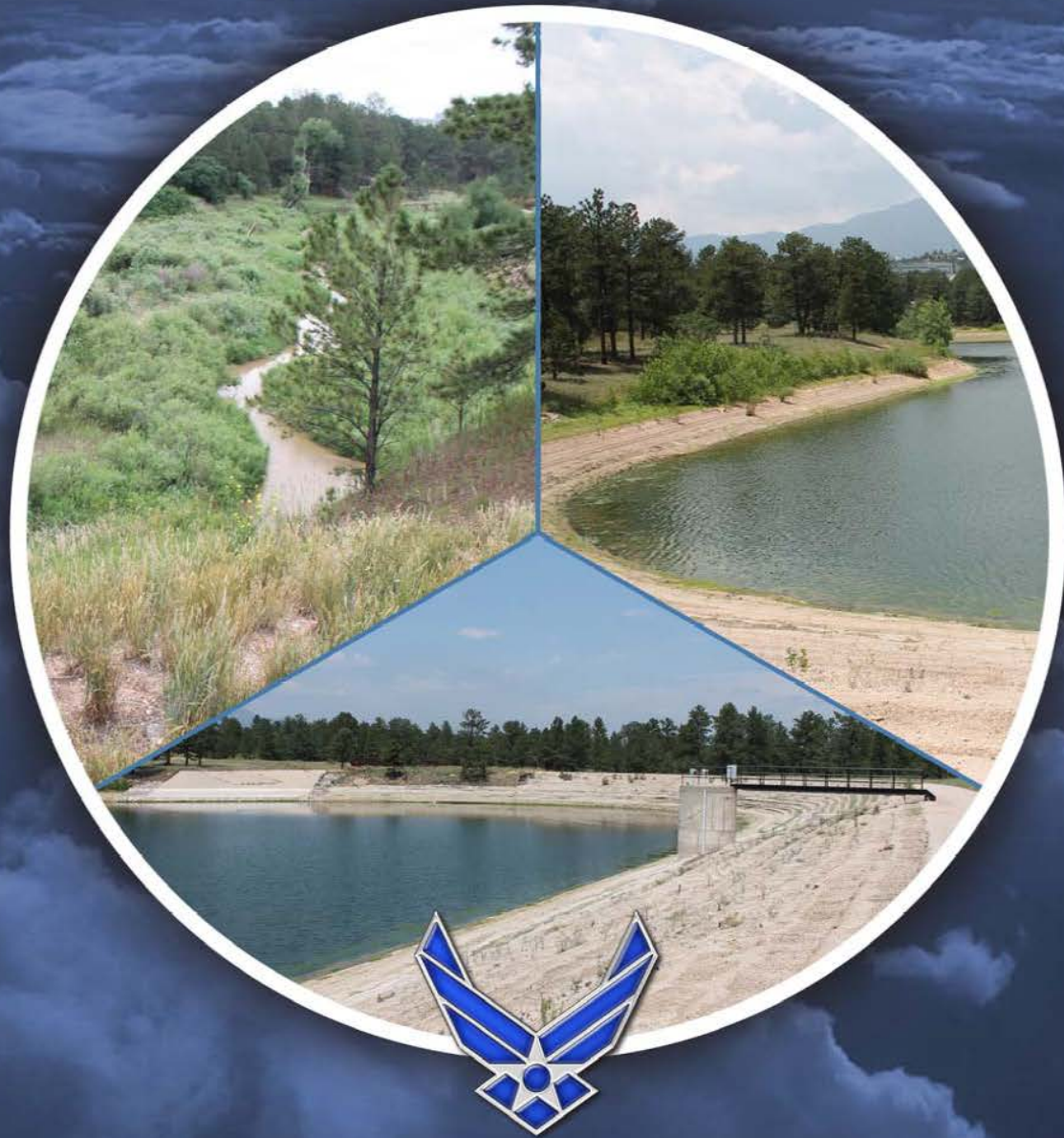


U.S. AIR FORCE ACADEMY
COLORADO

ENVIRONMENTAL ASSESSMENT

REPAIR OF THE DAM AT NON-POTABLE RESERVOIR #1



FINAL
August 2015

Report Documentation Page

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FINAL

ENVIRONMENTAL ASSESSMENT

REPAIR OF THE DAM AT NON-POTABLE RESERVOIR #1

U.S. AIR FORCE ACADEMY, COLORADO

August 2015

**FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND
FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)
REPAIR DAM AT NON-POTABLE RESERVOIR #1
U.S. AIR FORCE ACADEMY, COLORADO**

Pursuant to provisions of the National Environmental Policy Act (NEPA), 42 United States Code (U.S.C.) 4321 to 4270d; Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) 1500-1508; and 32 CFR Part 989, Environmental Impact Analysis Process, the U.S. Air Force assessed the potential environmental consequences associated with the proposed repair of the dam at Non-Potable Reservoir #1 at the U.S. Air Force Academy (USAFA), Colorado within the attached Environmental Assessment (EA).

Purpose and Need

The hazard classification of Non-Potable Reservoir #1 was evaluated in accordance with the Colorado Division of Water Resources (DWR) Guidelines for Hazard Classification, and Rules and Regulations for Dam Safety and Dam Construction. This hazard classification was completed to support the design of dam modifications. Based on the hazard classification analysis and utilizing Colorado State Engineer's Office (SEO) criteria, the results indicate that Non-Potable Reservoir #1 does not pose a significant threat to loss of human life, but does pose the potential for significant downstream property damage, as a result of a sunny day failure. Therefore, the dam has been classified as a "Significant Hazard Dam".

The purpose of the action is to repair the dam at Non-Potable Reservoir #1 to minimize the potential for catastrophic failure. The intake and outlet pipes at the dam are in excess of 50 years old and its downstream embankment slopes are excessively steep and potentially unstable. Because of the over steepened downstream slope and the age of the intake and outlet pipes through the embankment, the dam is deemed to have exceeded its useful life and requires repair. The need for action is due to the potential damage to downstream infrastructure (i.e., Union Pacific Railroad), the presence of seepage, the over-steepened downstream slope, and the anticipated poor condition of the embankment piping.

Description of Proposed Action and Alternatives

Under the **Proposed Action**, the central portion of the dam would be excavated with the removed embankment either being removed from the site or stockpiled for reuse, depending upon its condition. Approximately 7,600 cubic yards of material would be excavated from the dam. Material excavated from the dam would be stockpiled either within the drained reservoir area and/or at the contractor staging areas. A temporary coffer dam would be installed within the reservoir to separate the construction area on the dam from any water that may flow into the reservoir. Contractor staging areas would be established in existing cleared areas adjacent to the reservoir. The existing piping would be removed and replaced. The liner of the reservoir would be repaired to address seepage losses. Clearing and grubbing including tree removal within the dam and work limits and trimming of vegetation within the existing soil cement liner would occur. Once the piping is replaced and the liner is repaired, the excavation would be backfilled. The repaired dam would be built of compacted soil and would be protected by riprap on both the upstream and downstream faces.

In accordance with SEO findings, the potential to breach the reservoir during a large storm event would be reduced by the installation of an auxiliary spillway. The proposed auxiliary spillway would be constructed within an area south of the existing dam. The extent of construction work in this area would be limited to an area approximately 200 feet wide and 400 feet in length. The spillway would consist of a trapezoidal concrete channel that would discharge into a riprapped plunge pool with continuing flow within the earth-lined drainage channel. The spillway would discharge southeast of the dam. As Non-

Potable Reservoir #1 is drained, the non-potable water system would need to bypass the reservoir to continue servicing the remaining system. There would be two bypass pipes that would be constructed to bypass Non-Potable Reservoir #1. Total length of the by-pass lines would be approximately 3,000 feet.

The total area of disturbance associated with establishing staging areas, installing the non-potable by-pass lines, repairing the dam, and constructing the auxiliary spillway is estimated to be 4.0 acres. Construction would be complete within a 9-month period.

Under the **Upgrade Dam Alternative**, the same repair activities as discussed under the Proposed Action would occur (i.e., repair of piping and installation of by-pass line); however, the existing earthen embankment would be modified to allow for the dam to overtop. Modification to the existing earthen embankment would be accomplished using a roller compacted concrete overlay. This overlay would essentially encase the earthen dam in concrete. The liner of the reservoir would also be repaired to address seepage losses. Because the dam would be designed to allow water to overtop the dam, construction of an auxiliary spillway would not occur. The total area of disturbance is estimated to be 2.0 acres and construction would occur after 2014 and would be complete within a 9 month period.

Under the **No-Action Alternative**, the Air Force would not repair the dam at Non-Potable Reservoir #1. Approximately 75,000 gallons of water per day would continue to seep from the reservoir. The Air Force would be in violation of DWR Dam Safety and Dam Construction Rule 6 - Requirements for Alteration, Modification, or Repair of an Existing Dam.

Summary of Environmental Impacts

The analyses of the affected environment and environmental consequences of implementing the dam repair activities presented in the EA concluded that impacts to floodplains and rail transportation will occur regardless of dam repair actions.

The Inflow Design Flood (IDF) for Non-Potable Reservoir #1 (a Small Significant Hazard Dam) is the flood resulting from 45 percent of the Probable Maximum Precipitation (PMP). The IDF supports the determination of the capacity of the spillway. During high flow events in which the auxiliary spillway is utilized, rail service through the area will have to be interrupted to ensure the safety of train traffic. After the high flow event has passed, the tracks will be inspected by Union Pacific personnel to ensure the integrity of the railroad bed and tracks has not been compromised and train service can safely resume. The purpose of implementing dam repair activities is to minimize the potential for catastrophic failure to prevent potential damage to downstream infrastructure (i.e., Union Pacific Railroad). Given the terrain in the area, during a PMP event there will be no other practicable means of directing flows from the auxiliary spillway to Monument Creek regardless of proposed dam repair activities. Additionally, because the dam and Non-Potable Reservoir #1 are within the flood zone, there is no practicable alternative to implementing dam repair activities outside of the flood zone. This FONSI includes a FONPA because there is no practicable alternative to avoid these impacts.

Repair of the dam would not change the land use of the area. The Non-Potable Reservoir #1 area would continue to be compatible with existing land uses surrounding the property. No significant impacts to land use are anticipated. Dam repair activities would not result in a change in the appearance of the property; however, construction of the auxiliary spillway would change the appearance of the area south of the reservoir. Due to the isolated setting of Non-Potable Reservoir #1 and the presence of trees creating a visible barrier to the area, no significant impacts to aesthetics are anticipated.

As discussed above, interruption of rail service will occur during high flow events. Given the terrain in the area, during a high flow event there would be no other practicable means of directing flows from the auxiliary spillway to Monument Creek regardless of proposed dam repair activities.

Hazardous materials and hazardous waste (including asbestos) will be managed in accordance with applicable regulations; therefore, no significant impacts are anticipated.

Management practices required by the National Pollutant Discharge Elimination System (NPDES) General Permit and associated Storm Water Pollution Prevention Plan (SWPPP) will be implemented during construction activities. The NPDES permit, together with the required SWPPP, would outline construction site management practices designed to protect the quality of the surface water, ground water, and natural environment through which they flow; therefore, no significant impacts to geology and soils or water resources are anticipated. As discussed above, Non-Potable Reservoir #1 and the dam are within a 100-year flood zone. Since the Auxiliary Spillway would be used to convey water from the reservoir during a large storm event, this spillway would also be located within a 100-year flood zone. Because the project site is within the flood zone, there is no practicable alternative to implementing repair activities outside of the flood zone. However, with implementation of the spillway design features, the risks associated with this flood zone would be less than significant.

Construction activities will result in short-term air quality impacts. However, emissions associated with construction activities will not hinder maintenance of the National Ambient Air Quality Standards.

The amount of clearing and grubbing of ponderosa pine woodland and grassland vegetation at the project site represents a small percentage of this vegetation in the region and would not represent a significant loss in the area. The Proposed Action will also follow the Revegetation and Tree Care Standards provided in the Final Reservoir Plans. Resident wildlife could be temporarily displaced due to the increased activity and noise during construction activities. Displacement of common wildlife species is not considered significant due to their abundance and their ability to seek similar habitat in the surrounding area.

The Proposed Action is within habitat of the federally threatened Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*). The Proposed Action is consistent with the provisions of USAFA's Conservation Agreement with the U.S. Fish and Wildlife Service (USFWS), allowing for repair and maintenance of existing infrastructure. Cumulative habitat disturbance from the Proposed Action and any other ongoing projects during the same calendar year will not exceed 12 acres without prior consultation with USFWS. Potential impacts to nesting great blue heron (*Ardea herodias*) and other bird species protected under the Migratory Bird Treaty Act would be avoided to the maximum extent possible. Construction activities would be limited to non-breeding season (September-January) within areas identified as having potential for nesting great blue heron. If construction activities occur during the general avian breeding season (February-August) within areas known to have historically supported breeding great blue heron or other protected migratory bird species, a pre-construction nesting bird survey would be conducted to identify active nests. If active nests are identified, an avoidance buffer (per regulatory guidance and/or discretion of monitoring biologist) would be established and the nest would be monitored until the juvenile birds have fledged. No significant impacts to threatened and endangered species are anticipated.

In support of dam repair activities, the water level in Non-Potable Reservoir #1 will be lowered below the level of the dam excavation and a temporary cofferdam installed. The reservoir will be refilled after completion of dam repair activities resulting in no long term impacts to jurisdictional waters/wetlands. A jurisdictional wetland survey for Non-Potable Reservoir #1 classified the reservoir as open water; the reservoir does not meet the soils, vegetation, or hydrology criteria to be delineated as a jurisdictional

wetland. Lehman's Run, which enters the western end of the reservoir, has been classified as an intermittent streambed wetland and the small drainage at the toe of the dam has been classified as an emergent wetland. Based on stipulations within the dam design analysis report, the Proposed Action will require permitting under Section 404 of the Clean Water Act (CWA). Measures identified as part of the Section 404 permit will be implemented in order to minimize impacts to jurisdictional waters/wetlands. Therefore, no significant impacts to sensitive habitats are anticipated.

Based on the findings of the 2015 cultural resources survey and inventory of the project area, proposed construction activities will not affect prehistoric or historic archaeological resources because no resources eligible for listing on the National Register were identified. Non-Potable Reservoir #1 (Facility 10488) was evaluated for eligibility for listing on the National Register in 2013 and 2015 and found to be a non-contributing element to the USAFA Master Plan Historic District. Therefore, no significant impacts to historic buildings and structures are anticipated. In support of the USAFA Integrated Cultural Resources Management Plan, the Air Force has conducted consultations with representatives of Native American groups as required under American Indian Religious Freedom Act. Based on consultation with representatives of Native American groups, no traditional cultural resources, sacred areas, or traditional use areas have been identified in the vicinity of Non-Potable Reservoir #1.

Cumulative Impacts

The EA reviewed cumulative impacts that could result from the incremental impact of proposed dam repair activities when added to other past, present, or reasonably foreseeable future action. No significant cumulative impacts would be expected.

Mitigations

The EA concluded that no significant impacts to the environment will result from the construction and operation of the Proposed Action for most resources; therefore, no mitigation measures will be required.

Conclusion

Based on the provisions set forth in the Proposed Action, proposed activities were found to comply with the criteria or standards of environmental quality and coordinated with the appropriate federal, State, and local agencies. The attached EA and a draft of this FONSI/FONPA were made available to the public on 17 November 2014 for a 30-day review period.

Findings

Finding of No Practicable Alternative. Reasonable alternatives were considered; however, during a PMP event there will be no other practicable means of directing flows from the auxiliary spillway to Monument Creek regardless of proposed dam repair activities. Due to the presence of wetlands at the project site, work within the reservoir will require permitting under Section 404 of the CWA. Measures identified as part of the Section 404 permit will be implemented to minimize impacts to jurisdictional waters/wetlands. Additionally, because the dam and Non-Potable Reservoir #1 are within the flood zone, there is no practicable alternative to implementing repair activities outside of the flood zone. Pursuant to Executive Orders 11988 and 11990 and the authority delegated by Secretary of the Air Force Order 791.11, and taking the above information into account, I find that there is no practicable alternative to this action and that the Proposed Action includes all practicable measures to minimize harm to the environment. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the U.S. Air Force.

Finding of No Significant Impact. After review of the EA prepared in accordance with the requirements of the NEPA; CEQ regulations, and 32 CFR Part 989, Environmental Impact Analysis Process, and which is hereby incorporated by reference, I have determined that the Proposed Action would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement (EIS) will not be prepared. This decision has been made after taking into account all submitted information, and considering a full range of practical alternatives that would meet project requirements and are within the legal authority of the U.S. Air Force. The signing of this FONSI/FONPA completes the environmental impact analysis process.



TROY E. DUNN, Col, USAF
Commander, 10th Air Base Wing

1 SEP 15

Date

Attachment:

Final Environmental Assessment, Repair of the Dam at Non-Potable Reservoir #1, U.S. Air Force Academy, Colorado

COVER SHEET

ENVIRONMENTAL ASSESSMENT REPAIR OF THE DAM AT NON-POTABLE RESERVOIR #1 U.S. AIR FORCE ACADEMY, COLORADO

- a. Lead Agency: U.S. Air Force
- b. Proposed Action: Repair of the Dam at Non-Potable Reservoir #1, U.S. Air Force Academy, Colorado.
- c. Written comments and inquiries regarding this document should be directed to: Ms. Elizabeth Wade, 10 CES/CEAN, 8120 Edgerton Drive, U.S. Air Force Academy, CO 80840.
- d. Designation: Environmental Assessment (EA)
- e. Abstract: This EA evaluates the potential environmental impacts associated with repair of the dam at Non-Potable Reservoir #1 on the U.S. Air Force Academy.

The Proposed Action involves the repair of the dam at Non-Potable Reservoir #1 to replace damaged piping and installation of an auxiliary spillway.

The Upgrade Dam Alternative would involve upgrading the dam at Non-Potable Reservoir #1 using a roller compacted concrete overlay, which would allow for the dam to overtop.

Under the No-Action Alternative, the proposed dam repair activities would not be implemented.

All environmental resources were analyzed in this EA; however, only the environmental resources potentially affected by the Proposed Action and alternatives were analyzed in depth, including land use/aesthetics, transportation (rail), hazardous materials management, hazardous waste management, asbestos-containing material, geology and soils, water resources, air quality, biological resources, and cultural resources.

Based on the analysis of the Proposed Action and alternatives, the U.S. Air Force has determined that with incorporation of best management practices, proposed dam repair activities would result in no significant impacts. However, there is a Probable Maximum Precipitation (PMP) issue that could result in impacts to rail transportation. The dam and associated pump house would survive a PMP event; however, the nearby Union Pacific Railroad train tracks would likely be impacted. Dams and spillways are designed for the Inflow Design Flood, which for Non-Potable Reservoir #1 is 45 percent of the PMP. During a PMP event, the potential impact to rail transportation would occur regardless of dam repair activities. As a result, a Finding of No Significant Impact/Finding of No Practicable Alternative has been prepared as no practicable alternative exists to eliminate the PMP hazard.

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LIST OF ACRONYMS/ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
AFI	Air Force Instruction
AIRFA	American Indian Religious Freedom Act
AOG	Association of Graduates
APE	Area of Potential Effect
CAA	Clean Air Act
CCR	Colorado Code of Regulations
CDNR	Colorado Department of Natural Resources
CDPHE	Colorado Department of Public Health and the Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CPSC	Consumer Product Safety Commission
CPW	Colorado Department of Parks and Wildlife
CWA	Clean Water Act
dBA	decibel A-weighted
DOD	Department of Defense
DWR	Division of Water Resources
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
gpd	gallons per day
GWP	global warming potential
HAP	Hazardous Air Pollutant
HDPE	high density polyethylene
HFC	hydrofluorocarbon
I-25	Interstate 25
ICRMP	Integrated Cultural Resources Management Plan
IDF	Inflow Design Flood
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPAC	Information, Planning, and Conservation System
LBP	lead-based paint
LF	linear feet

LIST OF ACRONYMS/ABBREVIATIONS (Continued)

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves
National Register	National Register of Historic Places
NCOA	Non-Commissioned Officer Academy
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHLD	National Historic Landmark district
NHPA	National Historic Preservation Act
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
pCi/L	picocuries per liter
PCB	polychlorinated biphenyl
PFC	perfluorocarbon
P.L.	Public Law
$\text{PM}_{2.5}$	particulate equal to or less than 2.5 microns in diameter
PM_{10}	particulate equal to or less than 10 microns in diameter
PMJM	Preble's meadow jumping mouse
PMP	Probable Maximum Precipitation
POL	petroleum, oils, and lubricants
ppm	parts per million
RCC	roller compacted concrete
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
SEO	State Engineer's Office
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USAFA	U.S. Air Force Academy
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WWTP	wastewater treatment plant

1.0 PURPOSE OF AND NEED FOR ACTION

This environmental assessment (EA) evaluates the potential environmental impacts associated with the proposed repair of the dam at Non-Potable Reservoir #1 at the U.S. Air Force Academy (USAFA), Colorado.

This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321, et seq.); the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and Air Force policy and procedures (32 CFR Part 989).

1.1 PURPOSE AND NEED

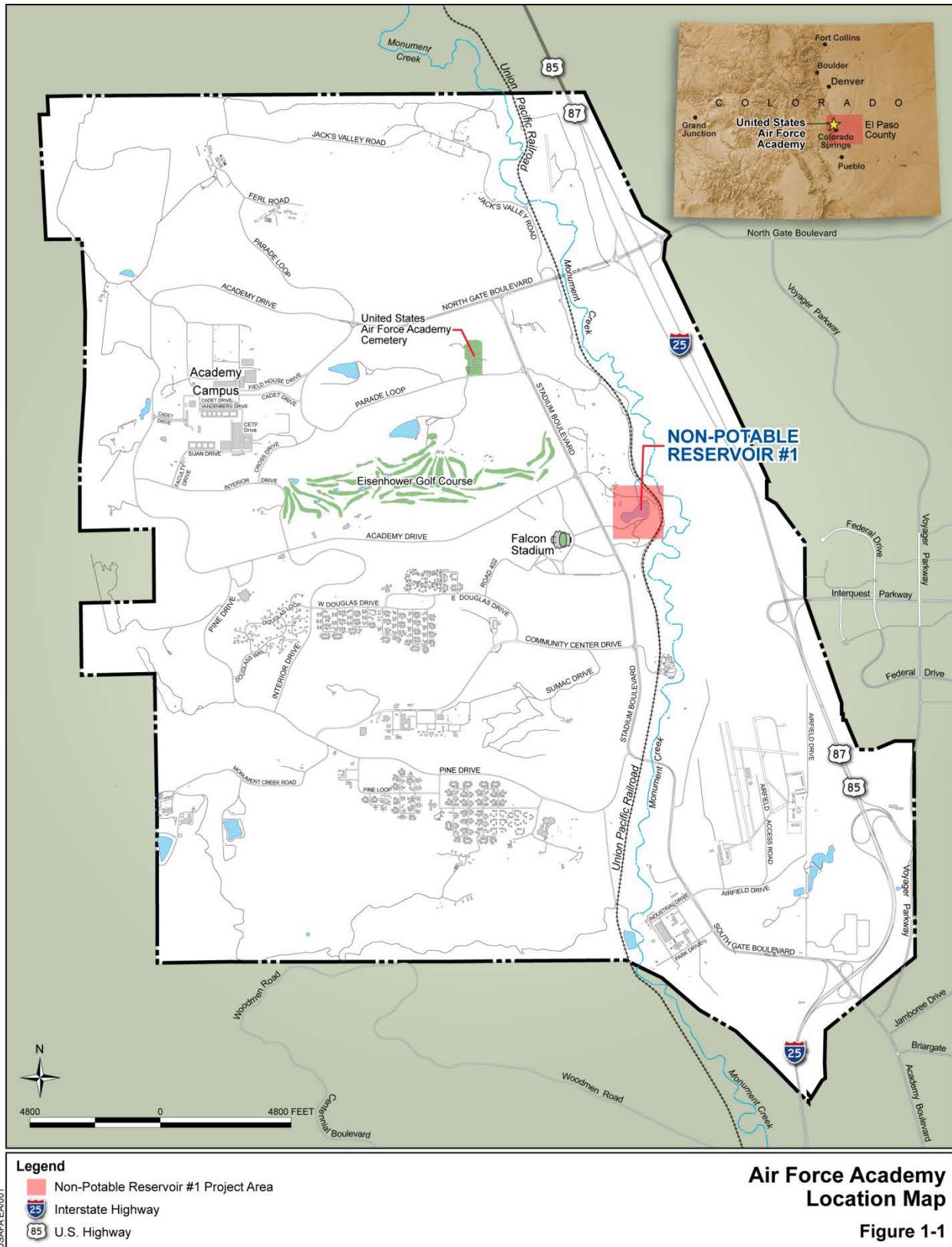
The purpose of the action is to repair the dam at Non-Potable Reservoir #1 to minimize the potential for catastrophic failure. The intake and outlet pipes at the dam are in excess of 50 years old and its downstream embankment slopes are excessively steep and potentially unstable. Because of the over-steepened downstream slope and the age of the intake and outlet pipes through the embankment, the dam is deemed to have exceeded its useful life and requires repair. The need for action is due to the potential damage to downstream infrastructure (i.e., Union Pacific Railroad), the presence of seepage, the over-steepened downstream slope, and the anticipated poor condition of the embankment piping. The hazard classification of dams is used to determine the appropriate Inflow Design Flood (IDF) to analyze the capacity of the reservoir spillway. To address the IDF peak outflow for Non-Potable Reservoir #1 (8,000 cubic feet per second), an auxiliary spillway would also be constructed to increase the current spillway capacity by 400 percent.

The hazard classification of Non-Potable Reservoir #1 was evaluated in accordance with the Colorado Division of Water Resources (DWR) Guidelines for Hazard Classification (Colorado Department of Natural Resources [CDNR], 2010), and Rules and Regulations for Dam Safety and Dam Construction (CDNR, 2007). This hazard classification was completed to support the design of dam modifications. The USAFA desires to follow DWR dam safety criteria based on the intent of a Memorandum of Understanding between the USAFA and the Colorado State Engineer's Office (SEO) entered into and dated May 4, 2012. The U.S. Army Corps of Engineers (USACE) HEC-RAS 4.1.0 computer program was used to complete the sunny day dam failure analysis for Non-Potable Reservoir #1 to confirm its hazard classification. Based on the hazard classification analysis and utilizing SEO criteria, the results indicate that Non-Potable Reservoir #1 does not pose a significant threat to loss of human life, but does pose the potential for significant downstream property damage, as a result of a sunny day failure. Therefore, the dam has been classified as a "Significant Hazard Dam" (URS, 2014a).

This EA provides the Air Force decision maker and the public with the information required to understand the potential environmental consequences of repairing the dam at Non-Potable Reservoir #1 at the USAFA.

1.2 LOCATION OF THE PROPOSED ACTION

Non-Potable Reservoir #1 is located within the USAFA in El Paso County, Colorado, approximately ½ mile east of Falcon Stadium (Figure 1-1). There is an access road to the dam from Stadium Boulevard east on Husted Road to the toe of the embankment and pump station building. Approximately 400 feet downstream of the dam is the Union Pacific Railroad.



The dam consists of an earthen embankment, about 1,250 feet long and 45 feet high (Figure 1-2). The original construction drawings illustrate upstream and downstream slopes of about 3:1 (horizontal: vertical). On the downstream face, there are areas of steeper slopes (possibly associated with past slope instabilities); currently, the slope appears to be stable. Extending under the dam footprint from the downstream toe a distance equal to about 1/3 of the embankment width, a filter drain blanket about 24 inches in thickness is present. Located within the upstream face is a 10-foot-diameter by about 49-foot-tall concrete control tower. Two intake lines (12-inch and 18-inch corrugated metal pipe, upper and lower intakes, respectively) lead into the outlet control tower, with an 18-inch-diameter steel outlet line connecting the control tower with the outlet structure and pump house. The intake and outlet pipes are in excess of 50 years old and have reached or exceeded their normal service life. The dam impounds a pool of about 125 acre-feet (maximum) with a surface area of about 9.7 acres and a maximum water depth of about 35 feet. There is a concrete lined service spillway along the north side of the structure. To allow monitoring of water levels within the embankment, six open standpipe piezometers are present, two on the upstream face and four on the downstream face. The reservoir pool bottom may be lined with a thin soil cement liner. However, calculations indicate seepage losses from the toe of the dam are on the order of 75,000 gallons per day (gpd) (URS, 2014a).

The bulk of the stored water within Non-Potable Reservoir #1 is from several non-potable wells (1A, 1B, 3A, 5A, and 9A) cumulatively pumping approximately 1.5 million gpd during the irrigation season with an additional 0.5 million gpd of effluent from the wastewater treatment plant (WWTP) throughout the year. The non-potable water is stored for irrigation uses throughout the USAFA.

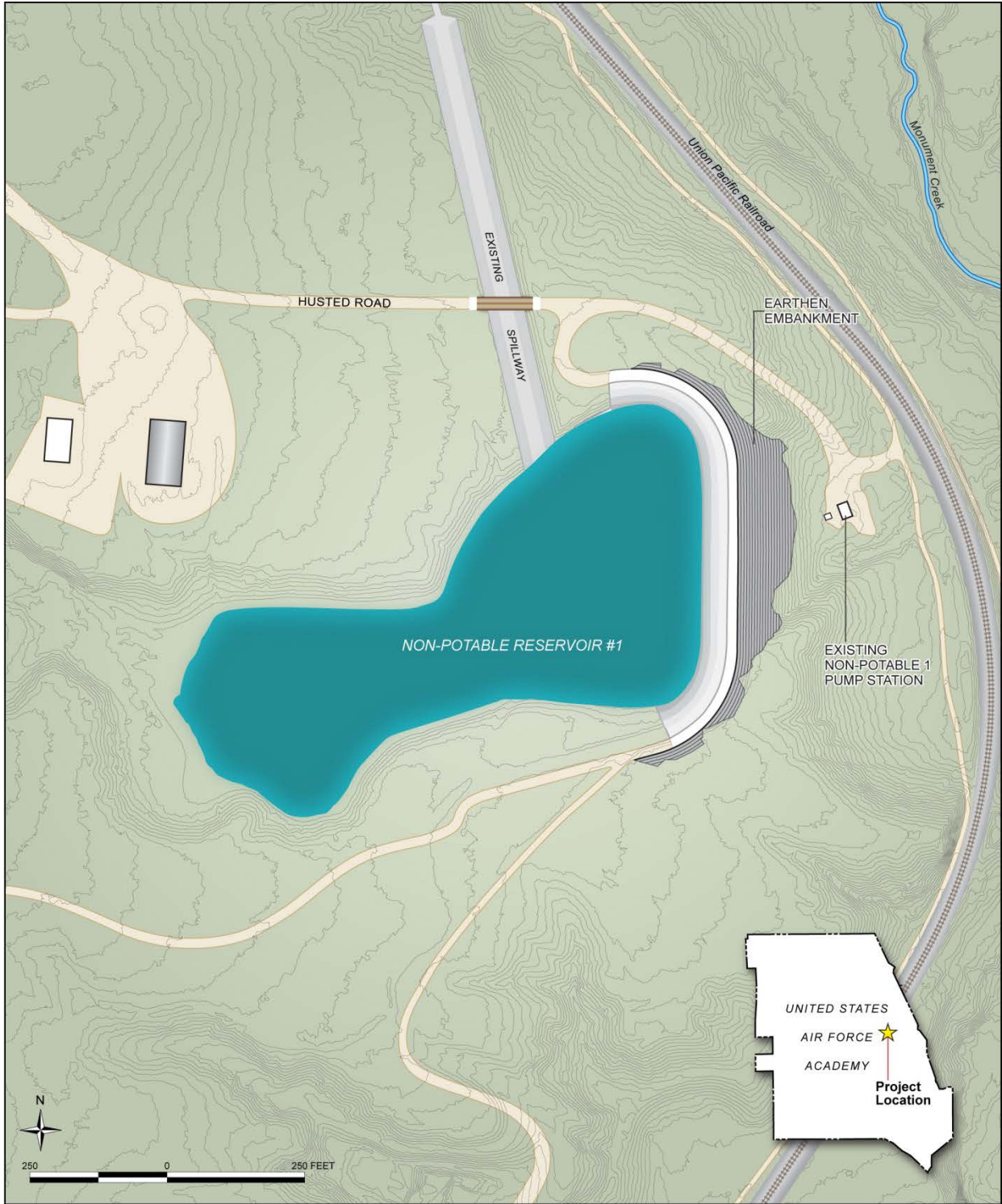
1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Consistent with the CEQ regulations, the scope of analysis presented in this EA is defined by the potential range of environmental impacts that would result from implementation of the Proposed Action or alternatives. This document is “issue-driven,” in that it concentrates on those resources that may be affected by implementation of the Proposed Action or alternatives.

Resources that have a potential for impact were considered in detail in order to determine if implementing the Proposed Action or alternatives would have a significant impact on environmental resources. The resources analyzed in detail include land use/aesthetics, transportation (rail), hazardous materials management, hazardous waste management, asbestos-containing material (ACM), geology and soils, water resources, air quality, biological resources, and cultural resources. The affected environment and the potential environmental consequences relative to these resources are described in Chapter 3.0, Affected Environment and Chapter 4.0, Environmental Consequences.

Initial analysis of the proposed repair activity indicates that construction activities would not result in impacts to socioeconomics, environmental justice, utilities, transportation (roadway), Environmental Restoration Program (ERP) sites, storage tanks, pesticide usage, polychlorinated biphenyls (PCBs), lead-based paint (LBP), radon, medical/biohazardous waste, ordnance, radioactive materials, and noise. The reasons for not addressing these resources in detail are briefly discussed in the following paragraphs.

Socioeconomics. The use of local construction workers would produce increases in local sales volumes, payroll taxes, and the purchases of goods and services resulting in a beneficial increase in the local economy. The Proposed Action is not anticipated to increase the number of persons employed at the USAFA; therefore, no significant effects on socioeconomics would be expected.



Legend

**Non-Potable Water Reservoir #1
Site Map
Figure 1-2**

USAFA EA/002

Environmental Justice. Executive Order (EO) 12898, *Environmental Justice*, was issued by the President on February 11, 1994. Objectives of the EO, as it pertains to this EA, include development of federal agency implementation strategies, and identification of low-income and minority populations potentially affected because of proposed federal actions. In addition to environmental justice issues are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children. Potential environmental impacts identified for resource areas evaluated in this EA would occur primarily on the USAFA (air quality impacts are regional); off-installation populations would not be affected. Based on these findings, disproportionate impacts to low-income, minority, and child populations are not expected and are not analyzed further in this EA.

Utilities. The electrical, natural gas, water, and sanitary sewer requirements of the Proposed Action and alternatives would be similar to those of the existing facility. No new personnel would be required for the Proposed Action or alternatives; therefore, no increase in utility usage or sanitary and solid waste generation would occur. Utility connections that run alongside the existing dam would require deeper burial; however, no additional utility lines would be required and no interruption of service would occur. The 16-inch by-pass line would receive water from the non-potable water wells and the WWTP and convey that water to the pump station to be used within the non-potable system; no change to the WWTP National Pollutant Discharge Elimination System (NPDES) permit would occur. Impacts to USAFA utility systems are not expected and are not analyzed further in this EA.

Transportation (roadway). There would be no change in the number of dam operations personnel from proposed repair activities; therefore, no increase in operations traffic would occur. Construction-related traffic would use the South Gate entrance to access the project location. A short-term increase in construction-related traffic (construction employee and construction equipment) during dam repair activities is anticipated; however, given the scope of the repair activity, no change in the traffic level of service on roadways within the USAFA is anticipated. The construction-related traffic would be localized and would be temporary, lasting as long as the project activity. Therefore, potential impacts to roadway transportation are not anticipated and are not analyzed further in this EA.

Potential effects to rail transportation are addressed in Chapter 4.0, Environmental Consequences.

Environmental Restoration Program Sites. No ERP sites are located within or adjacent to Non-Potable Reservoir #1; therefore, impacts from ERP sites are not expected and are not analyzed further in this EA.

Storage Tanks. No storage tanks (for storing petroleum or hazardous substances) are currently associated with Non-Potable Reservoir #1. The Proposed Action and alternatives do not include installation of storage tanks. Therefore, impacts from storage tanks are not anticipated and are not analyzed further in this EA.

Pesticide Usage. Pesticide applications would continue to be conducted in accordance with applicable laws and label directions; therefore, impacts from pesticide usage are not expected and are not analyzed further in this EA.

Polychlorinated Biphenyls. No transformers, capacitors, or switches containing PCBs are present at Non-Potable Reservoir #1; therefore, impacts from PCBs are not expected and are not analyzed further in this EA.

Lead-Based Paint. Human exposure to lead has been determined to be an adverse health risk by agencies such as the Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (EPA). Sources of exposure to lead are through contact with dust, soil, and paint. In 1973, the Consumer Product Safety Commission (CPSC) established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law [P.L.] 101-608, as implemented by 16 CFR Part 1303), the CPSC lowered the allowable lead level in paint to 0.06 percent. The Act also restricted the use of LBP in nonindustrial facilities. Because no painted surfaces would be disturbed during dam repair activities, impacts from LBP are not expected and are not analyzed further in this EA.

Radon. Radon is a colorless, odorless, and radioactive gas found naturally in some soils and rocks. It is formed from the decay of naturally occurring radioactive materials such as uranium and thorium. The U.S. EPA has evaluated the radon potential in the United States and has assigned each of the U.S. counties into one of three zones based on radon potential: Zone 1 – Highest Potential (greater than 4 picocuries per liter [pCi/l]), Zone 2 – Moderate Potential (from 2 to 4 pCi/l), and Zone 3 – Low Potential (less than 2 pCi/l). Each zone designation reflects the average short-term radon measurement that can be expected to be measured in a building without the implementation of radon control methods. El Paso County has been designated as being in Zone 1 (U.S. EPA, 2014). Because dam repair activities do not involve permanently occupied structures, impacts from radon are not expected and are not analyzed further in this EA.

Medical/Biohazardous Waste. Medical/biohazardous waste was not generated at Non-Potable Reservoir #1 and none would be generated under the Proposed Action or alternatives. Therefore, impacts from medical/biohazardous waste are not expected and are not analyzed further in this EA.

Ordnance. Ordnance has not been stored, used, or disposed at Non-Potable Reservoir #1. The Proposed Action and alternatives would not require the use of ordnance. Therefore, impacts from ordnance are not expected and are not analyzed further in this EA.

Radioactive Materials. Radioactive materials have not been stored, used, or disposed at Non-Potable Reservoir #1. The Proposed Action and alternatives would not require the use of radioactive materials. Therefore, impacts from radioactive materials are not expected and are not analyzed further in this EA.

Noise. Short-term noise generated from proposed repair activities would be isolated to the Non-Potable Reservoir #1 area, which is situated within a rural area of the USAFA away from any noise-sensitive receptors. The nearest noise-sensitive receptor is Peregrine Pines Family Camp, approximately 0.4 mile (2,100 feet) north of the project site. Noise generated by construction equipment could also produce localized noise events of 100 decibels (dBA) or higher, with noise levels decreasing with distance from the project site. Construction vehicles would be at the site for up to 9 months, with normal work hours from 7:00 a.m. to 5:00 p.m. Typical noise levels at construction sites have been measured from 85-88 dBA at a distance of 50 feet. This would attenuate to about 78 to 82 dBA at 100 feet, and 72 to 76 dBA at 200 feet, and below 65 dBA at 800 feet. Operations at Non-Potable Reservoir #1 would not generate elevated noise levels. Therefore, impacts from noise are not expected and are not analyzed further in this EA.

1.4 FEDERAL, STATE, AND LOCAL PERMITS AND LICENSES

The contractor responsible for conducting repair activities would obtain required federal, State, and local permits. The contractor would cooperate with the Air Force to ensure compliance with applicable Air Force, federal, State, and local regulations, permits, and/or requirements.

Prior to initiation of construction activities, the Air Force would obtain any required permits, including a Clean Water Act (CWA) Section 404 permit issued by the USACE and a CWA Section 401 certification issued by the Regional Water Quality Control Board.

Construction activities are generally exempt from air permitting process. However, earthwork for purposes of land development that exceed 25 acres in size and 6 months in duration would require a construction air permit, including submission of an Air Pollutant Emissions Notice for fugitive dust emissions associated with land disturbance.

Construction activities would be conducted in accordance with the U.S. EPA NPDES General Permit and associated Storm Water Pollution Prevention Plan (SWPPP). The NPDES permit, together with the required SWPPP, would outline construction site management practices designed to protect the quality of the surface water, ground water, and natural environment through which they flow.

1.5 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING, NATIVE AMERICAN TRIBAL CONSULTATION, AND PUBLIC INVOLVEMENT

IICEP. The USAFA, as the responsible agency implemented the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process. Through the IICEP process, the USAFA notifies relevant federal, State, and local agencies of the Proposed Action and alternatives and provides them with sufficient time to make known their environmental concerns specific to the action. The IICEP process also provides the USAFA the opportunity to cooperate with and consider State and local views in implementing the federal proposal. IICEP materials related to this action are included in Appendix A.

Native American Tribal Consultation. EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. In accordance with EO 13175 and Air Force Instruction (AFI) 90-2002, *Air Force Interactions with Federally-Recognized Tribes*, federally recognized tribes that are affiliated historically with the USAFA geographic region are invited to consult on proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The USAFA is conducting ongoing consultation with 16 of the 29 Native American tribes with cultural affiliation to USAFA lands. These tribes include the Cheyenne & Arapaho Tribes of Oklahoma, Comanche Nation of Oklahoma, Eastern Shoshone Tribe (Wind River Reservation), Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Pueblo of Taos, Rosebud Sioux Tribe, Southern Ute Indian Tribe, Ute Indian Tribe (Uintah & Ouray Reservation), Ute Mountain Ute Tribe, and the Zuni Tribe of the Zuni Reservation. Native American tribal government coordination materials for this EA are included in Appendix A.

Public Involvement. A Notice of Availability for the draft EA and draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) was published in the *Colorado Springs Gazette* on December 22 and December 28, 2014 announcing that these materials were made available to the public for a 30-day review period. The Draft EA was circulated to interested public and government agencies for a 30-day review and comment period (December 22 to January 20). Comments were reviewed and addressed, when applicable, and have been included in their entirety in this document (Appendix D). Comments simply stating facts or opinions, although appreciated, did not require specific response.

Changes from the Draft EA to the Final EA

The text of this EA has been revised, when appropriate, to reflect concerns expressed in public comments. The major comments received on the Draft EA were:

- The project appears to have a potential to have a significant effect on historic resources. The Area of Potential Effect (APE) should be further defined, the eligibility determination for the reservoir still needs to be confirmed, the railroad segment is a known resource that could be affected, and there is a potential to affect undiscovered resources.

Based on more recent studies or comments from the public, the following sections of the EA have been updated or revised:

- Section 3.4.5 has been updated to incorporate a map of the APE.
- Section 3.4.5 has been updated to clarify the eligibility determination of the dam at Non-Potable Reservoir #1.
- Sections 3.4.5 and 4.4.5 have been revised to incorporate results of the 2015 archaeological survey and inventory of the APE.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter describes the Proposed Action and alternatives for the repair of the dam at Non-Potable Reservoir #1 at the USAFA, Colorado, as well as the No-Action Alternative. The potential environmental impacts of the Proposed Action and alternatives are summarized in Table 2-1 at the end of this chapter.

The **Proposed Action** involves the repair of the dam at Non-Potable Reservoir #1 to replace damaged piping and install an auxiliary spillway.

The **Upgrade Dam Alternative** would involve upgrade of the dam at Non-Potable Reservoir #1 using a roller compacted concrete (RCC) overlay, which would allow for the dam to overtop.

The **No-Action Alternative** would involve no repair of the dam at Non-Potable Reservoir #1. Approximately 75,000 gpd of water would continue to seep from the reservoir.

2.2 SELECTION STANDARDS

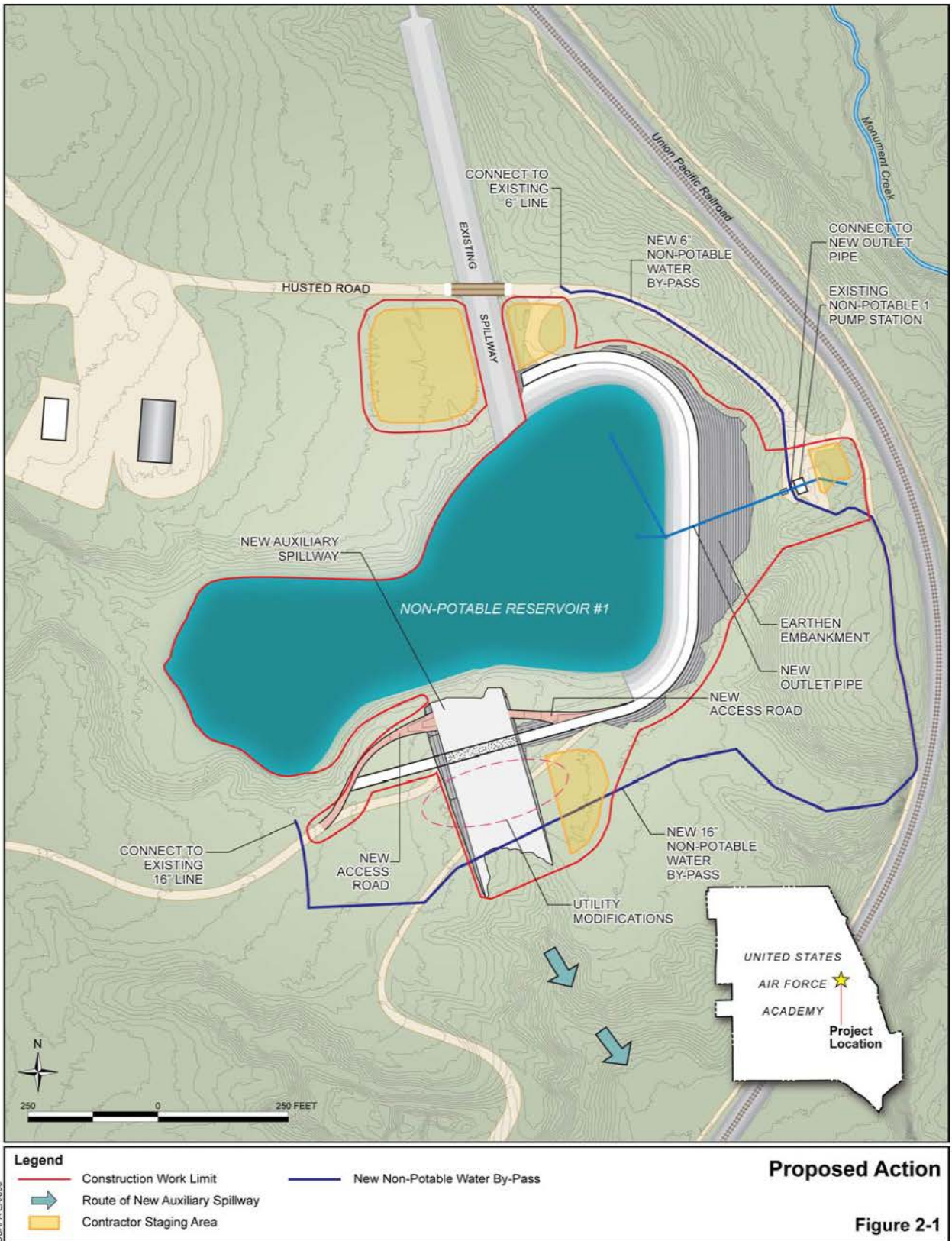
Screening is a process that evaluates an alternative's ability to fulfill the action's purpose and need while meeting the USAFA's mission development standards. The purpose and need statement is a declaration of the broad goals and objectives of the dam repair project. Selection standards are based on the purpose and need statement and are used to develop and narrow the range of alternatives.

Selection standards for this project are as follows:

- Repair existing dam deficiencies and meet current rules and regulations for dam safety and dam construction set forth by the Colorado State Engineer
- Maintain the existing maximum water surface elevation and storage capacity of the reservoir
- Protect the dam from breaching
- Minimize effects to Preble's meadow jumping mouse (PMJM) habitat and great blue heron nesting
- Minimize tree removal and damage effects on natural resources, including Monument Creek.

2.3 DESCRIPTION OF THE PROPOSED ACTION

Under the Proposed Action, the central portion of the existing dam would be excavated with the removed embankment either being transported from the site or stockpiled for reuse, depending upon its condition. Approximately 7,600 cubic yards of material would be excavated from the dam. Material excavated from the dam would be stockpiled either within the drained reservoir area and/or at the contractor staging areas (Figure 2-1). A temporary coffer dam would be installed within the reservoir to separate the construction area on the dam from any water that may flow into the reservoir. Contractor staging areas would be established in existing cleared areas adjacent to the reservoir and located outside the PMJM Conservation Zone to the extent possible. Trees in proximity to staging areas would be protected with construction fencing to restrict vehicular access and limit soil compaction. The depth of the excavation at the dam would be of sufficient extent to expose the existing piping that passes through it. The existing piping



would be removed and replaced. The liner of the reservoir would be repaired to address seepage losses. Clearing and grubbing of trees would be minimized to the extent possible within the dam and excavation area, and trimming of vegetation within the existing soil cement liner would occur. Once the piping is replaced and the liner is repaired, the excavation would be backfilled. The repaired dam would be built of compacted soil and would be protected by riprap on both the upstream and downstream faces. The dam would be constructed with sufficient strength to support maintenance vehicles.

The upstream face of the dam would be reconstructed at a slope of 3:1 and the downstream face would be constructed at a slope of 2.5:1. The downstream portion of the dam would have a toe drain that consists of trenched horizontal collector pipes surrounded by permeable material, traveling the length of the repaired embankment. The collector pipes would be directed into an outflow pipe, which discharges into the downstream channel. The outlet works would be in the center of the dam and would discharge into a riprap plunge pool before flowing into Monument Creek.

In accordance with SEO findings, the potential to breach the reservoir during a large storm event would be reduced by the installation of an auxiliary spillway. The proposed auxiliary spillway would be constructed within an area south of the existing dam (see Figure 2-1). The extent of construction work in this area would be limited to an area approximately 200 feet wide and 400 feet in length. The auxiliary spillway crest elevation would be approximately 5 feet higher than the existing emergency spillway crest to limit the frequency that the auxiliary spillway would operate. The spillway would consist of a trapezoidal concrete channel that would discharge into a riprapped plunge pool with continuing flow within the earth-lined drainage channel. The spillway would discharge southeast of the dam. The flow would then pass over the railroad tracks and enter into Monument Creek.

As Non-Potable Reservoir #1 is drained (i.e., as water within the reservoir is being used for irrigation), the non-potable water system would need to bypass the reservoir to continue servicing the remaining system (see Figure 2-1). Two by-pass pipes would be constructed to bypass Non-Potable Reservoir #1. The first pipe would be a 16-inch-high density polyethylene (HDPE) pipe that would tee into the existing pipe, near the discharge to Non-Potable Reservoir #1 from the WWTP and Wells 1A, 1B, 5A, and 9A. A valve would be installed on the discharge line to Non-Potable Reservoir #1 that would be closed while the by-pass is in operation. A valve would also be installed on the by-pass line so that the system can continue to discharge to Non-Potable Reservoir #1 when it is in operation. The other by-pass pipe would be a 6-inch HDPE pipe that would take water from Well 3A around Non-Potable Reservoir #1. The by-pass line would tee off the existing line; near the discharge to Non-Potable Reservoir #1 and similar to the 16-inch line, would have two valves, one to the Non-Potable Reservoir #1 discharge and one to the by-pass line. Total length of the by-pass lines would be approximately 3,000 feet. These pipes would discharge to Pump Station #1.

The existing pump station has a capacity of 1,400 gallons per minute at approximately 170 pounds per square inch. The capacity of the by-pass system would be about the same, or slightly higher, due to limitations with the pressure rating of the existing discharging piping. A by-pass overflow line with pressure relief valves would be installed, which would discharge to a tributary of Monument Creek during periods of excess flow to Non-Potable Reservoir #1.

The total area of disturbance associated with establishing staging areas, installing the non-potable by-pass line, repairing the dam, and constructing the auxiliary spillway is estimated to be 4.0 acres. The area proposed for repair actions would be fenced with snow fence or a similar visible barrier to prevent inadvertent impacts to PMJM habitat outside of the construction area. Earthwork for construction activities would be performed in accordance with an approved SWPPP. For analysis purposes, it is assumed that construction would be completed within a 9-month period.

The construction contractor would be required to transport and dispose any construction debris and hazardous waste (including non-regulated waste such as used oil) off site at approved or permitted facilities for that type of waste in accordance with federal, State, and local regulations. If a spill occurs during construction, it would be cleaned up by the contractor in accordance with the site construction management plan. If ACM or other hazardous materials are identified in areas proposed for construction and cannot be avoided, removal and disposal would be conducted by a certified remediation contractor in accordance with applicable federal, State, and local regulations.

Hazardous materials likely to be used on the property during construction activities as well as during non-potable water operations would include fuels; petroleum, oil, and lubricants (POL); adhesives; corrosives; paints; and solvents. The specific chemical compositions and exact use rates are not known. Hazardous wastes likely to be generated would include used POL and oily rags. Hazardous materials and hazardous wastes would be managed in accordance with applicable regulations.

2.3.1 Employment and Population

The Proposed Action would not generate any new jobs. Construction activities would create temporary construction-related jobs. There would be no on-site population.

2.3.2 Transportation

Stadium Boulevard would be the primary access route to Husted Road and existing dirt access roads to the dam at Non-Potable Reservoir #1 as well as staging areas for construction crews and equipment.

2.3.3 Utilities

No change in utility usage at the dam is anticipated; however, several existing utility lines would require relocation (buried deeper) on the south side of the reservoir to allow for construction of the auxiliary spillway structure. These utilities include:

- a 6-inch-diameter asbestos cement non-potable waterline
- a 10-inch-diameter steel gas distribution main
- three underground electrical lines, and
- a communications (fiber optic) line.

2.4 ALTERNATIVES TO THE PROPOSED ACTION

2.4.1 Upgrade Dam Alternative

Under the Upgrade Dam Alternative, the same repair activities as discussed under the Proposed Action would occur (i.e., repair of piping and installation of by-pass line); however, the existing earthen embankment would be modified to allow the dam to pass the IDF and allow for the dam to overtop. Modification to the existing earthen embankment would be accomplished using a RCC overlay. This overlay would essentially encase the earthen dam in concrete. There would be concerns with settlement of the newly placed embankment materials potentially resulting in air pockets beneath the RCC overlay, weakening the dam. The liner of the reservoir would also be repaired to address seepage losses. During large storm events, this alternative would allow discharge of flows over the dam to the toe where there is currently no adequate drainage infrastructure to convey these flows across the Union Pacific Railroad. Because the dam would be designed to allow water to overtop the dam and pass the IDF, construction of an auxiliary spillway would not occur.

The total area of disturbance associated with establishing staging areas, installing the non-potable by-pass line, and repairing the dam is estimated to be 2.0 acres. Earthwork for construction activities would be performed in accordance with an approved SWPPP. For analysis purposes, it is assumed that construction would be completed within a 9-month period.

The construction contractor would be required to transport and dispose any construction debris and hazardous waste (including non-regulated waste such as used oil) off site at approved or permitted facilities for that type of waste in accordance with federal, State, and local regulations. If a spill occurs during construction, it would be cleaned up by the contractor in accordance with the site construction management plan. If ACM or other hazardous materials are identified in areas proposed for construction and cannot be avoided, removal and disposal would be conducted by a certified remediation contractor in accordance with applicable federal, State, and local regulations.

Hazardous materials likely to be used on the property during construction activities as well as during non-potable water operations would include fuels, POL, adhesives, corrosives, paints, and solvents. The specific chemical compositions and exact use rates are not known. Hazardous wastes likely to be generated would include used POL and oily rags. Hazardous materials and hazardous wastes would be managed in accordance with applicable regulations.

2.4.1.1 *Employment and Population.*

The Upgrade Dam Alternative would not generate any new jobs. Construction activities would create temporary construction-related jobs. There would be no on-site population.

2.4.1.2 *Transportation.*

Stadium Boulevard would be the primary access route to Husted Road and existing dirt access roads to the dam at Non-Potable Reservoir #1 as well as staging areas for construction crews and equipment.

2.4.1.3 *Utilities.*

No change in utility usage at the dam is anticipated; utility lines would not require relocation as construction of an auxiliary spillway structure would not occur.

2.4.2 *No-Action Alternative*

Under the No-Action Alternative, the Air Force would not repair the dam at Non-Potable Reservoir #1. Approximately 75,000 gallons of water per day would continue to seep from the reservoir. Due to the potential for damage to downstream infrastructure, the presence of seepage, the over-steepened downstream slopes, and anticipated poor condition of the embankment piping, it is desired to repair this structure to minimize the potential for catastrophic failure. The Air Force would be in violation of DWR Dam Safety and Dam Construction Rule 6 – Requirements for Alteration, Modification, or Repair of an Existing Dam. The No-Action Alternative would not satisfy the purpose and need for this project; however, it is included in the environmental analysis to provide a baseline for comparison with the alternatives.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

A brief description of alternatives that were considered but eliminated from further analysis is provided below.

2.5.1 Lehman Run By-Pass

This alternative would reroute Lehman Run upstream of Non-Potable Reservoir #1 so that the reservoir would be off channel storage (i.e., no longer receive water from Lehman Run) and the IDF would be reduced. Rerouting Lehman Run around Non-Potable Reservoir #1 would extend it approximately 1 mile or more upstream. Due to the length and scope of these improvements, and the construction costs, potential environmental impacts would likely be significant. Due to the potential environmental impacts, this alternative was considered impractical given other available options (URS, 2013).

2.5.2 Remove and Rebuild the Dam with Upgrading Existing Spillway

The dam would be constructed the same as the Proposed Action as stated in Section 2.3; however, it would include expanding the existing spillway and not constructing a new auxiliary spillway. The current spillway consists of a 510-linear foot (LF) concrete-lined channel followed by a 211-LF unlined channel, more than 350 LF of grouted riprap channel, a concrete drop structure at a 66-degree bend, and triple box culverts under the railroad tracks. Due to the length and scope of these improvements, the construction costs and environmental impact would be significant; therefore, this alternative was considered impractical given other available options (URS, 2013).

2.5.3 Lower the Height of the Dam

As the dam now exists, the height is 45 feet (the difference between the natural ground surface elevation at the centerline of the dam and the emergency spillway elevation). A 45-foot-high dam falls into the "small dam" classification as defined by the State (URS, 2013). At the elevation of the current emergency spillway, the reservoir holds a storage volume of approximately 125 acre-feet with a 9.7-acre lake surface. The combination of a "small dam" and the presence of the railroad tracks resulted in the "Significant Hazard Dam" classification and the very large design storm event.

If the dam height is reduced to a total of 20 feet, the structure would fall into a "minor dam" classification. In that case, the IDF would be the 100-year design storm (the existing emergency spillway is designed for the IDF), even if the hazard classification remains "significant." This would circumvent the need for the auxiliary spillway and the impact on the railroad. However, the north side emergency spillway would need to be lowered approximately 20 feet, and the storage volume would be reduced to approximately 9.4 acre-feet (rather than the current 125 acre-feet) with a lake surface area of approximately 3.35 acres (rather than the current 9.7 acres). This reduced storage volume would have operational restrictions and restrict how much landscaping can be irrigated. Additionally, a regulatory requirement of dam repair actions includes maintaining the existing maximum water surface elevation and storage capacity of the reservoir. Therefore, this alternative was considered impractical given other available options (URS, 2013).

2.5.4 Apply for Waiver

This alternative would involve the Air Force receiving a waiver on spillway requirements for Non-Potable Reservoir #1. The Colorado State Dam Engineers office indicated that waivers for spillway requirements are typically only issued for off-channel dams and reservoirs with little or no drainage basin. Non-Potable Reservoir #1 has a tributary basin of approximately 4,000 acres or 6.25 square miles; with that much area potentially receiving rainfall and feeding the reservoir, the dam would always require adequate spillway capacity. As a result, a spillway waiver would not be permitted for Non-Potable Reservoir #1 (USAFA, 2014c). Therefore, this alternative was considered but eliminated from further evaluation.

2.6 OTHER FUTURE ACTIONS IN THE REGION

Cumulative impacts result from “the incremental impact of actions when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (Council on Environmental Quality, 1978).

Although several projects are planned at the USAFA, other than the privatization and closure projects listed below, these project locations are distant from Non-Potable Reservoir #1 and would not contribute to cumulative impacts (with the exception of possible increases in construction-related traffic on the USAFA). Identified projects include:

- proposed repair of Kettle Creek Dry Dam (east side of Interstate 25 [I-25])
- expansion of Association of Graduates (AOG) facility
- construction of a new golf course club house
- expansion of the cemetery
- demolition of the Non-Commissioned Officer Academy (NCOA) facility
- privatization of USAFA wet systems (potable water, non-potable water, and sewer).

Details of these proposed projects have not been fully developed (e.g., size of development, duration of construction, etc.); therefore, quantitative air quality analysis is not possible.

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS

Table 2-1 presents a comparative analysis of the Proposed Action and alternatives for each resource (i.e., land use/aesthetics, transportation (rail), hazardous materials management, hazardous waste management, ACM, geology and soils, water resources, air quality, biological resources, and cultural resources) evaluated in this EA. A detailed discussion of potential effects is presented in Chapter 4.0, Environmental Consequences.

Table 2-1. Summary of Influencing Factors and Environmental Impacts
Page 1 of 5

Resource	Proposed Action	Upgrade Dam Alternative	No-Action Alternative
Land Use/Aesthetics	<p>Impacts</p> <ul style="list-style-type: none"> No change in land use of the area Property would continue to be compatible with adjacent land uses No change in appearance of the dam Auxiliary spillway would change the visual appearance along the path to Monument Creek; however, trees in the area create a visual barrier and the spillway would not be noticeable <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Potential impacts to land use and aesthetics would be similar to those described under the Proposed Action The earthen dam would be encased in concrete resulting in a change to the aesthetic appearance of the dam; however, the isolated setting of the dam and the presence of trees create a visible barrier and the auxiliary spillway would not be constructed <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> No change to land use No change to aesthetic quality of the area <p>Mitigation Measures</p> <ul style="list-style-type: none"> None
Transportation (Rail)	<p>Impacts</p> <ul style="list-style-type: none"> The new auxiliary spillway that would be used during high flow events follows an existing drainage path that crosses the Union Pacific Railroad at grade Rail service would be interrupted during high flow events There is no other practicable means of directing flows from the auxiliary spillway to Monument Creek <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Rail service would be interrupted during high flow events There is no other practicable means of directing flows that overtop the dam to Monument Creek <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> No change to rail transportation; the nearby railroad would continue to be susceptible to damage should a major storm event occur <p>Mitigation Measures</p> <ul style="list-style-type: none"> None
Hazardous Materials Management	<p>Impacts</p> <ul style="list-style-type: none"> Hazardous materials would be stored, used, and disposed in accordance with applicable regulations during construction activities <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Potential impacts of hazardous materials management would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Small quantities of hazardous materials would continue to be used by the Air Force during maintenance activities in accordance with applicable regulations <p>Mitigation Measures</p> <ul style="list-style-type: none"> None

Table 2-1. Summary of Influencing Factors and Environmental Impacts
Page 2 of 5

Resource	Proposed Action	Upgrade Dam Alternative	No-Action Alternative
Hazardous Waste Management	<p>Impacts</p> <ul style="list-style-type: none"> Hazardous waste would be stored and disposed in accordance with applicable regulations during construction activities <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Potential impacts of hazardous waste management would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Small quantities of hazardous waste would continue to be generated by the Air Force during maintenance activities in accordance with applicable regulations <p>Mitigation Measures</p> <ul style="list-style-type: none"> None
Asbestos-Containing Material	<p>Impacts</p> <ul style="list-style-type: none"> ACM could be encountered during construction activities The construction contractor would be advised of the potential for ACM to be present Construction activities would be subject to applicable federal, State, and local regulations to minimize the potential risk to human health and the environment <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Potential impacts from ACM would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> The Air Force would continue to be responsible for management of ACM, and would continue to manage ACM in accordance with its own policy and applicable regulations <p>Mitigation Measures</p> <ul style="list-style-type: none"> None
Geology and Soils	<p>Impacts</p> <ul style="list-style-type: none"> Short-term impacts would occur as a result of ground disturbance associated with construction activities Compliance with an NPDES General Permit and SWPPP and implementation of standard construction practices would reduce the potential for erosion effects Once construction activities are complete, disturbed areas would be covered with gravel or riprap to reduce erosion potential <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Potential geology and soils impacts would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> None 	<p>Impacts</p> <ul style="list-style-type: none"> Dam repair activities would not occur <p>Mitigation Measures</p> <ul style="list-style-type: none"> None

Table 2-1. Summary of Influencing Factors and Environmental Impacts
Page 3 of 5

Resource	Proposed Action	Upgrade Dam Alternative	No-Action Alternative
Water Resources	<p>Impacts</p> <ul style="list-style-type: none"> • Non-Potable Reservoir #1 would be drained to facilitate dam repair activities • Construction activities would comply with an NPDES General Permit and SWPPP to minimize potential effects to surface waters • Non-Potable Reservoir #1 is classified as open water; Lehman’s Run at the western end of the reservoir is an intermittent streambed wetland and the small drainage at the toe of the dam is an emergent wetland <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands 	<p>Impacts</p> <ul style="list-style-type: none"> • Potential water resources impacts would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> • Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands 	<p>Impacts</p> <ul style="list-style-type: none"> • Dam repair activities would not occur <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None
Air Quality	<p>Impacts</p> <ul style="list-style-type: none"> • Construction activities would result in short-term air quality impacts • BMPs would be used to reduce emissions of dust and particulate matter • Emissions associated with the Proposed Action would not hinder maintenance of the NAAQS <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None 	<p>Impacts</p> <ul style="list-style-type: none"> • Potential air quality impacts would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None 	<p>Impacts</p> <ul style="list-style-type: none"> • Dam repair activities would not occur <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None

Table 2-1. Summary of Influencing Factors and Environmental Impacts
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Resource	Proposed Action	Upgrade Dam Alternative	No-Action Alternative
Biological Resources	<p>Impacts</p> <ul style="list-style-type: none"> • Demolition and construction activities would cause short-term impacts to wildlife • Most species near the site are disturbance tolerant • Tree removal would be minimized to the extent possible during construction of the auxiliary spillway • The federally threatened Preble's meadow jumping mouse may be present on the site • The scope of the project, and the probable disturbance of adjacent protected habitat of the federally threatened Preble's meadow jumping mouse, is consistent with the provisions of the USAFA's Conservation Agreement with the USFWS, allowing for repair and maintenance of existing infrastructure • The USAFA and the construction contractor would be responsible for complying with the Terms and Conditions of the current Biological Opinion for the Preble's meadow jumping mouse • Construction activities would comply with the Migratory Bird Treaty Act • To the extent possible, construction activities would be scheduled outside the typical great blue heron nesting season (April through September); if construction work begins prior to an active nest condition, construction may be able to continue throughout the nesting/breeding/fledging period • Non-Potable Reservoir #1 is classified as open water; Lehman's Run at the western end of the reservoir is an intermittent streambed wetland and the small drainage at the toe of the dam is an emergent wetland 	<p>Impacts</p> <ul style="list-style-type: none"> • Potential impacts to biological resources would be similar to those described under the Proposed Action 	<p>Impacts</p> <ul style="list-style-type: none"> • Dam repair activities would not occur

Table 2-1. Summary of Influencing Factors and Environmental Impacts
Page 5 of 5

Resource	Proposed Action	Upgrade dam Alternative	No-Action Alternative
Biological Resources (continued)	<p>Mitigation Measures</p> <ul style="list-style-type: none"> • Compliance with the Terms and Conditions of the current Biological Opinion for the Preble's meadow jumping mouse would preclude the need for mitigation measures • Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands 	<p>Mitigation Measures</p> <ul style="list-style-type: none"> • Compliance with the Terms and Conditions of the current Biological Opinion for the Preble's meadow jumping mouse would preclude the need for mitigation measures • Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands 	<p>Mitigation Measures</p> <ul style="list-style-type: none"> • None
Cultural Resources	<p>Impacts</p> <ul style="list-style-type: none"> • Based on the 2015 survey and inventory of the project area, no archaeological or historic resources eligible for the National Register have been identified • The dam at Non-Potable Reservoir #1 is not considered eligible for listing in the National Register • No traditional cultural resources have been identified <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None 	<p>Impacts</p> <ul style="list-style-type: none"> • Potential impacts to cultural resources would be similar to those described under the Proposed Action <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None 	<p>Impacts</p> <ul style="list-style-type: none"> • Dam repair activities would not occur <p>Mitigation Measures</p> <ul style="list-style-type: none"> • None

ACM = asbestos-containing material

BMP = best management practice

NAAQS = National Ambient Air Quality Standards

NPDES = National Pollutant Discharge Elimination System

National Register

SWPPP

USAFA

USFWS

= National Register of Historic Places

= Storm Water Pollution Prevention Plan

= U.S. Air Force Academy

= U.S. Fish and Wildlife Service

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing environmental conditions at Non-Potable Reservoir #1 on the USAFA. It provides information to serve as a baseline from which to identify and evaluate environmental changes associated with implementation of proposed dam repair activities at Non-Potable Reservoir #1. The environmental components addressed include relevant natural or human environments likely to be affected by the Proposed Action and alternatives.

Based on the nature of the activities that would occur under the Proposed Action and alternatives, it was determined that the potential exists for the following resources to be affected or to create environmental effects: land use/aesthetics, transportation (rail), hazardous materials management, hazardous waste management, ACM, geology and soils, water resources, air quality, biological resources, and cultural resources.

The region of influence (ROI) to be studied will be defined for each resource area affected by the proposed project. The ROI determines the geographical area to be addressed as the Affected Environment. Although the Non-Potable Reservoir #1 area may constitute the ROI limit for some resources, potential impacts associated with certain issues (e.g., air quality) transcend these limits.

3.2 PROJECT SETTING

Non-Potable Reservoir #1 is located within the USAFA in El Paso County, Colorado, approximately ½ mile east of Falcon Stadium (see Figure 1-1). There is an access road to the dam from Stadium Boulevard east on Husted Road to the toe of the embankment and pump station building. Approximately 400 feet downstream of the dam is the Union Pacific Railroad with Monument Creek immediately east of the railroad.

3.2.1 Land Use/Aesthetics

This section describes the land use and aesthetics for the area surrounding Non-Potable Reservoir #1. The ROI includes Non-Potable Reservoir #1 and potentially affected adjacent properties.

Land Use. The layout of the USAFA was comprehensively programmed and planned before construction began. Therefore, land uses have remained consistent over time. The Master Plan for the USAFA was completed in 1955 and established five major use areas:

- Cadet area
- Airfield/flightline area
- Logistics and support area
- Housing/neighborhood area
- Community center area.

By clustering facilities into five areas, open space was maximized to preserve scenic quality, restrict development in environmentally unsuitable areas, separate major use areas according to function, and provide recreation.

Current land use at Non-Potable Reservoir #1 is considered logistics and support as the reservoir supports non-potable water storage and ultimately irrigation at the USAFA. Surrounding areas are considered open space.

Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is characterized in terms of high, medium, and low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in a remote pristine environment. High-sensitivity views would include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality.

Medium visual sensitivity is characteristic of areas where human influence and modern civilization are evident and the presence of motorized vehicles is commonplace. These landscapes generally have features containing varieties in form, line, color, and texture, but tend to be more common than high visual sensitivity areas.

Low visual sensitivity areas tend to have minimal landscape features with little change in form, line, color, and texture.

Although the dam, reservoir, access roads, and nearby structures portray a developed nature on the USAFA, the visual environment of Non-Potable Reservoir #1 and surrounding areas is characteristic of a high visual quality in an isolated setting. Trees provide a visual barrier from Stadium Boulevard and views to the west from the reservoir are of the Rocky Mountains. Based on the isolated setting of the project location, the ROI is considered to have a high visual sensitivity.

3.2.2 Transportation (Rail)

The Union Pacific Railroad runs north-south approximately 400 feet downstream of the dam. Primary commodities handled by Union Pacific in Colorado include grain, automobiles and trucks, consumer and manufactured goods, and coal.

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

The ROI for hazardous materials and hazardous waste management encompasses those areas of the USAFA that could potentially be exposed to a release during dam repair activities. Hazardous materials management, hazardous waste management, and ACM are discussed in this section.

3.3.1 Hazardous Materials Management

Hazardous materials are those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. Sections 9601-9675), the Toxic Substances Control Act (15 U.S.C. Sections 2601-2671), and the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. Sections 6901-6992). In general, this includes substances that, because of their quantity; concentration; or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare, or to the environment when released into the environment. In addition, hazardous materials are regulated by the Emergency Planning and Community Right-to-Know Act (EPCRA) (42 U.S.C. Sections 11001-110505). Transportation of hazardous materials is regulated by the U.S. Department of Transportation and Colorado Department of

Transportation regulations within 49 CFR and 8 Code of Colorado Regulations (CCR) 1507-9, respectively.

Hazardous materials commonly stored or used to support operations and maintenance on non-potable water systems include fuels, POL, adhesives, corrosives, paints, and solvents. The USAFA manages hazardous materials as described in 29 CFR 1910.1200, *Hazard Communication*, and AFI 32-7086, *Hazardous Materials Management*; contractors working at the USAFA must follow these regulations. The USAFA has prepared and maintains a Hazardous Materials Emergency Response Plan in accordance with AFI 32-7043 guidance. This plan complies with AFI 32-4002, *Hazardous Material Emergency Planning and Response Compliance*; U.S. EPA requirements for Spill Prevention, Control, and Countermeasure Plans; EPCRA; and OSHA requirements. The plan was prepared to provide guidance for the identification of possible hazardous materials sources, the discovery and reporting of a hazardous materials release, and procedures to follow after a release has occurred.

3.3.2 Hazardous Waste Management

Hazardous wastes are those substances defined as hazardous by the CCR for Hazardous Wastes (Title 6 CCR 1007-3 Part 261). In general, this includes substances that, because of their characteristics, may present substantial danger to public health or to the environment when released into the environment. Hazardous waste from operations and facilities construction (including construction and demolition) at the USAFA is managed in accordance with AFI 32-7042 USAFA-Supplement, *Solid and Hazardous Waste Compliance* and RCRA regulations (as adopted and implemented under corresponding regulations found at Title 6 CCR 1007-3). Any hazardous waste generated on the USAFA must be coordinated for turn in at the USAFA Hazardous Waste Site. Hazardous wastes are not known to be generated at Non-Potable Reservoir #1.

3.3.3 Asbestos-Containing Material

ACM and ACM abatement are regulated by the U.S. EPA and OSHA. Asbestos fiber emissions into the ambient air are regulated in accordance with Section 112 of the Clean Air Act (CAA), which established the National Emissions Standards for Hazardous Air Pollutants (NESHAP). Under NESHAP, the owner of a structure must, prior to demolition or renovation of buildings with ACM, provide notice to the regulator with CAA authority (either the U.S. EPA or its State counterpart). The NESHAP regulations (40 CFR Part 61, Subpart M) address the demolition or renovation of buildings with ACM. The Asbestos Hazard Emergency Response Act, (P.L. 99-519 and P.L. 101-637), addresses worker protection for employees who work around or remediate ACM.

The Colorado Department of Public Health and the Environment (CDPHE) Air Pollution Control Division administers Colorado's asbestos removal regulation (State Regulation No. 8, Part B). These regulations cover demolition and renovation activities and are more stringent than the federal NESHAP program. The Air Force has a policy of managing asbestos in place and systematically eliminating it from facilities as modifications/renovations are conducted. Specific Air Force regulations for the handling and disposal of ACM are prescribed in a variety of AFIs, specifically AFI 32-1052, *Facility Asbestos Management*. Inspections are conducted prior to initiating modification/renovation or demolition activities.

An asbestos survey has not been conducted for the non-potable water system facilities at the USAFA; however, real property records indicate that portions of the non-potable water lines consist of transite pipe.

3.4 NATURAL ENVIRONMENT

This section describes the affected environment for natural resources: geology and soils, air quality, biological resources, and cultural resources.

3.4.1 Geology and Soils

The discussion of geology and soils covers features of the physical environment that may be affected by, or have an impact upon, the proposed activities; these include topography, physiography, seismicity, and soils (types and properties). Although the discussion of geology includes the regional discussion needed to understand this setting, the ROI is considered to be localized and limited to the Non-Potable Reservoir #1 area.

3.4.1.1 Geology.

Topography. The USAFA is situated along the eastern edge of the Rampart Range; this area is characterized by a series of mesas extending like fingers to the east from the Rampart Range. Elevations at Non-Potable Reservoir #1 range from approximately 6,590 feet above mean sea level (MSL) at the western end of the reservoir to approximately 6,550 feet above MSL near the pump house east of the reservoir.

Physiography. The physiography of the USAFA generally consists of a series of west-to-east trending ridges interspersed by valleys. Valley streams drain eastward into Monument Creek. Gentle southwest-trending slopes drain towards Monument Creek from the areas east of the USAFA. The western boundary of the west-to-east traveling mesas and valleys is formed by an abrupt, north-south trending ridge of sedimentary rock, with the steep slopes of the Rampart Range forming the visual and physical backdrop to the USAFA (USAFA, 2008).

The dominant physiographic feature in the region is the Pike's Peak batholith, a huge mass of magma that pushed its way upward approximately 1 billion years ago. The reddish-pink Pike's Peak granite is the prevalent rock type in the area. An associated formation, the Dawson Arkose, underlies much of the USAFA. This formation consists of sandstones that have been created by the weathering of granite.

Seismicity. In general, Colorado is not considered to be at risk from significant earthquake damage. The state is ranked 30th in the nation in terms of Annualized Earthquake Losses by the Federal Emergency Management Agency. The Rampart Fault extends north and south along the USAFA western boundary; geologists consider this fault to be inactive (USAFA, 2008).

3.4.1.2 Soils.

Most of the soils at the USAFA are derived from granitic parent material. They are generally very shallow (horizons are not defined) and have very little fine or organic material. Deeper soils with finer particles and organic matter occur as outwash deposition in the valleys. Soils at Non-Potable Reservoir #1 have been mapped as Kettle series soils. The Kettle series consists of deep, well-drained soils that formed in sandy arkosic deposits. These soils are on fans and uplands and have slopes of 3 to 40 percent (USAFA, 2008).

3.4.2 Water Resources

The water resource evaluation for the USAFA includes both surface water features (lakes, streams, rivers, etc.) and ground water. The ROI for water resources includes Non-Potable Reservoir #1 at the USAFA, and Monument Creek and associated tributaries. Although the discussion of water resources includes a

regional discussion needed to understand this setting, the ROI is considered to be localized and limited to the Non-Potable Reservoir #1 area.

Surface Water. The drainage basin contributing to Non-Potable Reservoir #1 is located south of the Cadet Academic Area within the USAFA. The basin area is approximately 4.9 square miles with elevations ranging from 6,570 feet at Non-Potable Reservoir #1 to 9,294 feet at the watershed divide (USAFA, 2008). The principal drainage system for the USAFA is Monument Creek, which originates from springs northwest of the USAFA in the Rampart Range. Surface runoff is directed to ditches flowing to small streams, such as the easterly flowing Deadman's and West Monument Creeks and the westerly flowing Smith, Kettle, and Pine Creeks, which eventually discharge to Monument Creek. The tributary streams that flow into Monument Creek from the east have been impacted by urban development and increased storm water runoff, especially in Kettle and Pine Creeks (USAFA, 2008).

Non-Potable Reservoir #1 holds approximately 125 acre-feet (maximum) of water with a surface area of about 9.7 acres and a maximum water depth of about 35 feet. A jurisdictional wetland survey for Non-Potable Reservoir #1 classified the reservoir as open water (URS, 2002). The reservoir does not meet the soils, vegetation, or hydrology criteria to be delineated as a jurisdictional wetland. The survey classified Lehman's Run, which enters the western portion of the reservoir, as an intermittent streambed wetland and the small drainage at the toe of the dam as emergent wetland (URS, 2002). Monument Creek runs north-south approximately 700 feet east of the reservoir. Lehman Run is an eastward-flowing intermittent stream that terminates in the northwest portion of Non-Potable Reservoir #1.

Ground Water. The USAFA obtains potable water from the city of Colorado Springs. The area's primary aquifer is the alluvial sediments of the Fountain Creek Valley and adjacent terraces. This aquifer ranges in depth from 0.8 to 63.7 feet below ground surface and supplies Colorado Springs with drinking water (USAFA, 1999). In June 2013, ground water was encountered during a geotechnical investigation at a depth of 25.5 feet under the crest of the embankment and at a depth of 29.5 feet at the downstream toe of the embankment. The bulk of the stored water within Non-Potable Reservoir #1 is from several non-potable wells (1A, 1B, 3A, 5A, and 9A) that cumulatively pump approximately 1.5 million gpd during the irrigation season (URS, 2014a).

Floodplains. Floodplains at the USAFA are found along riparian areas and are most prevalent along Monument Creek (USAFA, 2008). Non-Potable Reservoir #1, the existing service spillway, and the area adjacent to and west of the reservoir are located within a 100-year flood zone (USAFA, 2008).

3.4.3 Air Quality

The ROI for the air quality analysis includes the existing air shed that the USAFA is within, specifically El Paso County in Colorado.

3.4.3.1 National Ambient Air Quality Standards.

Air quality in any given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. The federal CAA, 42 U.S.C. Sections 7401-7671(q) provides that emission sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on (1) the maximum allowable ambient pollutant concentrations, and (2) the maximum allowable emissions from individual sources.

The U.S. EPA established the federal standards for the permissible levels of certain pollutants in the atmosphere. The National Ambient Air Quality Standards (NAAQS) have been established for seven criteria pollutants: ozone, nitrogen dioxide (NO₂), particulate matter equal to or less than 10 microns in diameter (PM₁₀), particulate matter equal to or less than 2.5 microns in diameter (PM_{2.5}), carbon monoxide (CO), sulfur dioxide (SO₂), and lead. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. The ozone precursors are nitrogen oxides (NO_x) and volatile organic compounds (VOCs). The State of Colorado has adopted the NAAQS to regulate air pollution levels. The NAAQS are outlined in Table 3-1.

Areas that meet the NAAQS standard for a criteria pollutant are designated as being “in attainment” while areas where criteria pollutant levels exceed the NAAQS are designated as “nonattainment”. The nonattainment classifications for CO and PM₁₀ are further divided into moderate and serious categories. Ozone nonattainment areas are further classified, based on the severity of the pollution problem, as basic, marginal, moderate, serious, severe, or extreme. A maintenance area is an area that has recently been redesignated as an attainment area from a former nonattainment area. However, during the maintenance period, most of the CAA rules for a nonattainment area are still applicable to a maintenance area.

The U.S. EPA has classified a portion of El Paso County, including the area where the USAFA is located, as a maintenance area (i.e., a formerly nonattainment area) for CO and as in attainment for other criteria pollutants with respect to the NAAQS.

3.4.3.2 Existing Air Quality Conditions.

The USAFA is a synthetic minor source (i.e., a minor source with capped emissions limits that are below the major source thresholds) for criteria pollutants and Hazardous Air Pollutants (HAPs), and therefore not subject to CAA Title V permitting. Various sources on the USAFA emit criteria pollutants and HAPs, including generators, boilers, water heaters, fuel storage tanks, gasoline service stations, and surface coating/paint booths. Because no new operational stationary sources would be associated with the Proposed Action or alternatives, the current installation-wide air permit would not be affected.

Clean Air Act Conformity. Title 40 CFR 51 Part 93, General Conformity, requires federal actions to conform to any State Implementation Plan approved or promulgated under Section 110 of the CAA. An air conformity applicability analysis and possibly a formal air conformity determination are required for federal actions in nonattainment or maintenance areas. The general conformity rule applicability analysis applies to the Proposed Action since the project is located within the El Paso County CO maintenance area. The rules specify *de minimis* emission levels by pollutant to determine the applicability of conformity requirements for a project. The corresponding CO *de minimis* level is 100 tons per year.

Table 3-1. National and Colorado Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 µg/m ³ ⁽¹⁾	Not to be exceeded
Nitrogen Dioxide		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	Annual	53 ppb ⁽²⁾	Annual mean
Ozone		Primary and Secondary	8-hour	0.075 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Matter	PM _{2.5}	Primary	Annual	12 µg/m ³ ⁽⁴⁾	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m ³	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	Primary and Secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		Primary	1-hour	75 ppb ⁽⁵⁾	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Notes (as of May 2013):

⁽¹⁾ Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

⁽²⁾ The official level of the annual nitrogen dioxide standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of a clearer comparison to the 1-hour standard.

⁽³⁾ Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard (“anti-backsliding”). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

⁽⁴⁾ Final rule signed January 15, 2013. The primary annual fine particle (PM_{2.5}) standard was lowered from 15 to 12 µg/m³.

⁽⁵⁾ Final rule signed June 2, 2010. The 1971 annual and 24-hour SO₂ standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

EPA = Environmental Protection Agency

µg/m³ = micrograms per cubic meter

PM_{2.5} = particulate matter equal to or less than 2.5 microns in diameter

PM₁₀ = particulate matter equal to or less than 10 microns in diameter

ppm = parts per million

ppb = parts per billion

SO₂ = sulfur dioxide

Hazardous Air Pollutants. In addition to the criteria pollutants discussed above, non-criteria toxic pollutants, called hazardous air pollutants (HAPs), are also regulated under the CAA. The U.S. EPA has identified a total 188 HAPs that are known or suspected to cause health effects in small doses. HAPs are emitted by a wide range of man-made and naturally occurring sources including combustion mobile and stationary sources. However, unlike the NAAQS for criteria pollutants, federal ambient air quality standards do not exist for non-criteria pollutants.

Greenhouse Gas Emissions. Greenhouse gases (GHGs) are compounds that contribute to the greenhouse effect. The greenhouse effect is a natural phenomenon where gases trap heat within the surface-troposphere (lowest portion of the earth's atmosphere) system, causing heating at the surface of the earth. The primary long-lived GHGs directly emitted by human activities are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

The heating effect from these gases is considered the probable cause of the global warming observed over the last 50 years (U.S. EPA, 2009a). Global warming and climate change can affect many aspects of the environment. The U.S. EPA Administrator has recognized potential risks to public health or welfare and signed an endangerment finding regarding GHGs under Section 202(a) of the CAA (U.S. EPA, 2009b), which finds that the current and projected concentrations of the six key well-mixed GHGs—CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆—in the atmosphere threaten the public health and welfare of current and future generations. To estimate global warming potential (GWP), all GHGs are expressed relative to a reference gas, CO₂, which is assigned a GWP equal to 1. All six GHGs are multiplied by their GWP and the results are added to calculate the total equivalent emissions of CO₂ (CO₂e). However, the dominant GHG gas emitted is CO₂, mostly from fossil fuel combustion (85.4 percent). This EA considers CO₂ as the representative GHG emission.

This EA follows the Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas issued by the CEQ (Council on Environmental Quality, 2010). The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. As such, this EA predicts CO₂ levels as appropriate for disclosure purposes.

3.4.4 Biological Resources

Biological resources include both native and non-native species of plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife, threatened and endangered species, and sensitive habitats. Vegetation and wildlife at the USAFA have been well documented by USAFA staff and through cooperative programs with the Colorado Division of Wildlife, the Nature Conservancy, the Colorado Natural Heritage Program, and the U.S. Fish and Wildlife Service (USFWS).

The ROI used for discussion of biological resources includes the USAFA, with a focus on the Non-Potable Reservoir #1 area. This ROI includes the area within which potential impacts could occur and provides a basis for evaluating the level of impact.

Vegetation. The USAFA's vegetation resources encompass the elevation-related gradient from prairie grasslands, in the east, to montane forests, in the west. Vegetation types at the USAFA are divided into two zones, the montane and foothill zones. Non-Potable Reservoir #1 is located in the foothill zone and comprises of ponderosa pine woodlands, grasslands, and developed/disturbed areas.

The foothill zone is divided into Douglas fir/white oak woodlands, ponderosa pine woodlands, oak shrublands, grasslands, and riparian communities. Douglas fir/white oak woodlands are dominated by

Douglas fir (*P. menziesii*), white fir (*Abies concolor*), and associated by common juniper, waxflower (*Chamaelucium uncinatum*), and mountain mahogany (*Cercocarpus ledifolius*). Ponderosa pine woodlands, the most common woodland on the USAFA, are dominated by ponderosa pine and associated with gooseberries (*Ribes aureum*), currants (*Ribes cereum*), yellow mountain parsley (*Pseudocymopterus montanus*), mountain muhley (*Muhlenbergia montana*), ninebark (*Physocarpus monogynus*), and Gambel oak (*Quercus gambelii*). Oak shrublands are dominated by Gambel oak and associated with piñon pine (*Pinus edulis*), one-seeded juniper (*Sabina monosperma*), mountain mahogany, ocean spray (*Holodiscus dumosus*), Boulder raspberry (*Oreobatus deliciosus*), and snowberry (*Symphoricarpus albus*). Ponderosa pines may occasionally occur within the oak shrublands. The grassland communities are dominated by blue grama (*Bouteloua gracilis*), little bluestem (*Schizochyrium scoparium*), fringed sage (*Artemisia frigida*), and Spanish bayonet (*Yucca glauca*), and are associated with Parry's oatgrass (*Danthonia parryi*), sandreed (*Calamovilfa longifolia*), big bluestem (*Andropogon gerardii*), and needle-and-thread grass (*Stipa comata*). The riparian communities are dominated by narrowleaf cottonwood (*Populus angustifolia*), eastern cottonwood (*Populus deltoids*), and willows (*Salix ssp.*). The riparian communities also contain herbs such as shooting star (*Dodecatheon pulchellum*), bunchberry (*Chamaepericlymenum canadense*), and twinflower (*Linnaea borealis*) (USAFA, 2008).

Wildlife. The USAFA contains a high biodiversity of wildlife. This is due to the convergence of north-south and plains-mountains transition zones, the presence of high-quality riparian habitat, and the proximity to the undeveloped forested expanses of the Pike National Forest. The large percentage of undeveloped natural areas on the USAFA and the numerous vegetation types and their resulting mosaic, or pattern, provide a high degree of connectivity between habitat types and maintain essential migration routes for wildlife.

The USAFA's coldwater streams and reservoirs support many fish and amphibian species. Many of the reservoirs are stocked with hatchery-raised fish, including the rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), channel catfish (*Ictalurus punctatus*), German brown trout (*Salmo trutta*), Snake River cutthroat trout (*Oncorhynchus clarki*), and sterile hybrid grass carp (*Ctenopharyngodon idella*). Common amphibians and reptiles found at the USAFA that could potentially occur near Non-Potable Reservoir #1 include the chorus frog (*Pseudacris triseriata*), northern leopard frog (*Rana pipiens*), shorthorned lizard (*Phrynosoma douglassi*), bullsnake (*Pituophis melanoleucus*), and western rattlesnake (*Crotalus viridis*) (USAFA, 2008).

Most native North American birds, their eggs, and nests are protected by the Migratory Bird Treaty Act (MBTA) of 1918, as amended. Bird species identified by the USFWS Information, Planning, and Conservation System (IPAC) as having the potential to be year-round residents, if suitable habitat is present, include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*), and bald eagle (*Haliaeetus leucocephalus*). Bird species identified by the USFWS IPAC as having the potential to breed at the USAFA, if suitable habitat is present, include grasshopper sparrow (*Ammodramus savannarum*), burrowing owl (*Athene cunicularia*), American bittern (*Botaurus lentiginosus*), lark bunting (*Calamospiza melanocorys*), veery (*Catharus fuscescens*), mountain plover (*Charadrius montanus*), willow flycatcher (*Empidonax traillii*), sage thrasher (*Oreoscoptes montanus*), Williamson's sapsucker (*Sphyrapicus thyroideus*), and Brewer's sparrow (*Spizella breweri*) (USFWS, 2014a). The USAFA Integrated Natural Resources Management Plan (INRMP) indicates that a great blue heron (*Ardea herodias*) rookery is located near the waters-edge of Non-Potable Reservoir #1.

A number of small mammals exist on the USAFA and have the potential to occur in the vicinity of Non-Potable Reservoir #1. Common small mammals may include the long-eared bat (*Myotis evotis*), western small-footed bat (*Myotis ciliolabrum*), Abert's squirrel (*Sciurus aberti*), heather vole (*Phenacomys intermedius*), meadow vole (*Microtus pennsylvanicus*), Montane shrew (*Sorex monticolus*), porcupine (*Erethizon dorsatum*), striped skunk (*Mephitis mephitis*), marten (*Martes americana*), cottontail rabbit

(*Sylvilagus* spp.), least chipmunk (*Tamias minimus*), Gunnison’s prairie dog (*Cynomys gunnisoni*), spotted ground squirrel (*Spermophilus spilosoma*), northern pocket gopher (*Thomomys talpoides*), western harvest mouse (*Reithrodontomys megalotis*), and several other mouse species (primarily *Peromyscus maniculatus*) (USAFA, 2008).

Large mammals include the red fox (*Vulpes vulpes*), coyote (*Canis latrans*), black bear (*Ursus americanus*), mountain lion (*Puma concolor*), raccoon (*Procyon lotor*), and gray fox (*Urocyon cinereoargenteus*). Mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and American elk (*Cervus elaphus*) are larger ungulates that could occur on the USAFA (USAFA, 2008).

Threatened and Endangered Species. The USFWS website and the Colorado Parks and Wildlife (CPW) website were reviewed for the most up-to-date information concerning federally and state threatened and endangered species that have the potential to occur on or adjacent to the USAFA. Table 3-2 presents federal and state threatened and endangered species listed by the USFWS and CPW as having the potential to occur on or within the vicinity of the USAFA.

Table 3-2. Federally and State Threatened and Endangered Species Potentially within the USAFA

Common Name (<i>Scientific Name</i>)	Federal Status	State Status
Plants		
Ute ladies’-tresses (<i>Spiranthes diluvialis</i>)	Threatened	S2
Fish		
Arkansas darter (<i>Etheostoma cragini</i>)	Candidate	Threatened
Greenback cutthroat trout (<i>Oncorhynchus clarki stomias</i>)	Threatened	Threatened
Birds		
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened	Threatened
Mammals		
Preble’s meadow jumping mouse (<i>Zapus hudsonius preblei</i>)	Threatened	Threatened

Sources: USFWS, 2014a; Colorado Department of Parks and Wildlife, 2014.

Notes:

S2 = imperiled

Threatened = any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate = any species that has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Ute ladies’ tresses (*Spiranthes diluvialis*) orchid occurs along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams. This species typically occurs in stable wetland and seepy areas associated with old landscape features within historical floodplains of major rivers. It also is found in wetland and seepy areas near freshwater lakes or springs. Ute ladies’ tresses was not detected during the vegetation study in 1994 or the botanical surveys in 1993 and 2002. Additionally, habitat to support this species is not present at Non-Potable Reservoir #1; therefore, this species is not likely to occur.

The Arkansas darter (*Etheostoma cragini*) prefers shallow, clear, cool water, sand or silt bottom streams with spring-fed pools and abundant rooted aquatic vegetation. During late summer low-water periods when streams may become intermittent, Arkansas darter populations in Colorado persist in large, deep pools (USFWS, 2014a). This type of habitat is not present at Non-Potable Reservoir #1; therefore, this species is not likely to occur.

The greenback cutthroat trout (*Oncorhynchus clarki stomias*) inhabits cold water streams and cold water lakes with adequate stream spawning habitat present during spring. In general, trout require different habitat types for different life stages: juvenile (protective cover and low velocity flow, as in side channels and small tributaries); spawning (riffles with clean gravels); over-winter (deep water with low velocity flow and protective cover); and adult (juxtaposition of slow water areas for resting and fast water areas for feeding, with protective cover from boulders, logs, overhanging vegetation or undercut banks). Both water quality and quantity are important. Greenbacks, like other cutthroat trout, generally require clear, cold, well-oxygenated water (USFWS, 2014b). Efforts to reestablish the threatened greenback cutthroat trout were undertaken on the USAFA in cooperation with the USFWS starting in the late 1990s as an experimental population to assess their suitability for a catch and release fishing program. However, reproducing populations of greenbacks on the USAFA were never established due to poor water quality and fluctuating water conditions in the waters where they were stocked. The effort to reintroduce this species was discontinued in late 2007 by the USFWS and it is unlikely that any greenback cutthroat trout currently occur in any USAFA waters (USAFA, 2008).

The Mexican spotted owl (*Strix occidentalis lucida*) is a resident of lower elevation forests mostly in deeply incised, rocky canyons or can be found in complex forest structures that contain uneven aged, multi-level and old-aged, thick forests (USFWS, 2014b). This type of habitat is not present at Non-Potable Reservoir #1; therefore, this species is not likely to occur.

Preble's meadow jumping mouse (PMJM) (*Zapus hudsonius preblei*) is often found in dense, herbaceous riparian vegetation. Known PMJM locations sometimes have an overstory canopy layer, but usually have a well-developed shrub layer and a thick herbaceous layer. Most often, the shrub cover consists of willow species (*Salix* sp.), but the species composition seems to be secondary to the overall presence of a mature shrub component. What seems universally true for meadow jumping mouse habitat is that a dense, herbaceous ground cover needs to be present (USAFA, 1999). The PMJM is known to occur within the USAFA in areas adjacent to Monument Creek including the area around Non-Potable Reservoir #1. The USAFA has a Conservation Agreement with the USFWS allowing for repair and maintenance of existing infrastructure that complies with the terms and conditions of the April 2000 Biological Opinion (USAFA, 2000; USAFA, 2014d).

Sensitive Habitats. Sensitive habitats are those areas considered for protection due to their ecological value. They include wetlands, critical habitat for protected species, plant communities of limited or unusual distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer/winter habitat). In 1996, the Colorado Natural Heritage Program identified rare or species of special concern that occur on the USAFA and seven sites were considered as significant natural heritage wildlife resources (USAFA, 2008). The Proposed Action is adjacent to the Monument Creek Conservation Area, one of the seven sites. Monument Creek Conservation Area contains habitat for the following significant species: PMJM, hops azure butterfly (*Celastrina humulus*), southern Rocky Mountain cinquefoil (*Potentilla ambigens*), New Mexico cliff fern (*Woodsia neomexicana*), cedar waxwing (*Bombycilla cedrorum*), gray catbird (*Dumatella carolinensis*), and northern leopard frog (*Rana pipiens*) (USAFA, 2008).

A jurisdictional wetland survey for Non-Potable Reservoir #1 classified the reservoir as open water (URS, 2002). The reservoir does not meet the soils, vegetation, or hydrology criteria to be delineated as a jurisdictional wetland. The survey classified Lehman's Run, which enters the western end of the reservoir as an intermittent streambed wetland and the small drainage at the toe of the dam as emergent wetland (URS, 2002).

3.4.5 Cultural Resources

Cultural resources are defined as prehistoric or historic archaeological sites, buildings, structures, districts, artifacts, or other physical evidence of human activity. For ease of discussion, cultural resources have been divided into prehistoric and historic archaeological resources, historic buildings and structures, and traditional cultural resources (e.g., sacred or ceremonial sites).

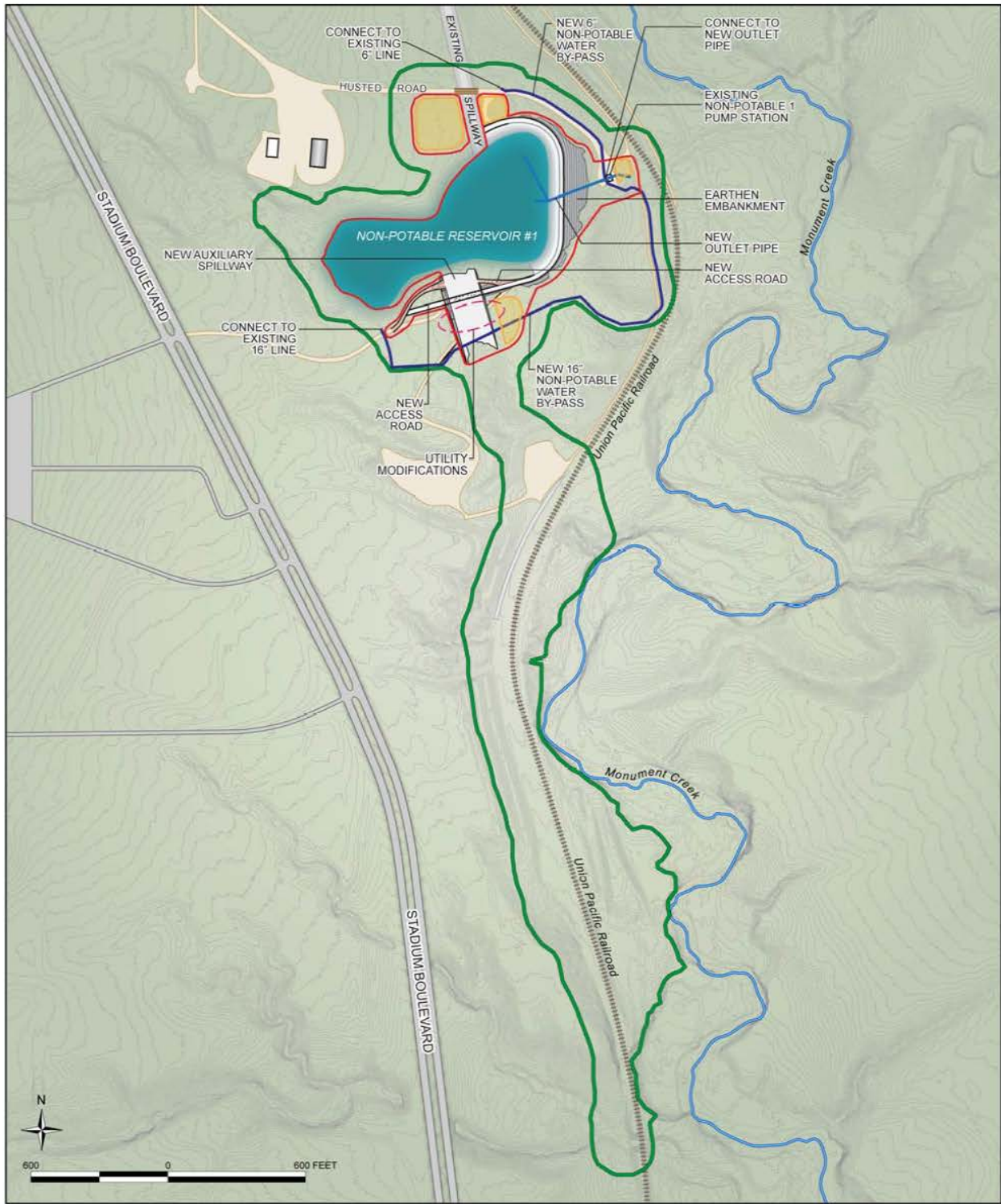
For the purposes of this analysis, the term ROI is synonymous with the “area of potential effect” (APE) as defined under cultural resources legislation. The ROI for the analysis of cultural resources within this EA includes any structures and areas that may be affected by proposed repair activities at Non-Potable Reservoir #1. The APE for cultural resources encompasses approximately 80 acres and is illustrated in Figure 3-1. This APE captures the potential disturbance areas for proposed repair activities including reservoir improvements, dam and auxiliary spillway improvements, construction equipment staging areas, the auxiliary spillway inundation area, and utility improvements.

Numerous laws and regulations require federal agencies to consider the effects of a proposed action on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationships among other involved agencies (e.g., the State Historic Preservation Office [SHPO] and the Advisory Council on Historic Preservation [ACHP]). The primary law governing the treatment of cultural resources is the National Historic Preservation Act (NHPA), which requires a federal agency to consider potential impacts on historic properties from any proposed undertaking.

In compliance with the NHPA, the Air Force has initiated the Section 106 review process with the Colorado SHPO. Consultation is ongoing in an effort to determine the appropriate APE as well as to identify any archaeological sites and historic properties within the APE that may be affected by proposed dam repair activities at Non-Potable Reservoir #1.

Only those cultural resources determined to be significant under cultural resources legislation are subject to protection or consideration by a federal agency. Significant cultural resources, whether they be prehistoric, historic, or traditional in nature, are referred to as “historic properties.” Under 36 CFR Part 800, historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (National Register). For the purposes of these regulations, the term includes artifacts, records, and remains that are related to, and located within, such properties. The term “eligible for inclusion in the National Register” includes properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria. Therefore, sites that meet the criteria, but are not yet evaluated, may be considered potentially eligible to the National Register and, as such, are afforded the same regulatory consideration as nominated historic properties. As a federal agency, the Air Force is responsible for identifying any historic properties associated with its property.

Prehistoric and Historic Archaeological Resources. Previous archaeological surveys conducted at the USAFA have identified 214 archaeological sites and 257 isolated finds. Of these, 12 sites have been recommended eligible for listing in the National Register and 22 sites have been recommended as potentially eligible and require further evaluation. Historical site types consist of townsites, individual homesteads, logging camps, a stone boundary wall, and a limestone kiln. Prehistoric site types consist primarily of lithic scatters including some with associated stone circles and hearths (USAFA, 2012).



- Legend**
- APE (Area of Potential Effect)
 - Construction Work Limit
 - Contractor Staging Area
 - New Non-Potable Water By-Pass

Area of Potential Effect

Figure 3-1

In May 2015, an intensive pedestrian cultural resources survey and inventory of approximately 80 acres was conducted for the proposed dam repair activities at Non-potable Reservoir #1. The survey resulted in the documentation and re-evaluation of 1 previously documented cultural resource and the documentation and evaluation of 5 new cultural resources:

- A previously documented historic foundation (5EP840) did not meet the requirements for listing in the National Register. It was also determined to be a non-contributing element to the USAFA Historic District.
- Two segments of the Denver and Rio Grande (D&RG) Railroad were identified, segment (5EP2181.27) and segment (5EP2181.28). The overall linear resource, the D&RG Railroad (5EP2181), is eligible for listing in the National Register under Criterion A and Criterion B; however, the segments were determined to be non-supporting to the overall linear resource as they had lost too much integrity to convey the significance of the overall linear resource. The segments were also determined to be non-contributing to the USAFA Historic District.
- An isolated find (5EP7607) did not meet the requirements for listing in the National Register. It was also determined to be a non-contributing element to the USAFA Historic District.
- Non-potable Reservoir #1 (USAFA facility #10488) (5EP7608) was not recommended to be eligible for listing in the National Register and was further recommended as a non-contributing element to the USAFA Historic District.
- The Stadium Siding (5EP7609) did not meet the requirements for listing in the National Register. It was also determined to be a non-contributing element to the USAFA Historic District (URS, 2015).

The Colorado SHPO concurred with the survey and inventory findings in a letter dated July 31, 2015 (see Appendix A).

Historic Buildings and Structures. Significant architectural resources at the USAFA have been identified during multiple resource survey efforts including a comprehensive architectural survey of the USAFA in 1999, 2000, 2012, and 2013. To date the USAFA contains one designated National Historic Landmark district (NHLD; Cadet Area NHLD) and two National Register listed properties (Carlton House and Burgess/Capps Cabin). Four additional properties (Elkhorn Ranch, Douglas Ranch, Massey House, and Farish Memorial Recreation Area) have been determined eligible for listing on the National Register by the Colorado SHPO (USAFA, 2012). Non-Potable Reservoir #1 (Facility 10488) was evaluated by RNL for eligibility for listing on the National Register in 2013 and by URS in 2015. Based on the evaluations, it was recommended that Non-Potable Reservoir #1 was a non-contributing element to the proposed USAFA Master Plan Historic District and not individually eligible for listing on the National Register (USAFA, 2013b and URS, 2015). The Colorado SHPO concurred with this determination in a letter dated July 31, 2015 (see Appendix A).

Traditional Cultural Resources. In support of the USAFA Integrated Cultural Resources Management Plan (ICRMP) and in compliance with Department of Defense (DOD) Instruction 4710.02 and the American Indian Religious Freedom Act (AIRFA), the USAFA is conducting ongoing consultation with 16 of the 29 Native American tribes with cultural affiliation to USAFA lands. Currently, there are no known sacred sites or traditional cultural properties in the vicinity of Non-Potable Reservoir #1.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter presents the results of the analysis of potential environmental effects associated with proposed dam repair activities at Non-Potable Reservoir #1 at the USAFA. The Proposed Action and alternatives, including the No-Action Alternative, are analyzed. Changes to the natural and human environments that may result from the Proposed Action and alternatives were evaluated relative to the existing environment as described in Chapter 3.0. The potential for significant environmental consequences was evaluated utilizing the context and intensity considerations as defined in CEQ regulations for implementing the procedural provisions of NEPA (40 CFR Part 1508.27).

4.2 PROJECT SETTING

This section describes the potential effects of the Proposed Action and alternatives on land use/aesthetics and transportation (rail).

4.2.1 Land Use/Aesthetic

The potential effects of the Proposed Action and alternatives on land use and aesthetics within the ROI are presented in this section.

4.2.1.1 Proposed Action.

Land Use. Under the Proposed Action, repair of the dam at Non-Potable Reservoir #1 would not change the land use of the area. Because Non-Potable Reservoir #1 would continue to support non-potable water storage and ultimately irrigation at the USAFA, the designated land use for the area would continue to be logistics and support. The Non-Potable Reservoir #1 area would continue to be compatible with existing land uses surrounding the property (i.e., open space). No significant impacts to land use are anticipated.

Aesthetics. The proposed dam repair activities would not result in a change in the appearance of the property; however, construction of the auxiliary spillway would change the appearance of the area south of the reservoir. The spillway would consist of a trapezoidal concrete channel that would discharge into a riprapped plunge pool with continuing flow within the earth-lined drainage channel. The channel would discharge southeast of the dam. Some vegetation clearance would be required to construct the auxiliary spillway. Due to the isolated setting of Non-Potable Reservoir #1 and the presence of trees creating a visible barrier to the area, no significant impacts to aesthetics are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.2.1.2 Upgrade Dam Alternative.

Land Use. Under the Upgrade Dam Alternative, modification of the dam at Non-Potable Reservoir #1 would not change the land use of the area. Because Non-Potable Reservoir #1 would continue to support non-potable water storage and ultimately irrigation at the USAFA, the designated land use for the area would continue to be logistics and support. The Non-Potable Reservoir #1 area would continue to be compatible with existing land uses surrounding the property (i.e., open space). No significant impacts to land use are anticipated.

Aesthetics. Potential aesthetic impacts from implementation of this alternative would be similar to those described under the Proposed Action. Under the Upgrade Dam Alternative, modification to the existing earthen embankment would be accomplished using an RCC overlay. This overlay would essentially encase the earthen dam in concrete. An auxiliary spillway would not be included as part of the reservoir modifications. Although encasing the earthen dam in concrete would result in a change to the aesthetic appearance of the dam, the isolated setting of the dam and the presence of trees create a visible barrier to the area. Therefore, no significant impacts to aesthetics are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.2.1.3 No-Action Alternative.

Under the No-Action Alternative, no dam repair activities would occur. Non-Potable Reservoir #1 would continue to support non-potable water storage and ultimately irrigation at the USAFA. No significant impacts to land use are anticipated.

Visual resources would not change. Because no repair activities would occur, significant degradation of the existing aesthetic quality is not anticipated.

Mitigation Measures. No mitigation measures would be required.

4.2.2 Transportation (Rail)

The potential effects of the Proposed Action and alternatives on rail transportation within the ROI are presented in this section.

4.2.2.1 Proposed Action.

The Union Pacific Railroad is situated approximately 400 feet east of the dam at Non-Potable Reservoir #1. The existing concrete lined emergency overflow spillway on the northern side of Non-Potable Reservoir #1 runs approximately 0.2 mile to the north, passes beneath the Union Pacific Railroad tracks and discharges into Monument Creek. This spillway would continue to provide discharge of water during high flow events (large storm events) to the reservoir. Under the Proposed Action, a new auxiliary spillway would be constructed to pass the IDF. The new auxiliary spillway that would be constructed on the south side of the reservoir would follow an existing drainage path approximately 0.3 mile to the south that crosses the Union Pacific Railroad. The railroad embankment crossing of this drainage is limited to a few feet in height and provides an opportunity to pass spillway flows at grade across the railroad with limited ponding and impounding of water behind the railroad embankment.

The IDF for Non-Potable Reservoir #1 (a Small Significant Hazard Dam) is the flood resulting from 45 percent of the Probable Maximum Precipitation (PMP). The IDF supports the determination of the capacity of the spillway. During high flow events in which the auxiliary spillway is utilized, rail service through the area would have to be interrupted to ensure the safety of train traffic. After the high flow event has passed, the tracks would be inspected by Union Pacific personnel to ensure the integrity of the railroad bed and tracks has not been compromised and train service can safely resume.

The purpose of implementing the Proposed Action is to repair the dam to minimize the potential for catastrophic failure to prevent potential damage to downstream infrastructure (i.e., Union Pacific Railroad). Significant impacts to rail transportation would occur during high flow events (i.e., flows greater than the PMP design of the dam) when rail service would need to be interrupted to ensure the safety of train traffic.

Given the terrain in the area, during a PMP event there would be no other practicable means of directing flows from the auxiliary spillway to Monument Creek regardless of proposed dam repair activities.

Mitigation Measures. No mitigation measures would be required.

4.2.2.2 Upgrade Dam Alternative.

As discussed above, the Union Pacific Railroad is situated approximately 400 feet east of the dam at Non-Potable Reservoir #1. Under this alternative, the existing spillway would continue to provide discharge of water during high flow events (large storm events) to the reservoir. However, a new auxiliary spillway would not be constructed. The dam embankment would be modified (using an RCC overlay) to allow for the dam to overtop. Flows over the dam would discharge at the toe where there is currently no adequate drainage infrastructure to convey these flows across the Union Pacific Railroad. Depending on the amount of water that overtops the dam, water would pond behind the railroad embankment and eventually flow southward towards the existing drainage (discussed above) where flows could cross the railroad.

During high flow events in which the dam overtops, rail service through the area would have to be interrupted to ensure the safety of train traffic. After the high flow event has passed, the tracks would be inspected by Union Pacific personnel to ensure the integrity of the railroad bed and tracks has not been compromised and train service can safely resume.

Significant impacts to rail transportation would occur during high flow events (i.e., flows greater than the PMP design of the dam) when rail service would need to be interrupted to ensure the safety of train traffic. Given the terrain in the area, during a PMP event there would be no other practicable means of directing flows that overtop the dam to Monument Creek regardless of proposed dam repair activities.

Mitigation Measures. No mitigation measures would be required.

4.2.2.3 No-Action Alternative.

Under the No-Action Alternative, dam repair activities at Non-Potable Reservoir #1 would not occur. The existing spillway would continue to provide discharge of water during high flow events (large storm events) to the reservoir. There would continue to be the potential for catastrophic failure and damage to downstream infrastructure. Significant impacts to downstream infrastructure could result if the No-Action Alternative is implemented.

Mitigation Measures. No mitigation measures would be required.

4.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

This section describes the potential effects of the Proposed Action and alternatives on hazardous materials management, hazardous waste management, and ACM.

4.3.1 Hazardous Materials Management

The potential effects of the Proposed Action and alternatives on the management of hazardous materials within the ROI are presented in this section.

4.3.1.1 Proposed Action.

During construction activities, small amounts of hazardous materials are expected to be used, and the potential for spills would exist. Any spills or releases of hazardous materials would be cleaned up by the contractor. Hazardous materials likely to be used during construction activities include fuels, POL, adhesives, corrosives, paints, and solvents. The specific chemical composition and exact use rates associated with proposed construction activities are not known. Storage, handling, and transportation of hazardous materials associated with construction activities would be conducted in accordance with applicable regulations and established procedures including 29 CFR 1910.1200, *Hazard Communication*, and AFI 32-7086, *Hazardous Materials Management*. Because hazardous materials would be managed in accordance with applicable regulations, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.1.2 Upgrade Dam Alternative.

Potential impacts of hazardous materials management under the Upgrade Dam Alternative would be similar to those described under the Proposed Action. The types and quantities of hazardous materials expected to be used during construction activities are anticipated to be similar to those discussed under the Proposed Action. Because hazardous materials would be managed in accordance with applicable regulations, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.1.3 No-Action Alternative.

Under the No-Action Alternative, the Air Force would continue to be responsible for the management of hazardous materials used at Non-Potable Reservoir #1. Management of hazardous materials would continue in accordance with applicable regulations. No significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.2 Hazardous Waste Management

The potential effects of the Proposed Action and alternatives on the management of hazardous waste within the ROI are presented in this section.

4.3.2.1 Proposed Action.

Small quantities of hazardous waste may be generated during construction activities. Hazardous wastes likely to be generated would include used POL and oily rags. The construction contractor would be responsible for following applicable regulations for management of any hazardous waste generated including AFI 32-7042 USAFA-Supplement. Any spills or releases of fuel or oil from equipment would be cleaned up by the contractor. The contractor would be responsible for the off-site disposal of any hazardous waste (including construction debris) generated on the property in accordance with applicable regulations. Any hazardous waste generated must be coordinated for turn in at the USAFA Hazardous Waste Site. Because hazardous waste would be managed in accordance with applicable regulations, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.2.2 Upgrade Dam Alternative.

Potential impacts of hazardous waste management activities under the Upgrade Dam Alternative would be similar to those described under the Proposed Action. The types and quantities of hazardous waste expected to be generated during construction activities are anticipated to be similar to those discussed under the Proposed Action. Because hazardous waste would be managed in accordance with applicable regulations, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.2.3 No-Action Alternative.

Under the No-Action Alternative, the Air Force would continue to be responsible for the management of any hazardous waste generated at Non-Potable Reservoir #1. Management of hazardous waste would continue in accordance with applicable regulations. No significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.3.3 Asbestos-Containing Material

The potential effects of the Proposed Action and alternatives on the management of ACM within the ROI are presented in this section.

4.3.3.1 Proposed Action.

The Air Force would inform the construction contractor of the potential presence of ACM on the property. ACM could be encountered within some non-potable water lines during work performed on these systems. Construction activities would be subject to applicable federal, State, and local regulations to minimize the potential risk to human health and the environment. ACM waste generated as a result of construction activities would be disposed in accordance with applicable regulations at an off-site landfill permitted to accept this type of material. The construction contractor would be responsible for ensuring the proper management of asbestos and maintaining continued regulatory compliance. Management of ACM and ACM waste in accordance with applicable regulations would preclude any significant impacts.

Mitigation Measures. No mitigation measures would be required.

4.3.3.2 Upgrade Dam Alternative.

Potential impacts to ACM management under the Upgrade Dam Alternative would be similar to those described under the Proposed Action. Management of ACM and ACM waste in accordance with applicable regulations would preclude any significant impacts.

Mitigation Measures. No mitigation measures would be required.

4.3.3.3 No-Action Alternative.

Under the No-Action Alternative, the Air Force would continue to be responsible for the management of any structures that contain ACM at Non-Potable Reservoir #1. The Air Force would continue to manage ACM in accordance with current Air Force policy and applicable regulations. Management of ACM and ACM waste in accordance with applicable regulations would preclude any significant impacts.

Mitigation Measures. No mitigation measures would be required.

4.4 NATURAL ENVIRONMENT

This section describes the potential effects of the Proposed Action and alternatives on the natural resources of geology and soils, water resources, air quality, biological resources, and cultural resources.

4.4.1 Geology and Soils

The potential effects of the Proposed Action and alternatives on the local geology and soils have been analyzed based on a review of published literature. Geology and soils would be affected primarily during ground-disturbing activities, when local soil profiles would be altered. Soils in these areas would remain relatively stable in the long term because they would be overlain by pavement or riprap material that would minimize erosion.

4.4.1.1 Proposed Action.

Geology. The Proposed Action is unlikely to affect the local geology at Non-Potable Reservoir #1. Sedimentation patterns would not be significantly altered, and no structural movements or changes in seismicity would result. No significant impacts are anticipated.

Soils. Potential impacts to soil at Non-Potable Reservoir #1 from the Proposed Action would result primarily from ground disturbance associated with establishing staging areas, installation of the non-potable water by-pass line, dam repair activities, and construction of the auxiliary spillway. These activities could alter soil profiles and local topography, as grading is required for spillway construction activities.

Construction activities would be conducted in accordance with a U.S. EPA NPDES General Permit and associated SWPPP. The NPDES General Permit, together with the required SWPPP, would outline construction site management practices designed to protect the quality of the surface water, ground water, and natural environment through which they flow. The SWPPP would identify specific areas of existing and potential soil erosion, location of structural measures for sediment control, and management practices and controls. Use of these management practices and controls would reduce the potential for erosion of disturbed soils.

Under the Proposed Action, demolition and construction activities would disturb approximately 4 acres at Non-Potable Reservoir #1.

Short-term erosion impacts could occur during ground-disturbing activities. Potential impacts would be minimized through proper management practices defined within the approved SWPPP. Standard construction practices that could be implemented to minimize soil erosion include:

- Use of protective cover, such as mulch, straw, or a combination of these protective coverings
- Use of silt fences, erosion bales, and/or erosion logs around staging areas and construction sites
- Implementation of site grading procedures to limit the time soils are exposed prior to being covered by impermeable surfaces or vegetation
- Implementation of storm water diversions to reduce water flow through exposed sites

- Retention of as many trees and shrubs as possible adjacent to exposed ground areas for use as natural windbreaks.

Upon completion of construction activities, maintenance of a vegetative cover or covering areas with riprap or gravel would serve as effective, long-term erosion control strategies for areas not covered with impervious surfaces.

Because management practices required by the NPDES General Permit and SWPPP would be implemented during construction activities, no significant impacts to soils are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.1.2 Upgrade Dam Alternative.

Potential geology and soils impacts from implementation of the Upgrade Dam Alternative would be similar to those described under the Proposed Action. Because standard construction practices would be implemented, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.1.3 No-Action Alternative.

Under the No-Action Alternative, no dam repair activities would occur at Non-Potable Reservoir #1. Therefore, no significant impacts to geology or soils are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.2 Water Resources

The potential effects of the Proposed Action and alternatives on water resources within the ROI are presented in this section.

4.4.2.1 Proposed Action.

Surface Water. As discussed under Geology and Soils, the proposed activities would be subject to NPDES General Permit requirements for the management of rainfall/runoff processes during the construction period. SWPPP requirements under the NPDES General Permit include an outline of the storm water drainage system for each discharge point, actual and potential pollutant contact, and surface water locations. The SWPPP would also incorporate storm water management controls. Compliance with the NPDES General Permit and associated SWPPP would minimize potential impacts to surface water quantity and quality.

After construction, erosion in the auxiliary spillway would be less than significant due to the design features. The design features of the auxiliary spillway include elements to address potential scour and erosion risk by reducing flow velocity and increasing residence time. The check dam and temporary retention of the storm water at the toe of the auxiliary spillway would reduce the flow velocity and diffuse and spread water flow traveling towards the railroad tracks and ultimately to Monument Creek. These design features would reduce the potential for erosion and scour of the railroad tracks and Monument Creek.

Under the Proposed Action, water would be drained (i.e., water within the reservoir would be used for irrigation and not replaced) from Non-Potable Reservoir #1 to conduct the excavation and repair to address the seepage loss. A jurisdictional wetland survey conducted by the USAFA for Non-Potable Reservoir #1 classified the reservoir as open water (URS, 2002). The reservoir does not meet the soils, vegetation, or hydrology criteria to be delineated as a jurisdictional wetland. However, Lehman's Run, which enters the western end of the reservoir, was classified as an intermittent streambed wetland and the small drainage at the toe of the dam was classified as emergent wetland (URS, 2002). Based on stipulations within the dam design analysis report, the Proposed Action would require permitting under Section 404 of the CWA. Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands (URS, 2014a).

Non-Potable Reservoir #1 is classified as a "Small Significant Hazard Dam," which means that, in the event of a dam failure, significant damage is expected to occur, but no loss of life is expected. Hazard modeling conducted for the dam indicated that, during a sunny day dam failure, there would be significant damage or destruction of the pump house and the Union Pacific Railroad located down-gradient and to the east of Non-Potable Reservoir #1 (URS, 2014a). As discussed earlier, the IDF for Non-Potable Reservoir #1 is the flood resulting from 45 percent of the PMP. The purpose of implementing the Proposed Action is to repair the dam to minimize the potential for catastrophic failure to prevent potential damage to downstream infrastructure. The new auxiliary spillway would follow an existing drainage path with flows eventually crossing the railroad track at grade. Given the terrain in the area, during a PMP event there would be no other practicable means of directing flows from the auxiliary spillway to Monument Creek regardless of proposed dam repair activities.

Floodplains. Non-Potable Reservoir #1, the dam, and the existing service spillway are within a 100-year flood zone (USAFA, 2008); therefore, a FONPA in accordance with EO 11988, Floodplain Management, is included with this EA because there is no practicable alternative to implementing dam repair activities outside of the flood zone. Since the auxiliary spillway would be used to convey water from the reservoir during a large storm event, this spillway would also be located within a 100-year flood zone. However, with implementation of the spillway design features, the risks associated with the flood zone would be less than significant.

Ground Water. Under the Proposed Action, there is no potential for direct contamination of ground water. There are no major sources of potential contamination at Non-Potable Reservoir #1 and construction activities would not introduce any contaminants with the potential to affect ground water. Therefore, no significant impacts to ground water are anticipated.

Mitigation Measures. No mitigation measures would be required. Measures identified as part of the Section 404 permit would be implemented to minimize potential impacts to jurisdictional waters/wetlands.

4.4.2.2 Upgrade Dam Alternative.

Surface Water. Potential surface water impacts from implementation of this alternative would be similar to those described under the Proposed Action. Under this alternative, construction activities would disturb approximately 2 acres during dam repair activities. Because management practices required by the NPDES General Permit and associated SWPPP would be implemented during construction activities, no significant impacts to surface water resources are anticipated.

Under the Upgrade Dam Alternative, water would be drained (i.e., water within the reservoir would be used for irrigation and not replaced) from Non-Potable Reservoir #1 to conduct the excavation and repair to address the seepage loss. A jurisdictional wetland survey for Non-Potable Reservoir #1 classified the

reservoir as open water (URS, 2002). The reservoir does not meet the soils, vegetation, or hydrology criteria to be delineated as a jurisdictional wetland. However, Lehman's Run, which enters the western end of the reservoir, was classified as an intermittent streambed wetland and the small drainage at the toe of the dam was classified as emergent wetland (URS, 2002). Based on stipulations within the dam design analysis report, the Proposed Action would require permitting under Section 404 of the CWA. Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands (URS, 2014a).

The Upgrade Dam Alternative would discharge flows (over the dam) to the toe of the dam where there is currently no adequate drainage infrastructure to convey these flows across the Union Pacific Railroad. Discharge flows over the dam would have the potential to cause erosion in the areas down gradient of where the water is allowed to overtop the dam and where flows cross the Union Pacific Railroad. Given the terrain in the area, during a PMP event there would be no other practicable means of directing flows that overtop the dam to Monument Creek regardless of proposed dam repair activities.

Ground Water. Potential ground water impacts from implementation of the Upgrade Dam Alternative would be similar to those described under the Proposed Action. Under the Upgrade Dam Alternative, there is no potential for direct contamination of ground water. There are no major sources of potential contamination at Non-Potable Reservoir #1 and construction activities would not introduce any contaminants with the potential to affect ground water. Therefore, no significant impacts to ground water are anticipated.

Mitigation Measures. No mitigation measures would be required. Measures identified as part of the Section 404 permit would be implemented to minimize potential impacts to jurisdictional waters/wetlands.

4.4.2.3 No-Action Alternative.

Under the No-Action Alternative, no dam repair activities would occur at Non-Potable Reservoir #1. Therefore, no significant impacts to water resources are anticipated during construction. However, approximately 75,000 gallons of water per day would continue to seep from the reservoir causing the potential for damage to downstream infrastructure. In addition, the presence of seepage, the over-steepened downstream slopes, and anticipated poor condition of the embankment piping have the potential for catastrophic failure in the future.

Mitigation Measures. No mitigation measures would be required.

4.4.3 Air Quality

The potential effects of the Proposed Action and alternatives on air quality within the ROI are presented in this section.

4.4.3.1 Proposed Action.

Activities associated with the Proposed Action, including demolition and construction activities, would not result in significant air quality impacts.

Although the EA includes the discussion of one additional alternative, Upgrade Dam Alternative, to the Proposed Action, the construction activities within the same 9-month period are expected to result in less air quality impacts as compared to the Proposed Action primarily due to much less quantity of material

export and import under the Upgrade Dam Alternative. Therefore, the air quality impact analysis is only conducted quantitatively for the Proposed Action and is discussed in this section.

The Proposed Action would involve operation of construction equipment and vehicles as a result of dam repair activities. Thus, potential air quality impacts are expected to result from the anticipated increase in construction emissions. Pollutant exhaust emissions generated by the construction activities were calculated for equipment using the U.S. EPA-developed NONROAD emission factor model and the equipment usage hours. The equipment operational hours are estimated based on RSMMeans handbook guidance. The change in on-site indirect vehicular emissions from trucks and workers commuting to and from the site were estimated using the EPA-MOVES emission factor model. The vehicular trip distance was based on default inputs from the same RSMMeans handbook guidance. The U.S. EPA AP-42, *Compilation of Air Pollution Emission Factors* (U.S. EPA, 1995), was used to predict fugitive dust emissions from vehicles traveling on paved roads and on-site material handling process including movement of construction equipment.

Clean Air Act General Conformity Rule Applicability. The Proposed Action would result in an increase in air emissions as compared to the baseline condition during the 9-month construction duration (Table 4-1). However, these net emissions would be well below the *de minimis* threshold for maintenance pollutant CO and a formal general conformity determination is not required. Therefore, the potential air quality impact is less than significant. The detailed emissions estimate can be found in Appendix B.

Attainment Criteria Pollutant and HAPs Emissions. Unlike the nonattainment or maintenance criteria pollutants, the *de minimis* levels have not been established for attainment criteria pollutants and HAPs emissions. This EA follows Air Force Instruction 32-7040 (June 8, 2011) and quantifies these emissions with the comparison of the relevant on-installation baseline annual stationary source emissions inventory for the purpose of informing the public and decision makers about the relative air quality impacts from the Proposed Action during the 9-month period under NEPA requirements. Since the increase in attainment pollutant and HAP emissions predicted for the proposed project for mobile sources (see Appendix B) would be temporary over a 9-month duration and is only a fraction of the baseline stationary source emissions inventory as summarized in Table 4-1, the Proposed Action would have a negligible and non-significant air quality impact with respect to attainment pollutants and HAPs.

Table 4-1. Total Net and Net Percent Increase in Construction Emissions (tons)

Alternative	VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂ ¹
Proposed Action	0.87	11.28	4.42	0.88	1.47	0.34	0.29	1,422.67
Baseline Emissions Inventory²	15.69	28.03	23.33	2.13	2.13	0.44	4.93	n/a
Maximum Net Percent Increase over Baseline Stationary Source Annual Emissions Inventory (%)	5.5	40.2	18.9	41.3	69.0	77.3	5.9	n/a
<i>De minimis</i> Threshold (tons)	n/a	n/a	100	n/a	n/a	n/a	n/a	n/a

Note: ¹ The unit is in metric tons converted from short tons. Source: ² USAFA, 2014e.

CO = carbon monoxide	PM _{2.5} = particulate matter equal to or greater than 2.5 microns in diameter
CO ₂ = carbon dioxide	PM ₁₀ = particulate matter equal to or greater than 10 microns in diameter
HAP = Hazardous Air Pollutant	SO ₂ = sulfur dioxide
n/a = not applicable	VOC = volatile organic compound
NO _x = nitrogen oxide	

Greenhouse Gas Emissions. The change in climate conditions caused by GHG resulting from the burning of fossil fuels from construction activities associated with the Proposed Action is a global effect and requires that the emissions be assessed on a global scale. Consequently, given the minimal increase predicted for the proposed project, which is well below the CEQ meaningful assessment threshold of 25,000 metric tons per year, the proposed project would result in an insignificant impact on overall global or U.S. cumulative GHG emissions and global climate change.

Mitigation Measures. No mitigation measures would be required.

4.4.3.2 Upgrade Dam Alternative.

This alternative incorporates a smaller area of construction during dam repair activities compared to the Proposed Action. Potential impacts to air quality would be similar to those described under the Proposed Action except that air emissions produced by construction would be somewhat less as compared to the Proposed Action given the smaller scale of repair activities.

Given the similar magnitude of development scale for this alternative and the Proposed Action, potential air quality impacts from this alternative would not be significant.

Mitigation Measures. No mitigation measures would be required.

4.4.3.3 No-Action Alternative.

Under the No-Action Alternative, no dam repair activities would occur at Non-Potable Reservoir #1. Therefore, no significant impacts to air quality are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.4 Biological Resources

The potential effects of the Proposed Action and alternatives on biological resources (e.g., vegetation, wildlife, threatened and endangered species, and sensitive habitats) within the ROI are presented in this section.

4.4.4.1 Proposed Action.

Vegetation. The Proposed Action would involve clearing and grubbing (i.e., removal of trees, shrubs, stumps, and rubbish) within the dam and work limits (spillway construction) and trimming of vegetation within the existing soil cement liner. Vegetation outside of the work limits would not require removal and would be protected to the extent feasible by limiting soil compaction and grade changes through protective fencing and minimizing branch pruning. The area around Non-Potable Reservoir #1 is composed of upland forest, upland grassland, and developed/disturbed areas.

The 4 acres of disturbance associated with establishing staging areas, installing the non-potable water by-pass line, implementing dam repair activities, and constructing the auxiliary spillway would not involve tree and brush removal for the entire disturbed area. The amount of clearing and grubbing of ponderosa pine woodland and grassland vegetation at the project site represents a small percentage of this vegetation in the region and would not represent a significant loss in the area. Ponderosa pine woodland areas surrounding Non-Potable Reservoir #1 would be retained to provide visual barriers to the property.

The Proposed Action would follow the Revegetation and Tree Care Standards provided in Section 01351 of the Final Reservoir Plans (Appendix C). No significant impacts to vegetation are anticipated.

Wildlife. The long-term loss of vegetation would affect wildlife by removing or altering habitat in the vicinity of Non-Potable Reservoir #1. Species likely to occupy the area are common and widespread within the ROI, and the loss of this habitat would not represent a significant impact to these wildlife species. Channel catfish and sterile grass carp have been stocked in Non-Potable Reservoir #1. Fish would be harvested and relocated during draining of the reservoir.

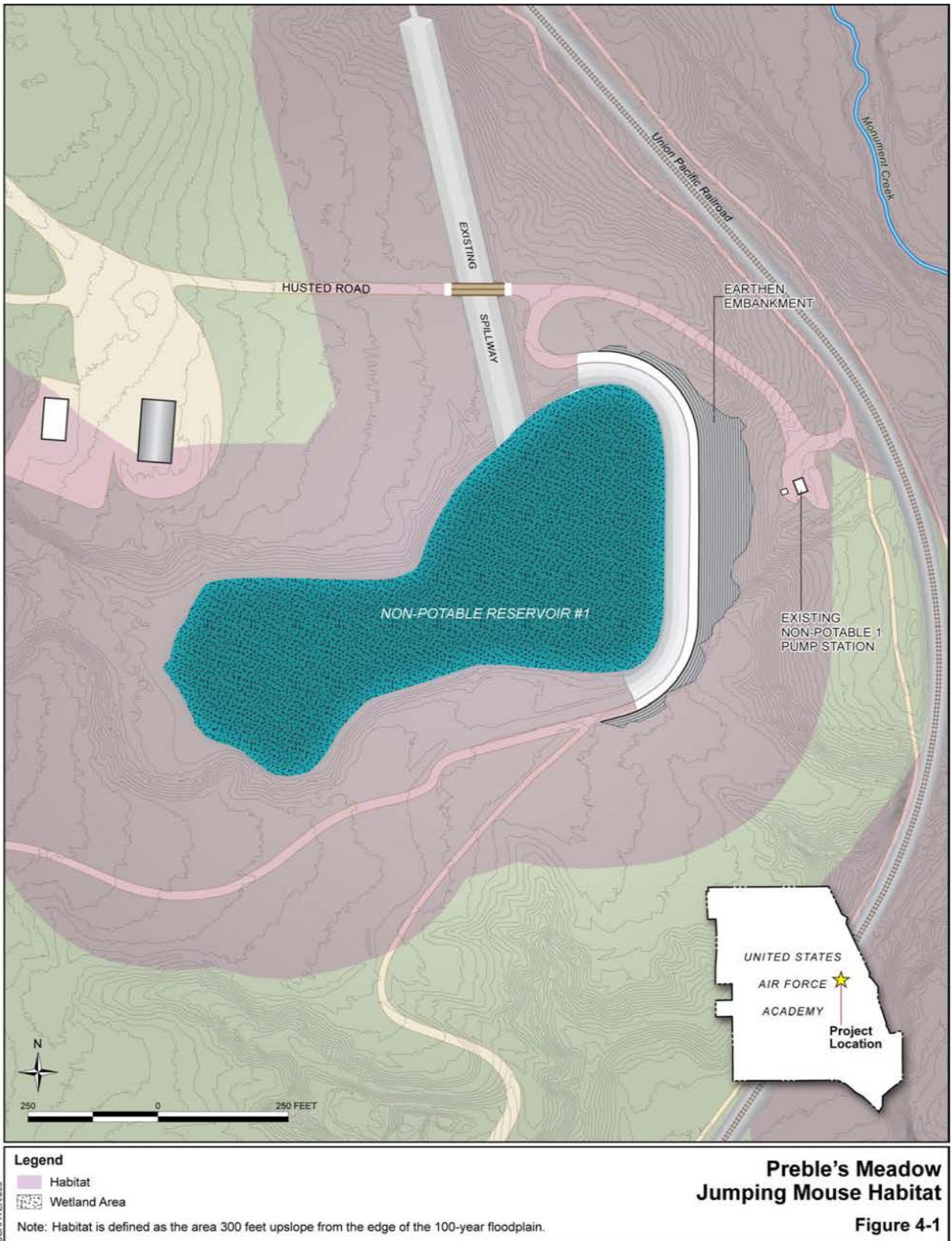
Threatened and Endangered Species. The Proposed Action is within habitat of the federally threatened Preble's meadow jumping mouse. PMJM habitat at the USAFA is defined as 300 feet upslope from the edge of the 100-year floodplain (Figure 4-1) (USAFA, 2008). The Proposed Action is consistent with the provisions of the USAFA's Conservation Agreement with the USFWS (April 12, 2000; 5-year renewal on December 15, 2009), allowing for repair and maintenance of existing infrastructure (USAFA, 2014d). Contractor staging areas would be established in existing cleared areas adjacent to the reservoir and located outside the PMJM Conservation Zone to the extent possible.

The Air Force and USFWS determined that Section 7 consultation would not be required as a result of the existing Conservation Agreement. The Air Force prepared a Memorandum for Record (Appendix A) clarifying that, in accordance with the Conservation Agreement, the USAFA and the construction contractor would be responsible for complying with the Terms and Conditions of the April 2000 Biological Opinion, including:

1. Workers onsite would be trained by a USAFA biologist as to the reason for, and importance of, limiting impacts to vegetated habitat outside the fenced work area.
2. Work would be supervised at all times by an onsite individual from the USAFA or by an authorized representative familiar with the PMJM and its habitat needs.
3. The area of proposed impacts for any maintenance or repair actions would be fenced with snow fence or a similar visible barrier to prevent inadvertent impacts to habitat outside the construction footprint.
4. In the unlikely event that a PMJM (dead, injured, or hibernating) is located during any proposed activities, the Service's Colorado Ecological Services Field Office or the Service's Law Enforcement Office would be contacted immediately after coordinating with the USAFA Natural Resource Manager (USAFA, 2014d).

Additionally, based on guidance provided by the USFWS for ditch maintenance activities, to the extent possible, the Proposed Action should be implemented during the PMJM hibernation season (November through April). If the Proposed Action is implemented during the PMJM breeding season (May through October), ground disturbing activities should be conducted during daylight hours only. To the extent possible, the Proposed Action work area access and disposition of construction related debris should avoid shrub habitat (USFWS 2000).

Cumulative PMJM habitat disturbance, from the Proposed Action and any other ongoing projects during the same calendar year would not exceed 12 acres without prior consultation with the USFWS.



Potential impacts to nesting great blue heron and other bird species protected under the MBTA would be avoided to the maximum extent possible. Depending on the nesting status of great blue heron, contractor staging areas could be located some distance from the worksite, as determined by the USFWS through MBTA consultation/coordination. Construction activities would be limited to the non-breeding season (September–January) within areas identified as having potential for nesting great blue heron. If construction work begins prior to an active nest condition, construction may be able to continue throughout the nesting/breeding/fledging period. If construction activities occur during the general avian breeding season (February–August) within areas known to have historically supported breeding great blue heron or other protected migratory bird species, pre-construction nesting bird surveys would be conducted (within 7 days of proposed activity) to identify active nests. If active nests are identified during pre-construction surveys, an avoidance buffer (distance per regulatory guidance and/or discretion of monitoring biologist) would be established and the nest would be monitored until the juvenile birds have fledged. No significant impacts to threatened and endangered species are anticipated.

Sensitive Habitats. The ROI is adjacent to a small portion of the Monument Creek Conservation Area. However, construction activities would not occur in this area; therefore, impacts to this area are not anticipated. In support of the proposed dam repair activities, the water level in Non-Potable Reservoir #1 would be lowered below the level of the dam excavation and a temporary cofferdam would be installed. The reservoir would be refilled after completion of dam repair activities resulting in no long-term impacts to jurisdictional waters/wetlands. Although Non-Potable Reservoir #1 is classified as open water, Lehman's Run, which enters the western end of the reservoir has been classified as an intermittent streambed wetland and the small drainage at the toe of the dam has been classified as emergent wetland (URS, 2002). The Proposed Action would require permitting under Section 404 of the CWA. Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands (URS, 2014a). Therefore, no significant impacts to sensitive habitats are anticipated.

Mitigation Measures. No mitigation measures would be required. Measures identified as part of the Section 404 permit would be implemented to minimize potential impacts to jurisdictional waters/wetlands.

4.4.4.2 Upgrade Dam Alternative.

Vegetation. The Upgrade Dam Alternative would involve clearing and grubbing (i.e., removal of trees, shrubs, stumps, and rubbish) within the dam and work limits and trimming of vegetation within the existing soil cement liner. Vegetation outside of the work limits would not require removal and would be protected to the extent feasible by limiting soil compaction and grade changes through protective fencing, and minimizing branch pruning. The area around Non-Potable Reservoir #1 is composed of upland forest, upland grassland, and developed/disturbed areas.

The 2 acres of disturbance associated with establishing staging areas, installing the non-potable water by-pass line, implementing dam repair activities, and modifying the earthen embankment by using an RCC overlay would not involve tree and brush removal for the entire disturbed area. The amount of clearing and grubbing of upland forest and grassland vegetation at the project site represents a small percentage of this vegetation in the region and would not represent a significant loss in the area. Upland forest areas surrounding Non-Potable Reservoir #1 would be retained to provide visual barriers to the property. The Upgrade Dam Alternative would follow the Revegetation and Tree Care Standards provided in Section 01351 of the Final Reservoir Plans (Appendix C). No significant impacts to vegetation are anticipated.

Wildlife. Potential impacts to wildlife from implementation of this alternative would be similar to those described under the Proposed Action. The long-term loss of vegetation would affect wildlife by removing or altering habitat in the vicinity of Non-Potable Reservoir #1. Species likely to occupy the area are

common and widespread within the ROI, and the loss of this habitat would not represent a significant impact to these wildlife species. Channel catfish and sterile grass carp have been stocked in Non-Potable Reservoir #1. Fish would be harvested and relocated during draining of the reservoir.

Threatened and Endangered Species. Potential impacts to threatened and endangered species from implementation of this alternative would be similar to those described under the Proposed Action. Proposed dam repair activities would occur within habitat of the federally threatened PMJM. The repair activities are consistent with the provisions of the USAFA's Conservation Agreement with the USFWS (April 12, 2000; 5-year renewal on December 15, 2009), allowing for repair and maintenance of existing infrastructure (USAFA, 2014d). In accordance with the Conservation Agreement, the USAFA and the construction contractor would be responsible for complying with the Terms and Conditions of the April 2000 Biological Opinion. Cumulative habitat disturbance, from the Upgrade Dam Alternative and any other ongoing projects during the same calendar year would not exceed 12 acres without prior consultation with the USFWS.

Potential impacts to nesting great blue heron and other bird species protected under the MBTA would be avoided to the maximum extent possible. Construction activities would be limited to the non-breeding season (September–January) within areas identified as having potential for nesting great blue heron. If construction work begins prior to an active nest condition, construction may be able to continue throughout the nesting/breeding/fledging period. If construction activities occur during the general avian breeding season (February–August) within areas known to have historically supported breeding great blue heron or other protected migratory bird species, pre-construction nesting bird surveys would be conducted (within 7 days of proposed activity) to identify active nests. If active nests are identified during pre-construction surveys, an avoidance buffer (distance per regulatory guidance and/or discretion of monitoring biologist) would be established and the nest would be monitored until the juvenile birds have fledged.

Sensitive Habitats. Potential impacts to sensitive habitats from implementation of this alternative would be similar to those described under the Proposed Action. The ROI is adjacent to a small portion of the Monument Creek Conservation Area; however, construction activities would not occur in this area; therefore, impacts to this area are not anticipated. In support of the proposed dam repair activities, the water level in Non-Potable Reservoir #1 would be lowered below the level of the dam excavation and a temporary cofferdam would be installed. The reservoir would be refilled after completion of dam repair activities resulting in no long-term impacts to jurisdictional waters/wetlands. Although Non-Potable Reservoir #1 is classified as open water, Lehman's Run, which enters the western end of the reservoir has been classified as an intermittent streambed wetland and the small drainage at the toe of the dam has been classified as emergent wetland (URS, 2002). Work within the reservoir would require permitting under Section 404 of the CWA. Measures identified as part of the Section 404 permit would be implemented to minimize impacts to jurisdictional waters/wetlands (URS, 2014a). Therefore, no significant impacts to sensitive habitats are anticipated.

Mitigation Measures. No mitigation measures would be required. Measures identified as part of the Section 404 permit would be implemented to minimize potential impacts to jurisdictional waters/wetlands.

4.4.4.3 No-Action Alternative.

Vegetation. Under the No-Action Alternative, no dam repair activities would occur. No significant impacts to vegetation are anticipated.

Wildlife. Under the No-Action Alternative, no dam repair activities would occur. No significant impacts to wildlife are anticipated.

Threatened and Endangered Species. Under the No-Action Alternative, no dam repair activities would occur. No significant impacts to threatened and endangered species are anticipated.

Sensitive Habitats. Under the No-Action Alternative, no dam repair activities would occur. No significant impacts to sensitive habitats are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.5 Cultural Resources

The potential effects of the Proposed Action and alternatives on cultural resources (e.g., prehistoric and historic archeological resources, historic buildings and structures, traditional cultural resources) within the ROI are presented in this section.

4.4.5.1 Proposed Action.

Prehistoric and Historic Archaeological Resources. Based on the May 2015 cultural resources survey and inventory, it was determined that the proposed dam repair activities at Non-Potable Reservoir #1 would not adversely affect cultural resources located within the APE because no resources eligible for listing on the National Register were identified. The proposed dam repair activities would be consistent with the function and design of the current features and the improvements would not detract from the resources' abilities to convey historical significance, nor would they detract from elements contributing to the historic significance of the USAFA (URS, 2015).

In the unlikely event that archaeological resources are encountered during construction activities, the construction contractor would suspend work in the immediate area, protect the site in place, and report the discovery to the USAFA Cultural Resources Manager to determine if additional investigation is required. In the event further investigation is required, any data recovery would be performed in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeological Documentation (48 FR 44734-37) and take into account the ACHP's publication, Treatment of Archaeological Properties. Subsequent actions would follow guidance provided in 36 CFR Part 800.11 and/or the Native American Graves Protection and Repatriation Act (NAGPRA). No significant impacts to archaeological resource are anticipated.

Historic Buildings and Structures. Non-Potable Reservoir #1 (Facility 10488) was evaluated by RNL for eligibility for listing in the National Register in 2013 and by URS in 2015. Based on the evaluations, the reservoir was recommended to be a non-contributing element to the proposed USAFA Master Plan Historic District (USAFA, 2013b and URS, 2015) and not individually eligible for inclusion on the National Register. The Colorado SHPO has concurred with this determination in a letter dated July 31, 2015 (see Appendix A). No significant impacts to historic buildings and structures are anticipated.

Traditional Cultural Resources. In accordance with DOD Instruction 4710.02 and the USAFA ICRMP, the USAFA is conducting ongoing consultations with representatives of Native American groups as required under AIRFA. The purpose of these consultations was to determine AIRFA-related concerns such as access to sites of past cultural activity, landforms, and components of the natural environment that may occur on the USAFA and are important to traditional religious practices of Native American groups. Sixteen of the 29 Native American groups consulted include the Cheyenne & Arapaho Tribes of Oklahoma, Comanche Nation of Oklahoma, Eastern Shoshone Tribe (Wind River Reservation), Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Northern Arapaho Tribe, Northern Cheyenne Tribe, Oglala Sioux Tribe, Pueblo of Taos, Rosebud Sioux Tribe, Southern Ute Indian Tribe,

Ute Indian Tribe (Uintah & Ouray Reservation), Ute Mountain Ute Tribe, and the Zuni Tribe of the Zuni Reservation. Based on consultation over the last four years with representatives from the 16 federally recognized tribes with cultural affiliation to USAFA lands, no traditional cultural resources, sacred areas, or traditional use areas have been identified in the vicinity of Non-Potable Reservoir #1. Therefore, no significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.5.2 Upgrade Dam Alternative.

Prehistoric and Historic Archaeological Resources. Potential impacts to prehistoric and historic archaeological resources under the Upgrade Dam Alternative would be similar to those described under the Proposed Action. No significant impacts are anticipated.

Historic Buildings and Structures. Potential impacts to historic buildings and structures under the Upgrade Dam Alternative would be similar to those described under the Proposed Action. No significant impacts are anticipated.

Traditional Cultural Resources. Potential impacts to traditional cultural resources would be similar to those discussed under the Proposed Action. No significant impacts are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.4.5.3 No-Action Alternative.

Under the No-Action Alternative, no dam repair activities would occur; therefore, no significant impacts to cultural resources are anticipated.

Mitigation Measures. No mitigation measures would be required.

4.5 UNAVOIDABLE AND ADVERSE ENVIRONMENTAL EFFECTS

Unavoidable adverse effects to rail transportation could result from implementation of the Proposed Action or the Upgrade Dam Alternative. Under the Proposed Action, there would be no other practicable means of directing flows from the auxiliary spillway to Monument Creek during a PMP event regardless of proposed dam repair activities. A similar situation would exist under the Upgrade Dam Alternative; there would be no other practicable means of directing flows that overtop the dam to Monument Creek during a PMP event regardless of proposed dam repair activities.

4.6 COMPATIBILITY OF THE PROPOSED ACTION WITH OBJECTIVES OF FEDERAL, STATE, REGIONAL, AND LOCAL LAND USE PLANS AND POLICIES

The Proposed Action and alternatives promote the efficient and economical use of America's real property assets in accordance with EO 13327, *Federal Real Property Asset Management*. This action enables and sustains the safe, suitable, and effective operation of functions at the USAFA. The Proposed Action and alternatives would not adversely affect federal, State, regional, or local land use plans and policies and are compatible with adjacent land uses.

4.7 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Proposed Action and alternatives would not affect the long-term productivity of the environment because no significant environmental impacts are anticipated, provided best management practices identified in this EA are implemented.

4.8 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable resource commitment refers to the use of nonrenewable sources and the effects these resources would have on future generations. Irreversible effects would result primarily from the consumption or destruction of a resource that could not be reversed. Irretrievable resource commitments would involve a loss or gain in the value of an affected resource that could not be reversed. The Proposed Action and alternatives would result in an irreversible or irretrievable commitment of resources such as labor, fuel, and demolished materials. Implementation of the Proposed Action or alternatives would not result in any significant irreversible or irretrievable commitment of resources.

4.9 CUMULATIVE ENVIRONMENTAL CONSEQUENCES

Cumulative impacts result from “the incremental impact of actions when added to other past, present, and reasonably foreseeable future actions, regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (Council on Environmental Quality, 1978).

Other future actions in the region were evaluated and considered within the analysis presented in this EA to determine whether cumulative environmental impacts could result from implementation of proposed dam repair activities in conjunction with other past, present, or reasonably foreseeable future actions. Other actions that would occur in the region include:

- proposed repair of Kettle Creek Dry Dam (east side of I-25)
- expansion of the AOG facility
- construction of a new golf course club house
- expansion of the cemetery
- demolition of the NCOA facility
- privatization of USAFA wet systems (potable water, non-potable water, and sewer).

The proposed repair of Kettle Creek Dry Dam would occur approximately 2.5 miles southeast of Non-Potable Reservoir #1, east of I-25. Due to the distant location of the Kettle Creek Dry Dam as well as downstream location in relation to the Proposed Action, no cumulative impacts are anticipated.

The expansion of the AOG facility, construction of the golf course club house, expansion of the cemetery, and demolition of the NCOA facility are on-installation projects that primarily involve ground disturbance and facility construction or demolition. The specific time period that these projects would occur is not yet established and may not occur while dam repair activities are occurring. Due to the distant location of these projects in relation to the Proposed Action, no cumulative impacts are anticipated.

Privatization of USAFA wet systems would result in a managerial change only. Continued operation and maintenance of the wet systems would occur to ensure services are provided at the USAFA. Therefore, no cumulative impacts from wet systems privatization are anticipated.

5.0 CONSULTATION AND COORDINATION

The federal, State, DOD, and other agencies/organizations/individuals contacted during the preparation of this EA are listed below:

Federal

U.S. EPA, Region 8
U.S. Fish and Wildlife Service

State

Colorado Department of Public Health and Environment
Colorado Division of Wildlife
Colorado State Historic Preservation Officer

Department of Defense

HQ AFCEC/CZN
10 CES/CEAN

Other

Cheyenne & Arapaho Tribes of Oklahoma
Comanche Nation of Oklahoma
Eastern Shoshone Tribe (Wind River Reservation)
Jicarilla Apache Nation
Kiowa Tribe of Oklahoma
Northern Arapaho Tribe
Northern Cheyenne Tribe
Ute Indian Tribe (Uintah & Ouray Reservation)
Oglala Sioux Tribe
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
Cheyenne River Sioux Tribe
Crow Tribe
Mescalero Apache Tribe
Pueblo of Taos
Rosebud Sioux Tribe
Zuni Tribe of the Zuni Reservation

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6.0 LIST OF PREPARERS AND CONTRIBUTORS

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7.0 BIBLIOGRAPHY

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8.0 DISTRIBUTION LIST

Federal Agencies

U.S. Environmental Protection Agency, Region 8
Director, Office of Federal Activities
999 18th Street, Suite 200
Denver, CO 80202-2466

U.S. Fish and Wildlife Service
Natural Resources Manager
8120 Edgerton Drive
U.S. Air Force Academy, CO 80840

State Agencies

Colorado Department of Public Health &
Environment
Federal Facilities, HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Colorado Department of Public Health &
Environment
Air Pollution Control Division, APCD-TS-B2
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Denver, CO 80246-1530

State Historic Preservation Office
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Colorado Division of Wildlife
Wildlife Manager
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Denver, CO 80216

Local Agencies

Apache Tribe of Oklahoma

Cheyenne & Arapaho Tribes of Oklahoma

Cheyenne River Sioux Tribe

Comanche Nation of Oklahoma

Crow Tribe

Eastern Shoshone Tribe (Wind River
Reservation)

Jicarilla Apache Nation

Kiowa Tribe of Oklahoma

Mescalero Apache Tribe

Northern Arapaho Tribe

Northern Cheyenne Tribe

Oglala Sioux Tribe

Pueblo of Taos

Rosebud Sioux Tribe

Southern Ute Indian Tribe

Ute Indian Tribe (Uintah & Ouray Reservation)

Ute Mountain Ute Tribe

Zuni Tribe of the Zuni Reservation

Department of Defense

Department of the Air Force
HQ AFCEC/CZN
3515 S. General McMullen, Building 171
San Antonio, TX 78236-2018

Department of the Air Force
10 CES/CEAN
8120 Edgerton Drive
U.S. Air Force Academy, CO 80840

Libraries

Pikes Peak Public Library
5550 N. Union Boulevard
Colorado Springs, CO 80918

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APPENDIX A

CONSULTATION LETTERS



**DEPARTMENT OF THE AIR FORCE
10TH CIVIL ENGINEER SQUADRON
USAF ACADEMY COLORADO**

MEMORANDUM FOR RECORD

SUBJECT: Endangered Species Act Consultation, Repair Non-Potable Reservoir #1

FOR: Jennifer McCorkle, 10 CES/CECP

After reviewing the engineering design for the repair and flood protection improvements of Non-Potable Reservoir #1, I have determined that the scope of the project, and the probable disturbance of adjacent protected habitat of the federally threatened Preble's meadow jumping mouse (*Zapus hudsonius preblei*), is consistent with the provisions of the U.S. Air Force Academy's (Academy) Conservation Agreement with the U.S. Fish and Wildlife Service (USFWS) (April 12, 2000; 5-year renewal on December 15, 2009), allowing for repair and maintenance of existing infrastructure. Section 7 consultation with the USFWS, therefore, will not be required, however, in accordance with the Agreement, the Academy and the construction contractor shall be responsible for complying with the Terms and Conditions of the April 2000 Biological Opinion, including:

1. Workers onsite will be trained by an Academy biologist as to the reason for, and importance of, limiting impacts to vegetated habitat outside the fenced work area.
2. Work will be supervised at all times by an onsite individual from Academy or by an authorized representative familiar with Preble's and its habitat needs.
3. The area of proposed impacts for any maintenance or repair actions will be fenced with snow fence or a similar visible barrier to prevent inadvertent impacts to habitat outside the construction footprint.
4. In the unlikely event that a Preble's (dead, injured, or hibernating) is located during any proposed activities, the Service's Colorado Ecological Services Field Office (303) 275-2370 or the Service's Law Enforcement Office (303) 274-3560 will be contacted immediately after coordinating with the Academy's Natural Resources Manager.

In accordance with the Agreement, The Academy and construction contractor shall be responsible for restoring all disturbed habitat areas per the base's Erosion Control, Revegetation, and Tree Care standards. Cumulative habitat disturbance, from this project and any other ongoing projects during the same calendar year, shall not exceed 12 acres without prior consultation with USFWS.

Any questions concerning this MFR should be directed to Dr. Brian Mihlbachler, Natural Resources Manager, at (719) 333-3308 or brian.mihlbachler@us.af.mil.

A handwritten signature in black ink, appearing to read "Brian S. Mihlbachler", followed by the date "9 OCT 2014".

Brian S. Mihlbachler, PhD
USAF Natural Resources Manager



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Edward C. Nichols
State Historic Preservation Office
Colorado History Museum
1300 Broadway
Denver CO 80203-2137

Dear Mr. Nichols

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1. The dam is located within USAFA, in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

The proposed dam repair activities include the dam embankment and concrete liner; replacement of the intake and outlet pipes; construction of a new auxiliary spillway and installation of by-pass pipes and an overflow line to allow drainage and by-pass of the reservoir during repair activities. There are no known archaeological resources or sites of potential interest to tribes located in the vicinity of the proposed project location.

Please review the attachment and submit any comments you might have no later than 30 days from the receipt of this letter to my POC Ms. Vicki Williams, 10 CES/CENP, victoria.williams@usafa.af.mil, at (719) 333-7341 or mail to 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840.

Sincerely


JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Apache Tribe of Oklahoma
Attn: Donnie Cabaniss
Chairman
P.O. Box 1330
Anadarko OK 73005

Dear Mr. Cabaniss

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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Lieutenant Colonel Jose L. Rivera
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10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Cheyenne & Arapaho Tribes of Oklahoma
Attn: Eddie Hamilton
Governor
P.O. Box 38
Concho OK 73022

Dear Mr. Hamilton

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

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Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Cheyenne River Sioux Tribe
Attn: Kevin Keckler
Chairman
P.O. Box 590
Eagle Butte SD 57625

Dear Mr. Keckler

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



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10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
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10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Comanche Nation of Oklahoma
Attn: Wallace Coffey
Chairman
P.O. Bpx 908
Lawton OK 73502

Dear Mr. Coffey

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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Sincerely


JOSE L. RIVERA, Lt Col, USAF, P.E.

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10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Crow Nation
Attn: Darrin Old Coyote
Chairman
P.O. Box 159
Crow Agency MT 59022

Dear Mr. Old Coyote

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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Sincerely

A handwritten signature in black ink, appearing to read "Jose L. Rivera".

JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



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10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Eastern Shoshone Tribe (Wind River Reservation)
Attn: Darwin St. Clair Jr.
Chairman
P.O. Box 538
Fort Washakie WY 82514

Dear Mr. St. Clair Jr.

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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Sincerely



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DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Jicarilla Apache Nation
Attn: Ty Vicenti
President
P.O. Box 507
Dulce NM 87528

Dear Mr. Vicenti

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Please review the attachment and submit any comments you might have no later than 45 days from the receipt of this letter to my POC Ms. Vicki Williams, 10 CES/CENP, victoria.williams@usafa.af.mil, at (719) 333-7341, or mail to 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840.

Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Kiowa Tribe of Oklahoma
Attn: Amber Toppah
Chairman
P.O. Box 369
Carnegie OK 73015

Dear Ms. Toppah

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Mescalero Apache Tribe
Attn: Danny Breuninger
President
P.O. Box 227
Mescalero NM 88340

Dear Mr. Breuninger

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Northern Arapho Tribe
Attn: Darryll O'Neal, Sr
Chairman
P.O. Box 396
Fort Washakie WY 82514

Dear Mr. O'Neal, Sr

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Northern Cheyenne Tribe
Attn: Llevando Fisher
President
P.O. Box 128
Lame Deer MT 59043

Dear Mr. Fisher

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Oglala Sioux Tribe
Attn: Bryan Brewer
President
P.O. Box 2070
Pine Ridge SD 57770

Dear Mr. Brewer

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Pueblo of Taos
Attn: Clyde M. Romero, Sr
Governor
P.O. Box 1846
Taos NM 87571

Dear Mr. Romero, Sr

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Rosebud Sioux Tribe
Attn: Cyril Scott
President
P.O. Box 430
Rosebud SD 57570

Dear Mr. Scott

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Sincerely

A handwritten signature in black ink, appearing to read "Jose L. Rivera".

JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Southern Ute Indian Tribe
Attn: Clement Frost
Chairman
P.O. Box 737
Ignacio CO 81137

Dear Mr. Frost

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JOSE L. RIVERA, Lt Col, USAF, P.E.

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Draft EA for Dam Repair at Non-Potable Reservoir #1



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ute Indian Tribe (Uintah & Ouray Reservation)
Attn: Gordon Howell
Chairman
P.O. Box 190
Ft. Duchesne UT 84026

Dear Mr. Howell

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10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ute Mountain Ute Tribe
Attn: Manuel Heart
Chairman
P.O. Box JJ
Towaoc CO 0

Dear Mr. Heart

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JOSE L. RIVERA, Lt Col, USAF, P.E.

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DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ute Mountain Ute Tribe
Attn: Lynn Hartman
Contractor Administrator
P.O. Box 468
Towaoc CO 81334

Dear Ms. Hartman

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DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

DEC 12 2014

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Zuni Tribe of the Zuni Reservation
Attn: Arlen P. Quetawki, Sr.
Governor
P.O. Box 339
Zuni NM 87327

Dear Mr. Quetawki, Sr.

Attached, please find a draft Environmental Assessment (EA) USAFA has prepared in accordance with the National Environmental Policy Act (NEPA) to evaluate the potential environmental impacts of repairing the dam at Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
Draft EA for Dam Repair at Non-Potable Reservoir #1



20 April 2015

HC #67186

Jose L. Rivera
Lt Col, USAF, P.E.
United States Air Force Academy
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAS Academy, CO 80840-2400

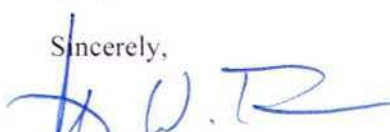
RE: Proposed Dam Repairs to Non-Potable Reservoir #1, United States Air Force Academy,
El Paso County

Dear Lt Col Rivera:

Thank you for your recent correspondence received 15 April 2015, concerning the proposed repairs and new construction associated with Non-Potable Reservoir #1. Our office has reviewed the additional submitted materials, which establish an Area of Potential Effect (APE) for the proposed undertaking. We believe that this proposed APE is acceptable and covers the areas that might be affected (directly or indirectly) by the proposed undertaking. We look forward to continuing our work with your office on this project as it moves forward.

If you have any questions, please contact Joseph Saldibar, Architectural Services Manager, at (303) 866-3741.

Sincerely,



Edward C. Nichols
State Historic Preservation Officer, and
President, Colorado Historical Society

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
303-866-3392 * Fax 303-866-2711 * E-mail: oahp@state.co.us * Internet: www.historycolorado.org



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Mr. Henry Little Bird, Sr.
Cheyenne & Arapaho Tribes of Oklahoma
200 Wolf Robe Circle P.O. Box 203
Geary OK 73040

Dear Mr. Little Bird

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

On January 20, 2015, the Colorado State Historic Preservation Office asked USAFA to define the undertaking's Area of Potential Effect (APE), complete a Cultural Resources Survey for the APE and forward the information to Tribal Historic Preservation Offices for review and comment. The attached 95% draft survey was completed by a team of qualified archeologists. It discusses the background, methods, uses, and survey results of the survey. The survey clarifies there are no above ground, culturally significant artifacts or sites located in the vicinity of the proposed project. The 100% report will incorporate any typographical edits; the report's substance will not be altered.

In accordance with 36 CFR § 800.5(b), USAFA proposes a finding of "no adverse effect" for the repair Non-Potable Reservoir #1.

Please review the attachment and submit any comments you might have no later than 45 days from the receipt of this letter to Ms. Vicki Williams, Cultural Resources Manager, at victoria.williams@usafa.af.mil or 10 CES/CENP, 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840. Ms. Williams may also be contacted to answer any questions you might have at (719) 333-7341. We thank you for your review and assistance.

Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Chief Willey
Cheyenne & Arapaho Tribes of Oklahoma
11176 Chisholm Road
Geary OK 73040



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ms. Karen Little Coyote
Cheyenne & Arapaho Tribes of Oklahoma
200 Wolf Robe Circle P.O. Box 145
Concho OK 73022

Dear Ms. Little Coyote

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Joe Big Medicine
Cheyenne & Arapaho Tribes of Oklahoma
620 S. Weigle
Watonga OK 73772



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Harold Frazier
Cheyenne River Sioux Tribe
P.O. Box 590 98 South Willow Street
Eagle Butte SD 57625

Dear Chairman Frazier

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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In accordance with 36 CFR § 800.5(b), USAFA proposes a finding of "no adverse effect" for the repair Non-Potable Reservoir #1.

Please review the attachment and submit any comments you might have no later than 45 days from the receipt of this letter to Ms. Vicki Williams, Cultural Resources Manager, at victoria.williams@usafa.af.mil or 10 CES/CENP, 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840. Ms. Williams may also be contacted to answer any questions you might have at (719) 333-7341. We thank you for your review and assistance.

Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Steve Vance
Cheyenne River Sioux Tribe
P.O. Box 590 98 South Willow Street
Eagle Butte SD 57625



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Mr. Edward C. Nichols
State Historic Preservation Office
Colorado History Museum
1300 Broadway
Denver CO 80203-2137

Dear Mr. Nichols

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within the USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities.

In accordance with your January 2, 2015 correspondence, USAFA is pleased to submit the attached 95% draft of the cultural resources survey for the proposed undertaking's Area of Potential Effect (APE). The APE delineation was approved by your staff on April 20, 2015. The survey was completed by a team of qualified archeologists. It discusses the background, methods used, and survey results of the cultural resource survey. The survey clarifies there are no above ground, culturally significant artifacts or sites located in the vicinity of the proposed project. The 100% report will incorporate any typographical edits; the report's substance will not be altered. USAFA is concurrently sending the survey to Federally-Recognized Tribes with cultural affiliation to USAFA lands for their review and comment.

In accordance with 36 CFR § 800.5(b), USAFA proposes a finding of "no adverse effect" for the repair Non-Potable Reservoir #1.

Please contact Ms. Vicki Williams, 10 CES/CENP, victoria.williams@usafa.af.mil, (719) 333-7341, if you have any questions. We thank you for your review and assistance.

Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Tom Koehan, Historical Architect
National Park Service
12795 W Alameda Parkway
Lakewood, CO 80228-2838



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

President Ty Vicenti
Jicarilla Apache Nation
P.O. Box 507
Dulce NM 87528

Dear President Vicenti

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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In accordance with 36 CFR § 800.5(b), USAFA proposes a finding of "no adverse effect" for the repair Non-Potable Reservoir #1.

Please review the attachment and submit any comments you might have no later than 45 days from the receipt of this letter to Ms. Vicki Williams, Cultural Resources Manager, at victoria.williams@usafa.af.mil or 10 CES/CENP, 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840. Ms. Williams may also be contacted to answer any questions you might have at (719) 333-7341. We thank you for your review and assistance.

Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Dr. Jeffrey Blythe
Jicarilla Apache Nation
P.O. Box 1367
Dulce NM 87528



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Amber Toppah
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie OK 73015

Dear Chairman Toppah

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Ms. Amie Tah-bone
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie OK 73105



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

President Danny Breuninger
Mescalero Apache Tribe
P.O. Box 227
Mescalero NM 88340

Dear President Breuninger

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Ms. Holly Houghten
Mescalero Apache Tribe
P.O. Box 227
Mescalero NM 88340



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Dean Goggles
Northern Arapaho Tribe
P.O. Box 396
Fort Washakie WY 82514

Dear Chairman Goggles

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Yufna Soldier Wolf
Northern Arapaho Tribe
P.O. Box 369
Fort Washakie WY 82514



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

President Llevando Fisher
Northern Cheyenne Tribe
P.O. Box 128
Lame Deer MT 59043

Dear President Fisher

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. James Walks Along
Northern Cheyenne Tribe
P.O. Box 128
Lame Deer MT 59043



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

President John Yellow Bird Steele
Oglala Sioux Tribe
P.O. Box 2070
Pine Ridge SD 57770

Dear President Yellow Bird Steele

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Sincerely



JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Dennis Yellow Thunder
Oglala Sioux Tribe
P.O. Box 129
Kyle SD 57752



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Governor Luis Romero
Pueblo of Taos
P.O. Box 1846
Taos NM 87571

Dear Governor Romero

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Lt. Gov. Edwin Concha
Pueblo of Taos
P.O. Box 1846
Taos NM 87571



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Manuel Heart
Ute Mountain Ute Tribe
P.O. Box JJ
Towaoc CO 81334-0248

Dear Chairman Heart

The United States Air Force Academy (USafa) proposes to repair Non-Potable Reservoir #1, located within USafa in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Terry Knight, Sr.
Ute Mountain Ute Tribe
P.O. Box 468
Towaoc CO 81334

cc:
Ms. Lynn Hartman
Ute Mountain Ute Tribe
P.O. Box 468
Towaoc, CO 81334



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

President Cyril Scott
Rosebud Sioux Tribe
P.O. Box 430
Rosebud SD 57570

Dear President Scott

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Russell Eagle Bear
Rosebud Sioux Tribe
P.O. Box 430
Rosebud SD 57570



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Clement Frost
Southern Ute Indian Tribe
356 Ouray Drive, P.O. Box 737
Ignacio CO 81137

Dear Chairman Frost

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Alden B. Naranjo
Southern Ute Indian Tribe
P.O. Box 737
Ignacio CO 81137



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Shaun Chapoose
Ute Indian Tribe
P.O. Box 190
Ft. Duchesne UT 84026

Dear Chairman Chapoose

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Ms. Betsy Chapoose
Ute Indian Tribe
P.O. Box 190
Ft. Duchesne UT 84026



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Governor Zal Panteah
Zuni Pueblo
P.O. Box 339
Zuni NM 87327

Dear Governor Panteah

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Sincerely


JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Kurt Dongoske
Zuni Pueblo
P.O. Box 1149
Zuni NM 87327



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Wallace Coffey
Comanche Nation of Oklahoma
P.O. Box 908
Lawton OK 73502

Dear Chairman Coffey

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Jimmy Aterberry
Comanche Nation of Oklahoma
P.O. Box 908
Lawton OK 73502



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Darwin St. Clair, Jr.
Eastern Shoshone Tribe
P.O. Box 538
Fort Washakie WY 82514

Dear Chairman St. Clair

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Wilford Ferris, III
Eastern Shoshone Tribe
P.O. Box 538
Fort Washakie WY 82514



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Head Councilman Phillip Vicenti
Zuni Pueblo
P.O. Box 339
Zuni NM 87327

Dear Head Councilman Vicenti

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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In accordance with 36 CFR § 800.5(b), USAFA proposes a finding of "no adverse effect" for the repair Non-Potable Reservoir #1.

Please review the attachment and submit any comments you might have no later than 45 days from the receipt of this letter to Ms. Vicki Williams, Cultural Resources Manager, at victoria.williams@usafa.af.mil or 10 CES/CENP, 8120 Edgerton Drive, Suite 40, USAF Academy CO 80840. Ms. Williams may also be contacted to answer any questions you might have at (719) 333-7341. We thank you for your review and assistance.

Sincerely


JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey



DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

War Chief Robert Espinosa
Pueblo of Taos
P.O. Box 1846
Taos NM 87571

Dear War Chief Espinosa

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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10TH MISSION SUPPORT GROUP
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Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ms. Downita Knight
Cheyenne River Sioux Tribe
P.O. Box 590 98 South Willow Street
Eagle Butte SD 57625

Dear Ms. Knight

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Ms. Donna Rae Peterson
Cheyenne River Sioux Tribe
P.O. Box 590 98 South Willow Street
Eagle Butte SD 57625

Dear Ms. Peterson

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Lyman Gui
Apache Tribe of Oklahoma
P.O. Box 1330
Anadarko OK 73005

Dear Chairman Gui

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Governor Eddie Hamilton
Cheyenne & Arapaho Tribes of Oklahoma
P.O. Box 38
Concho OK 73022

Dear Governor Hamilton

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Mr. Max Bear
Cheyenne & Arapaho Tribes of Oklahoma
200 Wolf Robe Circle P.O. Box 145
Concho, OK 73022

Dear Mr. Bear

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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DEPARTMENT OF THE AIR FORCE
10TH MISSION SUPPORT GROUP
USAF ACADEMY COLORADO

JUN 30 2015

Lieutenant Colonel Jose L. Rivera
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy CO 80840-2400

Chairman Darrin Old Coyote
Crow Nation
P.O. Box 159
Crow Agency MT 59022

Dear Chairman Old Coyote

The United States Air Force Academy (USAFA) proposes to repair Non-Potable Reservoir #1, located within USAFA in El Paso County, Colorado, approximately one-half mile east of Falcon Stadium. The proposed undertaking includes repair of the dam embankment and concrete liner, replacement of the intake and outlet pipes, construction of a new auxiliary spillway, and installation of by-pass pipes and an overflow line to allow drainage of the reservoir during repair activities. Approximately 35 acres of ground will be disturbed during construction of the project.

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JOSE L. RIVERA, Lt Col, USAF, P.E.

Attachment:
95% Draft Cultural Resources Survey

cc:
Mr. Emerson Bull Chief
Crow Nation
P.O. Box 159
Crow Agency MT 59022

-----Original Message-----

From: atahbone@kiowatribe.org [<mailto:atahbone@kiowatribe.org>]

Sent: Friday, July 24, 2015 7:12 AM

To: WILLIAMS, VICTORIA D GS-13 USAF USAFA 10 CES/CENP

Subject: Kiowa Tribe Response to Reservoir Improvements, El Paso County

Dear Ms. Williams,

Thank you for informing the Kiowa Tribe of Oklahoma about the above referenced project. By initiating Section 106 consultation, we are allowed an opportunity to determine the potential effects that a project may have on cultural resources that are important to our tribe.

We made the conclusion of "no historic properties affected." If, however, any additional information becomes available our assessment may be revised. In the event that any archaeological or historical objects/materials are discovered during this project, the Kiowa Tribe requests that all work ceases, the area is secured, and that the Tribe is immediately notified.

Thank you for initiating the Section 106 consultation process. Any questions or comments regarding our determination of "no historic properties affected" can be forwarded to atahbone@kiowatribe.org.

Sincerely,

Amie Tah-Bone
Museum Director/NAGPRA Representative
Kiowa Tribe of Oklahoma
P.O. Box 369
Carnegie, OK. 73015
580-654-2300 ext. 370

Avast logo <<https://www.avast.com/antivirus>>

Avast antivirus software.

www.avast.com <<https://www.avast.com/antivirus>>

This email has been checked for viruses by

From: Jimmy Arterberry [jimmya@comanchenation.com]
Sent: Friday, July 24, 2015 8:48 AM
To: WILLIAMS, VICTORIA D GS-13 USAF USAFA 10 CES/CENP
Subject: RE: USAFA Non-Potable Reservoir #1

In response to your request, the above referenced project has been reviewed by staff of this office. Based on the information provided and a search within the Comanche Nation Site Files, we have determined that there are **no properties** affected by the proposed undertaking.

If you require additional information or are in need of further assistance, please contact this office at (580) 595-9960 or 9618.

This review is performed in order to identify and preserve the Comanche Nation and State's cultural heritage, in conjunction with the State Historic Preservation Office.

Jimmy W. Arterberry, THPO
Comanche Nation
#6 SW 'D' Avenue, Suite C
Lawton, Oklahoma 73502
(580) 595-9960 or 9618
(580) 595-9733 FAX

This message is intended only for the use of the individuals to which this e-mail is addressed, and may contain information that is privileged, confidential and exempt from disclosure under applicable laws. If you are not the intended recipient of this e-mail, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this e-mail in error, please notify the sender immediately and delete this e-mail from both your "mailbox" and your "trash." Thank you.

From: WILLIAMS, VICTORIA D GS-13 USAF USAFA 10 CES/CENP [victoria.williams@us.af.mil]
Sent: Friday, July 24, 2015 10:01 AM
To: Jimmy Arterberry
Subject: Request for consultation for proposed undertaking - USAFA Non-Potable Reservoir #1

Mr. Arterberry, please review and respond to proposed project per our discussion this morning.

Very Respectfully,
Vicki

Vicki Williams, AICP
Community Planner
Cultural Resources Manager
USAFA Tribal Liaison
10 CES/CENP
8120 Edgerton Drive Suite 40
United States Air Force Academy, CO 80840-2400

Email: victoria.williams@us.af.mil
Phone: (719) 333-7341
FAX: (719) 333-0475
DSN: 333-7341

From: WILLIAMS, VICTORIA D GS-13 USAF USAFA 10 CES/CENP <victoria.williams@us.af.mil>
Sent: Wednesday, August 05, 2015 9:17 AM
To: MCCORKLE, JENNIFER L CTR USAF USAFA 10 CES/CENPP
Subject: FW: Proposal to repair non potable reservoir#1

fyi

V/R

Vicki

//SIGNED//

Vicki Williams, AICP
Community Planner
Cultural Resources Manager
Installation Tribal Liaison Officer

10 CES/CENP
8120 Edgerton Drive Suite 40
United States Air Force Academy, CO 80840-2400

Email: victoria.williams@us.af.mil
Phone: (719) 333-7341
FAX: (719) 333-0475
DSN: 333-7341

-----Original Message-----

From: Yufna Soldier Wolf [<mailto:yufnanathpo@gmail.com>]
Sent: Thursday, July 09, 2015 12:44 PM
To: WILLIAMS, VICTORIA D GS-13 USAF USAFA 10 CES/CENP
Subject: Proposal to repair non potable reservoir#1

Vitoria,

Hello. I am contacting in regards to this project.

This is a courteous email to let you know I am reviewing the disk and will be getting back to you with a review and comments.

Thanks!

--

Yufna Soldier Wolf
NATHPO-Director
307-840-0837 call or text Cell
307-856-1628 Office call or lv msg



25 August 2015

HC #67186

Jose L. Rivera, Lt Col, USAF, P.E.
Commander
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy, CO 80840-2400

RE: Non-Potable Reservoir #1 Repairs and Redesign, United States Air Force Academy,
El Paso County

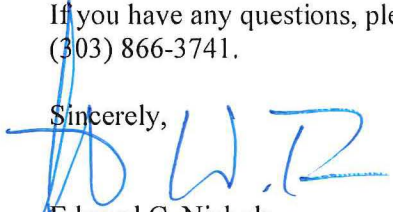
Dear Lt Col Rivera:

Thank you for your recent correspondence received 2 July 2015, concerning the proposed repairs and renovations to the Non-Potable Reservoir #1 and the surrounding area. The Reservoir is located within the boundaries of the United States Air Force Academy Historic District (5EP.595), a National Register-eligible district. Our office has reviewed the submitted materials. We believe that the Reservoir has been sufficiently altered over time as to not retain sufficient integrity to be considered a contributing building within the eligible District. However, very little information was provided that related to the role that these Non-Potable Reservoirs played in the development of the Academy. Other, similar reservoirs may be eligible under Criterion A if they retain significant integrity.

We concur with your assessment that the proposed project will have no adverse effect on historic properties. The historic property, in this case, is the segment of the Denver & Rio Grande Railroad (5EP.2181.5) that we identified in our December 2014 letter. There appear to be no other historic properties within the Area of Potential Effect.

If you have any questions, please contact Joseph Saldibar, Architectural Services Manager, at (303) 866-3741.

Sincerely,



Edward C. Nichols
State Historic Preservation Officer, and
President, Colorado Historical Society

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION

303-866-3392 * Fax 303-866-2711 * E-mail: oa hp@state.co.us * Internet: www.historycolorado.org

APPENDIX B

GENERAL CONFORMITY RULE

AND

CRITERIA AND HAZARDOUS POLLUTANTS AND

GREENHOUSE GAS EMISSIONS ANALYSIS

B.1 Introduction

This appendix provides the following analyses of potential air quality impacts:

- Criteria and hazardous pollutants emissions analysis and Clean Air Act (CAA) general conformity rule applicability analysis
- Greenhouse gas analysis.

B.2 Clean Air Conformity

The 1990 amendments to the CAA require federal agencies to ensure that their actions conform to the appropriate State Implementation Plan (SIP) in a nonattainment area. The SIP provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS); it includes emission limitations and control measures to attain and maintain the NAAQS. Conformity to an SIP, as defined in the CAA, means conformity to an SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of the standards. The federal agency responsible for a proposed action is required to determine if its proposed action conforms to the applicable SIP.

The U.S. Environmental Protection Agency (EPA) has developed two sets of conformity regulations; federal actions are differentiated into transportation projects and non-transportation-related projects:

- Transportation projects, which are governed by the "transportation conformity" regulations (40 Code of Federal Regulations [CFR] Parts 51 and 93), effective on December 27, 1993 and revised on August 15, 1997.
- Non-transportation projects which are governed by the "general conformity" regulations (40 CFR Parts 6, 51 and 93) described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* published in the *Federal Register* on November 30, 1993. The general conformity rule became effective January 31, 1994, and was revised on March 24, 2010.

Since the Proposed Action is not a transportation project, the general conformity regulation applies. The general conformity applicability analysis is prepared for the proposed project that includes an increase in construction at the U.S. Air Force Academy (USAFA) in El Paso County, Colorado.

B.3 General Conformity

B.3.1 Attainment and Nonattainment Areas

The general conformity rule applies to federal actions occurring in air basins designated as nonattainment for the NAAQS or in maintenance areas (a maintenance area is one that has been redesignated from nonattainment status and has an approved maintenance plan under Section 175 of the CAA). Federal actions occurring in air basins that are in attainment with the NAAQS are not subject to the conformity rule.

A criteria pollutant is a pollutant for which an air quality standard has been established under the CAA. The designation of nonattainment is based on the exceedances or violations of the air quality standard. A

maintenance plan establishes measures to control emissions to ensure the air quality standard is maintained in areas that have been redesignated as attainment from a previous nonattainment status.

Under the requirements of the 1970 CAA, as amended in 1977 and 1990, the U.S. EPA established NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), inhalable particulate matter (PM₁₀ and PM_{2.5}), and lead (Pb).

Areas that meet the NAAQS for a criteria pollutant are designated as being in “attainment”; an area where a pollutant level exceeds the corresponding NAAQS is designated as being in “nonattainment.” O₃ nonattainment areas are subcategorized based on the severity of their pollution problem (marginal, moderate, serious, severe, or extreme). PM₁₀ and CO nonattainment areas are classified as moderate or serious. When insufficient data exist to determine an area’s attainment status, it is designated unclassifiable (or in attainment).

The Proposed Action would take place at the USAFA in El Paso County, Colorado, an area that is currently designated as a maintenance area for CO and an attainment/unclassified area for the other criteria pollutants.

B.3.2 De Minimis Emissions Levels

To focus general conformity requirements on those federal actions with the potential to have significant air quality impacts, threshold (*de minimis*) rates of emissions were established in the final rule. A formal conformity determination is required when the annual net total of direct and indirect emissions from a federal action occurring in a nonattainment or maintenance area for a criteria pollutant would equal or exceed the annual *de minimis* level for that pollutant. Table B-1 lists the *de minimis* levels for each pollutant.

Table B-1. De Minimis Emission Levels for Criteria Air Pollutants

Pollutant	Nonattainment Designation	Tons/Year
Ozone*	Serious	50
	Severe	25
	Extreme	10
	Other nonattainment or maintenance areas outside ozone transport region	100
	Marginal and moderate nonattainment areas inside ozone transport region	50/100**
Carbon Monoxide	All	100
Sulfur Dioxide	All	100
Lead	All	25
Nitrogen Dioxide	All	100
Particulate Matter ≤ 10 microns	Moderate	100
	Serious	70
Particulate Matter ≤ 2.5 microns***	All	100

Notes: * Applies to ozone precursors – volatile organic compounds (VOCs) and nitrogen oxides (NO_x); ** VOC/NO_x; *** Applies to PM_{2.5} and its precursors.

For a CO maintenance area, the *de minimis* level of 100 tons per year (tpy) applies.

B.3.3 Analysis

This CAA General Conformity Rule (GCR) analysis was conducted according to the guidance provided by 40 CFR Parts 6, 51, and 93. *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, (U.S. EPA, 1993 and 2010).

The GCR analysis was performed to determine whether a formal conformity analysis would be required. Pursuant to the GCR, reasonably foreseeable emissions (both direct and indirect) associated with the implementation of the project were quantified and compared to the applicable annual *de minimis* levels to determine potential air quality impacts.

The conformity analysis for a federal action examines the impacts of the direct and indirect net emissions from mobile and stationary sources. Direct emissions are emissions of a criteria pollutant or its precursors that are caused or initiated by a federal action and occur at the same time and place as the action. Indirect emissions, occurring later in time and/or further removed in distance from the action itself, must be included in the determination if both of the following apply:

- The federal agency can practicably control the emissions and has continuing program responsibility to maintain control
- The emissions caused by the federal action are reasonably foreseeable.

Direct and indirect CO emissions would potentially result from the following construction activities:

- Use of diesel-powered nonroad equipment
- Movement of trucks and worker's commuting vehicles during the construction.

B.4 Emissions Determination

The GCR requires that potential emissions generated by any project-related construction and operational activities be determined on an annual basis and compared to the annual *de minimis* levels for those pollutants (or their precursors) for which the area is classified as nonattainment or maintenance. Emissions attributable to activities related to the proposed project were analyzed for CO.

B.4.1 Proposed Construction Activities Resource Data Estimates

An estimate to identify equipment, material, and manpower requirements for the construction associated with the repair of Non-Potable Reservoir #1 at the USAFA was made based on data presented in:

- "2003 RSMeans Facilities Construction Cost Data," R.S. Means Co., Inc., 2002
- "2011 RSMeans Facilities Construction Cost Data," R.S. Means Co., Inc., 2010

The assumptions and calculations presented below are based on the information described in the environmental assessment (EA), which provides a planning-level description of the proposed work. The proposed work includes the following: by-pass lines would be constructed around Non-Potable Reservoir #1 while repairs are made; a portion of the existing dam would be excavated; reservoir piping and lining would be repaired; an auxiliary spillway would be constructed; and the excavation would be backfilled to match a different cross-sectional profile that will provide greater long-term stability.

A total of 4.0 acres land would be disturbed as part of the overall construction project. Given the lack of data specifying the extent of disturbance associated with each portion of the work, the following assumptions were made based on scaling from Figure 2-1 of the EA:

- The total length of by-pass piping is approximately 3,000 linear feet (LF). Although two different diameters are used, it is assumed that for the purposes of construction the difference in pipe size is insignificant and the bypass lines will be constructed in a trench 5 feet (ft) wide, accounting for 0.3 acre of the overall project.
- The new spillway has approximate dimensions of 200 ft by 400 ft, or approximately 1.0 acre.

It is assumed that the remainder of the construction disturbance area is attributable to the replacement of a portion of the dam; assuming a total embankment cross-sectional width of 250 ft (based on a 45-ft embankment height, a 2.5:1 existing slope on either side, and a crest 25 ft wide), the length of the embankment to be replaced is 470 ft. For this estimate, this quantity will be rounded up to 600 ft for purposes of conservatism. The reconstructed embankment will have a shallower 3:1 slope on the upstream end and will retain the 2.5:1 slope on the downstream side.

Bypass Construction

The construction of the non-portable water bypass would involve the installation of 6- and 16-inch high density polyethylene (HDPE) pipes that would carry water from existing sources to the reservoir to the existing pump station for further distribution via existing lines. For estimate purposes, it is assumed that the entire bypass is of 16-inch piping and that a trench 5 ft wide and 5 ft deep is required for installation of the bypass. The total length of the bypass piping system is approximately 3,000 ft, so the volume of the entire trench is therefore 2,778 cubic yards (CY).

- Trench Preparation
 - For primary excavation, use item 02315-400-0300, Excavating, 3 CY backhoe, 2,778 CY.
 - Trench floor prep: assume gravel placed over entire building footprint, 12 inches thick lift x 15,000 square feet (SF) = 556 CY, use gravel, bank run, compacted, 12 inches deep (line 02720-200-1523).
- By-pass Piping
 - Use item 02510-850-0700, HDPE piping, butt fusion joints, 40-ft lengths, 3,000 LF.
- Backfill
 - Fill, Use item 02315-120-2200, backfill, dozer or front-end loader, 150-foot haul common earth
 - Compaction, use 02315-300-5020, riding vibrating roller, 3 passes.

Dam Repair

- Excavation
 - Based on dimensions indicated above, excavation volume for a 600-ft length of the embankment is 137,500 CY. Use item 02315-400-0300, excavating, 3 CY backhoe, 2,778 CY.
 - Assume 50 percent of material is not suitable for reuse and must be disposed of; use item 02320-200-1255, hauling, 20 CY dump trailer, 20-mile round trip, 68,750 CY.
- Piping Replacement
 - Estimated length is 800 LF. Material not specified; assume ductile iron similar to water distribution piping. Use item 02510-820-2180, water distribution ductile iron class 50, 18-ft lengths, 24-inches in diameter.

- Backfill – Due to shallower slope of reconstructed embankment, backfill quantity is greater than excavation quantity. Total backfill quantity is 148,750 CY; 68,750 CY will be reused from excavation; 80,000 CY will be imported to replace unsuitable materials and as makeup for increased size.
 - Import of fill, use item 02320-200-1255, hauling, 20 CY dump trailer, 20-mile round trip, 80,000 CY.
 - Compaction, use 02315-300-5020, riding vibrating roller, 3 passes.

Spillway Construction

- Site Preparation
 - Assume a 5-ft excavation to create the spillway cross-section. For primary excavation, use item 02315-400-0300, excavating, 3 CY backhoe, 8,333 CY.
 - For disposal of spillway excavation, use item 02320-200-1255, hauling, 20 CY dump trailer, 20-mile round trip, 8,333 CY.
 - Spillway preparation: assume gravel placed over entire building footprint, 12-inch-thick lift x 45,000 SF = 1,667 CY, use gravel, bank run, compacted, 12-inch-deep (line 02720-200-1523).
- Concrete Placement
 - Use item 03310-700-4650, Slab on grade, over 6 inches, pumped; assume spillway slab depth is 12 inches, so total volume is 1,667 CY.

B.4.2 Equipment Operations and Emissions

Estimates of equipment emissions were based on the estimated hours of usage and emission factors for each motorized source for the project. Emission factors for each pollutant related to heavy-duty diesel equipment were obtained from the NONROAD emission factor model (U.S. EPA, 2008).

The U.S. EPA recommends the following formula to calculate hourly emissions for the “ith” pollutant from non-road engine sources, including tractors:

$$M_i = N \times HP \times LF \times EF_i$$

where:

- M_i = mass of emissions of ith pollutants during inventory period;
- N = source population (units);
- HP = average rated horsepower;
- LF = typical load factor; and
- EF_i = average emissions of ith pollutant per unit of use (e.g., grams per horsepower-hour).

Typical load factor values were obtained from the NONROAD model emission factor worksheet (U.S. EPA, 2008). Estimated emissions from operation of nonroad equipment are presented in Table B-2.

B.4.3 Construction On-road Vehicle Operations and Emissions

U.S. EPA's Motor Vehicle Emission Simulator (MOVES) program was used to predict both truck and commuter vehicle emission factors for both criteria and hazardous pollutants (U.S. EPA, 2012). The national default input parameters applicable for the El Paso County area where the project site is located

were used in emissions factor modeling. Estimated emissions from operation of trucks and commuter vehicles associated with each element are presented in Table B-3.

B.4.4 Fugitive Dust Emissions

In addition to construction vehicle and equipment exhaust emissions as discussed above, the earth disturbance and paved road surface fugitive dust emissions would also be generated from material handling and maneuvering of vehicles and equipment. The U.S. EPA AP-42, *Compilation of Air Pollution Emission Factors* (U.S. EPA, 1995), was used to predict fugitive dust emissions from 1.) vehicles traveling on paved roads and 2.) on-site material handling process including movement of equipment. Total paved road emissions and on-site material handling emissions are summarized in Tables B-4 and B-5, respectively.

B.4.5 Total Construction Emissions

Total combined construction emissions with potential to occur within the 9-month construction period including both on-site equipment and on-road vehicle operational emissions are summarized in Table B-6.

Table B-2. Construction Equipment Emissions

Equipment Type	Number of Units	Days	Hours	Horsepower (hp)	Load Factor (%)	Emission Factor (grams/hp-hour)								Emissions (tons)								
						VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂	VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂	
Concrete pump, small	1	10	80	53	43	0.75	6.18	3.03	0.56	0.57	0.12	0.24	567.14	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.13
Dozer, 75 HP	1	310	2480	75	59	0.33	4.72	1.93	0.29	0.30	0.12	0.24	539.34	0.01	0.07	0.23	0.03	0.04	0.01	0.00	0.00	65.18
Dozer, 300 HP	1	2	16	300	59	0.33	4.72	1.93	0.29	0.30	0.12	0.24	539.34	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.68
Front end loader, 1.5 cy, cfl	1	2	16	243	59	0.37	5.05	2.09	0.32	0.33	0.12	0.24	539.44	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.36
Gas engine vibrator	1	20	160	2	55	57.01	1.42	291.97	7.03	7.64	0.22	0.24	1053.35	0.01	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.17
Grader, 30,000 lb	1	2	16	204	59	0.32	4.26	1.45	0.27	0.28	0.12	0.24	537.25	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.14
Hydraulic excavator, 3.5 cy	1	117	936	171	59	0.12	0.29	4.25	0.28	1.64	0.32	0.24	541.49	0.01	0.03	0.44	0.03	0.17	0.03	0.00	0.00	56.32
Roller, vibratory	1	2	16	92	59	0.42	4.77	2.49	0.40	0.41	0.12	0.24	558.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54
Vibratory drum roller	1	66	528	92	59	0.42	4.77	2.49	0.40	0.41	0.12	0.24	558.97	0.01	0.15	0.08	0.01	0.01	0.00	0.00	0.00	17.69
Tractor truck, 240 HP	1	2016	16128	240	59	0.32	4.28	1.33	0.26	0.27	0.12	0.24	536.35	0.81	10.77	3.34	0.66	0.68	0.29	0.20	0.00	1348.99
Water tank truck, 5000 gal	1	2	16	783	59	0.27	4.81	1.58	0.22	0.23	0.12	0.24	536.51	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	4.37
Total Equipment Emissions														0.86	11.12	4.17	0.74	0.90	0.34	0.21	1498.57	

Table B-3. Construction Vehicle Emissions

			Emission Factor (lb/mi)								Emissions (tons)							
	Number of Trips	Miles per Trip	VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂	VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂
Trucks	5,521	20	0.00	0.02	0.01	0.00	0.00	0.00	0.01	5.41	0.01	0.15	0.04	0.01	0.01	0.00	0.04	44.67
Cars	28,957	20	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.86	0.01	0.02	0.21	0.00	0.00	0.00	0.04	24.96
Total Motor Vehicle Emissions											0.01	0.17	0.25	0.01	0.02	0.00	0.09	69.63

Table B-4 – Construction Vehicle Paved Road Fugitive Dust Resuspension Emissions

Vehicle Type	Number of Units	Total Roundtrip Miles/Veh	PM ₁₀ Emission Factor lb/VMT	PM _{2.5} Emission Factor lb/VMT ⁵	PM ₁₀ Emissions lb/veh	PM _{2.5} Emissions lb/veh	PM ₁₀ Emissions ton	PM _{2.5} Emissions ton
Trucks	825	20	0.04	0.01	0.89	0.22	0.37	0.09
Cars	2908	20	0.003	0.001	0.06	0.01	0.08	0.02
Total Paved Road Emissions							0.45	0.11

Table B-5 – Construction Material Handling Fugitive Dust Resuspension Emissions

Activity	Pollutant	Particle Size Multiplier (K)	Wind Speed (mph)	Moisture Content (%)	Total Material Volume (CY)	Total Material Weight (tons)	Emission Factor (lb/ton)	Total Emissions (ton)
Pipeline Bypass Excavation	PM ₁₀	0.35	12	11	2778	3938	0.00032	0.00063
	PM _{2.5}	0.053					0.00005	0.00010
Pipeline Bypass Backfill	PM ₁₀	0.35	12	11	2778	3938	0.00032	0.00063
	PM _{2.5}	0.053					0.00005	0.00010
Dam Repair Excavation	PM ₁₀	0.35	12	11	137500	194906	0.00032	0.03132
	PM _{2.5}	0.053					0.00005	0.00474
Dam Repair Excavated Material to Truck	PM ₁₀	0.35	12	11	68750	97453	0.00032	0.01566
	PM _{2.5}	0.053					0.00005	0.00237
Dam Repair New Material from Truck	PM ₁₀	0.35	12	11	80000	113400	0.00032	0.01822
	PM _{2.5}	0.053					0.00005	0.00276
Dam Repair Backfill	PM ₁₀	0.35	12	11	148750	210853	0.00032	0.03388
	PM _{2.5}	0.053					0.00005	0.00513
Spillway Construction	PM ₁₀	0.35	12	11	8333	11812	0.00032	0.00190
	PM _{2.5}	0.053					0.00005	0.00029
Total Material Handling Emissions							PM₁₀	0.10
							PM_{2.5}	0.02

Table B-6. Total Construction Emissions

Pollutant (tons)							
VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂ ¹
0.87	11.28	4.42	0.88	1.47	0.34	0.29	1,422.67

Note: ¹ The unit is in metric tons converted from short tons.

B.5 Compliance Analysis

Based on this analysis of CO emissions performed in conjunction with the Final Rule of *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, (U.S. EPA, 1993 and 2010), the Proposed Action would not require a formal conformity determination as indicated in Table B-7. Therefore, the Proposed Action would have minimal air quality impacts and would not require a formal conformity determination.

Table B-7. Total Net and Net Percent Increase in Construction Emissions

Annual Emissions (tons)								
Alternative	VOC	NO _x	CO	PM _{2.5}	PM ₁₀	SO ₂	HAPs	CO ₂ ¹
Proposed Action	0.87	11.28	4.42	0.88	1.47	0.34	0.29	1,422.67
Baseline Stationary Source Emissions Inventory²	15.69	28.03	23.33	2.13	2.13	0.44	4.93	n/a
Maximum Net Percent Increase over Baseline Stationary Source Annual Emissions Inventory (%)	5.5	40.2	18.9	41.3	69.0	77.3	5.9	n/a
<i>De minimis</i> Threshold	n/a	n/a	100	n/a	n/a	n/a	n/a	n/a

Note: ¹ The unit is in metric tons converted from short tons.
Source: ² U.S. Air Force Academy, 2014.

B.6 Attainment Criteria Pollutants, Hazardous Pollutants, and Greenhouse Gas Emissions

The attainment pollutants (i.e., VOC, NO_x, PM_{2.5}, PM₁₀, and SO₂) and greenhouse gas emissions in terms of CO₂ levels were estimated in the same way used for predicting maintenance criteria pollutant emissions, and they are summarized in the same tables as for the maintenance pollutant. Since the NONROAD model is not capable of predicting Hazardous Air Pollutants (HAPs) emission factors for nonroad equipment, the nonroad equipment HAP emissions inventory methodology established in the U.S. EPA-sponsored document, *Documentation for Aircraft, Commercial Marine Vessel, Locomotive, and Other Nonroad Components of the National Emissions Inventory* (E.H. Pechan & Associates, Inc., 2005), was used to predict equipment HAPs. Specific HAP speciation factor for each available toxic in terms of VOC or PM₁₀ fraction are summarized in Table B-8. The combined HAPs fraction was further used in predicting HAPs annual emissions from the Proposed Action based on the annual VOC and PM₁₀ emissions summarized in Table B-2.

Table B-8. Nonroad Equipment HAP Speciation Factor

HAPs	National Diesel Exhaust HAP/VOC or HAP/PM ₁₀ Fraction
1,3-Butadiene	0.0018616
2,2,4-Trimethylpentane	0.000719235
Acetaldehyde	0.05308
Acrolein	0.00303
Benzene	0.020344
Ethylbenzene	0.0031001
Formaldehyde	0.11815
n-Hexane	0.0015913
PAH (fraction of PM ₁₀)	0.0004
Propionaldehyde	0.011815
Styrene	0.00059448
Toluene	0.014967
Xylenes	0.010582
Total VOC Fraction	0.24
Total PM₁₀ Fraction	0.0004

Assuming the Council on Environmental Quality suggested assessment threshold of 25,000 metric tpy as an indicator of potential climate impact (Council on Environmental Quality, 2010), the resulting greenhouse gas emissions under the Proposed Action would be minimal.

REFERENCES

- Council on Environmental Quality, 2010. Memorandum for Heads of Federal Departments and Agencies from: Nancy H. Sutley, Chair, Council on Environmental Quality Subject: *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas*. February 18.
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- U.S. EPA, 2008. Nonroad Model Emission Factor Worksheet, December 31.
- U.S. EPA, 2010. *40 CFR Parts 51 and 93. Revision to the General Conformity Rule*, March 24.
- U.S. EPA, 2012. Motor Vehicle Emission Simulator (MOVES) User Guide for MOVES.

APPENDIX C

REVEGETATION AND TREE CARE STANDARDS

**SECTION 01351
REVEGETATION AND TREE CARE STANDARDS**

PART 3 GENERAL

3.1 GENERAL

- A. Erosion Control, revegetation, and tree care is required when any project disturbs the soil, vegetation, or trees, and other site stabilization approaches (i.e., landscaping, sod, hardscape) is not part of the project. Compliance with the following is mandatory to promote the restoration and resource protection required by the Integrated Natural Resources Management Plan, Integrated Noxious Weed Management Plan, Preble's Meadow Jumping Mouse Conservation Agreement, Construction Storm water Pollution Prevention Plan (as applicable), and Municipal Storm Water Permit issued to the U.S. Air Force Academy (USAFA). Any deviation from these standards must be approved by the Contracting Officer (CO) and/or USAFA Natural Resources (10 CES/CEAN). Other Landscaping requirements outlined in the USAFA Design Standards shall also be followed.
- B. Contractors shall consult with USAFA Natural Resources for assistance in understanding these standards and implementing an acceptable site reclamation plan. Particular attention should be given to the requirements for seedbed preparation, supplemental topsoil, native seed mixes and planting techniques, and erosion control materials and installation.
- C. To prevent the introduction and spread of noxious weeds and other non-native plants, all equipment shall be thoroughly cleaned of dirt, seed, and plant parts prior to entering the base.
- D. To the extent possible, Contractors shall minimize creating new roads and trails around the project area. Any new trails, roads, parking areas, or staging areas shall be closed, signed, and rehabilitated as part of the project.
- E. As part of the Environmental Deliverables List, Contractors shall provide invoices, trip tickets, tags, or other documentation to verify that the specified type, quantity, and quality of seed, topsoil, erosion fabric, and other materials is installed per the standard.

3.2 SITE PREPARATION

- A. **SOIL PREPARATION.** All disturbed areas shall be tilled on the contour to a minimum depth of four inches, and then harrowed, raked or rolled to produce a firm seed bed. Imported topsoil (see 1.1.B) may be required to provide an acceptable planting medium. Large rocks (>3 inch diameter) and debris that may impede seeding shall be cleared from the site. Any required erosion control features (e.g., water bars, berms, basins, turnouts) shall be constructed prior to seeding. No fertilizers shall be applied to the seeded area. Sites that are not adequately prepared prior to seeding (e.g., compacted soil, insufficient topsoil, rocky, eroded surface, etc.) shall be rejected.
- B. **TOPSOIL.** All areas to be revegetated shall be topsoiled with at least 3 inches of quality soil as described below unless the requirement is waived by the Contracting Officer with concurrence from the USAFA Natural Resources office. Where possible, the upper 2-3 inches of the native soil shall be salvaged for re-distribution on the restoration area.

If necessary, additional topsoil shall be imported to meet the 3” minimum requirement. Imported topsoil shall be free of rocks, noxious weeds, large woody debris, trash, or other non-soil materials. Topsoil (native or imported) shall not be used from areas infested with noxious weeds. Both the native and imported topsoil shall be lightly disked on the contour to reduce compaction and to fully mix the soils.

- C. Prior to spreading the topsoil, a laboratory soil analysis of a composite soil sample (native and/or imported soils) shall be submitted as part of the Environmental Deliverables List for evaluation of the soils suitability for native revegetation. An acceptable topsoil shall have a loam, sandy loam, clay loam, or silt loam texture; a neutral pH; a low salt content; an organic matter content >2%; and adequate nutrients to support native grasses. If the topsoil does not meet these criteria, soil amendments (such as compost or other imported soils) shall be required to meet the standard.

PART 4 PRODUCTS

4.1 PLANT MATERIALS FOR REVEGETATION

- A. NATIVE SEED. Depending on the site conditions, and in coordination with USAFA Natural Resources, one of the following native seed mixes shall be used for revegetating disturbed areas. Other seed mixes may need to be developed for unique situations on a case-by-case basis. All seed mixes shall consist of certified seed varieties that are free of noxious weeds and have been tested for purity and germination within one year of the planting date. Locally adapted seed ecotypes collected from a similar elevation (6300-8000’ at USAFA; 9000’ at Farish Recreation Area) and precipitation zone (15-20 inches) shall be used. Certification labels which indicate the species, purity, germination, weed content, origin, and test date shall be submitted as part of the Environmental Deliverable List for all seed materials. If the seed is to be broadcast by hand, mechanical spreader or hydro-seeder, the seeding rate shall be doubled.

1. Xeric (dry) areas with a variety of soil and slope conditions shall be planted with the following seed mix:

SPECIES (Variety)	PLS RATE PER ACRE DRILL SEEDING	PLS RATE PER ACRE BROADCAST SEEDING
Perennial Ryegrass (Tetraploid) <i>Lolium perenne</i>	6.0	12.0
Little Bluestem (Camper) <i>Schizachyrium scoparium</i>	3.0	6.0
Blue Grama (Hachita) <i>Bouteloua gracilis</i>	1.5	3.0
Side Oats Grama (Vaughn) <i>Bouteloua curtipendula</i>	3.5	7.0
Green Needlegrass <i>Stipa viridula</i>	0.5	1.0
Sand Dropseed <i>Sporobolus cryptandrus</i>	0.05	0.10
Western Wheatgrass (Arriba) <i>Pascopyrum smithii</i>	3.0	6.0
Slender Wheatgrass (San Luis) <i>Elymus trachycaulus</i>	1.0	2.0

2. Forest and Shrubland areas with a variety of soil and slope conditions shall be planted with the following seed mix:

SPECIES (Variety)	PLS RATE PER ACRE DRILL SEEDING	PLS RATE PER ACRE BROADCAST SEEDING
Perennial Ryegrass (Tetraploid) <i>Lolium perenne</i>	6.0	12.0
Little Bluestem (Camper) <i>Schizachyrium scoparium</i>	3.0	6.0
Blue Grama (Hachita) <i>Bouteloua gracilis</i>	1.5	3.0
Side Oats Grama (Vaughn) <i>Bouteloua curtipendula</i>	3.5	7.0
Green Needlegrass <i>Stipa viridula</i>	0.5	1.0
Sand Dropseed <i>Sporobolus cryptandrus</i>	0.05	0.10
Indian Ricegrass <i>Oryzopsis hymenoides</i>	1.0	2.0
Mountain Muhly <i>Muhlenbergia montana</i>	0.5	1.0
Prairie Junegrass <i>Koeleria macrantha</i>	0.5	1.0

3. Mesic riparian areas and wetland fringes shall be planted with the following seed mix:

SPECIES (Variety)	PLS RATE PER ACRE DRILL SEEDING	PLS RATE PER ACRE BROADCAST SEEDING
Perennial Ryegrass (Tetraploid) <i>Lolium perenne</i>	6.0	12.0
Switchgrass (Forrestburg) <i>Panicum virgatum</i>	2.5	5.0
Western Wheatgrass (Arriba) <i>Pascopyrum smithii</i>	2.0	4.0
Canada Wildrye (Mandan) <i>Elymus canadensis</i>	4.5	9.0
Slender Wheatgrass (San Luis) <i>Elymus trachycaulus</i>	1.5	3.0
Canadian reed-grass <i>Calamagrostis canadensis</i>	0.25	0.50
Streambank wheatgrass (Sodar) <i>Elymus lanceolatus</i>	1.5	3.0

4. Wetland areas shall be planted with 2.5” containerized live plugs on 18” centers and seeded with the grasses identified below. Plugs shall be planted flush with the ground surface and rooted in moist to saturated soil depending on the species’ moisture preference. The quantity of plugs needed, by species, shall be based on the percentages below.

SPECIES (Variety)	PLS RATE PER ACRE DRILL SEEDING	PLS RATE PER ACRE BROADCAST SEEDING
Canadian reed-grass <i>Calamagrostis canadensis</i>	0.25	0.50
Ticklegrass <i>Agrostis scabra</i>	0.2	0.4
Nebraska sedge <i>Carex canadensis</i>	Plugs – 70%	Plugs – 70%
Creeping spikerush <i>Eleocharis palustris</i>	Plugs – 10%	Plugs – 10%
Torrey’s rush <i>Juncus torreyi</i>	Plugs – 5%	Plugs – 5%
Baltic rush <i>Juncus balticus</i>	Plugs – 10%	Plugs – 10%
Pale bulrush <i>Scirpus pallidus</i>	Plugs – 5%	Plugs – 5%

5. Upland areas at Farish Recreation Area, with a wide variety of slope and soil conditions, shall be planted with the following seed mix:

SPECIES (Variety)	PLS RATE PER ACRE DRILL SEEDING	PLS RATE PER ACRE BROADCAST SEEDING
Perennial Ryegrass (Tetraploid) <i>Lolium perenne</i>	6.0	12.0
Mountain Muhly <i>Muhlenbergia montana</i>	0.5	1.0
Arizona fescue (Redondo) <i>Festuca arizonica</i>	1.5	3.0
Western wheatgrass (Arriba) <i>Pascopyrum smithii</i>	2.5	5.0
Sideoats grama (Vaughn) <i>Bouteloua curtipendula</i>	2.0	4.0
Thickspike wheatgrass (Critana) <i>Elymus lanceolatus</i>	2.0	4.0
Idaho fescue (Winchester) <i>Festuca idahoensis</i>	1.5	3.0

PART 5 EXECUTION

5.1 SEEDING AND MULCHING

- A. SEEDING DATES. Seeding shall normally occur within 10 working days of the completion of construction. Fall (September-November) or spring (March-May) planting is preferable to help maximize seed establishment. If the project schedule does not coincide with the preferred seeding periods, or there are unsuitable site conditions (i.e. frozen ground), then soil stabilization and/or storm water Best Management Practices shall be implemented to stabilize the area until the next appropriate seeding date. Any seeding conducted outside the preferred months shall be approved by the CO and/or Natural Resources.
- B. SEEDING METHODS. Drill seeding or broadcast seeding shall be used for revegetation. As outlined below, the size and slope of the disturbed area shall determine which seeding method(s) is appropriate and acceptable. **Where feasible, rangeland drill seeding combined with a cover of crimped hay mulch or hydro-mulch is the required method of revegetation.**
1. **Slopes less than 3:1** – Seed shall be planted using a rangeland drill with a small seed/legume box and an agitator box for fluffy or bulky seed. Seed rows shall be spaced 7-10 inches apart, and planted 0.5 to 0.75 inches deep. The drill shall have double-disk furrow openers with depth bands and packer wheels. Seeding shall be accomplished using bi-directional drilling and following the slope contour. The drill equipment shall be calibrated each day or whenever there is a change in the seed mix to ensure proper seed distribution and rate.
 2. **Slopes greater than 3:1 or areas less than 0.10 acre** – Seed shall be broadcast by hand, mechanical spreader, or hydro-seeding equipment. Broadcasted areas shall be raked or harrowed to incorporate the seed into the soil at a depth not exceeding 0.75 inches. If hydro-seeding is used, the seed shall not be tank mixed with the hydro-mulch and broadcast. Broadcast seeding shall be avoided when wind speed exceeds 15 miles per hour.
 3. Where appropriate, pedestrian and vehicle access to the seeded areas shall be prevented by posting signage (i.e., “Closed for Restoration”) and erecting fencing.
- C. MULCHING. Weed-free native hay, weed-free straw, or virgin wood fiber hydro-mulch shall be used to control erosion and promote seed germination and plant establishment. Native hay, straw, or hydro-mulch shall be applied at 2000 pounds/acre on slopes less than 3:1. On steeper slopes, a mulching rate of 2500 pounds/acre shall be used. Native hay or straw shall be crimped into the soil to a depth of at least 3 inches and protrude above the ground at least 3 inches. An organic tackifier shall be used to hold the hay or straw in place if crimping alone is insufficient. Hydro-mulch shall be applied using a color dye and the manufacturer’s recommended rate of an organic tackifier.
- D. EROSION CONTROL MATERIALS. Erosion control blankets, straw coir logs, or soil berms shall be used whenever reclaiming slopes greater than 3:1 or along drainage areas where erosion is probable. All erosion control blanket shall be 100% biodegradable, net-free, wood fiber (excelsior) or coconut fiber materials with at least a two year functional longevity (Western Excelsior Excel S-2 or CC-4 or equivalent). Erosion control fabrics

with a plastic netting are strictly prohibited. Manufactured biodegradable stakes (6-inch minimum) or wooden stakes (8-inch minimum) shall be used to anchor any erosion materials; metal staples (8-inch minimum, 8 gauge) may be approved on a case-by-case basis. All erosion control materials shall be installed in accordance with the manufacturer's instructions and recommendations. Particular attention shall be given to overlapping fabric seams, burying the fabric edges, partially burying coir logs, and utilizing a staple pattern and sufficient number of staples or stakes to prevent the erosion control materials from being dislodged by wind or water.

- E. WATERING. Supplemental irrigation shall normally not be necessary or required if the seeding is accomplished during the preferred fall and spring planting periods. If a water hook-up is available a sprinkler system may be used to promote rapid plant establishment, but the system must then be operated throughout the first growing season. Generally, watering at 0.75-1.0 inches/week is recommended during the April-October growing season depending on rainfall. Supplemental irrigation of seeded areas using a watering truck is prohibited.

5.2 FINAL INSPECTION AND SEEDING SUCCESS CRITERIA

- A. A final inspection of all revegetated areas shall be coordinated with the CO, Construction Inspector and Natural Resources. If the project is under a Construction Storm Water Permit, the USAFA Water Quality Manager shall also be consulted. Any seeding, topsoil, or erosion control deficiencies noted during the inspection shall be corrected prior to project close-out or final contract payment.
- B. A revegetation project shall have at least 3 native grass seedlings/square foot and no bare areas exceeding one square meter after the second growing season. For drill seeded areas, planting rows shall be noticeable by the end of the first full growing season. If a partial or total seeding failure is apparent after the second growing season, poorly vegetated areas shall be reseeded in the same manner described above. Appropriate site preparation shall again be used to create a suitable seedbed for replanting, but any established native vegetation shall be left undisturbed to the extent possible. Areas that erode before establishment can occur shall be repaired and immediately reseeded during the same season.

5.3 CARE OF EXISTING TREES DURING CONSTRUCTION

- A. Extreme care shall be exercised in protecting root systems and branches of existing trees. Trenches shall be placed as far from trees as possible. **Absolutely no trenching is permitted within the dripline of any tree.** The dripline is the area directly located under the outer circumference of the tree branches. See Appendix A for sketch of tree dripline. Since tree roots extend up to three times the height of the tree, major damage can be incurred by cutting through root systems. Directional boring to minimize root damage should be used to the extent feasible. Moist conditions shall be maintained during construction. Roots damaged during excavation shall be pruned. Branch pruning shall be minimized, with necessary removal adhering to standard pruning techniques.
- D. See Appendix B for additional information on proper pruning techniques.
- E. Minimizing damage to trees to be retained within construction areas is critical.

- F. Information on protecting trees during construction activities can be found at www.ext.colostate.edu/PUBS/GARDEN/07420.html

5.4 TREE TRANSPLANTING FROM CONSTRUCTION AREA

- A. Whenever possible, existing trees that need to be cleared shall be relocated or sold by Natural Resources as a forest product prior to site clearing. Transplantable trees are generally less than twenty feet in height, although this maximum height will be less under extreme drought conditions due to increased transplant shock in larger trees. Coordinate with Natural Resources at least two months in advance to assess the feasibility of transplanting trees.

5.5 CARE OF TREES MOVED INTO CONSTRUCTION AREA

- A. Trees moved into the project area for landscaping purposes shall have irrigation needs addressed for three years, including winter watering. Approximately ten gallons per inch of tree caliper (measured at six inches above ground level) shall be applied to the tree ring area (see “C” below) upon planting. Water shall be applied approximately weekly for the first two months, and then every two to three weeks throughout the remainder of the first growing season, depending on natural moisture and soil conditions. Depending on precipitation, frequency of deep watering during the second and third years may be decreased as the tree continues to establish on the site, but newly transplanted trees will likely still require periodic waterings for at least three full growing seasons to maintain tree health and vigor and encourage root establishment. Light watering applications (i.e. sprinklers) will not provide adequate water saturation, tending rather to promote root proliferation within the top several inches of soil instead of encouraging deeper root establishment which is vital to long-term survival. The objective of deep watering is to saturate the root ball to a depth of at least twelve inches. Water amounts on heavy clay soils with poor drainage may need to be lessened to avoid drowning the root system. A rule of thumb is to check the edge of the root ball for moisture at a depth of eight inches. If this area is still moist, watering can be postponed.
- B. Winter watering from late October through March is critical, especially in dry climates with desiccating winter winds. Water shall be applied monthly during dry periods, when the ground is not frozen. Fall plantings shall receive a deep watering upon planting, followed by periodic winter watering as conditions warrant. As the tree becomes established, the need for supplemental watering should decrease. This watering regime shall be implemented for at least the first two growing seasons to assist in establishment, but is advisable beyond this timeframe if the transplanted tree is especially large, or is slow in adapting to its new site. See Appendix C for additional information on watering.
- C. A soil berm or tree ring of at least four inches in height shall be constructed around the tree (roughly under the tree dripline (outer edge of branches), or at least the size of the transplanted root ball). This will allow water to focus onto the root ball. The berm shall be removed in three years, when roots should have spread well beyond the dripline. Retaining the berm beyond this timeframe tends to lead to subsequent watering only within the bermed area, which will encourage root growth primarily in this area and not outward, to the detriment of the tree.
- D. Approximately three to four inches of mulch shall be placed above the root ball to preserve soil moisture, and to protect trees from lawnmower damage in mowed areas.

Mulch should not be placed directly against tree stem, as this could cause rotting of wood, and could afford rodents a place to hide and potentially damage tree. A distance of at least six inches from the tree stem should be left unmulched.

- E. Transplanted pines are a prime target for the Ips (engraver) beetle, which are attracted to environmentally stressed trees. Landscape planted spruce are highly susceptible to the white pine weevil which can cause significant damage to the tree crown. Transplanted pines and spruce shall be sprayed to prevent bark beetle infestation with a persistent formulation with the active ingredient Carbaryl, as specified on the USAF-approved pesticide list. Spring-planted pine and spruce shall be sprayed within one week of transplanting. Autumn-planted pine and spruce shall be sprayed within one week of planting, and again at the beginning of the following growing season. All pine and spruce shall be sprayed by late March for the following two years. Natural Resources will be available to consult on spraying activities. All pesticide use will be coordinated through the HAZMART and Pest Management Coordinator.
- F. In general, trees over six feet in height shall be staked, unless they are not located in a wind-prone location (i.e. sheltered from predominant west/north winds by a building), or do not have a large crown. Stakes shall be removed in one year, unless in unusually windy location, in which case they should be removed after the second growing season. Retaining stakes for too long compromises windfirmness and encourages a tall spindly rather than a sturdy tree trunk.
- G. Trees should not be fertilized upon transplanting, as this encourages stem growth at the expense of root growth. Root growth is more critical at this time, so fertilization (nitrogen in particular) is best held off for several years. A root stimulant (generally high in phosphorus) may be used during or immediately after transplanting.
- H. Holes resulting from trees moved from elsewhere on the Academy shall be filled with weed-free soil and graded to ground level within one week of tree removal. Holes shall be marked with three pin flags during the interim.
- I. Coordinate with Natural Resources for advice on watering, mulching, spraying, staking, and fertilization.

5.6 MERCHANTABLE WOOD

- A. Trees needing removal that are deemed infeasible for transplanting shall be cut and limbed (all limbs removed). Merchantable firewood (tree stems and limbs greater or equal to four inches in diameter) shall be delivered to the NR woodlot at Building 9030. Contractors may opt to purchase wood at the existing published rate. All wood delivery or purchase shall be coordinated in advance with Natural Resources. Disposition of wood products from Farish Recreation Area shall be determined by Natural Resources.

5.7 TREE SLASH AND STUMP REMOVAL

- A. Disposal of woody slash (limb wood and tree tops less than four inches in diameter) is the sole responsibility of the Contractors. There is no compost yard on base to accept this woody residue. If not removed from the installation, treatment of woody slash shall be approved in advance by Natural Resources. Slash may be chipped and spread onsite to a

depth not to exceed three inches, with chips spread at least 30 feet from a road, trail or building. No chips shall be spread in improved or mowed areas. Projects involving small amounts of limb wood may dispose of slash by lopping and scattering onsite only if prior coordination has been made with the Natural Resources. In such cases, the limbs shall be moved at least 50 feet from buildings, roads, or major trails, and lopped and scattered so as not to exceed eight inches above ground level.

- B. All rootwads (stumps with attached roots) shall be disposed of off base. These are not merchantable, and are thus not allowed in the Natural Resources woodlot.
- C. Where trees are removed but stumps and roots are not extricated, stumps shall be cut as close to ground level as practical, not to exceed two inches (measured on the uphill side of the tree on a slope) above ground level within 25 feet of buildings, roads or major trails, and four inches above ground level elsewhere.

5.8 BRANCH PRUNING

- A. Pruning of live branches shall be kept to a minimum, to reduce stress to the tree. Branches requiring removal shall be cut back to the trunk or to an acceptable branch, according to proper pruning procedures. The remaining portions of limbs broken by the passage of equipment shall also be cut back to the trunk or to an acceptable branch. Flush cuts are not acceptable, as these promote decay of the tree stem. Branches shall be cut by saw; not pulled off by heavy equipment. Pruning procedures are outlined in Appendix B.

5.9 BEETLE-INFESTED TREES

- A. Trees infested with bark beetles (mountain pine, Ips pine engraver or twig beetles) shall be chipped, debarked, or removed from site to be processed before beetles emerge. If removed from site and not processed in a mill, infested wood should not be placed within five (5) miles of any pines, to prevent beetle spread to other areas. Beetle-infested wood shall not be delivered to NR woodlot unless coordinated in advance with Natural Resources.

5.10 CONE COLLECTION

- A. Project areas will be examined for developing cone crops, which may be useful for future reforestation needs. A Natural Resources representative will assess this opportunity and, if feasible, coordinate with project manager to collect cones from high quality trees scheduled for removal. Cones ripen in September. Natural Resources would fell trees for collection upon ripening, if this does not hinder construction progress. Trees would be left onsite. Seed from cones would be utilized to grow tree seedlings for future reforestation needs on the Academy.

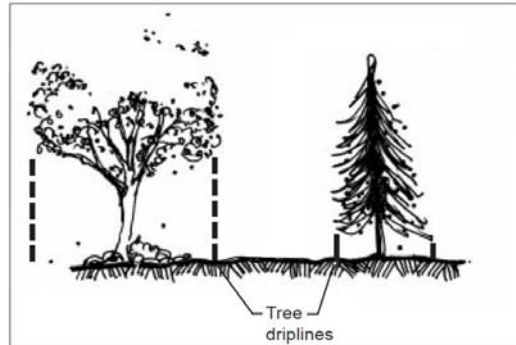
5.11 LIVE WILLOW STAKING

- A. Prior to planting, Natural Resources shall identify all necessary willow staking areas and approve any on-site locations for the harvesting of plant materials. All willow stakes shall be disease- and insect-free (e.g., oyster scale). Off-site plant materials shall only be used with prior approval from Natural Resources.

- B. Willow stakes shall be harvested and planted in late-winter to early-spring before plant dormancy is broken (identified by swelling buds). Planting shall only be conducted when the weather and soil conditions allow. Stakes shall not be planted when the ground is frozen or otherwise unsuitable.
- C. Live stakes shall be coyote willow (*Salix exigua*) cuttings that are one-half inch (1/2") to one-inch (1") in diameter and at least 4.0-feet (4.0') in length. Stakes shall be harvested with sharp pruning shears with the base cut at a forty-five degree (45°) angle and a branched top left intact. All side branches that would be buried below the ground shall be pruned without damaging the branch collar. The butt end of each stake shall be placed in water immediately after cutting to keep them hydrated. All stakes shall be planted within 7 days of harvest.
- D. Stakes shall be kept moist, cool and shaded and protected from the wind until installed. During transport or storage the stakes shall be covered to protect them from heat, light and wind damage.
- E. Willow stakes shall normally be planted on 2-foot centers in a staggered pattern, but the pattern and spacing may need to be adjusted depending on the availability of groundwater. A planting hole shall be excavated to the groundwater using a hammer drill and a one-inch drill bit, or other approved method. Damage to any erosion blanket shall be avoided to the maximum extent possible. Stakes shall be gently placed in the hole, ensuring that the butt end is seated below the groundwater level. Each hole shall be backfilled, hand-tamped, and/or watered to eliminate air pockets around the stake.

SECTION 01351 APPENDIX A – “DRIPLINE” SKETCH AND DEFINITION

Dripline: The dripline is the area directly located under the outer circumference of the tree branches. Because this area contains the highest amount of roots, protecting roots from cutting or compaction is critical. No trenching is permitted within this zone.



SECTION 01351 APPENDIX B – PRUNING TECHNIQUES

Pruning Cuts

Pruning cuts should be made so that only branch tissue is removed and stem tissue is not damaged. At the point where the branch attaches to the stem, branch and stem tissues remain separate, but are contiguous. If only branch tissues are cut when pruning, the stem tissues of the tree will probably not become decayed, and the wound will seal more effectively.

1. Pruning living branches (Fig. 6)

To find the proper place to cut a branch, look for the **branch collar** that grows from the stem tissue at the underside of the base of the branch (Fig. 6A). On the upper surface, there is usually a **branch bark ridge** that runs (more or less) parallel to the branch angle, along the stem of the tree. A proper pruning cut does not damage either the branch bark ridge or the branch collar.

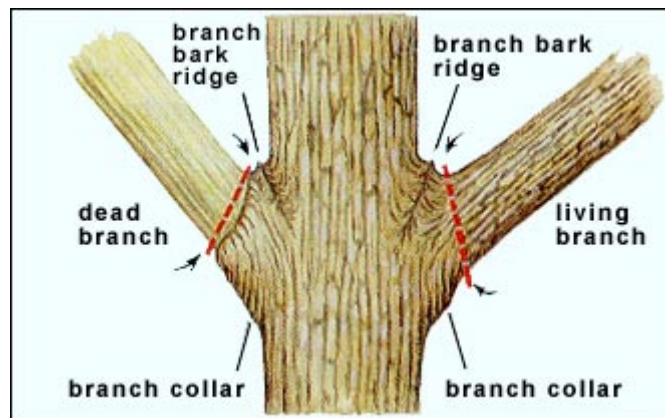
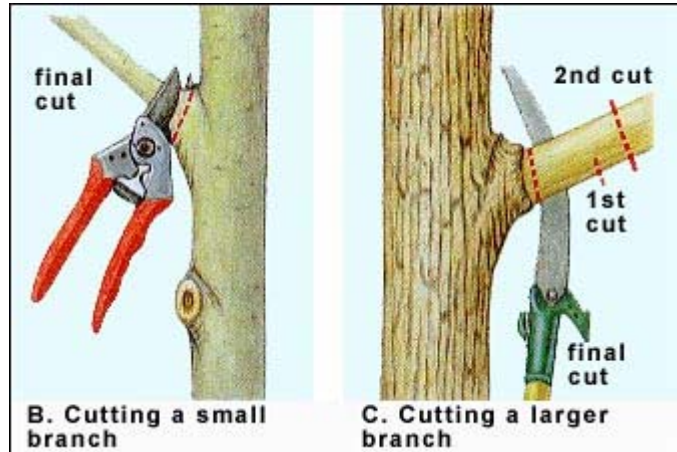


Figure 6A. Targeting the cut

A proper cut begins just outside the branch bark ridge and angles down away from the stem of the tree, avoiding injury to the branch collar (Fig. 6B). Make the cut as close as possible to the stem in the [branch axil](#), but outside the branch bark ridge, so that stem tissue is not injured and the wound can seal in the shortest time possible. If the cut is too far from the stem, leaving a branch stub, the branch tissue usually dies and woundwood forms from the stem tissue. Wound closure is delayed because the woundwood must seal over the stub that was left.



The quality of pruning cuts can be evaluated by examining pruning wounds after one growing season. A concentric ring of woundwood will form from proper pruning cuts (Fig. 6B). [Flush cuts](#) made inside the branch bark ridge or branch collar, result in pronounced development of woundwood on the sides of the pruning wounds with very little woundwood forming on the top or bottom (Fig. 7D). As described above, stub cuts result in the death of the remaining branch and woundwood forms around the base from stem tissues.

When pruning small branches with hand pruners, make sure the tools are sharp enough to cut the branches cleanly without tearing. Branches large enough to require saws should be supported with one hand while the cuts are made. If the branch is too large to support, make a three-step pruning cut to prevent bark ripping (Fig. 6C).

1. The first cut is a shallow notch made on the underside of the branch, outside the branch collar. This cut will prevent a falling branch from tearing the stem tissue as it pulls away from the tree.
2. The second cut should be outside the first cut, all the way through the branch, leaving a short stub.
3. The stub is then cut just outside the branch bark ridge/branch collar, completing the operation.

2. Pruning dead branches (Fig. 6)

Prune dead branches in much the same way as live branches. Making the correct cut is usually easy because the branch collar and the branch bark ridge can be distinguished from the dead branch because they continue to grow (Fig. 6A). Make the pruning cut just outside of the ring of woundwood tissue that has formed, being careful not to cause unnecessary injury (Fig. 6C). Large dead branches should be supported with one hand or cut with the three-step method, just as live branches. Cutting large living branches with the three step method is more critical because of the greater likelihood of bark ripping.

SECTION 01351 APPENDIX C – TREE CARE FOLLOWING PLANTING

After planting the tree, build a 4-inch tall berm around the edge of the hole. Fill the berm with mulch (i.e. shredded bark, compost). The mulch and berm make it easier to water the tree and reduce weed competition. Below are diagrams of a typical tree planting.

Right after planting, water the tree in by filling the bermed basin with water. This will settle the existing soil around the root ball. Fill the bermed basin with water once a week during the growing season, unless natural precipitation is abundant. The goal is to wean the tree slowly off of supplemental irrigation, and get the root system large enough for the tree to thrive on natural rainfall. Continue with winter watering once a month during extended dry periods from late October through March, unless ground is frozen.

REMEMBER: These are just guidelines. Use your index finger to check the soil moisture under the mulch. More plants are killed by over-watering than by under-watering.



(Portions of this appendix are from Douglas F. Welsh, Landscape Horticulturist Texas A&M University, College Station, Texas).

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APPENDIX D

PUBLIC COMMENTS



2 January 2015

HC #67186

Jose L. Rivera
Lt Col, USAF, P.E.
United States Air Force Academy
10th Civil Engineering Squadron
8120 Edgerton Drive, Suite 40
USAS Academy, CO 80840-2400

RE: Proposed Dam Repairs to Non-Potable Reservoir #1, United States Air Force Academy,
El Paso County

Dear Lt Col Rivera:

Thank you for your recent correspondence received 31 December 2014, concerning the proposed repairs and new construction associated with Non-Potable Reservoir #1. Our office has reviewed the submitted materials.

It appears from the project description that this project has the potential to have a very significant effect on historic resources, and we are disappointed that these issues were only minimally addressed in the submitted Environmental Assessment (EA). Our concerns are further listed below:

Area of Potential Effect: The EA only states that the Area of Potential Effect (APE) consists of “any structures and areas that may be affected by proposed repair activities.” No further clarification, map, description, or illustration of an APE with defined, defensible boundaries is presented in the EA. The lack of a defined APE makes it virtually impossible to declare that a project will have (or not have) an effect on historic resources, as there is no mechanism by which to identify said resources and determine whether they might be affected by the undertaking. See 36.CFR.800.4(a)(1) and 36.CFR.800.16(d) for further guidance.

Potential to affect known resources: The EA identifies the Non-Potable Reservoir #1 as a potential historic resource. It states that RNL (a consulting firm) recommended the Reservoir as ineligible for listing on the National Register in 2013. However, the Reservoir has not been reviewed for eligibility by SHPO. No photographs, drawings, or inventory forms associated with the dam and reservoir (from RNL or any other source) were submitted with the EA or with your letter. This information should always be provided to the SHPO office for a project, particularly one that will directly affect the resource, so that SHPO can make an official determination of eligibility in accordance with 36.CFR.800.

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION
303-866-3392 * Fax 303-866-2711 * E-mail: oahp@state.co.us * Internet: www.historycolorado.org

In addition to the Reservoir and its dam, a search of our files indicates that a segment of the Denver & Rio Grande Railroad (SEP.2181.5) is located just east of the project site. The EA indicates that the railroad will be impacted in several ways: 1) the project will affect the current spillway and subsequent drainage under the tracks, and; it is proposed that a second spillway to the south will allow excess water to freely flow over the tracks during a "high flow event," possibly resulting in damage to the railbed and tracks. The railroad is a known resource, and will be directly affected by the proposed undertaking, but the EA does not discuss potential historic significance or the potential adverse effects associated with allowing flood waters to flow over the tracks.

Potential to affect undiscovered resources: The proposed undertaking involves a large amount of construction activity, including grading, landscaping, road building, pipe laying, construction staging, and possibly earth fill and borrowing activities. All of these activities have the potential to affect or even destroy archaeological resources. In addition, the proposed new spillway will allow excess water to flow downhill over open ground until it intersects Monument Creek. This flow will be channeled to some extent by the spillway and by local topography, but it is not clear how widespread of an area might be affected by water exiting the reservoir during a high flow event.

The EA states that there is "a low probability for the presence of archaeological resources" (Table 2-1), but there is no evidence given to support that statement. The EA states that while previous surveys have been undertaken at the Academy, "none of these (archaeological) sites are located within the APE for proposed dam repair activities." However, there is no indication that any of these previous surveys targeted the area near the Reservoir for a comprehensive survey, or that the areas that might be impacted by the proposed Undertaking have been thoroughly investigated for the presence of subsurface cultural resources. Given that the Academy itself covers more than 18,000 acres of land, it is impossible to expect that any survey or report can serve as a complete accounting of all archaeological sites on USAFA land.

The flow of water over open ground during a high flow event could have a significant and damaging effect on subsurface cultural resources that lie within the water's path. In addition, sites that are located in areas that will accommodate other construction activities (such as those mentioned above) could be damaged or destroyed by the proposed Undertaking.

Because of the lack of information included with the EA, we believe that this project has the potential to have an adverse effect on historic resources. We request that the following information be submitted to our office:

- 1) A clearly defined Area of Potential Effect (APE), along with a description of how and why this APE was chosen, as well as maps that clearly delineate the APE and identify any resources located within.
- 2) Data forms (such as Management Data Forms or Architectural Inventory Forms) for the Non-Potable Reservoir #1, the segment of the Denver and Rio Grande Railroad, and any other historic resources determined to be within the APE.
- 3) A thorough and comprehensive archaeological survey of the APE, including areas used for construction, staging, and access, as well as the area that will be affected by water run-off during high flow events.
- 4) The information gathered in (3) should be forwarded to the SHPO as well as to the relevant Tribal Historic Preservation Offices (THPOS) for their review and comment.


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- 5) Clear, color photographs of the Reservoir, dam, railroad, and proposed work areas should be submitted to both the SHPO and the THPOs.

If you have any questions, please contact Joseph Saldibar, Architectural Services Manager, at (303) 866-3741.

Sincerely,



Edward C. Nichols
State Historic Preservation Officer, and
President, Colorado Historical Society



HISTORY Colorado

Office of Archaeology and Historic Preservation
1200 Broadway
Denver, CO 80203
270130170

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LIT-739 80840





COLORADO
Department of Public
Health & Environment

Dedicated to protecting and improving the health and environment of the people of Colorado

January 12, 2015

Ms. Elizabeth Wade
10th Civil Engineer Squadron
8120 Edgerton Drive, Suite 40
USAF Academy, CO 80840-2400

Re: Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) for Repair of Non-Potable Reservoir #1 at the U.S. Air Force Academy, Colorado

Dear Ms. Wade,

The Federal Facilities Remediation and Restoration Unit, Hazardous Materials and Waste Management Division has received the above referenced draft report dated December 2014. We have reviewed the report and have no comments. Thank you for the opportunity to review the report. If you have any questions please contact me by telephone at (303) 692-3383 or email at ken.vogler@state.co.us.

Sincerely,

Ken Vogler, P.E.
Project Manager
FFRR Unit

Cc: Danny Follett, USAFA
Sharon Stone, USAF
David Rathke, EPA
Tracie White, CDPHE
File D022-1.1



