Groundwater Resources

WSMR lies mostly within the Tularosa Valley Watershed. This watershed is an enclosed basin with no external outlet and is part of the Rio Grande Rift. A playa known as Lake Lucero represents the remains of the Pleistocene Epoch Lake Otero. The northeast portion of WSMR is contained within the Jornada del Muerto Watershed, which is a closed basin with no flow into the Rio Grande. Most drainages of the northern Jornada del Muerto Basin empty into or terminate at the edge of the central area of subsidence.

Surface Water

Potential water resources in the project area were determined by using the National Hydrologic Database, a preliminary feasibility study (Richards 2023), and the National Wetland Inventory (NWI). Potential water resources were also analyzed during field surveys for natural resources. Official delineations were not completed during the surveys since design and site placement have not been fully determined.

Within the project area, Range Road 13 crosses six defined riverine systems that generally flow east to west across the landscape. The streams originate in the Oscura Mountains to the east. Each is an ephemeral stream and only has flowing water during rain events or from snow melt. These six systems converge into four distinct riverine systems crossing the existing roadway. The field surveys and communications with DPW-E largely determined that areas of convergence and incision are largely yielding many of the existing roadway problems contributing to the overall sustainability and recurring maintenance concerns.

During the field surveys, it was documented that east of the existing roadway is largely flat, and the riverine systems are not confined to a defined channel. Instead, they are braided and transient systems that flow across the landscape in sheet flows, and movement is largely dictated by the amount of available water during any particular storm or melting event. In contrast, approaching, and to the west of the existing Range Road 13 corridor, there are more defined areas of incision, roughly defined channels, and the general hydrology was noted to be significantly different.

Groundwater

The groundwater basin underlying the project area is the Jornada del Muerto Basin. This basin is a north-south trending basin lying to the east of the main Rio Grande Rift system in Socorro, Sierra, and Doña Ana counties, New Mexico. The basin is roughly 160 miles (257 km) long, averages 20 miles (32 km) in width, and deepens to the south. The basin is bounded to the east by Chupadera Mesa, the Oscura Mountains, and San Andres Mountains. To the west, the basin is bounded by the Caballo and Fra Cristobal Range and the San Pasqual Platform (NMBGMR 2016). Depth to groundwater is approximately 300 ft (91 m) below ground surface (USGS 2025).

Drainage Locations

To determine where stormwater flows may affect Range Road 13 within the project area, the United States Geological Survey (USGS) StreamStats web application was used. This tool provides information on peak discharges, the drainage areas feeding stormwater flows, stream slope, and average soil permeability to assess potential stormwater flow issues (USGS 2024). A query of the USGS StreamStats application indicates that there are 13 drainages that cross Range Road 13 within the project area and one drainage immediately adjacent to the downstream (south) side of the road. Note that the maximum precipitation

value for the 6-hour event is a good indicator of flash flooding potential, with a higher value representing a higher chance for flash flooding.

Table 3-3 provides a summary of the 14 drainages found to be transecting Range Road 13. The table provides the drainage basin area that feeds each drainage, the maximum probable flood (MPF) during a flood event, maximum precipitation measured over 24- and 6-hour events, the mean precipitation for the month of July, and the average slope observed within the drainage basin to the point on Range Road 13.

Table 3-3 USGS StreamStats Analysis Results

Drainage	Area (mi^2)	MPF (ft^3/s)	Max precip (24-hour)	Max precip (6-hour)	Mean July precip	Basin slope (ft/ft)
1	0.4	3,790	3.47	3.26	2.55	0.0183
2	0.48	474	3.47	3.26	2.54	0.0138
3	1.14	10,100	3.5	3.28	2.54	0.054
4	0.0639	631	3.48	3.27	2.54	0.0157
4a	0.0549	542	3.48	3.27	2.54	0.0151
5	0.0751	741	3.48	3.27	2.54	0.0135
6	18.4	99,700	3.76	3.54	2.97	0.15
7	0.0518	512	3.5	3.28	2.17	0.0282
8	0.11	1,080	3.51	3.28	2.08	0.0398
9	0.15	1,470	3.5	3.28	2.07	0.0331
10	9.03	58,500	3.71	3.46	2.52	0.11
11	0.15	1,470	3.52	3.28	2.06	0.0161
12	0.28	2,690	3.53	3.29	2.06	0.0189
13	0.45	4,240	3.53	3.29	2.06	0.0198

As provided in the Table 3-3, three drainages (Numbers [Nos.] 3, 6, and 10) convey stormwater from much larger drainage basins than the others investigated. These larger drainage basins collect runoff from the Oscura Mountains east of the project area before transporting it to the lower ground near Range Road 13. These mountainous drainage systems experience higher average and peak precipitation, leading to higher runoff volumes. Additionally, these drainages originate at higher elevations, creating increased slope and; therefore, greater runoff velocity. This combination of factors has led to sedimentation and erosion problems at these three locations:

- Drainage No. 3 receives stormwater flow from a much larger area than the other neighboring drainages and experiences very high flows during flood events. It is possible that the higher stormwater flows from this drainage and Drainage No. 1 upstream contribute greatly to the conditions leading to the entrenched road segment nearby downstream from this location.
- Drainage No. 6 has the largest drainage area with the highest peak month precipitation and highest slope. These factors combine to create the highest erosion and sedimentation potential of the drainages crossing Range Road 13 within the project area. In September 2013, the area experienced a multi-day rain event, with the highest rainfall amount falling on September 13 (USACE 2014). This event washed out corrugated metal culverts running under Range Road 13 near the wash created by this drainage.
- Drainage No. 10 is an ephemeral stream crossing. Like drainages Nos. 3 and 6, this drainage carries much larger flows than the other drainages crossing Range Road 13 within the project area.

Figure 3-1 provides an overview of the extent of the project area along Range Road 13 and the 14 drainages identified in the USGS StreamStats analysis. output files for the USGS StreamStats analysis are provided in Appendix B to this EA.

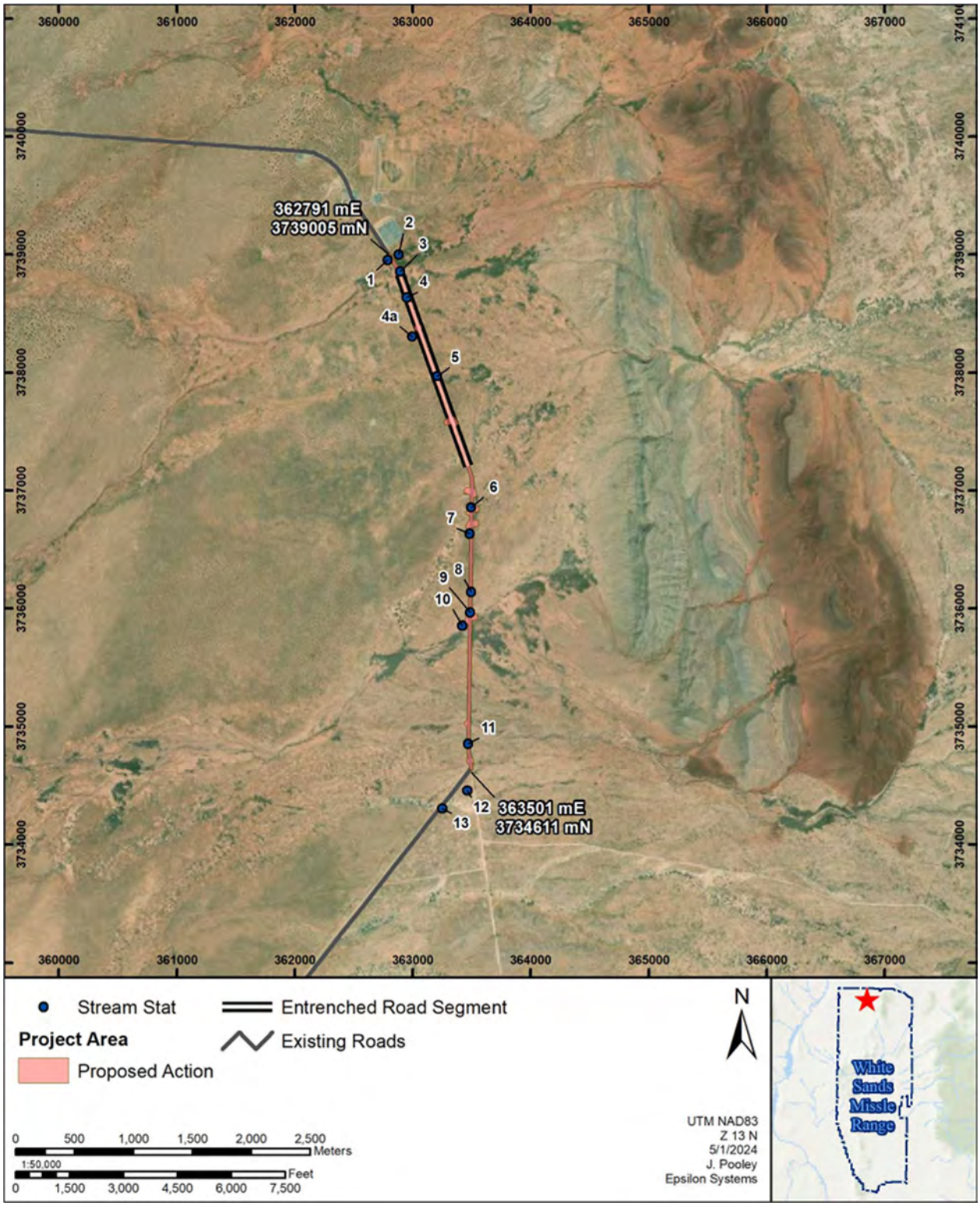

Figure 3-1. Drainage Intersections with Range Road 13

3.1.2 Environmental Consequences

3.1.2.1 No-Action Alternative

Soils/Geology/Topography

Under the No-Action Alternative, no LWCs or other erosion and sedimentation control measures would be installed. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no new soil erosion effects associated with this alternative.

Surface Water and Groundwater Resources

There would be no construction of LWCs or other control measures on Range Road 13 within the project area. The roadbed would continue to erode, further entrenching the road segment. Sediment would continue to deposit downstream, potentially affecting water resources. No new impacts to surface water and groundwater resources are expected under the No-Action Alternative.

3.1.2.2 Action Alternative – Rebuild the Existing Road

Soils/Geology/Topography

Impacts to soils would occur due to excavation and other ground disturbance; removal of vegetation; grading of access roads; temporary soil piling; compaction or rutting from heavy equipment; preparation of temporary work areas; or potential contamination from accidental fluid spills from equipment and containers. Ground that has been cleared of vegetation could be susceptible to erosion and establishment of invasive plants. Ground compaction could degrade the soil structure and reduce soil productivity and the soil's ability to absorb water.

Ground disturbance associated with the Proposed Action would take place within the existing roadbed and at the eight areas needing improvement identified on Figure 1-2. At these eight locations, DPW Engineering and DPW Roads and Grounds Services would install engineered sedimentation and erosion control measures as described in Section 2.3.1. Maximum ground disturbance at any of these locations would be 400 square ft (37.2 square m), for a total maximum ground disturbance of 3,200 square ft (0.07 acres, 297 square m).

Many of the control measures would be constructed to direct water away from the roadbed, reducing the erosion of or sedimentation upon the roadbed. The fill material used to rebuild the entrenched segment would be porous in nature, acting as an underdrain (i.e., an underground drainage feature installed to collect subsurface water and transport it to a surface outlet), pulling water from the surface and conveying it to other drainage features (e.g., roadside ditches, turnouts, or stormwater basins; PSU 2019). Many times, these underdrains can be designed to function as a vented ford (see Section 2.3.1.5), allowing low flows to pass under the roadway. The control measure should be designed to ensure that soils in the vicinity of the roadbed are not saturated, which could lead to the formation of potholes, rutting of the road surface, shoulder erosion, and ditch washouts. Installed control measures should be maintained regularly to prevent saturated surface of sub-base conditions or frequent overtopping of the roadway.

Roadside ditches will be installed to support the movement of water away from the roadbed. These ditches may be "V" or "U" shaped depending on the hydrologic conditions. Ditches with a "V" shape concentrate flow and tend to erode quickly, producing sediment downstream. Considering this, use of "V" shape ditches

should not be used in highly erodible soils. "U" shaped ditches spread the flow and are more likely to be vegetated, which may collect sediment impeding water flow.

Implementation of erosion and sedimentation control measures listed above would reduce the erosion of the Range Road 13 roadbed and would reduce downstream sedimentation. The Proposed Action would have no anticipated negative effects on local soil resources.

Surface Water and Groundwater Resources

Surface Water

Surface water resources in the project area are limited to ephemeral washes and arroyos. Range Road 13 crosses eight drainage areas where improvements would be implemented. These improvements would affect the surface flows of water within the project area in a matter that would reduce erosion and sedimentation in the vicinity of Range Road 13. These actions would not significantly affect surface water resources in the area, nor would the installation of control measures increase contamination of surface water resources. Implementation of the Proposed Action would not have significant effect on surface water resources within WSMR.

Groundwater

Construction activities associated with the Proposed Action would consume water due to activities such as concrete mixing and dust suppression. The water used would be trucked to the project area from wells located outside the project area. The increased water demand would be temporary in nature and would not significantly impact area groundwater resources.

Additionally, the construction activities would not contaminate groundwater due to depth to the resource. As such, implementation of the Proposed Action would not have significant impact on groundwater resources.

3.1.3 Best Management Practices and Mitigations

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all best management practices BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts to soils and water resources:

- To minimize ground disturbance, construction activities would be restricted to the existing road bed and the eight improvement areas identified in Figure 1-2;
- To the fullest extent possible, construction would occur during the dry season when rainfall and runoff potential are low;
- Installed stormwater control measures would be maintained regularly to prevent saturated surface of sub-base conditions or frequent overtopping of the roadway; and
- Bank stabilization using gabion baskets would be constructed in a stairstep fashion to avoid toppling. Care would also be taken to ensure that scouring does not occur under the baskets.

3.2 CULTURAL RESOURCES

Cultural resources include prehistoric and historic archaeological sites; as well as historic buildings, structures, objects, and districts that depict evidence of human activity considered important to any culture, subculture, or community. Cultural resources consist of archaeological resources, architectural resources, and traditional cultural properties (TCPs).

Archaeological resources consist of the material remains of prehistoric and/or historic human activity. The Archaeological Resources Protection Act of 1979 (ARPA) defines archaeological resources as "pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items" (16 USC 470bb [1988]).

Architectural resources include manmade structures including, but not limited to, standing buildings, dams, bridges, and canals. Under the National Historic Preservation Act (NHPA) of 1966 (Public Law [PL] 89-665, as amended by PL 96-515; 16 USC 470 et seq.), only architectural resources older than 50 years are considered for protection; however, younger structures can be afforded the same protection under special circumstances (e.g., Criteria Consideration G).

TCPs may include archaeological resources, architectural resources, topographic features, plant and animal habitat, and any other inanimate object deemed essential to the continuance of a traditional culture by Native Americans and other groups.

The NHPA provides for the establishment of the National Register of Historic Places (NRHP), an official list of districts, archaeological sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture. Section 106 of the NHPA requires federal agencies with jurisdiction over a proposed federal project to consider the undertaking's effect on cultural resources listed or eligible for listing in the NRHP and affords the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) opportunity to comment regarding the undertaking.

NRHP eligibility criteria have been defined by the Secretary of the Interior's Standards for Evaluation (36 CFR 60 [1981]). To be considered eligible for listing in the NRHP, cultural resources must covey the quality of significance in American history, architecture, archaeology, engineering, and culture present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the following criteria:

- Criterion A: The resources are associated with the events that have made a significant contribution to the broad patterns of American history;
- Criterion B: The resources are associated with the lives of persons significant in our past;
- Criterion C: The resources embody the distinctive characteristic of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant or distinguishable entity whose components may lack individual distinction; and
- Criterion D: The resources have yielded or may likely yield information important in prehistory or history.

3.2.1 Definition of Resource

The process of agency review and assessment of the effect of an undertaking on cultural resources is set forth in the implementing regulations formulated by the ACHP (36 CFR 800, Protection of Historic Properties [2000]). Other applicable laws and guidelines include:

- Executive Order 11593, Protection and Enhancement of Cultural Environment (16 USC 470 [Supp. 1, 1971]);
- Native American Graves Protection and Repatriation Act (PL 101 – 601 [1990], USC 3001 – 3013);
- Determination of Eligibility for Inclusion in the NRHP (36 CFR 63 [1981]);
- Curation of Federally Owned and Federally Administered Archaeological Collections (36 CFR 79 [1990]); and
- DoD Directive 4710.1, Archeological and Historic Resources Management (1984).

Section 101(d)(6)(B) of the NHPA requires federal agencies to consult with Indian tribes that attach religious or cultural significance to historic properties. Compliance with 36 CFR 800.2 (2004), which implements consultations with Native Americans, may be conducted by federal agencies as part of a government-to-government undertaking.

In accordance with Section 101(b)(3) of the Act, SHPOs advise and assist federal agencies in carrying out their Section 106 responsibilities and assist agencies, organizations, and individuals to ensure that historic properties are taken into consideration at all levels of planning and development. In New Mexico, the SHPO is the director of the New Mexico Historic Preservation Division (HPD) of the Department of Cultural Affairs. Consultation between WSMR and SHPO is an ongoing process regarding actions performed at WSMR, and SHPO will be consulted whenever a new ground disturbance is planned in support of the Proposed Action.

The definition of effect is contained within 36 CFR Part 800 (2000): "Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." As per this regulation, an adverse effect occurs:

> "…when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association…. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative."

Examples of adverse effects may include, but are not limited to, the following:

I. Physical destruction of or damage to all or part of the property;
II. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68 [1995]) and applicable guidelines;
III. Removal of property from its historic location;
IV. Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

V. Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
VI. Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
VII. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure the long-term preservation of the property's historic significance.

Effects can be direct, indirect, and cumulative. Direct effects include physical destruction or damage. Indirect effects include the introduction of visual, auditory, or vibration impacts as well as neglect to a historic property. Cumulative effects are the impacts of a project taken into account with known past or present projects as well as foreseeable future projects.

3.2.2 Affected Environment

An intensive (100%) pedestrian survey of the project Area of Potential Effects (APE) was conducted by Epsilon Systems Solutions, Inc. (Epsilon Systems) staff on October 22, 2022. Subsequent site recordation was conducted on October 23 and November 1, 2022. The survey was performed under New Mexico Archaeological Survey Permit Number (No.) NM-24-266-S. The Archaeological Records Management Section (ARMS) designated the survey as New Mexico Cultural Resources Information System (NMCRIS) Activity No. 151920 (WSMR Report No. 1165). A cultural resources inventory report was developed based on the surveys, which has been approved and accepted by the DPW-E Cultural Resources Manager (CRM).

A total two previously recorded sites (Laboratory of Anthropology [LA] Nos. 104286 and 106535), two newly recorded archaeological sites (LA Nos. 201959 and 204060), and one historic structure (Historic Cultural Property Inventory [HCPI] No. 54490) were documented within the APE.

3.2.3 Environmental Consequences

3.2.3.1 No-Action Alternative

Under the No-Action Alternative, no LWCs or other erosion and sedimentation control measures would be installed. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. Therefore, there would be *no effect* on cultural resources associated with the No-Action Alternative.

3.2.3.2 Action Alternative – Rebuild the Existing Road

Epsilon Systems recommends LA Nos. 106535, 201959, and 204060 as well as HCPI 54490 as not eligible for listing in the NRHP under any Criteria. Subject to concurrence, no further management consideration is warranted for these resources.

LA 104286 was determined eligible for listing in the NRHP under Criterion D. The present update documented significant disturbance to the site within the existing roadway prism, significantly diminishing the integrity of the portion of the site within the roadway. Epsilon Systems recommends that all proposed improvements to Range Road 13 within the vicinity of LA 104286 be limited to the existing roadway prism. Furthermore, the presence of an archaeological monitor is recommended to facilitate avoidance of adverse

effects to LA 104286 during construction. If these management recommendations are followed, the proposed project should have *no adverse effect* on LA 104286.

3.2.4 Best Management Practices and Mitigations

- All personnel conducting work at WSMR will be presented an environmental awareness brief;
- Support vehicles will be limited to existing roads;
- Cultural resources monitoring of all proposed improvements to Range Road 13 within the vicinity of LA 104286 would be conducted to ensure that the site's features are avoided; and
- In the event of an inadvertent discovery, program personnel would implement the WSMR inadvertent discovery policy by contacting DPW-E.

3.3 BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and their associated habitats are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites were reviewed, with particular emphasis on the presence of any species listed as threatened or endangered by federal or state agencies to assess their sensitivity to the effects of the Proposed Action. For this EA, biological resources are divided into three areas: vegetation communities, wildlife communities, and protected species. Species with protective status are protected based on regulations such as those listed below:

- Threatened or endangered under the federal Endangered Species Act of 1973 ([ESA], 16 USC § 1531 et seq.) by the USFWS;
- Threatened or endangered wildlife species under the New Mexico Wildlife Conservation Act (17-2-40.1 New Mexico Statutes Annotated [1978]) by the New Mexico Department of Game and Fish (NMDGF);
- Rare and endangered plants species by the New Mexico State Forestry Division's Endangered Plant Program;
- Protected species under the MBTA (16 USC §§ 703-712 [2004]); and
- Bald and golden eagles, as protected under the Bald and Golden Eagle Protection Act (16 USC § 668 [1972]).

3.3.1 Affected Environment

Two natural resources surveys were conducted in support of this project; one in November 2023 and one in December 2023. The initial survey encompassed a 3.28-mile (5.28-km) by 50 ft (15.24 m) realignment corridor considered as a bypass route, in addition to a buffer of 50 ft (15.24 m) on either side. The second survey encompassed the 2.78 miles (4.47 km) by 50 ft (15.24 m) existing Rand Road 13 rehabilitation corridor, a buffer of 50 ft (15.24 m) on either side, and eight expanded stretch of Range Road 13 identified by WSMR staff for rehabilitation. All observed plant and animal species or signs of animal species were documented.

Each survey was completed on single-day visits to the project area. Conditions during the 10 November 2022 survey were sunny, with light to no winds, and temperatures were roughly in the mid-40 to mid-60-degree Fahrenheit (4.5 – 15.5 degrees Celsius) range. Conditions during the 19 December 2023 survey were slightly overcast, light to no winds, and temperatures were roughly in the mid-40 to mid-50-degree

Fahrenheit (4.5 – 12.75 degrees Celsius) range. For both surveys, there were no documented freezes in the season, and many flowers and grasses near the surface were actively blooming or still retained signs of flowers and seeds. The survey was used in tandem with desktop resources, conversations with personnel of DPW-E, other general site visits, and known historical conditions of the vicinity of Range Road 13.

3.3.1.1 Vegetative Community

A wide diversity of vegetation types occurs on WSMR lands, ranging from desert shrublands of basin floors to ponderosa pine (*Pinus ponderosa*) forests of mountaintops. A model for describing the vegetation communities of WSMR, called vegetation map units, was developed by Muldavin et al. (2000). Under this model, the project area falls within the same seven vegetation units. The composition and structures of the various cover types presented by Muldavin were largely confirmed in the field. The dominant vegetation cover type was Mixed Lowland Desert Scrub, but importantly, the category of road disturbance (representing the existing Range Road 13 corridor) is by far the most significant map unit represented within the project area. Detailed descriptions of the vegetation units are provided in the biological assessment developed for the project (Epsilon 2024).

Table 3-4 summarizes the plant species observed during the 10 November 2022 and 19 December 2023 surveys of the project area.

There were distinct community zones and transitional areas largely divided between areas that had signs of water, especially in the form of sheet flow, and areas that had slightly raised topography and were significantly drier. Although not fully inclusive, these generally follow and support the findings from the Muldavin et al. (2000) vegetation map units. Vegetation communities present include mixed lowland desert, creosote bush, and mesquite shrubland. While all the species in these areas were not entirely inclusive of those described by Muldavin's vegetation units, many of the dominant and typical species of the community types were present.

The project area is naturally prone to sheet flow. By design, the roadway and right-of-way do not support vegetation, but it was further noted that the road is acting as a physical boundary to vegetation between the east and west sides of the road. Available water is channeling into the road and only crossing in several low water crossings. As such, the roadway is creating channels and rills that are causing water to not be transported laterally. As a result, vegetation was noted to be significantly less present on the western side of the road.

Noxious Weeds

The Noxious Weed Management Act directs the New Mexico Department of Agriculture (NMDA) to develop a noxious weed list for the state, identify methods of control for designated species, and educate the public about noxious weeds. NMDA coordinates weed management among local, state, and federal land managers and private landowners (NMDA 2020). DPW-E has developed an Integrated Pest Management Plan for the range. This plan outlines the resources necessary to identify, survey, manage, and the environmental and personnel requirements to control pests (Rodden 2021).

No noxious weeds were observed during the pedestrian survey of the project area.

1 **Table 3-4. Flora Observed During Surveys**

Common Name	Scientific Name	Abundance
Plant Species Observed on 10 November 2022 Survey		
Alkali sacaton	*Sporobolus airoides*	Common
Bahia	*Bahia spp.*	Rare
Banana yucca	*Yucca baccata*	Rare
Black grama	*Bouteloua eriopoda*	Abundant
Blue grama	*Bouteloua gracilis*	Common
Bush muhly	*Muhlenbergia porteri*	Common
Christmas cactus	*Opuntia leptocaulis*	Very rare
Cowtongue cactus	*Opuntia engelmannii*	Abundant
Creeping muhly	*Muhlenbergia repens*	Rare
Creosote bush	*Larrea tridentata*	Abundant
Dakota mock vervain	*Glandularia bipinnatifida var. bipinnatifida*	Very rare
Desert prickly pear	*Opuntia phaeacantha*	Common
Fourwing saltbush	*Atriplex canescens*	Common
Honey mesquite	*Prosopis glandulosa*	Abundant
Jame's buckwheat	*Eriogonum jamesii*	Very rare
Little leaf sumac	*Rhus microphylla*	Common
Louisiana sagewort	*Artemisia ludoviciana*	Very rare
Mesa dropseed	*Sporobolus flexuosus*	Common
Needle-and-thread grass	*Hesperostipa comata*	Common
New Mexico feathergrass	*Hesperostipa neomexicana*	Abundant
New Mexico rubber plant	*Partenium incanum*	Common
One-seed juniper	*Juniperus monosperma*	Rare
Pricklyleaf dogweed	*Thymophylla acerosa*	Common
Purple lovegrass	*Eragrostis spectabilis*	Rare
Rubber rabbit bush	*Ericameria nauseosa*	Common
Sand dropseed	*Sporobolus cryptandrus*	Rare
Shrub live oak	*Quercus turbinella*	Frequent
Sideoats grama	*Bouteloua curtipendula*	Common
Silverleaf nightshade	*Solanum elaeagnifolium*	Rare
Soaptree yucca	*Yucca elata*	Rare
Strawberry hedgehog cactus	*Echinocereus stramineus*	Very rare
Tall fescue	*Schedonorus arundinaceus*	Common
Tarbush	*Flourensia cernua*	Common
Thistle	*Cirsium spp.*	Common
Threadleaf snakeweed	*Gutierrezia microcephala*	Rare
Tobosagrass	*Hilaria mutica*	Common
Tree cholla	*Cylindropuntia Imbricata*	Rare
Various grasses, forbs, shrubs		Common
Western daisy fleabane	*Erigeron bellidiastrum*	Rare
Winter fat	*Krascheninnikovia lanata*	Common
Plant Species Observed on 19 December 2023 Survey		
Banana yucca	*Yucca baccata*	Rare
Christmas cactus	*Opuntia leptocaulis*	Frequent
Cowtongue cactus	*Opuntia engelmannii*	Rare
Creosote bush	*Larrea tridentata*	Common
Desert prickly pear	*Opuntia phaeacantha*	Frequent
Fourwing saltbush	*Atriplex canescens*	Common
Grama grass	*Bouteloua spp.*	Common
Honey mesquite	*Prosopis glandulosa*	Abundant

Common Name	Scientific Name	Abundance
Little leaf sumac	*Rhus microphylla*	Common
Needle-and-thread grass	*Hesperostipa comata*	Common
One-seed juniper	*Juniperus monosperma*	Rare
Purple pricklypear	*Opuntia macrocentra*	Rare
Rubber rabbit bush	*Ericameria nauseosa*	Common
Sand dropseed	*Sporobolus cryptandrus*	Frequent
Sand sagebrush	*Artemisia filifolia*	Frequent
Silverleaf nightshade	*Solanum elaeagnifolium*	Rare
Soaptree yucca	*Yucca elata*	Rare
Strawberry hedgehog cactus	*Echinocereus stramineus*	Very rare
Tall fescue	*Schedonorus arundinaceus*	Common
Thistle	*Cirsium spp.*	Occasional
Tobosagrass	*Hilaria mutica*	Common
Various grasses, forbs, shrubs		Common
White fishhook cactus	*Sclerocactus intertextus*	Rare
Winter fat	*Krascheninnikovia lanata*	Common

3.3.1.2 Wildlife

Mammals

The forest, woodland, and scrub habitats are highly associated with several carnivores including the gray fox (*Urocyon cinereoargenteus*), black bear (*Ursus americanus*), and to a great extent mountain lion (*Puma concolor*) (Logan et al. 1996). A survey in the San Andres and Oscura mountains in 2009 reported nine black bears, and a survey in 2012 yielded 22 bear individuals. Other mammals documented during the 2012 survey were gray fox, rock squirrel (*Otospermophilus variegatus*), cougar, mule deer (*Odocoileus hemionus*), ringtail (*Bassariscus astutus*), javalina (*Pecari tajacu*), coyote (*Canis latrans*), and bobcat (*Lync rufus*). The grizzly bear (*Ursus actos horribilis*) and Mexican gray wolf (*Canis lupus baileyi*) are noted to be extirpated from these habitats. Importantly, the Mexican gray wolf has been reintroduced across the southwest, and a male and female pair have been noted on WSMR near the Stallion Range area. These individuals were probably transients, but they do demonstrate that the species does have the potential to occur on WSMR.

Birds

Habitats within WSMR support approximately 290 documented avian species (WSMR 2013). WSMR has resident populations of raptors, game birds, and songbirds. Raptor species common on WSMR include red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni*). Game birds found on WSMR include Gambel's quail (*Callipepla gambellii*), scaled quail (*Callipepla squamata*), white-winged dove (*Zenaida asiatica*), and mourning dove (*Zenaida macroura*). Songbirds common to WSMR include black-throated sparrow (*Amphispiza bilneata*), pyrrhuloxia (*Cardinalis sinuatus*), and horned larks (*Eremophila alpestris*) (WSMR 2010).

Amphibians and Reptiles

WSMR contains habitat that supports a diverse array of herpetofauna, including seven species of amphibians and 48 species of reptiles representing three orders and 12 families. There are six toad species (three spadefoot toads and three true toads), one salamander species, one turtle species, 27 snake species,

and 20 lizard species. One study suggests that three additional species of reptiles and amphibians may occur on WSMR. Possible species that may never be documented due to their secretive nature and scarcity include the New Mexico milk snake (*Lampropeltis gentilis*) and many-lined skink (*Plestiodon multivirgatus*). The nonnative Mediterranean gecko (*Hemidactylus turcicus*) was detected on WSMR Main Post in 2013 (WSMR 2023).

No USFWS or New Mexico state listed amphibians or reptiles are found on WSMR. NMDGF lists the western massasauga as a Species of Greatest Conservation Need (SGCN). In 2012, the USFWS was petitioned by WildEarth Guardians to determine if the desert subspecies of western massasauga (*Sistrurus tergeminus edwardsii*) may warrant federal protection as threatened or endangered. Taxonomic changes published in the Journal of Conservation Genetics (Bylsma et al. 2021) reveal that sub-speciation of the western massasauga is not warranted. Subsequently, the petition to list the formerly accepted sub-species (desert massasauga) was formally withdrawn by the WildEarth Guardians. The USFWS is not scheduled to complete a formal status review of desert massasauga for potential inclusion as a threatened or endangered species under the ESA (WSMR 2023).

The desert massasauga is considered uncommon, with only a handful of individuals documented on WSMR. During 2020 and 2021, survey efforts were conducted to document possible populations potentially within WSMR boundaries and to collect morphological data and genetic material in order to improve understanding of the species distribution and taxonomy (Burkett 2021). These survey efforts reveal a population of massasauga rattlesnakes near the northwestern boundary of WSMR (WSMR 2023).

Fishes

There are no known fish collections from or reports of such species from aquatic habitats in the San Andres or Oscura mountains. The only native fish species at WSMR is the White Sands pupfish (*Cyprinodon tularosa*), which is endemic to the Tularosa Basin, natively occurring at Salt Creek and Malpais Spring and introduced to Mound Spring within WSMR and Lost River on Holloman Air Force Base. This small fish is considered a species at risk by the Army and is under evaluation for listing by the USFWS. It occupies a variety of microhabitats, ranging from deep spring ponds to shallow pools and calm spring runs varying in salinity (WSMR 2010).

Nonnative fish species introduced to WSMR include largemouth bass (*Micropterus salmoides*), mosquitofish (*Gambusia affinis*), goldfish (*Carassius auratus*), and sunfish (*Lepomis* spp.), which have been introduced into springs and ponds and can pose a threat to native White Sands pupfish populations (WSMR 2010).

Invertebrates

Invertebrates in the Chihuahuan Desert, including WSMR, are significant contributors to pollination, soil aeration, decomposition, and seed dispersal. Invertebrates are also an important source of nutrition for many vertebrate species. The invertebrate surveys that have been completed on WSMR have been within the White Sands National Monument. As such, a complete inventory of invertebrate species for WSMR has not yet been documented due to factors such as the physical size (both of the individuals being surveyed and WSMR generally), habitat associations, and overall difficulty in sampling (WSMR 2023).

Common orders of insects found on WSMR include beetles (Coleoptera), true bugs (Hemiptera), ants, bees, and wasps (Hymenoptera), butterflies and moths (Lepidoptera), and flies (Diptera). Other common arthropod orders include bark centipedes (Scholopendromorpha), vinegaroons (Thelyphonida), scorpions (Scorpiones), and spiders (Araneae).

Observed Species

The proposed project areas include habitats ranging from lowland desert scrub to high elevation woodlands. Complete lists of wildlife species present on WSMR can be found in the 2010 FEIS and 2023 INRMP (WSMR 2010; WSMR 2023). Table 3-5 provides a list of the wildlife species observed in the November 2022 and December 2023 surveys.

3.3.1.3 Threatened and Endangered Species

The ESA mandates that all federal agencies consider the potential effects of their actions on species listed as federally threatened or endangered. Section 7 of the ESA requires federal agencies that fund, authorize, or carry out an action to ensure that their action is not likely to jeopardize the continued existence of any federally listed threatened or endangered species (including plant species) or result in the destruction or adverse modification of designated critical habitats. The lead federal agencies for implementing the ESA are the USFWS and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The USFWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

Table 3-5. Wildlife Observed During Surveys

Common Name	Scientific Name	Abundance
Wildlife Species Observed on 10 November 2022 Survey		
Brown harvester ants	*Pogonomyrmex spp.*	Common
Common crow	*Corvus brachyrhynchos*	Common
Cricket	*Grylloidea spp.*	Abundant
Desert cottontail	*Sylvilagus audubonii*	Rare
Elk scat	*Cervus spp.*	Rare
Falcon	*Falco spp.*	Very Rare
Mole/vole	*Ellobius spp.*	Common
Mule deer tracks	*Odocoileus hemionus*	Rare
Oryx tracks	*Oryx spp.*	Rare
Pronghorn tracks	*Antilocapra americana*	Rare
Roadrunner tracks	*Geococcyx spp.*	Common
Sparrow	*Passeridae spp.*	Common
Wildlife Species Observed on 19 December 2023 Survey		
African oryx	*Oryx gazella*	Frequent
Brown harvester ants	*Pogonomyrmex spp.*	Rare
Common crow	*Corvus brachyrhynchos*	Common
Elk scat	*Cervus spp.*	Rare
House finch	*Haemorhous mexicanus*	Occasional
Kangaroo rat burrows	*Dipodomys spp.*	Occasional
Loggerhead shrike (ID via Merlin)	*Lanius ludovicianus*	Rare
Pocket gopher	*Thomomys bottae* and *Cratogeomys castanops*	Common
Red tailed hawk	*Buteo jamaicensis*	Rare (flying adjacent to roadway)
Roadrunner	*Geococcyx spp.*	Rare
Sagebrush sparrow (ID via Merlin)	*Artemisiospiza nevadensis*	Abundant

The ESA requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.

Table 3-6 lists federal and state threatened or endangered listed plants and wildlife that occur or have the potential to occur within WSMR boundaries, the existing Range Road 13 corridor, and the realignment corridor, including the various buffered areas (described in detail in Chapter 3). The list was generated using the USFWS Information for Planning and Consultation (IPaC) (USFWS 2023), the New Mexico Environmental Review Tool ([NMERT], NMDGF 2024), and discussions with WSMR DPW-E staff. Results from both pedestrian surveys were used in tandem with the potential occurrences based on past documentation of each species within the vicinity of the project areas and on the suitability of habitat within the region of a particular species.

In addition to the federally and state threatened or endangered plant species, there are 13 federal and state species of concerns and one state species of concern without federal listing. There are four federal or state bird species of concern that have the potential to occur at WSMR. There are 10 mammal species of concern that have the potential to occur at WSMR, with eight of these being bat species. Descriptions of these species can be found in the WSMR INRMP (WSMR 2023). No threatened or endangered plant or wildlife species were observed during the pedestrian survey.

Table 3-6. Protected Species Potentially Occurring at WSMR and the Proposed Action Area

Species	Federal	State	Base Presence	Potential to Occur on Project Sites
Pecos sunflower *Helianthus paradoxus;*	T	E	Saturated saline soils of desert wetlands. Usually associated with cienega or the wetlands created from modifying desert springs. Elevations ranging from 3,300 – 6,600 ft (1,000-2,000 m).	No
Wright's Marsh Thistle *Cirsium wrightii;*	PT	E	Wet, alkaline soils in spring seeps and marshy edges of streams and ponds. Elevations ranging from 3,450 – 8,500 ft (1,130-2,600 m).	No
Chiricahua Leopard Frog *Lithobates chiricahuensis;*	T	SGCN	Requires permanent waters from ponds, tanks, cienegas, or small streams in montane and river valleys that is free from non-native predators (e.g., American bullfrog). If permanent water is not available, adults may persist, but reproduction is unlikely.	No
Western massasauga *Sistrurus tergeminus rattlesnake*	--	SGCN	Typically found in flat grasslands, open woodland edges, or rocky hillsides.	No, the elevations of the project area are outside the known discoveries.
Northern aplomado falcon *Falco femoralis septentrionalis*	NEP	E	Small trees and large shrubs must be widely spaced, and dense lightly or ungrazed grasslands are preferred. Preferred habitat often contains tobosa swales and dominant	Yes, individuals could be in the immediate project

Species	Federal	State	Base Presence	Potential to Occur on Project Sites
			grasses including blue, black, and sideoats grama.	area breeding, nesting, or foraging.
Southwestern willow flycatcher *Empidonax trailii extimus*	E	E	Associated with moist microclimates and dense riparian vegetation near surface water. Wet conditions are uniformly required, but the vegetative structure and composition can vary widely by region and availability. This species typically avoids narrow, linear patches of habitat less than 10 m wide.	Yes, as temporary vagrants.
Mexican spotted owl *Strix occidentalis lucida*	T	SGCN	Mexican spotted owls are not known to occur on WSMR. The overall habitat associations of the project area also do not support this species.	Yes, as temporary vagrants.
American peregrine falcon *Falco peregrinus anatum*	MBTA	T	In New Mexico, almost all nests are constructed on ledges on relatively tall cliffs, in remote areas with minimal human disturbance.	No
Baird's sparrow *Ammadramus bairdii*	MBTA	T	Typically, this species winters in dense, expansive grasslands with a minor shrub component. They have been found in areas with extensive little and ground cover, but where a solid vegetative mat is lacking.	Yes, only in winter.
Yellow-billed cuckoo *Coccyzus americanus*	T	SGCN	Associated with wooded, dense cover and water nearby. They prefer mature or late-successional cottonwood/willow associations with a dense understory. Western populations will often place nests in willows along streams, with adjacent cottonwoods serving as foraging sites.	Yes, as temporary vagrants.
Piping plover *Charadius melodus*	T	T	Foraging habitats include mud flats, ephemeral pools, and seasonally emergent seagrasses with high invertebrate abundance.	No
Mexican wolf *Canis lupus baileyi*	EXPN	E	Found in a variety of habitats in the southwest in mountain woodlands and the Chihuahuan and Sonoran deserts.	Yes, as transients or residents
Spotted bat *Euderma maculatum*	--	T	Can inhabit a wide variety of habitats, including riparian communities, pinyon-juniper woodlands, and ponderosa pine and spruce-fir forests. In New Mexico, this species prefers subalpine coniferous forests.8m7	No

E = endangered, T = threatened, EXPN = Experimental, NEP = nonessential experimental population, SGCN = species of greatest conservation need, -- = no listing. Sources = USFWS 2024, NMDGF 2024.

3.3.1.4 Migratory Birds

The MBTA protects migratory birds and prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except with a federal permit (16 USC 703 [2009]; 50 CFR 21 [1974]; 50 CFR 10 [1973]). Under the MBTA, "take" is defined as "to pursue, hunt, shoot, shoot at, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." Most actions that result in taking or the permanent or temporary possession of a

protected species or nests containing eggs or young constitute violations of the MBTA, and the MBTA has no specific provision for authorizing incidental take.

Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal departments and agencies to take certain actions to further implement the MBTA. Federal agencies must ensure that EAs of federal actions required by NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on bird species of concern. In addition, federal agencies must minimize the intentional take of species of concern by (i) delineating standards and procedures for such take; and (ii) developing procedures for the review and evaluation of take actions. This Executive Order specifies the need to avoid or minimize adverse impacts on migratory birds and bird habitat when conducting agency actions, as well as the need to restore and enhance the habitat of migratory birds. To streamline the review and evaluation process, a Memorandum of Understanding was signed between the U.S. Department of Defense and the USFWS in June 2006.

Protocols and procedures for the protection of migratory birds on WSMR are discussed in the WSMR INRMP (WSMR 2023). The project areas associated with the Proposed Action cover a wide range of vegetative communities and habitat associations. As such, a variety of birds protected by the MBTA are expected to occur within these sites.

WSMR hosts a large number of resident and transient birds, including a variety of raptors, game birds, and songbirds. There are many resident populations located on WSMR. Of the 290 documented species, 17 orders and 55 families have been reported. The greatest numbers of bird species occur during the spring and fall. There are 158 resident species that are documented during the summer, winter, or year-round. The European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and Eurasian collared dove (*Streptopelia decaoto*) are three exotic species documented on the WSMR Main Post area (WSMR 2023).

3.3.1.5 Raptors

The Bald and Golden Eagle Protection Act (the Eagle Act) makes it illegal to import, export, take (which includes molest or disturb), sell, purchase, or barter any Bald Eagle or Golden Eagle or parts thereof. Under the Eagle Act (72 CFR 31132, June 5, 2007), “take” is defined as to “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb.” “Disturb” is defined as “to agitate or bother a Bald or Golden Eagle to the degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (72 CFR 31132, June 5, 2007).

WSMR partners with the Peregrine Fund (TPF) each year on golden eagle monitoring and research studies. Partnering with DPW-E, TPF made great strides in understanding the distribution and abundance of golden eagles and their nests on WSMR. A study of eagle use of oryx gut piles was also completed, with data currently being analyzed. The WSMR Hunt Program distributed information to hunters on the benefits of using non-lead ammunition (WSMR 2023).

There are currently 31 golden eagle breeding territories documented on WSMR (excluding the Organ Mountains and the San Andres National Wildlife Refuge) with over 240 nests (each pair with multiple nests). TPF conducts annual occupancy surveys of these territories and has documented high occupancy, with typically 85 to 95 percent of territories occupied by adult breeding pairs each year. There is also a

population of wintering golden eagles and, presumably, a year-round floater population of eagles waiting for an opportunity to occupy a breeding territory. TPF has also initiated annual prey surveys to document trends in lagomorph (i.e., rabbits for prey) abundance (WSMR 2023). There are no documented golden eagle nests within one mile (1.6 km) of the project area.

3.3.2 Environmental Consequences

3.3.2.1 No-Action Alternative

Vegetative Community

Under the No-Action Alternative, repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no impacts on vegetative community.

Wildlife

Under the No-Action Alternative, no construction of LWCs or other control measures on Range Road 13 within the project area would take place. As a result, there would be no impacts on wildlife.

Threatened and Endangered Species

Under the No-Action Alternative, no construction of LWCs or other control measures on Range Road 13 within the project area would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on threatened and endangered species communities or species at risk.

Migratory Birds

Under the No-Action Alternative, no construction of LWCs or other control measures on Range Road 13 within the project area would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on migratory birds.

Raptors

Under the No-Action Alternative, no construction of LWCs or other control measures on Range Road 13 within the project area would take place. Repairs would continue to be conducted on an ad hoc basis, with separate environmental review for each repair effort. As a result, there would be no adverse impacts on golden eagles or other raptor species.

3.3.2.2 Action Alternative – Rebuild the Existing Road

Vegetative Community

Implementation of the Proposed Action would remove a small portion of the associated vegetative communities but would not result in major long-term effects or a significant impact to local vegetation. Direct effects (i.e., removal of plants during excavation) on plants would occur from the proposed project, but this would not adversely impact the overall plant community.

Direct and temporary effects on vegetation are expected as a result of the project. Potential effects on vegetation from the proposed project are expected to be minimal, and temporary impacts are anticipated to occur related to construction activities. No significant impacts on vegetation communities are expected.

Wildlife

Wildlife species would likely vacate areas temporarily when human activity levels are high during construction. Small mammals, rodents, and reptiles would likely withdraw to burrows during these same activities. Individual mortality may occur; however, no population-level impacts are anticipated. Therefore, no significant or long-term effects on wildlife populations are anticipated.

Threatened and Endangered Species

There are no known populations of federally or state-listed threatened or endangered species or critical habitats present within the proposed project area; however, there is potential for the northern Aplomado falcon and Baird's sparrow to occur as seasonal migrants, as transients, potentially nesting, or as foraging individuals. It was determined that both species may be affected, but likely not adversely affected by this project if no BMPs were implemented.

The Aplomado falcon habitat associations are generally present in the project area, and the predicted area of occurrence is within the general vicinity of this species, albeit not exactly the predicted yucca grassland habitat. As such, individuals could be in the immediate project area breeding, nesting, or foraging. Importantly, the proposed activities are not noted to be significant threats to the species.

The WSMR Endangered Species Management Plan for the Northern Aplomado Falcon (Appendix B of the WSMR INRMP) provides strategic management actions and a monitoring plan for the Aplomado falcon. These actions primarily focus on range-wide surveys three times a year and grassland restoration and conservation. If individuals are noted, the management plan also describes the measure necessary to report to USFWS, BLM, NMDGF, and TPF. Existing monitoring and survey should be adequate measures for avoidance to be possible, and if adhered to, should allow for there to be no direct and adverse effects to the Aplomado falcon.

Baird's sparrow is only considered a migrant in the area, but the grasslands of the project area could provide the necessary cover for this bird to winter over and migrate through. Importantly, it is rarely reported or seen in New Mexico, but it will use grasslands, similar to those noted in the pedestrian survey, for winter migration.

Avoidance of this species should be prioritized by project activities by avoiding the periods during winter migration. If activities occur during the winter months, then presence/absence surveys before construction should be completed to ensure no individuals are in the immediate area. Statewide management goals for the species primarily revolve around maintaining and creating suitable grassland habitats and monitoring wintering populations and locations. If avoidance of construction during winter months, or pre-construction presence/absence surveys are completed, then the proposed activities should have no direct or adverse effects on Baird's sparrow.

Through implementation of the protection measures provided, it is anticipated that the Proposed Action would not adversely affect threatened and endangered species within the project area.

Migratory Birds

Environmental consequences for migratory birds at the construction site would be direct if work occurs during the nesting season and nesting birds are present. Direct effects include possible noise and visual disturbance to adjacent nesting birds and potential harm to nesting birds and their young that might occur in proposed project construction areas that require removal of vegetation.

It is recommended that construction activities be conducted outside of the migratory bird nesting season which is typically between mid-March through the end of August for most species, but variations occur based on bird species and climate conditions.

Surveys for nesting migratory birds would take place seven days before construction activities. The surveys would be conducted by a qualified biologist and use methods accepted by DPW-E (e.g., point transects or time-area counts). If occupied bird nests are found during surveys, avoidance mitigation would be employed to either move distribution system locations or delay construction until the nestlings have fledged. DPW-E would be consulted to determine how to best address the situation. DPW-E would consult with the USFWS, if needed, to avoid MBTA violations. Through the implementation of these measures, the Proposed Action would not adversely affect migratory bird populations.

Raptors

Existing avoidance and minimization strategies for bald and golden eagles should be followed, including the Species at Risk – Golden Eagles Avoidance and Impact Minimization standards. The proposed project is well outside the known nesting sites and habitat for bald and golden eagles. As such, the implementation of the proposed action should not adversely affect bald and golden eagles.

3.3.3 Best Management Practices and Mitigations

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all BMPs and mitigation measures are implemented. The following BMPs and mitigation measures would be applied to minimize impacts to biological resources:

BMPs:

- Erosion control measures will be implemented using U.S. Army Corps of Engineers approved storm water prevention standards;
- Trash and uneaten food would be removed from project area and stored in secure receptacles to prevent attracting wildlife;
- Construction personnel will not harass, collect, possess, harm, disturb, or destroy wildlife or their parts to include but not limited to snakes, bats, birds, nests, eggs, or nestlings;
- Report to DPW-E any injured or dead birds or active nests with eggs or nestlings discovered at the project sites; and
- DPW-E would be contacted regarding any issues regarding migratory birds, raptors, lizards, snakes, or other wildlife species of concern.

Mitigation Measures

- Surveys for migratory birds would be conducted within seven days of commencing construction activities during nesting season (mid-March through end of August);
- Follow the avian protection plan guidelines and guidelines for protection of eagles and Baird's sparrow, as provided in the current INRMP;
- If bird nests are found during surveys, DPW-E would be consulted to determine actions to be taken; and
- Road-killed animals will be removed from WSMR roadways to avoid attracting predators and scavengers (e.g., golden eagles and crows); and
- DPW-E would consult with the USFWS regarding MBTA and ESA issues.

3.4 LAND USE AND INFRASTRUCTURE

3.4.1 Affected Environment

3.4.1.1 Land Use

Land Use Classification

WSMR developed a Land Use Classification system to assist in planning range use. The classifications primarily reflect the administrative status of land areas and overlying airspace and the associated limitations on use. The WSMR FEIS lists 17 discrete Land Use Classifications involving combinations of land status and airspace designation at WSMR.

Figure 2.3-1 of the FEIS (WSMR 2010) provides an overview of the Land Use Classifications for the WSMR lands. The project areas associated with the proposed action fall under Land Use Classification C, Augmented Test Zone. All proposed activities would be consistent with WSMR's Land Use and Airspace Strategy Plan ([LUASP] Appendix B, WSMR 2010) and would follow the siting and review process provided in Section 6. Sensitive species and specialized areas would be avoided to the fullest extent feasible.

Land Use Classification C, Augmented Test Zone, supports a wide variety of test and management activities, including airborne and surface-based weapons firing, impact zones, and danger zones, directed energy systems, aircraft operations, dismounted operations, communications and instrumentation, field operations, and off-road travel using all types of vehicles (heavy/light, tracked/wheeled). Activities in this Land Use Classification can be constrained by a variety of environmental or operational factors. For example, certain safety buffers, such as around munitions storage facilities, are in effect continuously and preclude siting or occupation of other facilities. The large safety buffers associated with many testing activities at WSMR are temporary, lasting only for the duration of the test, allowing multiple uses at other times (WSMR 2010).

Recreation

Hunting on WSMR is conducted for recreation and wildlife population management. Since the 1950s, WSMR and NMDGF have cooperated to conduct hunts for big- and small-game animals on WSMR. Big game available for hunting on WSMR include oryx, pronghorn, desert bighorn sheep, and mountain lion. Small-game species include furbearers, upland game birds, waterfowl, and non-protected species. WSMR is closed to fishing, sport trapping, and hunting for black bear, Barbary sheep, mule deer, elk, javelina, and

turkey. The collection and/or killing of reptiles and amphibians are prohibited. Hunting on WSMR occurs in compliance with state and federal laws, NMDGF regulations, and WSMR regulations. The White Sands Missile Range Installation Hunting Program Guidance, Policies, and Procedures (WSMR 2019) addresses responsibilities, policies and procedures, safety and security issues, and methods, means, and access for hunting on WSMR. Hunting seasons, dates, areas, closures, species, licensing, weapons restrictions, and bag limits are primarily established by and in compliance with state regulations.

Restricted Access Hunts are available only to WSMR personnel who have long-term up-range access authority and have a Range Hunting Permit, and to guests who are escorted by volunteers that are properly permitted. Hunting opportunities include lottery draw oryx hunts, cougar, and small game hunting. Restricted access oryx hunts are conducted to reduce animal numbers in remote areas of the range (WSMR 2019).

Public tours of the Trinity Site are offered biannually. The Trinity Site, which was the site of the first atomic bomb detonation in 1945, is a National Historic Landmark. In addition, White Sands National Park provides guided tours of Lake Lucero once per month between the months of November thru March (NPS 2025).

Athletic events held on WSMR include biking, running, and swimming races and the Bataan Memorial Death March. Several races are run per year and include duathlons and triathlons. The annual Bataan Memorial Death March, first held in 1989, consists of a 26.2-mi (42.2-km) trek through rugged terrain within WSMR. This event can host thousands of participants (WSMR 2010).

3.4.1.2 Traffic and Transportation Networks

Interstate Highways 10 (I-10) and 25 (I-25) are the primary interstate highways in the vicinity of WSMR. I-10 generally traverses in an east-west direction and passes approximately 50 miles (80 km) south of the Main Post, with exits to WSMR at El Paso, Texas and Las Cruces, New Mexico. I-25 provides a north–south interstate connection to WSMR, with local exits at San Antonio (17 miles [27 km] from the Stallion Gate), and Las Cruces (22 miles [35 km] from the Las Cruces Gate). Major highways serving WSMR include US 380, US 70, and US 54 (WSMR 2010).

There are several access points onto WSMR, with the primary points being US 70 at the Las Cruces and Small Missile Range Gates; Range Road 1 at the El Paso Gate; and US 380 at the Stallion Gate. The Las Cruces and El Paso gates are the primary access control points providing ingress and egress to the Main Post area.

WSMR maintains access via a widespread network of primary and secondary range roads. Access to the project area along Range Road 13 can be achieved using mainly larger, well-maintained range roads. From the north, access to WSMR is gained using U.S. 380 and turning south on NM 525, which turns into WSMR Range Road 7 at the Stallion Gate. Turning east on Range Road 24 will take the driver to the project area on Range Road 13.

From the south, the project area is best accessed by driving north on Range Road 7 until it intersects with Range Road 13. Due to the nature of the range roads on WSMR, visitors to the project area tend to prefer and use the northern access route over the southern.

3.4.1.3 Facilities

The project area is near the northern terminus for Range Road 13, near one RDT&E facility and an area used for bivouacking exercises. North of the project area, Range Road 13 merges with Range Road 24, which runs west of the project leading towards Range Road 7 and the Stallion Army Airfield.

Numerous RDT&E facilities use Range Road 13 south of the project area for access when entering WSMR from the north at Stallion Gate.

3.4.1.4 Utilities

There is a buried fiber optic cable buried along the western side of Range Road 13, extending north-south parallel to the roadbed. It is unknown whether other utilities (i.e., communications, natural gas pipelines, water, or wastewater) are buried within the project area. There are no overhead power lines within the project area.

3.4.2 Environmental Consequences

3.4.2.1 The No-Action Alternative

Land Use

Implementation of the No-Action Alternative would not change the land use status of the project area. No impact on land use would be anticipated.

Traffic and Transportation Networks

Under the No-Action Alternative, road repairs would be conducted on an ad hoc basis. It is anticipated that entrenchment would continue. If Range Road 13 were to become unusable within the project area, other routes would be used to access facilities and test areas normally accessed by this portion of Range Road 13.

Facilities

There would be no impact on facilities under the No-Action Alternative, as their use would not change under this alternative. If conditions on Range Road 13 deteriorate to unusable conditions, other routes would be utilized to access facilities near the project area. This may increase transit times to and from WSMR facilities, but no significant impact to facilities would occur.

Utilities

There would be no impact to utilities under the No-Action Alternative, as no new land disturbance would be conducted that could impact buried utilities. Furthermore, access to an existing buried communications line west of Range Road 13 would not be affected under this alternative.

3.4.2.2 Action Alternative – Rebuild the Existing Road

Land Use

The Proposed Action is consistent with existing land use plans and would have no impact on existing land uses within the project area. No impact anticipated.

Traffic and Transportation Networks

Under the Proposed Action, sections of Range Road 13 would be unpassable during construction activities. During this time, alternative routes would be needed. This traffic realignment would be temporary in nature, as Range Road 13 would be reopened following planned activities. No significant impacts on traffic and transportation networks would occur.

Facilities

The Proposed Action would not directly impact any WSMR facilities. However, construction on Range Road 13 could result in the need for alternative access routes, increasing transit time for travelers on WSMR roads. This impact would be temporary in nature and would not ultimately impact facility usage at WSMR.

Utilities

The Proposed Action would not impact a buried communications line west of Range Road 13. Utility surveys (desktop searches or in-field surveys) would be conducted prior to initiating ground disturbance within the project area to locate other buried utilities. Given this, no impacts to utilities are anticipated under the Proposed Action.

3.4.3 Best Management Practices and Mitigations

As specified in 32 CFR 651 (2002), the project proponent has the responsibility of ensuring that all BMPs or mitigation measures are implemented. The following BMPs would be applied to reduce impacts on land use and infrastructure:

- Cars and trucks used for personnel and delivery transport to the project area would follow all posted speed limits; and
- Utility surveys would be conducted prior to ground disturbing activities within the project area.

3.5 Summary of Potential Impacts and Mitigations

BMPs are standard practices that are implemented as part of the Proposed Action to minimize or avoid adverse impacts. Additional mitigation measures are proposed to rectify or compensate for unavoidable adverse environmental effects that could be significant without mitigation. Table 3-7 provides a summary of the potential impacts associated with the Proposed Action alternative, as well as the proposed BMPs and mitigation measures.

Table 3-7 Environmental Effects Summary

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
Soils and Erosion Effects	***BMPs***
No significant impacts • Range Road 13 regularly washes out in locations, and a segment of the road is entrenched; and • Monsoonal conditions exist during the summer month.	• To minimize ground disturbance, construction activities would be restricted to the existing road bed and the eight improvement areas identified in Figure 1-2; • To the fullest extent possible, construction would occur during the dry season when rainfall and runoff potential are low; • Installed stormwater control measures would be maintained regularly to prevent saturated surface of sub-base conditions or frequent overtopping of the roadway; and • Bank stabilization using gabion baskets would be constructed in a stairstep fashion to avoid toppling. Care would also be taken to ensure that scouring does not occur under the baskets.
Cultural Resources	***BMPs***
No adverse effect • There are five documented sites within the project APE; • Four recommended as ineligible for NRHP listing, with one eligible site under Criterion D (LA 104286).	• All personnel conducting work at WSMR will be presented an environmental awareness brief; • Support vehicles will be limited to existing roads; • Cultural resources monitoring of all proposed improvements to Range Road 13 within the vicinity of LA 104286 would be conducted to ensure that the site's features are avoided; and • In the event of an inadvertent discovery, program personnel would implement the WSMR inadvertent discovery policy by contacting DPW-E.
Biological Resources	***BMPs and Mitigation Measures***
No significant impacts • Reduction in habitat may occur on a small scale but would not impact the ability to maintain plant populations; • Some risk of spreading invasive plant species; • Individual mortality may occur; however, no population-level impacts are anticipated; and • No critical habitat located within the project areas.	**BMPs** • Erosion control measures will be implemented using U.S. Army Corps of Engineers approved storm water prevention standards; • Trash and uneaten food would be removed from project area and stored in secure receptacles to prevent attracting wildlife; • Construction personnel will not harass, collect, possess, harm, disturb, or destroy wildlife or their parts to include but not limited to snakes, bats, birds, nests, eggs, or nestlings;

Impacts of the Proposed Action Alternatives	Proposed Best Management Practices and Mitigation Measures
	• Report to DPW-E any injured or dead birds or active nests with eggs or nestlings discovered at the project sites; and • DPW-E would be contacted regarding any issues regarding migratory birds, raptors, lizards, snakes, or other wildlife species of concern. **Mitigation Measures** • Surveys for migratory birds would be conducted days before construction activities during nesting season (mid-March through end of August); • If bird nests are found during surveys, DPW-E would be consulted to determine actions to be taken; • DPW-E would consult with the USFWS regarding MBTA and ESA issues.
Land Use and Infrastructure	***BMPs***
No significant impacts • Project area land use is categorized as Land Use Classification C, Augmented Test Zone, which supports a wide variety of test and management activities; • Hunting is allowed as a recreational land use in the project area; • Facility access may be affected as secondary routes may be needed during construction; and • No utilities would be affected by implementation of the Proposed Action.	• Cars and trucks used for personnel and delivery transport to the project area would follow all posted speed limits; and • Utility surveys would be conducted prior to ground disturbing activities within the project area.

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CHAPTER 4 REASONABLY FORESEEABLE ACTIONS

When evaluating the environmental impact of an Army action, the analysis must include consideration of reasonably foreseeable future actions that could contribute to cumulative impacts. As defined in 32 CFR 651, "reasonably foreseeable actions" refers to future actions that are not highly speculative or remote, and which could potentially impact the environmental effects of a proposed Army action, meaning they should be considered when analyzing the potential environmental consequences of a project under NEPA.

Each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects based on its own time and space parameters. Therefore, cumulative effects analysis will typically encompass a Region of Influence (ROI) or geographic boundaries beyond the immediate area of the Proposed Action and a time frame including past actions and foreseeable future actions, to capture these additional effects.

For the Proposed Action to have a cumulatively significant impact on an environmental resource, two conditions must be met. First, the combined effects of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the effects of the Proposed Action, must be significant. Second, the Proposed Action must make a substantial contribution to that significant cumulative impact. In order to analyze cumulative effects, a cumulative effects region must be identified for which effects of the Proposed Action and other past, present, and reasonably foreseeable actions would occur.

For purposes of this cumulative effects analysis, the ROI includes projects considered within the vicinity of the Proposed Action. This includes any project that would involve use of Range Road 13 within the vicinity of the project area. This analysis depends on the availability of data and the relevance of effects of past, present, and future actions. Although certain data (e.g., extent of forest cover) may be available for extensive periods in the past (i.e., decades), other data (e.g., water quality) may be available for much shorter periods. Because specific information and data on past projects and action are usually scarce, the analysis of past effects for this EA is qualitative.

Table 4-1 lists the past, present, and reasonably foreseeable future actions within the ROI that have had, continue to have, or would be expected to have some impact on the natural and human environment. The projects in this table are limited to those implemented in the last five years or those with ongoing contributions to environmental effects. Projects with measurable contributions to impacts within the ROI for a resource area were included in the cumulative analysis.

4.1 SOILS AND EROSION EFFECTS

The Proposed Action would have soil erosion effects, limited to the project area. Such effects are limited to ground disturbance during construction activities, maintenance and repair of Range Road 13. As described in the NEPA documents for the past, ongoing, and proposed future projects listed in Table 4-1, the regional activities are not expected to significantly affect geology and soils. The Repair Range Road 13 and McDonald Ranch Roads folds in many of the same resource protection measures as the Proposed Action of this EA and identifies and analyzes the excavation of soils from an existing pond with the transport of the soils to the entrenched segment of Range Road 13.

The Proposed Action would result in the installation of LWCs and other measures to reduce soil erosion and sedimentation. Hence, there would be no cumulative impact on soil erosion effects.

Table 4.1. Reasonably Foreseeable Actions within the Region of Influence

Project Title	Project Description	Past	Present	Future
Repair Range Road 13 and McDonald Ranch Roads	Cleaning, repair, and replacement of 33 culverts on Range Road 13. Building up of the entrenched segment of Range Road 13, and repair of the McDonald Ranch House access road. A dirt tank adjacent to Range Road 13 would be recontoured, with the borrow soil used to build up the road with a basecourse cover. Basecourse material would be transported to the project site from a mill near the Mockingbird Gap.		✓	✓
Joint Directed Energy Test Center (JDETC)	The JDETC Program would perform developmental testing and operational testing of directed energy weapon systems at facilities on Salinas Peak. Range Road 13 could be used to access the JDETC facility on Salinas Peak.	✓	✓	✓
Operations and Training Support Facilities and Activities at WSMR	This program would improve facilities and allow for the training of up to 500 transient troops. Some of the offroad training areas could be accessed using Range Road 13.		✓	✓

4.2 Cultural Resources

The Action Alternative, would have no adverse effect on LA 104286 if recommendations of avoidance provided in Section 3.2.4 are implemented. A cultural resources monitor will be present during construction in the vicinity of LA 104286. These measures would minimize potential impacts on identified resources. Following completion of Section 106 analysis, the Proposed Action in conjunction with other past, present, and foreseeable activities, would not result in cumulative impacts to cultural resources.

4.3 Biological Resources

Implementation vegetation removal associated with the Proposed Action would have small-scale impacts to vegetation communities but would not impact the ability to maintain plant populations. When possible, work would be done outside nesting season to minimize impacts on migratory birds. The proposed project areas do not contain critical habitat. When combined with the effects of other past, present, and foreseeable project activities, implementation of the Proposed Action is unlikely to have any additional cumulative effect on regional plant and animal populations, including threatened and endangered species and Army Species at Risk.

4.4 Land Use Infrastructure

As construction associated with the Proposed Action could be conducted concurrently with JDETC construction, coordination would be needed to minimize impacts to infrastructure in the project area vicinity. Construction activities could be put on hold, as training of up to 500 transient troops are present on WSMR. Through implementation of BMPs provided in Section 3.4.3, these impacts are expected to be minor.

Implementing the Proposed Action would yield benefits to WSMR, as the road would be improved and the LWCs and other control measures would reduce future erosion and sedimentation in the vicinity of Range Road 13. No significant cumulative impacts are anticipated through implementation of the projects listed in Table 4-1.

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CHAPTER 6 LIST OF PREPARERS

This EA was prepared by Epsilon Systems Solutions, Inc. for WSMR. Members of the professional staff are provided below.

Environmental Division, WSMR

Brian Knight, Environmental Division Chief
Deborah Nethers, Customer Support Branch Chief
Jim Bowman, Conservation Branch Chief
Brian Wilson, NEPA Coordinator
Patricia Cutler, Wildlife Biologist
Greg Silsby, Natural Resources
Michael A. Stowe, Senior Archaeologist

Epsilon Systems Solutions, Inc.

Mark Dimsha, Environmental Planner
Jacob Richards, Biological Resources and NEPA SME
Brad Beacham, Archaeologist
Dan Martinez, Archaeologist
Nate Myers, Historian
Phil Esser, Architectural Historian
Justin Pooley, GIS Analyst
Becki Graham, Technical Editor

CHAPTER 7 AGENCIES AND CONSULTATIONS

APPENDIX A GLOSSARY OF TERMS

best management practice (BMP): a practice or combination of practices that is an effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources (Source: EPA 2024).

cross slope: The slope of a road perpendicular to the gradient of a road, either insloped towards the cutbank or outsloped towards the fillslope (Source: Zeedyk 2006).

crowned road: A roadway the slopes both left and right from the centerline, like a pitched roof, and is usually flanked by a roadside ditch on one or two sides (Source: Zeedyk 2006).

culvert: A conduit, pipe, tube or passageway under a road used for the passage of water, debris, sediment, and aquatic life (Source: Zeedyk 2006).

cutslope (cutbank): The artificial face or slope excavated from soils or rock along the inside (upslope) of a road (Source: Zeedyk 2006).

drainage basin: area from which all precipitation flows to a single stream or set of streams.

fillslope: The artificial face on the downhill side of a road created by fill material excavated from the cutslope side (Source: Zeedyk 2006).

gabion: Gabions are rectangular baskets fabricated from a hexagonal mesh of heavily galvanized steel wire filled with rock material. Gabions slow the velocity of concentrated runoff and stabilize slopes with seepage problems and/or non-cohesive soils (Source VDEQ 2024).

geotextile: Synthetic fibers forming a woven, nonwoven, or spunbonded fabric used to separate soil from engineered materials and add strength to a facility (Source: Zeedyk 2006).

inslope: The amount or degree of steepness of inward sloping (Source: Zeedyk 2006).

low-water crossing (LWC): Road-stream crossing structure designed to be overtopped by high flows or by debris- or ice-laden flows (Gautam and Bhattarai 2018).

outslope: The amount or degree of steepness of outward sloping (Source: Zeedyk 2006).

riprap: A layer of coarse sized rock fragments; cobble or small boulders spread on the ground surface to protect the soil from erosion by flowing water (Source: Zeedyk 2006).

roadside ditch: The ditch paralleling the roadway used to drain the road surface, road embankment and cut slopes (Source: Zeedyk 2006).

stormwater basin: a vegetated depression designed to collect and store runoff as a permanent pool of water that removes pollutants through settling and biological uptake. A detention basin slows the flow before releasing it into a smaller outlet. An infiltration basin operates much like a detention basin, but it is designed to infiltrate runoff into permeable soil, without discharge or release (PWD 2024).

turnout: side extension of the ditch that directs water away from the road and into a sediment trap or onto protected soil (NRCS 2005).

unvented ford: A structure that crosses streams which are dry most of the year or where normal stream flow is less than or equal to 6 inches (15.2 cm) in depth. They are usually used for ephemeral streams or streams with shallow flows and cross streams at or slightly above the streambed (Gautam and Bhattarai 2018).

vented fords have a driving surface elevated above the channel bottom with vents that allow low flows to pass beneath, keeping vehicles out of the water during low flow. High water will periodically flow over the crossing (Gautam and Bhattarai 2018).

water bar: A low barrier, sometimes accompanied by a ditch, designed to divert water off of a road; usually installed after a road has already been built (Source: Zeedyk 2006).

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APPENDIX B STREAMSTATS ANALYSIS RESULTS

APPENDIX C MEASURES CONSIDERED IN THIS ENVIROMENTAL ASSESSMENT

Table C-1 summarizes the sedimentation and erosion control measures recommended for use as part of the Proposed Action of this EA. The table provides the preferred area of application for each control measure, qualitatively compares construction and maintenance costs of each, provides rough estimates for new ground disturbance, and describes some of the limitations associated with each control measure.

Table C-1 Comparison Matrix of Construction Measures Considered in the Environmental Assessment

Measure/ EA Section	Areas Applied	Construction Cost	Maintenance Cost	New Ground Disturbance	Limitations
Raising the road profile Section 2.2.1	Entrenched segments where road surface is below the surrounding grade.	Moderate	Moderate	Minimal/within existing footprint	Would likely revert to entrenched state without the incorporation of other erosion and sedimentation controls measures. Fill dirt will need to meet engineering specifications.
Crowning of road Section 2.2.2	All areas of Range Road 13 where construction is conducted.	Low	Low/ Moderate	Minimal/within existing footprint	Heavy traffic increases the need for maintenance.
Roadside ditches Section 2.2.3	Along the roadways experiencing high flows and at the receiving end of water bars and rolling dips.	Moderate	Low/ Moderate	Extends 3 to 4 ft (0.9 to 1.2 m) beyond the road shoulder	Requires frequent maintenance to keep the ditch shape. Ditches on steep slopes have an increased need for maintenance.
Stormwater basin Section 2.2.4	At locations designed to receive stormwater for storage away from the roadways.	High	Moderate	All new land disturbance. Total size dependent upon design parameters	May require removal of sediments or control of noxious weeds to avoid filling up basin.
Concrete block ford Section 2.2.5.1	High velocity stream crossings or stream crossings with soft soils.	Moderate	Low	Extends 2 to 3 ft (0.6 to 0.9 m) beyond road shoulders.	Can lead to erosion at the edges of the ford.
Gabion ford Section 2.2.5.1	Stream crossings with fine, sandy soils.	Moderate	Low	Extends 3 to 4 ft (0.9 to 1.2 m)	

Measure/ EA Section	Areas Applied	Construction Cost	Maintenance Cost	New Ground Disturbance	Limitations
				beyond the road shoulder	
Concrete box culvert Section 2.2.5.2	Stream crossings where a high vented area ratio is needed.	High	Low	Would require armoring and shielding at the ends of the LWC	Installation cost is very high.
Scour and bank protection Section 2.2.6	Scouring protection added to structures installed in the stream bed and around abutments and discharge points. Bank protection is added along the banks of arroyos and washes as well as ditches or other water conveyances.	Low/ Moderate	Low/ Moderate	Dependent upon stream crossing features.	Requires maintenance and repair to remain in working order.
Water bar Section 2.2.7	Recommended for low-traffic roadways that are dry during normal conditions.	Low	Low	No new disturbance, but water bars should discharge into turnouts or roadside ditches.	May be impassable for low-clearance vehicles. Driving during wet conditions can easily flatten water bars.
Turnouts Section 2.2.8	Mostly, at the receiving (downstream) end of sedimentation and erosion control measures (e.g., rolling dips and water bars). Can be installed without other measures on flatter terrain (0% to 3% slopes, with adjacent hillslope <5%).	Low	Low	Minimal, extends roughly 10 ft (3 m) from road surface, emptying to vegetated areas.	Not recommended for narrow or entrenched roads. Sedimentation can build up without positive drainage. Attractive parking location for vehicles.

Note: $ = Low Price, $$ = Moderate Cost, and $$$ = High Cost.