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ENVIRONMENTAL ASSESSMENT

OF

PERIMETER ROAD MAINTENANCE AT BUCKLEY AIR FORCE BASE, COLORADO

Prepared for

460 CES/CEV
660 S. Aspen Street, Stop 86
Buckley AFB, CO 80011-9551

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)/ FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA) ENVIRONMENTAL ASSESSMENT OF PERIMETER ROAD MAINTENANCE AT BUCKLEY AIR FORCE BASE, COLORADO

Agency: 460th Space Wing, U.S. Air Force

Introduction: The United States Air Force (USAF) proposes to continue maintenance of the perimeter road as currently practiced and upgrade existing water/wetland crossings with either Texas crossings (hardened crossings over which high waters flow without eroding the roadbed) or culvert systems as appropriate. The Proposed Action, an Alternative Action, and the No Action Alternative were assessed in an Environmental Assessment (EA) which is incorporated herein by reference.

The Buckley Air Force Base (AFB) perimeter road follows the boundary fence and the condition of the road varies with the location. The road is approximately 10 feet wide and 70,785 feet (13.4 miles) long. In some places, the road is just soil that is graded periodically and in other locations an aggregate from recycled concrete and asphalt has been laid down and packed to provide a hardened surface (a process referred to in this document and the EA as "graveling").

The perimeter road allows Security Forces (SF) to access the installation's perimeter for regular surveillance patrols. These patrols are required daily at Buckley AFB, and must consist of an "eyes-on" inspection along the full length of the perimeter. The road can also be used by emergency personnel to access the southern section of the flightline, by wildfire crews combating wildfires on the southern portion of the installation and for outdoor training exercises as needed. Currently, the road is impassible in certain locations during and after inclement weather such as snow or rain, preventing personnel from performing their duties.

Description of the Proposed Action and Alternatives: Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described in this paragraph. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate.

No Action Alternative: Under the No Action Alternative, the installation would continue current maintenance procedures (i.e., grading the bare surface and graveling when funds and materials are available). Under the No Action Alternative, no modifications to existing water/wetlands crossings would occur.

Alternative Action: Under the Alternative Action, the entire perimeter road would be paved within the current footprint, including both lanes where the perimeter road splits. Either Texas crossings or culvert systems would be utilized at water/wetland crossings, as appropriate.

Summary of Anticipated Environmental Impacts: Analyses performed in the EA addressed potential effects of the Proposed Action and Alternatives on air quality, noise, hazardous materials and wastes (including the Environmental Restoration Program), safety, geology, water resources, biological resources, socioeconomics, and environmental justice. The analyses indicate that implementing the Proposed Action would have short- to long-term adverse impacts ranging in intensity from minor to moderate for the above resources. Use of best management practices (BMPs) during enhancement of low water crossings would minimize short-term adverse impacts on wetlands and floodplain, and these enhancements would result in long-term beneficial impacts for wetlands and floodplains. Improved access to peripheral portions of the installation would result in long-term beneficial impacts on safety. The analyses support the conclusion that implementation of the Proposed Action would not result in any significant direct, indirect, or cumulative effects on the quality of the natural or human environment.

Public Review and Interagency Coordination: The Draft EA was made available for a 30-day public review and comment period through publication of a notice of availability which ran in the Aurora Sentinel (posted on 28 February 2008), Denver Post (posted 3 March 2008) and Rocky Mountain News (posted on 3 March 2008). The review period for federal, state and local agencies and the public began 3 March 2008 and ended 2 April 2008. Copies of the Draft EA and Draft FONSI/FONPA were available for review at the following libraries: Aurora Central Library; Denver Public Library and the Boulder Public Library. Comments were received from the Colorado Historical Society Office of Archaeology and Historic Preservation and the Air Pollution Control Division of the Colorado Department of Public Health and Environment (see Appendix C of the EA). Responses to comments were made by letter to originators and incorporated into the EA and FONSI/FONPA as appropriate.

Finding of No Significant Impact/Finding of No Practicable Alternative: Reasonable alternatives to the Proposed Action were considered. The Proposed Action was found to be the preferred alternative to meet Buckley AFB's purposes and needs. I conclude that the environmental effects of the Proposed Action are not significant, that preparation of an Environmental Impact Statement (EIS) is unnecessary and that a FONSI/FONPA is appropriate. Pursuant to Executive Order (EO) 11988, *Floodplain Management*, EO 11990, *Protection of Wetlands*, the authority delegated by Secretary of the Air Force Order 791.1, 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 floodplain and wetland environments. The preparation of the EA is in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and 32 Code of Federal Regulations (CFR) Part 989, as amended.

Carlos R. Cruz-Gonzalez

CARLOS R. CRUZ-GONZALEZ
Colonel, USAF
Deputy Director for Installations

15 Sep 08
Date

COVER SHEET
ENVIRONMENTAL ASSESSMENT OF
PERIMETER ROAD MAINTENANCE AT
BUCKLEY AIR FORCE BASE, COLORADO

Responsible Agencies: 460th Space Wing (460 SW), Buckley Air Force Base (AFB), Colorado.

Affected Location: Buckley AFB, Colorado

Document Designation: Environmental Assessment (EA)

Proposed Action: Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described in this paragraph. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate.

No Action Alternative: Under the No Action Alternative, the installation would continue current maintenance procedures (i.e., grading the bare surface and graveling when funds and materials are available). Under the No Action Alternative, no modifications to existing water/wetlands crossings would occur.

Alternative Action: Under the Alternative Action, the entire perimeter road would be paved within the current footprint, including both lanes where the perimeter road splits. Either Texas crossings or culvert systems would be utilized at water/wetland crossings, as appropriate.

Other Action Alternatives Considered: Paving of the perimeter road to a 50-foot width to accommodate two traffic lanes, a hike/bike trail, and paved shoulders was also considered. Due to the potential environmental impacts, particularly to wetlands, this alternative was not analyzed in detail.

Paving only those portions of the perimeter road that are most prone to erosion or are most impassible during inclement weather was also considered. However, this was anticipated to result in higher maintenance requirements for the points where paved and unpaved/ungraveled road meets. Therefore, this alternative is not carried forward for detailed analysis.

The Draft EA and Draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) were made available to the public for a review period, beginning 3 March 2008, and concluding 2 April 2008. Copies of the Draft EA and Draft FONSI/FONPA were available for review at the following libraries: Aurora Central Library; Denver Public Library, and the Boulder Public Library. Written comments and inquiries regarding this document were directed to Ms. Elizabeth Meyer, NEPA Compliance Program Manager, 460th Civil Engineer Squadron Environmental Flight (460 CES/CEV), 660 South Aspen Street, Mail Stop 86, Buckley AFB, CO 80011-9551. Comments were received from the Colorado Historical Society Office of Archaeology and Historic Preservation and the Air Pollution Control Division of the Colorado Department of Public Health and Environment (see **Appendix C**).

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ABBREVIATIONS, ACRONYMS, AND GLOSSARY

µg/m^3	Micrograms per Cubic Meter
140 WG	140th Wing
460 SW	460th Space Wing
ACM	Asbestos Containing Material
AEI	Annual Emissions Inventory
AFB	Air Force Base
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AFSPC	Air Force Space Command
ANGB	Air National Guard Base
AOC	Area of Concern
AQCR	Air Quality Control Region
AST	Aboveground Storage Tank
BAFB	Buckley Air Force Base
BMP	Best Management Practice
CAA	Clean Air Act
CAP	Centralized Accumulation Point
CAPCD	Colorado Air Pollution Control Division
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES/CEV	Civil Engineering Squadron/Environmental Flight
CFR	Code of Federal Regulations
CGP	Construction General Permit
CO	Carbon Monoxide
COANG	Colorado Air National Guard
CSE	Comprehensive Site Evaluation
CWA	Clean Water Act
CY	Calendar Year
dB	Decibels
dBA	A-weighted Sound Level Measurements
DCE	Dichloroethene
DNL	Day-Night Average A-weighted Sound Level
DOD	Department of Defense
EA	Environmental Assessment
EAC	Early Action Compact
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETL	Engineering Technical Letter
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FONPA	Finding of No Practicable Alternative
HAZMART	Hazardous Materials Pharmacy
HAZMAT	Hazardous Materials
HMMP	Hazardous Materials Management Plan
HUD	U.S. Department of Housing and Urban Development
HWMP	Hazardous Waste Management Plan
I	Interstate
IAP	Initial accumulation point

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IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
IRP	Installation Restoration Program
LBP	Lead-based Paint
LBPPO	Lead-based Paint Program Officer
mg/m^3	Milligrams per Cubic Meter
MS4	Municipal Separate Storm Sewer Systems
MSA	Metropolitan Statistical Area
MSDS	Material Safety Data Sheets
MSGP	Multi-Sector General Permit
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRCS	National Resources Conservation Service
O_3	Ozone
OSHA	Occupational Safety and Health Administration
P2	Pollution Prevention
PA	Preliminary Assessment
Pb	Lead
PCE	Perchloroethylene (tetrachloroethylene)
PM_{10}	Particulate Matter 10 Microns or Less in Diameter
$PM_{2.5}$	Particulate Matter 2.5 Microns or Less in Diameter
POL	Petroleum, Oil, and Lubricants
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
QD	Quantity Distance
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SF	Security Forces
SHPO	State Historic Preservation Officer
SI	Site Investigation
SIP	State Implementation Plans
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SVOC	Semivolatile organic compounds
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TCE	Trichloroethylene
tpy	Tons per Year
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOC	Volatile Organic Compound

ENVIRONMENTAL ASSESSMENT OF PERIMETER ROAD MAINTENANCE AT BUCKLEY AIR FORCE BASE, COLORADO

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS ..... INSIDE FRONT AND BACK COVERS

1. INTRODUCTION 1-1

1.1 Background 1-1
1.2 Purpose of and Need for the Proposed Action 1-3
1.3 Scope of the Environmental Assessment 1-3
1.4 Summary of Key Environmental Compliance Requirements 1-5
1.5 Organization of the Environmental Assessment 1-5

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Identification of Selection Criteria 2-1
2.2 Description of the Proposed Action 2-1
2.3 Alternatives 2-4
2.3.1 No Action Alternative 2-4
2.3.2 Alternative Action 2-4
2.4 Alternatives Considered but Eliminated From Further Review 2-4
2.5 Comparison of Alternatives 2-4

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 3-1

3.1 Air Quality 3-1
3.1.1 Affected Environment 3-1
3.1.2 Impacts 3-3
3.2 Noise 3-6
3.2.1 Affected Environment 3-6
3.2.2 Impacts 3-6
3.3 Hazardous Materials and Wastes 3-9
3.3.1 Affected Environment 3-9
3.3.2 Impacts 3-14
3.4 Safety 3-16
3.4.1 Affected Environment 3-16
3.4.2 Impacts 3-16
3.5 Geology 3-17
3.5.1 Affected Environment 3-17
3.5.2 Impacts 3-21
3.6 Water Resources 3-22
3.6.1 Affected Environment 3-22
3.6.2 Impacts 3-25
3.7 Biological Resources 3-27
3.7.1 Affected Environment 3-27
3.7.2 Impacts 3-31
3.8 Socioeconomics and Environmental Justice 3-34
3.8.1 Affected Environment 3-34
3.8.2 Impacts 3-37
3.9 Summary 3-38

TABLE OF CONTENTS (CONTINUED)

4. CUMULATIVE IMPACTS 4-1

4.1 Impact Analysis 4-1
4.2 Unavoidable Adverse Impacts 4-3
4.3 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls 4-6
4.4 Relationship Between the Short-term Use of the Environment and Long-term Productivity 4-6

5. LIST OF PREPARERS 5-1

6. REFERENCES 6-1

APPENDICES

A. Air Force Form (AF) 813
B. Notice of Availability
C. Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) Materials
D. General Conformity Air Quality Emissions Estimates
E. Summary Tables for Cumulative Impacts Calculations
F. Table of Planned Construction for Cumulative Impacts Analyses

FIGURES

1-1. Buckley AFB Vicinity Map 1-2
1-2. Ungraveled Portion of Perimeter Road After a Rainstorm 1-3
2-1. Existing Perimeter Road at Buckley AFB 2-2
2-2. Split in the Perimeter Road 2-3
2-3. Texas Crossing at Buckley AFB 2-3
3-1. IRPs, AOCs, and MMRPs Proximal to Perimeter Road 3-12
3-2. Buckley AFB Soils Overlain by the Perimeter Road 3-18
3-3. Surface Water Resources 3-24

TABLES

2-1. Comparison of Alternatives with Selection Criteria 2-5
3-1. National Ambient Air Quality Standards 3-2
3-2. Buckley AFB Air Emissions Inventory [a] 3-4
3-3. Annual Emissions Estimates from the Proposed Action for Maintaining the Perimeter Road 3-5
3-4. Estimates from the Alternative Action of Grading and Paving the Perimeter Road 3-5
3-5. Predicted Noise Levels for Examples of Construction Equipment 3-7
3-6. Properties of the Soil Types Found on Buckley AFB 3-19
3-7. Threatened and Endangered Species and Species of Special Concern 3-30
3-8. Employment by Industry 3-35
3-9. Race and Poverty Characteristics 3-36
3-10. Race and Economic Characteristics of Census Tract Residents 3-37
3-11. Comparison of Environmental Effects 3-39
3-12. BMPs or Plans Providing Applicable BMPs 3-41
3-13. Required Mitigation Measures 3-43
4-1. Cumulative Effects on Resources 4-4

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1. Introduction

This section describes the purpose of and need for the Proposed Action at Buckley Air Force Base (AFB), provides summaries of the scope of the environmental review and the applicable regulatory requirements, and presents an overview of the organization of the document.

Federal agencies are required to consider the environmental consequences of proposed actions in the decisionmaking process under the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Sections 4321 to 4370d) and the Council on Environmental Quality's (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508). This Environmental Assessment (EA) for perimeter road maintenance at Buckley AFB was prepared in accordance with NEPA, CEQ regulations, and 32 CFR 989 as amended.

1.1 Background

Buckley AFB occupies approximately 3,283 acres (1,328 hectares) adjacent to the City of Aurora, Arapahoe County, Colorado, within the Denver metropolitan area (see **Figure 1-1**). Buckley Field was first used by the military for training during World War II, and then the Colorado Air National Guard (COANG) acquired use of Buckley Field in 1946. After ownership by the Department of the Navy from 1947 to 1959, the COANG resumed use of the installation in 1959. In October 2000, Buckley Air National Guard Base (ANGB) was realigned and became an AFB under Air Force Space Command (AFSPC). The 460th Space Wing (460 SW) is the current host of Buckley AFB (BAFB 2004b).

The mission of the 460 SW is to provide combatant commanders with expeditionary warrior Airmen, and deliver global infrared surveillance, tracking, and missile warning for theater and homeland defense. A wide range of missions are performed at Buckley AFB including flight training, support for transient military aircraft, and space-related initiatives by a variety of tenants including active-duty, National Guard, and Reserve personnel from the U.S. Air Force (USAF), Army, Navy, and Marine Corps. The 140th Wing (140 WG) of the COANG operates and manages the only active military airfield in the Denver metropolitan area as a tenant at Buckley AFB. The installation currently supports 2,712 active-duty personnel, 1,716 Air Force Reserves, 2,497 Air/Army/Navy/Marine Reserves, and 2,811 contract and private citizens (Spann 2006). In addition, the installation serves approximately 16,363 military dependents, 22,000 USAF retirees, and approximately 55,000 additional retirees (Spann 2006).

The Buckley AFB perimeter road follows the boundary fence and the condition of the road varies with the location. The road is approximately 10 feet wide and 70,785 feet (13.4 miles) long. In some places, the road is just soil that is graded periodically and in other locations, an aggregate from recycled concrete and asphalt has been laid down and packed to provide a hardened surface (a process referred to in this document as "graveling").

The perimeter road allows Security Forces (SF) to access the installation's perimeter for regular surveillance patrols. These patrols are required daily at Buckley AFB, and must consist of an "eyes-on" inspection along the full length of the perimeter. The road can also be used by emergency personnel to access the southern section of the flightline, by wildfire crews combating wildfires on the southern portion of the installation, for outdoor training exercises, and for other purposes as needed. Currently, the road is impassible in certain locations during and after inclement weather such as snow or rain, preventing personnel from performing their duties.

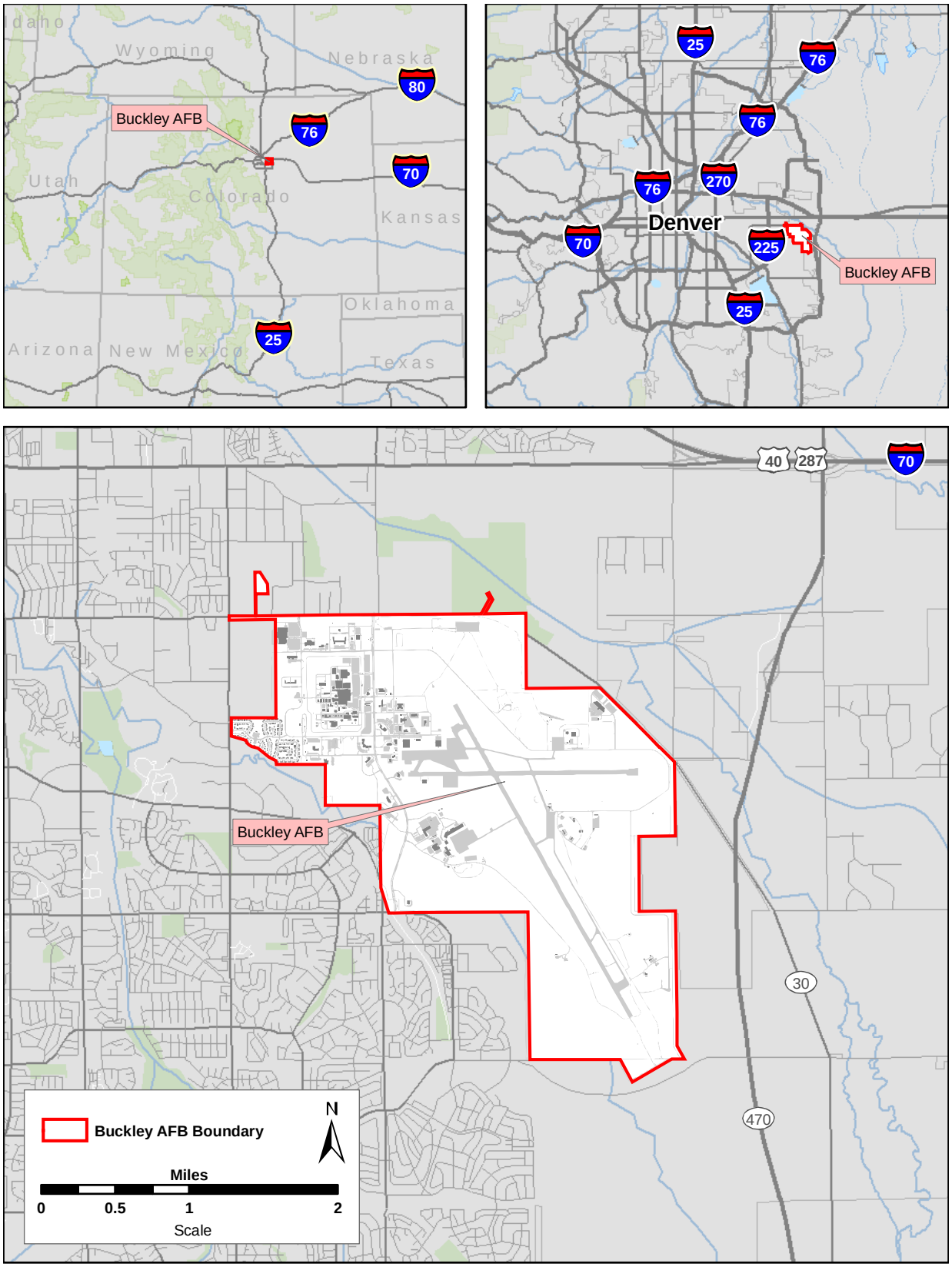

Figure 1-1. Buckley AFB Vicinity Map

1.2 Purpose of and Need for the Proposed Action

The USAF has prepared this EA to assess the environmental and social impacts resulting from the Proposed Action and Alternatives.

The purpose of the Proposed Action is to maintain and improve the perimeter road so that it is accessible at all times for installation personnel. SF should be able to access the installation's perimeter to ensure the security of the installation and to protect against the threats of global terrorism. Due to high clay content, the road is impassible during rainstorms, is susceptible to damage and rutting from vehicular traffic when wet (see **Figure 1-2**), and could result in increased sediment load to streams and wetlands during heavy rain events. The portions of the perimeter road which have not been graveled with recycled concrete and asphalt currently require frequent grading, which produces moderate to substantial quantities of fugitive dust depending on wind speed and moisture content of the road surface. Eventual graveling of the entire perimeter road, as described in the Proposed Action, is needed to improve air and water quality, improve normal operations and security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources. The Proposed Action also calls for the repair and upgrade of water/wetlands crossings with either Texas crossings (hardened crossings over which high waters flow without eroding the roadbed (see **Figure 2-3**) or culvert systems, as appropriate for the particular crossing. Repair and upgrade of these crossings is needed to protect against erosion and loss of road function during future flood events.

Figure 1-2. Ungraveled Portion of Perimeter Road After a Rainstorm

1.3 Scope of the Environmental Assessment

The Draft EA was made available for a public and agency review comment period from 3 March 2008 to 2 April 2008. The analyses presented in the EA indicate that neither the Proposed Action nor the Alternative Action would result in significant environmental or socioeconomic impacts, therefore a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) was prepared and an Environmental Impact Statement (EIS) would not be required.

In compliance with NEPA, CEQ, and USAF regulations and guidelines, this document focuses on those conditions and resource areas that are potentially subject to impacts. These resources include air quality, noise, hazardous waste/hazardous substances (including the Environmental Restoration Program [ERP]), safety, geological resources, water resources, biological resources, and socioeconomics and environmental justice.

Some environmental resources and conditions that are often analyzed in an EA have been eliminated from analysis or review. The following paragraphs identify these resource areas and the basis for such exclusions:

Cultural Resources – Buckley AFB has undergone four separate cultural resources surveys since 1983 which cumulatively evaluated all areas of the installation with the exception of portions of the 152 acres within the fenced high security area (BAFB 2002a, BAFB 2004b). Cultural resources identified in these combined surveys included a number of lithic scatters, foundations of historic properties, trash dumps, and a railroad spur line, none of which were considered eligible for the National Register of Historic Places (NRHP); and six buildings that are eligible for NRHP. None of these buildings are in the location of the Proposed Action or alternatives. The Colorado State Historic Preservation Officer (SHPO) has previously concurred that no significant archaeological resources have been identified at Buckley AFB and that various proposed actions are, therefore, unlikely to impact such resources. The implementation of the Proposed Action does not lead to any actions that have the potential to significantly affect cultural resources, tribal resources, tribal rights, or Indian lands. Should any cultural resources be uncovered during implementation of the Proposed Action, work would stop and the site would be evaluated by qualified personnel prior to the continuation of the project. Accordingly, the USAF has eliminated detailed examination of cultural resources, including historic structures and buildings, archaeological resources, and tribal resources.

Visual Resources – The Proposed Action does not involve activities that would impact visual resources, such as the construction of new facilities or modification of existing facilities. Accordingly, the USAF has eliminated detailed examination of visual resources.

Airspace Management – Because the Proposed Action would not involve any flying or flying missions, there would be no new impacts on airspace. Accordingly, the USAF has eliminated detailed examination of airspace management.

Utilities – The Proposed Action does not involve activities that would require movement of existing utility lines or the installation of additional utilities. Accordingly, the USAF has eliminated detailed examination of utilities.

Land Use – The Proposed Action does not involve movement or realignment of the existing road and, therefore, would not impact land use. Accordingly, the USAF has eliminated detailed examination of land use.

Prime and Unique Farmland – The Natural Resources Conservation Service (NRCS) has determined that there are no prime or unique farmlands on Buckley AFB due to pre-existing conditions and accessibility issues (Reference Letter in **Appendix C**). Accordingly, the USAF has eliminated detailed examination of prime and unique farmlands.

Radon, Storage Tanks, Lead-Based Paint (LBP), and Asbestos Containing Material (ACM) – These topics, typically addressed under "Hazardous Wastes/Materials" are not relevant to this EA because the Proposed Action does not include any activities which would involve these structures or substances. Accordingly, the USAF has eliminated detailed examination of these hazardous materials.

1.4 Summary of Key Environmental Compliance Requirements

This EA is documentation of the Environmental Impact Analysis Process (EIAP) (32 CFR Part 989), and complies with NEPA, CEQ regulations, and Department of Defense (DOD) Instruction 4715.9. The EA addresses all applicable Federal, state, and local laws and regulations, including the Clean Air Act (CAA); Endangered Species Act; Air Force Instruction (AFI) 32-7040, *Air Quality Compliance*; Executive Order (EO) 11990, *Protection of Wetlands*; EO 12898, *Floodplain Management*; EO 11988, *Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations*; EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*; Resource Conservation and Recovery Act (RCRA); and Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA). The EA does not constitute approval for construction of the Proposed Action.

In accordance with the National Pollutant Discharge Elimination System (NPDES) requirements, a site-specific Storm Water Pollution Prevention Plan (SWPPP), including sediment- and erosion-control measures, would be developed and implemented for graveling and construction activities. A Notice of Intent (NOI) would be filed to obtain coverage under the U.S. Environmental Protection Agency (USEPA) Storm Water Construction General Permit. Improvement of wetlands crossings by enhancement of Texas crossings or replacement with culvert systems would require a Clean Water Act (CWA) Section 404 permit from the U.S. Army Corps of Engineers (USACE), although, depending upon the extent of the action, this might fit under a nationwide permit. A fugitive dust permit would not be required for the Proposed Action or the alternatives because the sum of the remaining areas to be graded is below the 25-acre limit, beyond which a fugitive dust permit would be needed.

1.5 Organization of the Environmental Assessment

This EA is organized as follows:

Acronyms and Abbreviations: provides a list of acronyms and abbreviations used throughout the document.

Section 1 – Introduction: Purpose and Need for the Proposed Action: provides background information about the installation, the purpose and need for the Proposed Action, the scope of the environmental review, applicable regulatory requirements, and a brief description of how the document is organized.

Section 2 – Description of the Proposed Action and Alternatives: provides the selection criteria; a detailed description of the Proposed Action, the Alternative Action, and the No Action Alternative for perimeter road maintenance; other alternatives that were considered but not carried forward in the evaluation process; and an alternatives comparison table.

Section 3 – Affected Environment and Environmental Consequences: provides a description of the existing conditions of the areas potentially affected by the Proposed Action and alternatives, and an analysis of the direct and indirect project and cumulative impacts on resources from the Proposed Action, Alternative Action, and the No Action Alternative.

Section 4 – Cumulative Impacts: provides an analysis of present and reasonably foreseeable projects, and the potential incremental impacts of the Proposed Action when considered along with these other planned or reasonably foreseeable projects.

Section 5 – List of Preparers: provides a list of the document preparers and contributors.

Section 6 – References: provides a listing of the references used in preparing the EA.

Appendices – including AF 813, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) documentation, general conformity air quality emissions estimates, cumulative impacts calculation tables, and other information as needed.

2. Description of the Proposed Action and Alternatives

This section identifies selection criteria, and provides a detailed description of the Proposed Action and alternatives to the Proposed Action including the No Action Alternative and the Alternative Action, for maintenance of the perimeter road. In addition, a comparison of how the alternatives meet the selection criteria is provided at the end of this section.

2.1 Identification of Selection Criteria

In an effort to satisfy the purpose and need for the Proposed Action, several criteria were developed to compare and contrast alternative ways of fulfilling the objectives of the Proposed Action in accordance with 32 CFR 989.8(c).

Selection criteria for perimeter road maintenance include the following:

- Provides improved, all-weather access to the flightline, southern portions of the installation, and the perimeter fence
- Reduces fugitive dust impacts on air quality
- Facilitates natural hydrology at water/wetlands crossings
- Does not substantially increase impermeable surface area on the installation
- Reduces erosion/sediment impacts on water quality.

2.2 Description of the Proposed Action

The perimeter road encircles the installation, typically just inside of the boundary fence. There are several areas where the perimeter road is not close to the fence and alternative paved streets are used to move between these points. Where the perimeter road does in fact track along the boundary fence, the footprint for the road begins on the inside edge of the fence (see **Figure 2-1**). The COANG built a fence around the flightline for security and safety reasons and extended that fence all the way to the boundary fence on the southern end of the runway. Currently, personnel driving the perimeter road must enter this section through locked gates.

Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced. This entails grading ungraveled areas and graveling additional areas within the current footprint with an aggregate of recycled asphalt and concrete when materials and funds are available. In areas where the road splits into two separated paths (see **Figure 2-2**) both portions would continue to be maintained as described in this paragraph. Maintenance of these splits allows opportunities for vehicles to pass each other without driving off the current road. It also provides parking and training opportunities during various activities and exercises.

Where the road crosses ditches, wetlands, or drainages, Texas crossings or culvert systems would be constructed, as appropriate for each crossing, to maintain natural hydrology and permit vehicles to cross during inclement weather in a cost-effective manner (see **Figure 2-3**). Installation of such crossings is referred to as "construction" throughout this EA.

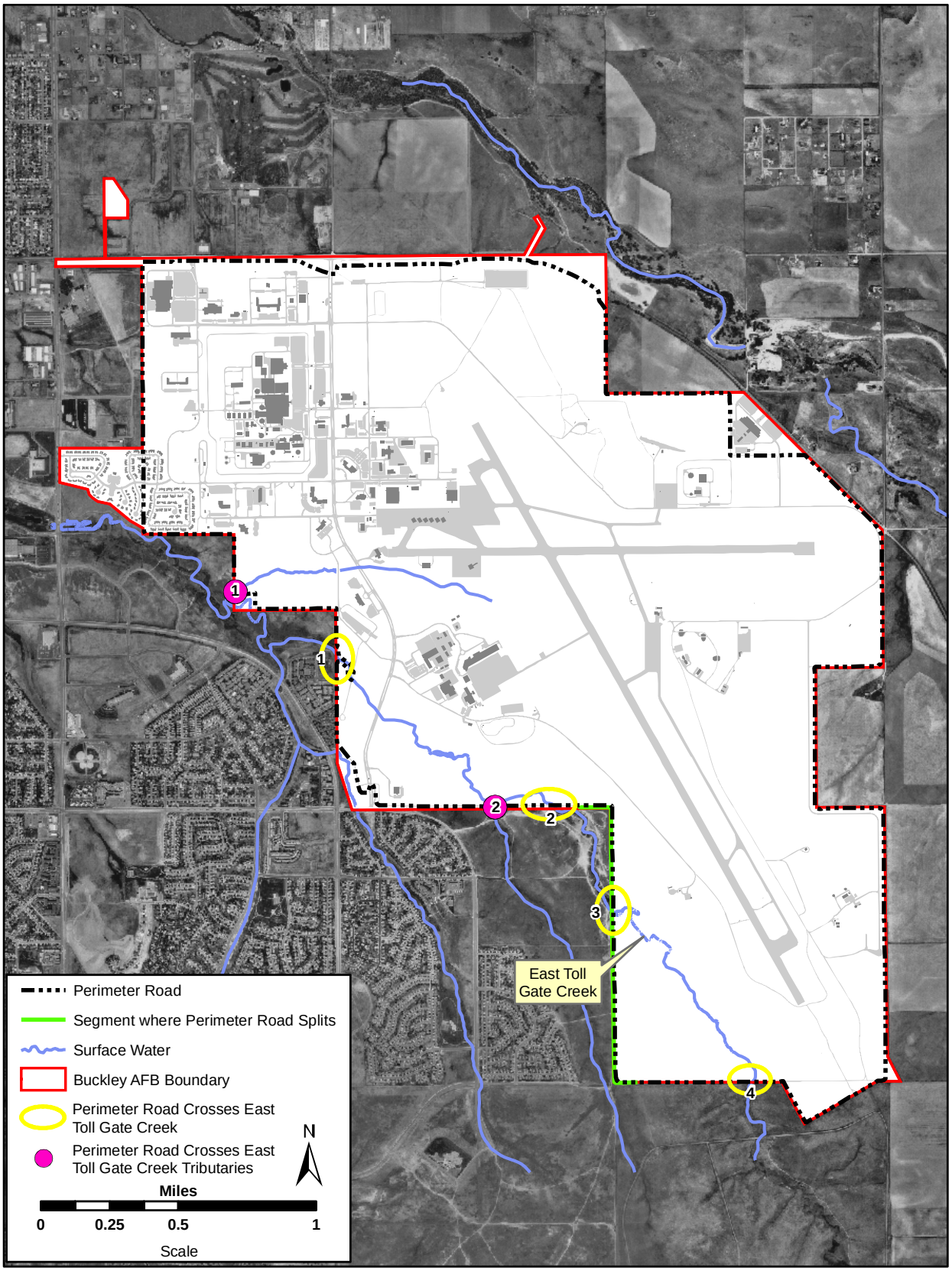

Figure 2-1. Existing Perimeter Road at Buckley AFB

Figure 2-2. Split in the Perimeter Road

Figure 2-3. Texas Crossing at Buckley AFB

2.3 Alternatives

2.3.1 No Action Alternative

Under the No Action Alternative, the installation would continue to maintain the perimeter road as currently practiced, grading ungraveled portions and graveling these portions with an aggregate base of recycled asphalt and concrete as funds and materials become available. No repair to or enhancement of existing water/wetlands crossings would occur. This document refers to the continuation of existing (i.e., baseline) conditions of the affected environment, without implementation of the Proposed Action or Alternative Action, as the No Action Alternative. The No Action Alternative serves as a benchmark against which Federal actions can be evaluated. Inclusion of a No Action Alternative is prescribed by CEQ regulations and, therefore, will be carried forward for further analysis in this EA.

2.3.2 Alternative Action

An alternative to the Proposed Action would be to pave the entire perimeter road, remaining within the current footprint and including both portions of road splits. For purposes of this EA, paving would involve reshaping the existing road bed to design specifications; preparing the road bed for paving (includes wetting and compacting soil layers and placement of gravel layers), and the actual "paving" of the road surface using either asphalt or concrete pavement. In areas where the road splits into two separated paths, both portions of the road would be paved. During the paving process, Texas crossings or culvert systems would be installed at water/wetlands crossings to facilitate natural hydrology.

2.4 Alternatives Considered but Eliminated From Further Review

Paving the perimeter road to a width of 50 feet to include two lanes of traffic and a biking/hiking lane was originally considered but dismissed after a field survey determined that the 50-foot-wide footprint could potentially have substantial impacts on natural resources, in addition to a prohibitive cost. Therefore, this alternative is not carried forward for detailed analysis.

Paving only those portions of the perimeter road that are most prone to erosion or are most impassible during inclement weather was also considered. However, this was anticipated to result in higher maintenance time for the points where paved and unpaved/ungraveled road meets as such joints tend to erode and develop pot holes more rapidly. The increased maintenance time and cost would be proportional to the number of such joints. Therefore, this alternative is not carried forward for detailed analysis.

2.5 Comparison of Alternatives

Table 2-1 illustrates the Proposed Action, Alternative Action, and the No Action Alternative as they relate to the selection criteria presented in **Section 2.1**. Only the Proposed Action meets all four selection criteria.

Table 2-1. Comparison of Alternatives with Selection Criteria

Selection Criterion	No Action	Proposed Action	Alternative Action
Provides improved, all-weather access to the flightline, southern portions of the installation, and the perimeter fence	Yes	Yes	Yes
Reduces fugitive dust impacts on air quality	No	Yes	Yes
Facilitates natural hydrology at water/wetlands crossings	No	Yes	Yes
Does not substantially increase impermeable surface area on the installation	Yes	Yes	No
Reduces erosion/sediment impacts on water quality	No	Yes	Yes

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3. Affected Environment and Environmental Consequences

This section describes the current conditions for and anticipated impacts on those resources which might be impacted by the Alternatives including air quality, noise, hazardous materials and wastes (including the ERP), safety, geology, water resources, biological resources, and socioeconomics and environmental justice. The definitions for impact intensity thresholds used in this document are as follows:

- ***Negligible.*** Impacts on the resource, although anticipated, could be difficult to observe and are not measurable
- ***Minor.*** Impacts on the resource would be detectable upon close scrutiny or would result in small but measurable changes to the resource
- ***Moderate.*** Impacts on the resource would be easily observed and measurable, but would be localized or short-term
- ***Major.*** Impacts on the resource would be easily observed and measurable, widespread, and long-term.

The definitions for duration of impacts used in this document are as follows:

- ***Short-term.*** Impacts are not anticipated to last for more than 1 to 2 years
- ***Long-term.*** Impacts are anticipated to last for more than 2 years.

3.1 Air Quality

3.1.1 Affected Environment

In accordance with Federal CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

To protect public health and welfare, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. **Table 3-1** presents the primary and secondary NAAQS.

As authorized by the CAA, the USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by the USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by the USEPA.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value		Standard Type
CO			
8-hour Average[a]	9 ppm	(10 mg/m^3)	Primary and Secondary
1-hour Average[a]	35 ppm	(40 mg/m^3)	Primary
NO_2			
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
O_3			
8-hour Average[b]	0.08 ppm	(157 µg/m^3)	Primary and Secondary
Pb			
Quarterly Average		1.5 µg/m^3	Primary and Secondary
PM_{10}			
Annual Arithmetic Mean[c]		50 µg/m^3	Primary and Secondary
24-hour Average[a]		150 µg/m^3	Primary and Secondary
$PM_{2.5}$			
Annual Arithmetic Mean[d]		15 µg/m^3	Primary and Secondary
24-hour Average[e]		65 µg/m^3	Primary and Secondary
SO_2			
Annual Arithmetic Mean	0.03 ppm	(80 µg/m^3)	Primary
24-hour Average[a]	0.14 ppm	(365 µg/m^3)	Primary
3-hour Average[a]	0.5 ppm	(1,300 µg/m^3)	Secondary

Source: USEPA 2004

Notes:

Parenthetical values are approximate equivalent concentrations.

[a] Not to be exceeded more than once per year.

[b] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

[c] To attain this standard, the expected annual arithmetic mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.

[d] To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

[e] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m^3.

The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93 exempt certain Federal actions from conformity determinations (e.g., contaminated site cleanup and natural emergency response activities). Other Federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that the USEPA has assigned to a nonattainment area. Once the net change in nonattainment pollutants is calculated, the Federal agency must compare them to the *de minimis* thresholds.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply in nonattainment areas. For example, the Title V permitting threshold for an "extreme" O_3 nonattainment area is 10 tpy of potential volatile organic compound (VOC) or NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality. Synthetic minor sources are those facilities that would be regulated under the air operating permit program but have opted to keep their emissions limits lower than the threshold for the program.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if (1) a proposed project is within 10 kilometers of any Class I area (i.e., an area in which visibility is protected more stringently than under the NAAQS; includes national parks, wilderness areas, monuments, and other areas of special national and cultural significance), and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)]. Because Buckley AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

The Colorado Air Pollution Control Division (CAPCD) under the Colorado Public Health and Environment Department is responsible for implementation of the CAA and has adopted the Federal primary and secondary NAAQS. Buckley AFB is in Arapahoe County, Colorado, within the Metropolitan Denver Air Quality Control Region (AQCR). The region of influence (ROI) affected by activities at Buckley AFB is considered to be the entire Metropolitan Denver AQCR. The Denver AQCR is currently designated attainment/maintenance for CO, the 1-hour ozone standard, and PM_{10}. The AQCR exceeded the 8-hour Ozone standard during the summer of 2007; therefore, the AQCR is a Marginal Non-attainment Area for the 8-hour Ozone standard. This USEPA non-attainment ranking renders the Early Action Compact (EAC) invalid (DiLio 2008).

Buckley AFB is a major source of criteria pollutants under the Title V program as it has the potential to emit more than 100 tons of sulphur oxides (SO_x) and more than 100 tons of NO_x. Buckley AFB is a minor source of VOCs, CO, and PM_{10} under the PSD with a potential to emit less than 250 tons of these pollutants. Buckley AFB is a PSD synthetic minor source of NO_x because the installation has accepted permit limits that establish the potential to emit less than 250 tons for these two pollutants per year. Buckley has a Title V Operating Permit (No. 950PAR118) issued in 1997, renewed in 2002, and, expires in 2007. The permit was modified 1 November 2005.

Stationary source emitting criteria pollutants consist of natural gas-fired boilers, furnaces and heaters, diesel-fired generators, fuel storage tanks, and degreasers. Buckley AFB is required to submit an Annual Emissions Inventory (AEI) each year. Buckley AFB Emissions Inventory is presented in **Table 3-2**.

3.1.2 Impacts

No Action

Under the No Action Alternative, the practices of occasionally grading parts of the road and filling with gravel when funds become available would continue to have short-term, negligible adverse effects on air

quality. There would be no measurable change to the baseline existing air quality described above and seen in **Table 3-2** as a result of not implementing the Proposed Action or Alternatives.

Table 3-2. Buckley AFB Air Emissions Inventory [a]

Pollutant Emission Sources	CO (tpy)	VOC (tpy) [b]	SO_x (tpy)	NO_x (tpy) [b]	PM_{10} (tpy)
Buckley AFB 2003 Mobile Emissions[c]	204.5	56.9	2.1	40.6	5.0
Buckley AFB 2005 Point and Fugitive Stationary Source Emission	21.8	26.4	1.5	52.04	6.08
Total 2003 Mobile and 2005 Stationary Buckley AFB Emissions	226.3	83.3	3.6	92.6	11.1
AQCR 36 Emissions Inventory	678,170	167,900	69,350	112,785	32,156
Conformity Rule *De Minimus* Threshold[d]	100	100	NA	100	100
10 percent of AQCR 36 Emissions Inventory (Significant Threshold Values)	67,817	16,790	6,935	11,279	2,316

Notes:

[a] The Buckley AFB 2005 AEI (BAFB 2006a) did not assess Pb or $PM_{2.5}$ emissions.

[b] VOCs and NO_x contribute to the formation of ground-level ozone.

[c] CO-2006 Interim Year Inventory, VOC and NO_x 2006 inventory, and PM_{10} and SO_x 2005 maintenance inventory.

[d] 40 CFR 93.153(b) - These limits are applicable to nonattainment and maintenance areas, and therefore, apply to Buckley AFB.

Proposed Action

Regulated pollutant emissions from the Proposed Action would not exceed the *de minimis* level of pollutants for the area or affect local or regional attainment status with the NAAQS. The Proposed Action does not include a net increase in personnel or commuter vehicles. Therefore, the Proposed Action's emissions from existing personnel and commuter vehicles would not result in an adverse impact to regional air quality.

The construction projects would generate total suspended particulate and PM_{10} emissions as fugitive dust from ground-disturbing activities (e.g., grading, demolition, soil piles) and from combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. This project would generate minimal amounts of dust that would be minimized by daily watering of the construction area.

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment. These emissions would be of a temporary nature. The emissions factors and estimates were generated based on guidance provided in *National Ambient Air Quality Standards* (USEPA 2004).

For purposes of this analysis, the project durations and affected project site areas that would be disturbed (presented in **Section 2**) were used to estimate criteria pollutant emissions. **Table 3-3** indicates the

annual emissions of criteria pollutants resulting from the existing method of maintaining the perimeter road at Buckley AFB and includes emissions from grading vehicles and construction vehicles used for the wetland crossing improvements. **Appendix D** details the emissions factors, calculations, and estimates of emissions for the Proposed Action based on the two methods described above.

Table 3-3. Annual Emissions Estimates from the Proposed Action for Maintaining the Perimeter Road

Description	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM_{10} (tpy)
Average Yearly Emissions Grading and Graveling Only	0.30	0.05	0.25	0.01	19.9
Arapahoe County Inventory Threshold (10% of Regional Emissions Inventory)	1,761	1,974	17,525	142	1,398

Although Metropolitan Denver AQCR is in marginal nonattainment for the 8-hour ozone levels, the emissions from this project fall well below the *de minimis* level of 100 tpy and therefore the General Conformity Rule requirements are not applicable. Under the requirements of 40 CFR 93.153 and 32 CFR 989.30, a General Conformity Determination is not required since the emissions of the Proposed Action are less than the *de minimis* level for the nonattainment area of Buckley AFB. In addition, the Proposed Action would generate emissions well below 10 percent of the emissions inventory for the AQCR (see **Table 3-3**) and the emissions would be short-term. Therefore, the Proposed Action is considered to have a short-term minor adverse effect on air quality.

According to 40 CFR Part 81, there are no Class I areas in the vicinity of Buckley AFB. Therefore, Federal PSD regulations would not apply to the Proposed Action. Buckley AFB would coordinate and obtain an required air permits or applications as needed.

The environmental consequences on air quality resulting from the perimeter road maintenance employing grading, graveling, and water/wetlands crossing modifications are provided in **Table 3-3**. **Table 3-3** demonstrates that the Proposed Action method of road maintenance is below the *de minimis* levels and does not violate the 10% Regional Value. In summary, the impact from the Proposed Action would not violate any Federal, state, or local air quality regulations.

Alternative Action

Under the Alternative Action, the road would be graded and paved. The impact on air quality resulting from this alternative would be short-term minor adverse. The impact on air quality would that of the impact under the Proposed Action plus that of paving the road. There would be a small offset under this alternative in that the annual maintenance under the Proposed Action would not take place each year since the road would be paved. The impact on air quality for this alternative is seen in **Table 3-4**.

Table 3-4. Estimates from the Alternative Action of Grading and Paving the Perimeter Road

Description	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM_{10} (tpy)

Air Emissions Resulting From Grading and Paving	0.81	0.13	1.05	0.02	19.9
Arapahoe County Inventory Threshold (10% of Regional Emissions Inventory)	1,761	1,974	17,525	142	1,398

Although Metropolitan Denver AQCR is in nonattainment for the 8-hour ozone levels, the emissions from this project fall well below the *de minimis* level of 50 tons per year and therefore the General Conformity Rule requirements are not applicable. Under the requirements of 40 CFR 93.153 and 32 CFR 989.30, a General Conformity Determination is not required since the emissions of this alternative are less than the *de minimis* level for the nonattainment area of Buckley AFB. In addition, this alternative would generate emissions well below 10 percent of the emissions inventory for the AQCR (see **Table 3-4**) and the emissions would be short-term. Therefore, the Proposed Action is considered to have a short-term minor effect on air quality. Therefore, the impact from this alternative would not violate any Federal, state, or local air quality regulations.

3.2 Noise

3.2.1 Affected Environment

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on the roof. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements are used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. All sound levels analyzed in this EA are A-weighted.

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (i.e., schools, churches, or hospitals) or broad areas (i.e., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

Most people are exposed to sound levels of 50 to 55 A-weighted decibel (dBA) or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dBA (USDOT 1984). Although the communities surrounding Buckley AFB are typical of an urban residential atmosphere, the noise environment in the vicinity of Buckley AFB is dominated by aircraft operations and vehicular traffic. Commercial facilities are also prevalent in the area.

3.2.2 Impacts

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Noise impacts from the Proposed Action would occur from temporary construction activities. Noise from construction activities varies depending on the type of construction being done, the area that the project would occur in, and the distance from the source. To predict how the construction activities would impact adjacent populations, noise from each of the

probable construction activities (grading, paving, or installation of wetland/water crossings) was estimated. For example, as shown in **Table 3-5**, construction usually involves several pieces of equipment (such as forklifts and cranes) that can be used simultaneously.

Table 3-5. Predicted Noise Levels for Examples of Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 feet (dBA)
Grading	
Bulldozer	87
Grader	85
Water Truck	88
Paving	
Paver	89
Roller	74
Demolition	
Loader	85
Haul Truck	88
Building Construction	
Generator Saw	81
Industrial Saw	83
Welder	74
Truck	80
Forklift	67
Crane	83

Source: COL 2001

No Action Alternative

Under the No Action Alternative, current maintenance activities would continue, including grading and graveling operations when needed. No modifications to water or wetland crossings would occur. Sources of noise due to implementation of the No Action Alternative include temporary noise due to grading and graveling activities (i.e. the existing noise condition). Maintenance activities e isolated to normal working hours (i.e., between 7:00 am and 5:00 pm). No impacts from long-term road operation and use are anticipated.

Proposed Action

Implementation of the Proposed Action would have temporary adverse noise impacts as a result of the construction activities.

Under the Proposed Action, Buckley AFB would continue to maintain the perimeter road as currently practiced and would make improvements to water/wetland crossings. Current road maintenance entails grading ungraveled areas and graveling additional areas within the current footprint when materials and funds are available. The upgrade or repair of water/wetland crossings would be with Texas Crossings or culvert systems.

Negligible, adverse impact in the long-term due to road operations and a small increase in traffic might occur due to better road surface conditions.

Construction Noise. The Proposed Action at Buckley AFB includes the continued maintenance of the perimeter road and the installation of Texas crossings or culvert systems installed along the perimeter road. Examples of expected construction noise during daytime hours are as follows:

- Populations approximately 97 feet away from construction activities would experience noise levels of approximately 86 dBA.
- Populations approximately 809 feet away from construction activities would experience noise levels of approximately 67 dBA.

Implementation of the Proposed Action would have temporary effects on the noise environment from the use of heavy equipment during construction activities, and the movement of these vehicles to and from the Base. The highest noise levels would be experienced by residences closest to the perimeter road and the major access routes. Construction activities would be isolated to normal working hours (i.e., between 7:00 am and 5:00 pm). It is anticipated that implementation of the Proposed Action would have moderate short-term adverse impacts as a result of the construction activities.

Alternative Action

Sources of noise at Buckley AFB that could impact populations under the Alternative Action include construction noise, which would result in temporary adverse impacts.

Under the Alternative Action, the perimeter road would be completely paved along its current route and footprint. Texas crossings or culvert systems would be created or upgraded at any water/wetland crossings where needed.

Negligible, adverse impact in the long-term due to road operations and a small increase in traffic might occur due to better road surface conditions.

Construction Noise. Construction activities are likely to cause noise impacts on nearby residential areas. Noise levels for construction activities would be similar to those under the Proposed Action.

- Populations approximately 97 feet from paving operations would experience noise levels of approximately 83 dB.
- Populations approximately 809 feet from paving operations would experience noise levels of approximately 64 dB.

Implementation of the Alternative Action would have temporary effects on the noise environment from the use of heavy equipment during construction activities and the movement of this equipment on and off the Base. However, noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 am and 5:00 pm). Several residential areas would be in close proximity of the paving and grading operations necessary for this alternative and to major access routes. Residential areas closest to the perimeter road and access routes would be most impacted

by noise created by implementation of this alternative. Therefore, it is anticipated that implementation of the Alternative Action would have moderate, short-term, adverse impacts as a result of the construction activities.

3.3 Hazardous Materials and Wastes

3.3.1 Affected Environment

Hazardous material is defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Substances Control Act, as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, or incapacitating reversible illness; or pose a substantial threat to human health or the environment. Hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that poses a substantial present or potential hazard to human health or the environment. In general, both hazardous materials (HAZMAT) and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Evaluation of HAZMAT and wastes focuses on underground storage tanks (USTs) and aboveground storage tanks (ASTs) and the storage, transport, and use of pesticides and herbicides; fuels; and petroleum, oil, and lubricants (POL). Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of HAZMAT and wastes can threaten the health and well being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of HAZMAT or wastes, the extent of contamination varies based on the type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based paint (LBP), radon, polychlorinated biphenyls, and unexploded ordnance. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, the DOD has dictated that all facilities develop and implement Hazardous Material Emergency Planning and Response Plans or Spill Prevention, Control, and Countermeasure Plans. Also, the DOD developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites on military installations. Through ERP, the DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed). These plans and programs, in addition to

established legislation (i.e., CERCLA and RCRA), effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

The Civil Engineering Squadron/Environmental Flight (CES/CEV) is responsible for the hazardous material and waste plans for the installation. In conformance with the policies established by Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, the CES/CEV has developed plans to manage HAZMAT, hazardous wastes, and special hazards on the installation.

Hazardous Materials. AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of HAZMAT throughout the USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of HAZMAT; and to those who manage, monitor, or track any of those activities. Buckley AFB has an established hazardous materials pharmacy (HAZMART) in accordance with AFI 32-7086. The HAZMART is the central location for the receipt, storage, and issue of the majority of HAZMAT at most USAF installations. However, Buckley AFB implements a "virtual" HAZMART, which does not have a central location but rather electronically tracks and controls use. The HAZMART focuses on reducing the USEPA's 17 industrial toxics which have a high probability of causing human health and environmental hazards (BAFB 2005b).

Hazardous Wastes. The CES/CEV maintains a *Hazardous Waste Management Plan* (HWMP) as directed by AFI 32-7042. This plan prescribes the roles and responsibilities of all members of Buckley AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid and hazardous waste management.

Wastes generated at Buckley AFB include pesticides, herbicides, POL, deicing fluids, flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, municipal solid waste (MSW), and other miscellaneous wastes. Management of hazardous wastes is the responsibility of each waste-generating organization and the CES/CEV. Hazardous waste is stored at an initial accumulation point (IAP), which is at or near the point of generation and under the control of the owner/manager of the generating activity. An IAP is designed to facilitate collection of hazardous wastes and ensure proper management. An IAP is allowed to accumulate up to 55 gallons of hazardous waste or 1 quart of acute hazardous waste. Once the 55 gallons (or 1 quart in the case of acute hazardous waste) limit is reached, the generating activity must transfer the hazardous waste container to the centralized accumulation point (CAP) where wastes from several IAPs are placed for periods of up to 180 days pending disposal or further transfer.

Each organization has appointed a primary and alternate manager for each hazardous waste site on Buckley AFB. Hazardous waste generators are required to maintain a listing of all the hazardous waste streams generated in their section, with proper identification, handling, storage, and record keeping. For special projects generators must coordinate with CES/CEV to obtain containers, to ensure they meet U.S. Department of Transportation (USDOT), compatibility, and air emissions standards. Response to spills of hazardous waste should follow the Spill Prevention Control and Countermeasure Plan.

Also, anyone working with hazardous materials or wastes on Buckley AFB, including contractors and Base personnel, must adhere to the following procedures:

- Obtain CES/CEV approval for all HAZMAT and waste at all times
- Ensure hazardous wastes are managed per 40 CFR and transported in accordance with 49 CFR to a certified disposal facility

- Ensure proper labeling, handling, segregation, collection, and storage of HAZMAT and waste at all times
- Ensure all personnel are properly trained for handling the HAZMAT they use and the hazardous waste they generate
- Ensure the CES/CEV is given notice when scheduling waste disposal requiring a manifest(s), before it is transported off installation
- Store and use HAZMAT in accordance with all Federal, state, and local laws and USAF regulations/policy.

Pollution Prevention. AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*; and EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management.* AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. To fulfill this requirement, Buckley AFB has the following plans:

- Hazardous Materials Management Plan (HMMP)
- Draft HWMP
- Draft Solid Waste Management Plan
- Draft Spill Prevention, Control, and Countermeasure Plan.

These plans assist in maintaining a waste-reduction program and meeting the requirements of the CWA; the NPDES permit program; and Federal, state, and local requirements for spill prevention control and countermeasures.

Environmental Restoration Program. The Installation Reserve Program (IRP) is a program category under the Air Force ERP. The scope of the IRP is investigation and cleanup of Air Force sites whose past activities created contamination primarily from hazardous substances, hazardous wastes, low level radioactive materials or wastes, or POLs. The Buckley IRP consists of 10 sites, two of which have been closed, and multiple Areas of Concern (AOCs). **Figure 3-1** identifies two IRP sites (LF003 and SS010) and one AOC (1011) currently traversed by the perimeter road. These sites are briefly described below:

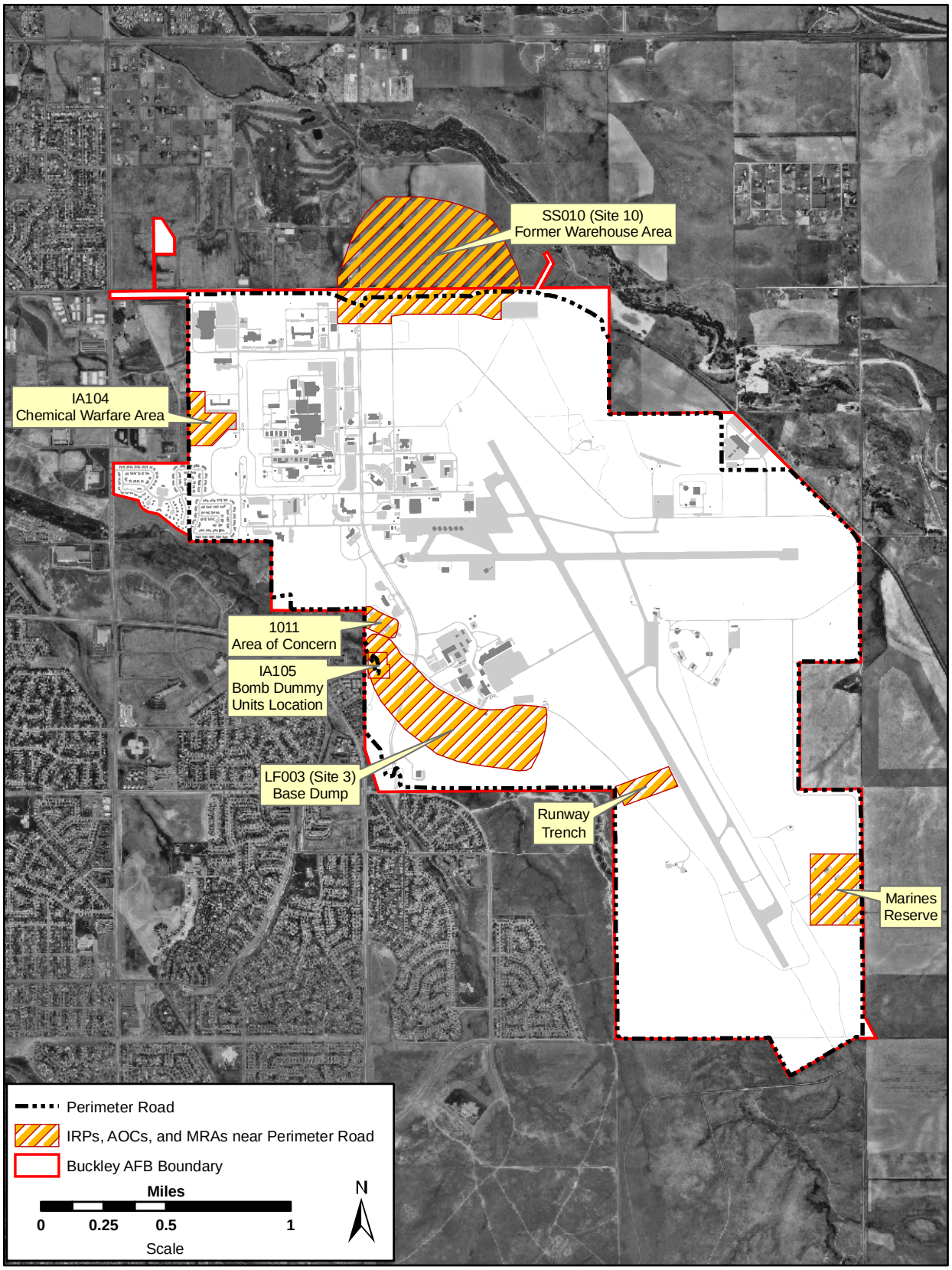

Figure 3-1. IRPs, AOCs, and MMRPs Proximal to Perimeter Road

IRP Site 3 (LF003) - Former Base Landfill. This site is located on the southwestern side of the Base, south of Aspen Way and Sunlight Way. As the former Base landfill, it was reported to have received a variety of waste (municipal refuse, shop waste, rubble, etc.) from 1942 to 1982. Building materials, paint cans, solvent containers, pesticide containers, municipal refuse, fuel tank sludge, and construction rubble were disposed in the landfill. Municipal refuse from Lowry AFB also was disposed of at Site 3 during the early 1960s. Landfill waste was burned periodically between 1947 and 1959, probably using waste oil or other flammables to aid combustion. First identified during a preliminary assessment (PA) in 1982, the site has undergone a site investigation (SI) in 1987 and a remedial investigation (RI) in 1994. The site is undergoing an assessment of the adequacy of the existing soil cover over the refuse, results of which will be reported in 2007. (Spangler 2007)

IRP Site 10 (SS010) - Former Warehouse Area. This site was added to the ERP program after an SI was completed in 1997. It is located near the northern Base boundary along East 6th Avenue, east of Aspen Street, and directly south of the future site of the City of Aurora's Upper Sand Creek Water Treatment Plant. The Former Motor Pool Area section of Site 10 was used from 1940 to 1957 for vehicle maintenance and service. The Former Depot Area section of Site 10 was used from 1955 to 1996 for storage of pesticides and herbicides and vehicle maintenance. (Spangler 2007)

A variety of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals have been detected in the soil and groundwater of the former Motor Pool and Depot Areas within IRP Site 10. The main contaminants of concern are as follows:

- ***Chlorinated solvents:*** 1,1-dichloroethene (DCE); cis-1,2-DCE; carbon tetrachloride; tetrachloroethylene (PCE); and trichloroethylene (TCE)
- ***Petroleum hydrocarbons:*** benzene, ethylbenzene, toluene, total xylenes, and naphthalene
- ***Metals:*** total and dissolved chromium and total and dissolved selenium.

During the extensive RI, which is still under development, a plume contaminated primarily with PCE has been shown to flow from the Base and under property owned by the City of Aurora. An interim remedial action was conducted in 2005 to substantially reduce groundwater contaminant concentrations in the on-Base source area and is being operated to preclude continued flow of contaminated groundwater off Base.

Treatability studies to evaluate remedial technologies for the off-Base portion of the plume will be conducted in 2007, and a feasibility study to evaluate alternatives for the final remedial action will incorporate the results of the treatability studies (Spangler 2007).

AOC 1011 – Building 1011 Site. This AOC is located northwest of the intersection of Aspen Street and Aspen Way. The recently demolished Building 1011 was built in 1942 (formerly Building 711) as a synchronization shed used to synchronize aircraft machine guns, engines, and propellers. The building was later used as a motor pool and then housed civil engineering shops. Activities in surrounding buildings (also demolished) included weapon maintenance, flight line fuel truck maintenance, fuel storage and dispensing, and steam production. In 2006, the AOC underwent an SI. It is currently anticipated that a removal action will be conducted for lead-contaminated soil, and the rest of the AOC will become a site for further study. (Spangler 2007)

Potential New AOC Sites. Buckley AFB recently completed an expansion of the Basewide PA conducted by the COANG in the 1980s. This nationwide search for historical Army, Navy, and National Guard records identified 24 potential new AOCs that are under further investigation in a Basewide SI (Spangler 2007). Although documentation of the extent and nature of these potential AOCs is not yet available, the

general location and identifications of the potential new AOCs traversed by the perimeter road are illustrated in **Figure 3-1**.

Military Munitions Response Program. The Military Munitions Response Program (MMRP) is another program category under the ERP. The scope of the MMRP is investigation and cleanup of other-than-operational ranges contaminated with military munitions, e.g., unexploded ordnance, or chemical residues of munitions. The Air Force MMRP is managed centrally by Air Staff, which recently initiated a comprehensive site evaluation (CSE), Phase I, at each Base to identify additional MMRP sites that might require responses to protect human health and the environment. The Buckley Phase I CSE conducted in 2006 identified nine Munitions Response Areas that warrant further study in the upcoming 2007 CSE Phase II. Those sites which are traversed by the perimeter road are identified in **Figure 3-1**. (Spangler 2007)

Ordnance. The storage and transport of munitions are important operations on Buckley AFB. The munitions storage area and aircraft explosive loading areas are on the eastern side of the installation. The explosive safety quantity distance arcs for these areas extend nearly to the eastern perimeter of the installation (BAFB 2003a).

3.3.2 Impacts

No Action Alternative

Under the No Action Alternative, routine maintenance would continue as is, and no Texas crossings or culverts would be installed. Because of the grading included in this alternative, its implementation would be expected to have effects similar to the Proposed Action, described below — no effect for all but ERP sites (IRP, AOC, and MMRP) which might be associated with long-term minor adverse impacts.

Proposed Action

Hazardous Materials. No effects on HAZMAT management during construction would be expected. Products containing HAZMAT would be procured and used during the Proposed Action. There would be no new chemicals or toxic substances used or stored at Buckley AFB. It is anticipated that the quantity of products containing HAZMAT used during the construction activities would be minimal, if at all, and their use would be of short duration. Contractors would be responsible for the management of HAZMAT, which would be handled in accordance with Federal and state regulations. Contractors must report use of HAZMAT to the HAZMART including pertinent information such as material safety data sheets (MSDS), an estimate of how much material will be used, amount stored, and location on the facility prior to the start of work.

Hazardous Waste. No effects on the installation's hazardous waste management program would be expected from the construction or operational activities. It is anticipated that the quantity of hazardous wastes generated from proposed construction activities would be negligible. Contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as the installation's Hazardous Waste Management Plan. Best management practices (BMPs) would be followed to ensure that contamination from a spill does not occur. If, however, a spill occurs, the Spill Prevention Control and Countermeasures Plan outlines the appropriate measures for spill situations.

There are two hazardous waste/waste petroleum accumulation sites and two oil/water separators in the area of Buildings 1301, 1302, and 1303. These sites would not be impacted from the Proposed Action.

Pollution Prevention. No effect on the P2 program at Buckley AFB would be expected. Quantities of hazardous material and chemical purchases, off-installation transport of hazardous waste, disposal of MSW, and energy consumption would increase during construction, however negligible. Also, it is USAF policy to procure materials (construction and office supplies) with the highest recyclable content possible.

Environmental Restoration Program. Long-term, minor, adverse effects on the installation's ERP LF 003 and Site 10 would be expected. The Proposed Action would traverse ERP LF 003 and Site 10.

Because LF 003 is situated in a floodplain and an area with wetlands, it could be necessary under the Proposed Action to install a Texas crossing or a culvert. Prior to the installation of either of these structures it would be necessary to determine the location and extent of LF 003 to ensure that debris from the landfill is not encountered and, also, if this construction would negatively impact the landfill's cap. If, during construction, debris was found, it is imperative that activities cease and the installation Civil Engineer be contacted.

The routine maintenance prescribed by the Proposed Action includes grading ungraveled areas. Although grading usually involves the smoothing of the surficial portion of the road, sometimes it might be necessary to grade at a larger depth, for example, if ruts from vehicles were extensive. Over the succession of routine maintenance, it is possible that debris from LF 003 could become exposed and the integrity of the cap compromised. If the section of perimeter road which traverses LF 003 requires grading, proper precautions and measures should be taken to ensure that this site is not disturbed.

The Proposed Action would not likely disturb contamination at Site 10 because it is predominantly associated with groundwater in that area. If, however, contamination does exist in the soil or subsoil, proper precautions and measures should be taken to ensure that this site is not disturbed and contaminants spread elsewhere. Maintenance of the perimeter road should not conflict with remedial actions taking place at this site; coordination is essential. Personnel responsible for grading or other equipment operation should be made aware of the location of vent pipes associated with Site 10 so that damage is not incurred.

Ordnance. No effect on ordnance would be expected as workers and equipment would be required to stay outside of quantity distance (QD) arcs.

Alternative Action

Hazardous Materials. No effects on HAZMAT management during construction or operations would be expected for the same reasons as described under impacts for the Proposed Action.

Hazardous Waste. No effects on the installation's hazardous waste management program would be expected from the construction or operational activities for the same reasons as described under impacts for the Proposed Action.

Pollution Prevention. No effect on the P2 program at Buckley AFB would be expected for the same reasons as described under impacts for the Proposed Action.

Environmental Restoration Program. Short-term, moderate, adverse effects due to likely disturbance of two IRP sites, one AOC, and a number of additional potential AOC sites and MMRP sites, would be expected. The alternative would require extensive preparation of the road bed before pavement could be laid. Preparation would include more intensive and extensive grading which would have a greater (relative to the Proposed Action) potential to disturb and spread debris and contamination at these sites.

Ordnance. No effect on ordnance is expected as workers and equipment would be required to stay outside of QD arcs.

3.4 Safety

3.4.1 Affected Environment

All government personnel and contractors performing construction activities are responsible for following ground safety and Occupational Safety and Health Administration (OSHA) regulations and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to HAZMAT, use of personal protective equipment, and use and availability of material safety data sheets (MSDS). Industrial hygiene is the responsibility of those working at the site, as applicable. Construction responsibilities are to review potentially hazardous workplaces; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous material), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures or engaged in hazardous waste work.

There are several areas that are constrained by QD clear zones at Buckley AFB. These zones are associated with the alert area, Explosive Combat Aircraft parking, and the Munitions Storage Area. Buckley AFB is aggressively managing its development program to ensure that it meets explosive safety requirements.

3.4.2 Impacts

No Action Alternative

The No Action Alternative would have short-term, minor, adverse effects due to road maintenance activities and the associated risks for contractor or installation personnel conducting the maintenance activities during the normal workday. However, the No Action Alternative would not provide the long-term, beneficial impacts associated with improved access to remote areas of the installation.

Proposed Action

Short-term, minor adverse effects and long-term beneficial effects would be expected from the Proposed Action. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors or installation personnel performing work at Buckley AFB during the normal workday because the level of such activity would increase. Contractors and installation personnel would be required to establish and maintain safety programs. Long-term beneficial effects would result from improved access for emergency response vehicles to all portions of the installation's perimeter.

Alternative Action

The impacts on safety would be the same for the Alternative Action as presented for the Proposed Action.

3.5 Geology

3.5.1 Affected Environment

Topography. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features. Buckley AFB is west of the Great Plains within the western portion of the central high plains of Colorado. The region is surrounded on three sides by higher terrain areas including the Palmer Lake Divide to the south, the Rampart Range and Rocky Mountains to the west, and the Cheyenne Ridge to the north (BAFB 2004a).

The topography of Buckley AFB comprises relatively flat land and rolling upland. Elevations range from 5,650 feet in the southeastern corner to 5,500 feet in the northwestern corner of the installation (BAFB 2004a).

Geology. Geology, the study of the earth's composition, provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Buckley AFB is within the Denver Basin approximately 50 miles east of the Continental Divide. The Denver Basin is a structural depression that is 300 miles long and 200 miles wide. This depression was created during a mountain-building event referred to as the Laramide Orogeny.

Coal reserves are present beneath the surface of Buckley AFB; however, these reserves are economically nonrecoverable due to their low quality and depth beneath the surface. Although mineral reserves (i.e., sand and gravel) are present in the area, economically desirable reserves do not exist on Buckley AFB (BAFB 2004a). No other significant mineral resources are present at Buckley AFB.

Soils. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use. The major soil-mapping units present on Buckley AFB include the Fondis-Weld, Alluvial Land-Nunn, and Renohill-Buick-Litle associations (see **Figure 3-2** and **Table 3-6**) (USDA/SCS 1971). Other areas on installation have been identified as gravel pits, rock outcrop complexes, sandy alluvial land, and terrace escarpments (USDA/SCS 1971).

The Fondis-Weld association mapping unit, composed of the Fondis and Weld soil series, covers the most surface area at Buckley AFB. This association consists of deep loamy soils that formed mainly in silty material deposited by the wind (loess). The Fondis soils are gently sloping (1 to 5 percent slope), well-drained, fertile upland soils with a high water-holding capacity (0.25 inch per inch of soil) and moderately slow permeability (< 0.63 inch per hour), and are susceptible to wind and water erosion. The Weld soil series consists of deep, well-drained, level to gently sloping (0 to 3 percent slope) soils that occur mainly in uplands. The Weld soils have a moderate rate of water intake and a high available water-holding capacity (0.20 to 0.25 inch per inch of soil). The most common soils in the Buckley AFB area are the Fondis silt loam and the Fondis-Colby silt loam (USDA/SCS 1971).

The Alluvial Land-Nunn association consists of soils that have moderate permeability (0.63 inch per hour) and high water-holding capacity (0.20 inch per inch of soil), and are typically found along floodplains and terraces. On installation, these soils are found along Toll Gate Creek and Sand Creek.

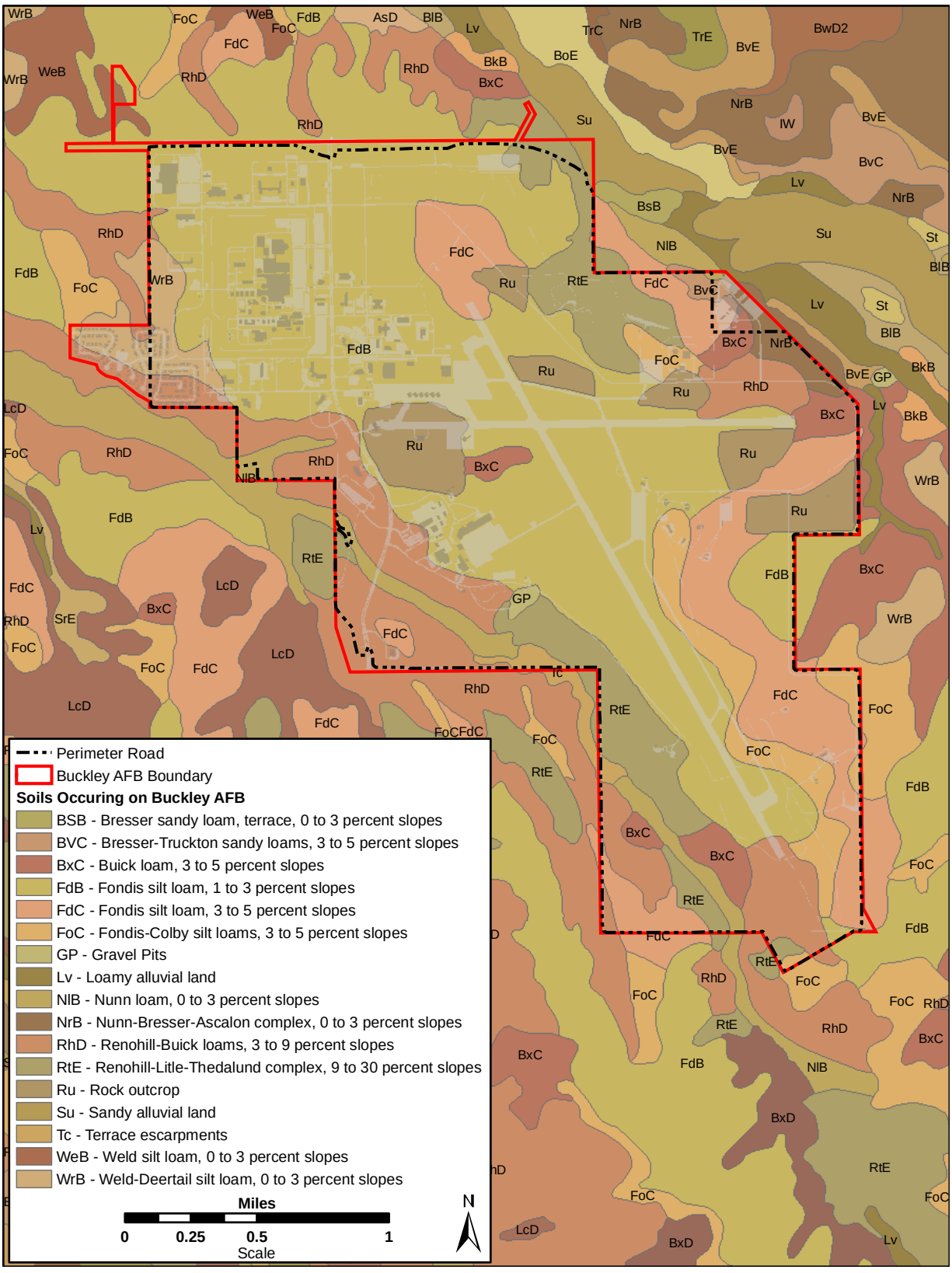

Figure 3-2. Buckley AFB Soils Overlain by the Perimeter Road

Table 3-6. Properties of the Soil Types Found on Buckley AFB

Name[a]	Type	Drainage	Properties	Slope[b] (%)
Beckton (BkB)	Loam	Moderately well- and somewhat poorly drained	Soft when dry; friable when wet. Subsoil ranges from clay loam to clay, contains salt throughout, and is slightly calcareous, at least in the lower part.	0–3
Bresser (BsB)	Sandy Loam	Well-drained	Moderate available water-holding capacity. Water table is at a depth of about 10 feet for most of the year. Sandy clay loam subsoil. A zone of lime accumulation does not occur.	0–3
Bresser-Truckton (BvC)	Sandy Loam	Well-drained	Bresser soils occupy the slopes. Surface layer about 6 inches, with a sandy clay loam subsoil about 20 inches thick. Truckton soils occur at ridgetops and are susceptible to soil blowing.	3–5
Bresser-Truckton (BvE)	Loamy Sand	Well-drained	Bresser soil is on the side slopes. Truckton soils occur in the higher areas.	5–20
Buick (BxC)	Loam	Moderately well-drained	Deep, gently sloping to sloping soils that occur in uplands. Surface layer is a brown loam that is free of lime and about 6 inches thick, with a clay loam to sandy clay loam subsoil about 50 inches thick.	3–5
Fondis (FdB)	Silt Loam	Well-drained	Occurs mainly on uplands. Surface layer is approximately 7 inches thick, with an upper clay subsoil about 20 inches thick. Moderate runoff and water intake, and the hazards of soil blowing and water erosion are slight to moderate.	1–3
Fondis (FdC)	Silt Loam	Well-drained	Occurs mainly on uplands. Surface layer is approximately 6 inches thick, and rests abruptly on dense clay subsoil about 18 inches thick.	3–5
Fondis-Colby (FoC)	Silt Loam	Moderately well-drained	Fondis silt loams make up about 60–80% of this complex and Colby silt loam 20–40%. Runoff is moderate, and the available water-holding capacity is high.	3–5
Litle (LcD)	Silty Clay Loam	Well-drained	Occurs on uplands; moderately deep, well-drained, gently sloping to sloping. Runoff is moderate to rapid, and the hazards of water erosion and soil blowing are moderate.	1–9
Alluvial Land (Lv)	Loamy	Well-drained	Occurs near narrow drainageways and major streams, and is subject to flooding. Surface layer is dark, generally noncalcareous, stratified loam and sandy loam about 6 inches thick. Moderate high available water-holding capacity and generally well-drained.	NA

Name[a]	Type	Drainage	Properties	Slope[b] (%)
Nunn (NIB)	Loam	Well-drained	Deep, well-drained, level or nearly level soils that occur on uplands and terraces along major streams. The surface layer is grayish-brown, noncalcareous loam about 3 inches thick, with a 19-inch thick subsoil.	0–3
Nunn-Bresser-Ascalon Complex (NrB)	Loam	Well-drained	Deep, nearly level and undulating, loamy soils that have a clayey to loamy subsoil; developed in outwash; on uplands and terraces.	0–3
Renohill-Buick (RhD)	Loam	Well-drained	Sloping to steep, loamy soils that have a loamy to clayey subsoil; moderately deep and deep over shale or sandstone; on uplands.	3–9
Renohill-Litle-Thedalund (RtE)	Loam, Silty Clay Loam, Clay Loam	Well-drained	Renohill loam comprises 20–40% of this complex; Litle silty clay loam, 10–30%; and Thedalund loam or clay loam, 10–30%. Too shallow and steep to be cultivated. Runoff is medium to rapid, and there are a few small gullies and landslips.	9–30
Rock Outcrop (Ru)	NA	NA	Soils have been stripped so that interbedded shale and sandstone are exposed at the surface. Shale is dominant, varies in color and texture, is hard and platey, and resists water penetration. The sandstone is very hard and coarse-grained.	NA
Sandy Alluvial Land (Su)	Sandy and Fine Gravel	Moderately well-drained	Occurs as narrow areas along major drainageways and next to stream channels. Droughty and unstable, subject to yearly flooding, to deposition of sand, and to soil blowing.	NA
Terrace Escarpments (Tc)	Clayey and Sandy	Well-drained	Occurs next to streams and drainageways, and consists of areas in which vertical banks as much as 20 feet tall have been cut. Deep, clayey to sandy, and generally is stratified and calcareous. Water erosion is a severe hazard, and soil slipping and sloughing are common.	NA
Weld-Deertrail (WrB)	Silt Loam	Well-drained	Weld silt loams make up 60–90% of this complex and Deertrail silty clay loams 10–40%. Runoff is slight, and the hazard of soil blowing is moderate.	0–3

Source: USDA/SCS 1971

Notes:

[a] These names are for soil types not soil associations; soil types can occur in multiple associations. Please see text to determine which association the soil type most commonly occurs.

[b] Slope is the average grade of a particular phase in a soil series. Phases are divisions of soil series defined by differences in textural class, slope degree of erosion, stoniness, or depth to bedrock.

NA = not applicable

These soils are deep, nearly level, loamy, and sandy soils. These soils support crops well, but flood protection is needed to prevent erosion and gully formation. The most common soil types in this association are the Nunn-Bresser Ascalon and the Nunn Loam series, both of which have moderate

permeability (0.63 to 6.3 inches per hour) and high water-holding capacity (0.20 inch per inch of soil). Both are typically well-drained, gently sloping soils (0 to 3 percent slope) (USDA/SCS 1971).

The Renohill-Buick-Litle association comprises moderately deep, well-drained, loamy to clayey soils. The most common soil series within this association are the Renohill-Litle complex and the Renohill-Buick loam. Renohill soils are characterized as being moderately fertile with moderate internal drainage, steep slopes (3 to 30 percent slope), moderately slow to slow permeability (less than 0.63 inch per hour), and moderate water-holding capacity (0.15 inch per inch of soil) (BAFB 2004a).

The perimeter road crosses all soil types present on Buckley AFB (see **Figure 3-2**).

3.5.2 Impacts

No Action Alternative

Under the No Action Alternative, the installation would continue to maintain the perimeter road as currently practiced, grading ungraveled portions and graveling these portions with an aggregate base of recycled asphalt and concrete as funds and materials become available. No repair to or enhancement of existing drainage or wetlands crossings would occur. Continued erosion of ungraveled portions from wind and rain would continue. Impacts on soils at drainage and wetland crossings during high-water events would continue due to water flow across these unhardened crossings and to soil disturbance caused by vehicles becoming stuck in or going off the road to bypass these areas. As such, this alternative would be anticipated to have long-term, moderate, adverse impacts on the soil resources of the installation.

Proposed Action

The Proposed Action would continue maintenance of the perimeter road as it currently occurs, with grading of ungraveled portions and graveling of new portions as funding and materials permit. Ungraveled portions of the perimeter road can currently become severely rutted after rains (see **Figure 2-3**). Drivers can be tempted to drive off the edges of the road to go around such ruts or potholes, creating the potential for soil erosion. Grading of the perimeter road surface provides a relatively smooth surface and prevents drivers from needing to drive off of the road to go around ruts or potholes, thus reducing the potential for road-edge disturbances that could lead to soil destabilization and erosion. Regardless of the travel condition of the ungraveled road surfaces or their use as passage, those portions of the perimeter road are susceptible to soil erosion from wind and rain. Graveled portions of the road present a more stable and durable road surface and are not as prone to soil erosion.

The Proposed Action also calls for the installation of Texas crossings or culvert systems where the perimeter road crosses drainages or wetlands. Detailed analysis of the natural hydrology and substrate at the particular crossing and the cost effectiveness of each in that context would determine whether a Texas crossing or a culvert system should be installed. Installation of culvert systems would require substantial reconfiguration of the current roadbed, creating an increased potential for soil erosion during construction. However, implementation of the required SWPPP, which would include standard BMPs for preventing soil erosion such as stockpiling of soils, use of silt fencing to prevent soil movement in flowing water environments or during rain events, and wetting of soil surfaces to prevent dust, should moderate the potential for soil erosion during construction. Repair to or enhancement of crossings at drainages or wetlands would be anticipated to have long-term beneficial impacts due to reduction of soil erosion during high-water events, and reduction of soil disturbance created when vehicles become stuck in or go off the road to bypass these areas. These long-term beneficial impacts are anticipated to outweigh any short-term impacts due to the construction of the crossings assuming proper planning, design and use of BMPs.

Impacts on soils from implementation of the Proposed Action would be anticipated to be short-term, minor, and adverse, due to installation of culvert systems if and where appropriate and to the continued existence of ungraveled portions of the perimeter road which are susceptible to erosion from wind and rain. Long-term, moderate, beneficial impacts would be expected from the installation of Texas Crossings or culvert systems and subsequent reduction in soil erosion.

Alternative Action

The Alternative Action calls for paving of the entire perimeter road, including both portions where the road splits. Like the Proposed Action, this alternative also calls for the installation of Texas crossings or culvert systems where appropriate. Formal paving of the perimeter road would require reshaping the current road bed to design specifications; preparation of the road bed for paving (including wetting and compacting soil layers and placement of gravel layers), and the actual "paving" of the road surface using either asphalt or concrete pavement. In addition to these increased manipulations of the soils within the road footprint, additional impacts on soils outside the footprint would be anticipated from the greater number and types of machinery and personnel that would be required for this undertaking. Implementation of the required SWPPP, including sediment- and erosion-control practices and installation of Texas crossings or culvert systems, would not further elevate such impacts because the road bed would already be reconfigured accordingly.

Short-term, moderate, adverse impacts on soil resources would be anticipated from implementation of the Alternative Action due to the extensive nature of the manipulations required to pave the entire road. However, long-term, moderate, beneficial effects could be realized under this alternative as it would result in a more durable road surface that would not require frequent grading and would be far more resistant to erosional forces than either the graveled or ungraveled portions of the current perimeter road. In addition, the repair or enhancement of drainage and wetland crossings would reduce future soil erosion in those areas.

3.6 Water Resources

3.6.1 Affected Environment

Groundwater. Groundwater consists of subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications.

Buckley AFB is within the Denver Basin groundwater basin. There are four major bedrock aquifers that underlie Buckley AFB within the Denver Basin: the Denver, Upper Arapahoe, Lower Arapahoe, and Laramie-Fox Hills aquifers. These aquifers are separated by a bed of shale with low permeability and are located in zones of sandstones and siltstones (USGS 1995).

Surficial aquifers at Buckley AFB are associated with present and ancestral surficial stream and river valleys. The aquifer systems are the result of alluvial deposition from erosion of upland bedrock areas. The alluvial aquifer identified on Buckley AFB is associated with East Toll Gate and Sand creeks and consists of primarily coarse-grained materials. Groundwater is recharged to this aquifer through direct infiltration of precipitation and irrigation water and by lateral and upward seepage of groundwater. Groundwater is discharged from the alluvial aquifer through seepage to streams, evapotranspiration, downward seepage into underlying bedrock aquifers, and extraction via pumping wells. Groundwater flow in these surficial aquifers is generally toward the north-northwest along creekbeds, toward the South Platte River (BAFB 2004a).

Surface Water. Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale.

The most prominent surface water feature on the installation is Williams Lake, a reservoir in the northeastern section of the installation (BAFB 2004a). The South Platte River, approximately 15 miles (27.8 kilometers) northwest of Buckley AFB, is the primary surface water drainage in the region. Several smaller intermittent tributaries within or adjacent to Buckley AFB feed this drainage system. Off-installation tributaries include Sand Creek to the north (see **Figure 3-3**) and Murphy Creek to the east. Portions of the northeastern and eastern section sections of the Base are in the Sand Creek and Murphy Creek drainage basins, respectively. East Toll Gate Creek, an intermittent stream, is the only named tributary on Buckley AFB and is in the western section of the installation. The perimeter road crosses the main channel of East Toll Gate Creek drainage four times along the western and southern borders of the installation (see **Figure 3-3**). The road also crosses two unnamed tributaries, the second (northernmost) of which flows through a 48-inch diameter culvert; thus, this tributary crossing would not require any improvement.

Storm Water. Storm water flows, which can be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to management of surface water. Storm water is also important to surface water quality because of the potential to introduce sediments and other contaminants into lakes, rivers, and streams. Storm water drainage systems convey precipitation away from developed sites to appropriate receiving surface waters. For several reasons, storm water systems can employ a variety of devices to slow the movement of water. For instance, a large, sudden flow could scour a streambed and harm biological resources in that habitat. Storm water drainage systems provide the benefit of reducing amounts of sediments and other contaminants that would otherwise flow directly into surface waters. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event will often lead to downstream flooding and the environmental and economic damages associated with flooding. As a general rule, areas with higher densities of development, such as urban areas, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

On Buckley AFB, storm water regulations are under the purview of USEPA, the agency responsible for regulatory enforcement on Federal facilities in the State of Colorado. USEPA's storm water regulations consist of three permit programs.

The General Permit for Storm Water Discharges from Construction Activities (Construction General Permit or [CGP]) Program has the objective preventing pollutants on constructions sites (e.g., sediment, POLs) from being transported off site by storm water runoff. The CGP is applicable to projects that disturb an area 1 acre or more in size, and requires that a Notice of Intent (NOI) be obtained by both the contractor doing the construction work and the owner/operator responsible for directing the work, per the definitions in the CGP. In addition to applying for an NOI, the CGP requires each project to develop and implement a SWPPP. The SWPPP includes BMPs for erosion and sediment control, control of waste at the site, self-inspection/monitoring, and reporting efforts

The purpose of the NPDES Storm Water Multi-Sector General Permit (MSGP) for Industrial Activities Program is to identify, permit, and limit storm water discharges from nonpoint sources associated with activities of industries specified in the regulation that are or have the potential to carry industrial pollutants in the runoff. Presently, discharges associated with the MSGP Sector L (landfills) and Sector S (air transportation) industries are permitted under Buckley AFB's MSGP. The MSGP is not applicable to perimeter road maintenance because it is not associated with either of these industry sectors.

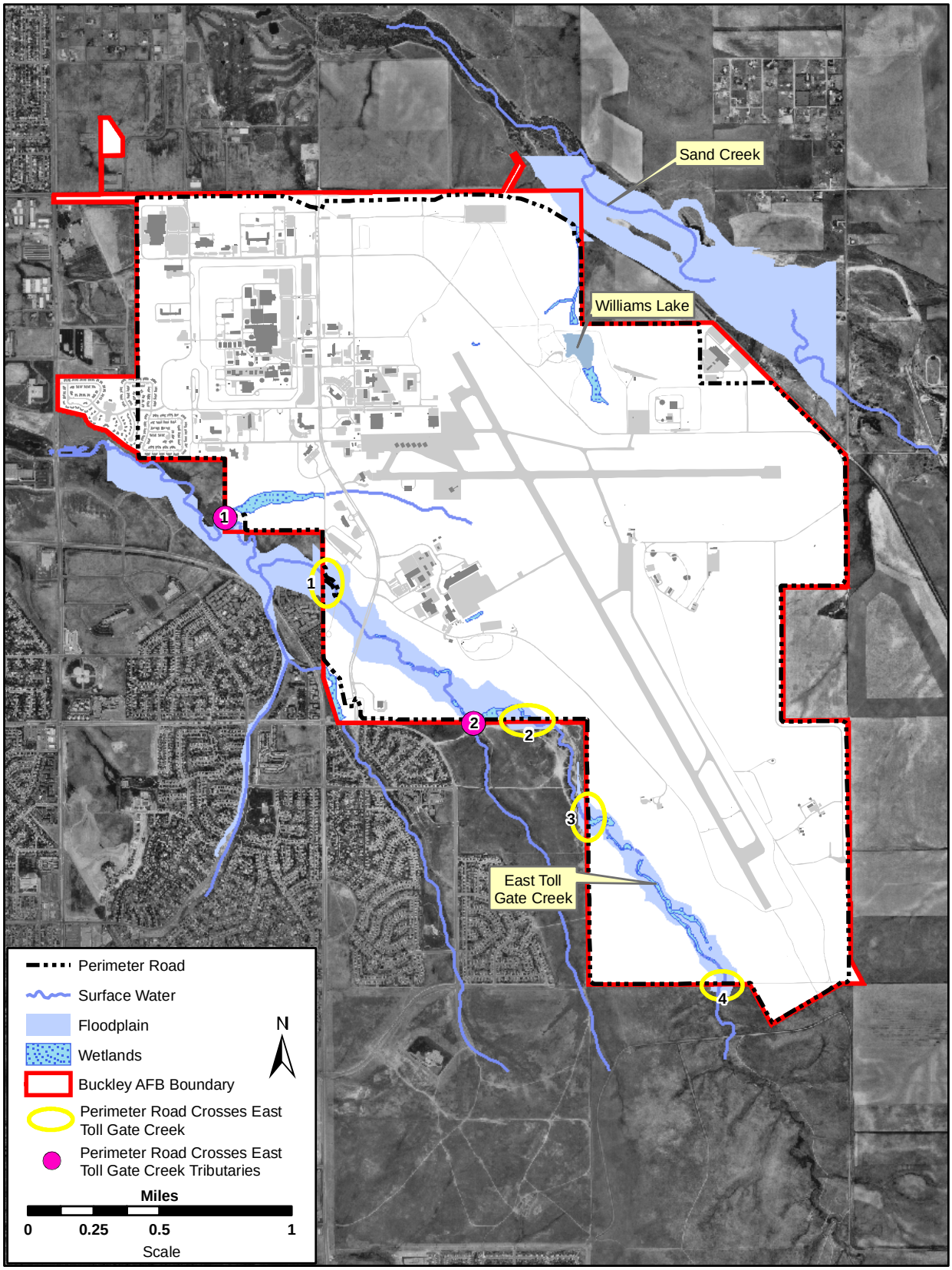

Figure 3-3. Surface Water Resources

The General Permit for Storm Water Discharges from Federal Facility Small Municipal Separate Storm Sewer Systems (MS4) in the Colorado Program provides an overall management and compliance program for the owners and operators of storm water conveyance systems. Requirements of the MS4 program include preparation and implementation of a Storm Water Management Plan (SWMP). The SWMP identifies BMPs that address each of six minimum control measures, which include construction site storm water runoff control and post-construction storm water management in new development/redevelopment.

Buckley AFB holds active permits under all three of these USEPA storm water programs. In addition to the USEPA permit program requirements, the USAF mandates compliance with Engineering Technical Letter (ETL) 03-01: Storm Water Construction Standards.

There are two primary drainage basins: Sand Creek Basin and the East Toll Gate Creek Basin. To offset impacts from channel erosion in the East Toll Gate Creek, structures have been installed to detain surface flows and release them at a controlled rate (BAFB 2003c). Modification of water/wetlands crossings would have to consider storm water drainage patterns on the installation.

Floodplains. Floodplains are defined as areas along a linear surface water feature (e.g., stream, creek, or river) that are inundated by the water leaving its banks. Floodplains are important because they temporarily store floodwaters, improve water quality, provide important habitat for wildlife, and create opportunities for recreation. Typically, in the United States, rivers have a 100-year floodplain, or an area that is inundated by a 100-year flooding event. The Federal Emergency Management Agency (FEMA) has designated the 100-year floodplain as an area in which construction activities are regulated. FEMA prints 100-year floodplain maps that show the floodplain for rivers in the United States. FEMA maps are based on historic events and insurance claims. **Figure 3-3** presents the location and extent of floodplains on Buckley AFB. The perimeter road crosses the East Toll Gate Creek floodplain four times along the western and southern portions of the installation, and skirts the edge of the Sand Creek floodplain on the northern border of the installation.

3.6.2 Impacts

Depth to groundwater is greater than 20 feet (6.1 meters) below ground surface. Therefore, it is not expected that groundwater would be impacted during construction activities under the Proposed Action, Action Alternatives, or the No Action Alternative. Therefore, groundwater will not be further discussed.

Potential impacts include disruption of natural drainage patterns, contamination entering storm water discharge, or heavy sediment loading from construction activities. Preparing and implementing a SWPPP can minimize adverse impacts. These plans provide construction and post-construction BMPs intended to control and manage the loading of sediment and other pollutants to levels that would minimize degradation of downstream water quality. Compliance with Air Force ETL 03-1: *Storm Water Construction Standards*, requires implementation of BMPs to reduce site storm water discharges and pollutant loadings to preconstruction levels or better. A storm water control site plan would be required for all but the No Action Alternative and must contain an NPDES permit declaration.

BMPs can also be implemented to decrease sedimentation by erosion. Examples of BMPs for preventing erosion and enhancing sediment control are as follows:

1. Preserve natural vegetation
2. Use buffer zones of vegetation around construction areas
3. Stabilize stream banks using riprap, gabions, concrete, or other means

4. Use mulch, matting, netting, or chemical stabilization where immediate erosion control is needed
5. Use temporary or permanent seeding and planting with native vegetation to revegetate disturbed areas
6. When seeding is not practical, use chemical or physical stabilization measures
7. Use interceptor dikes and swales to divert and slow runoff
8. Drain runoff using pipe slope and subsurface drains
9. Use silt or filter fences, straw bales or brush barriers, or gravel or stone filter berms for sediment control
10. Protect storm drain inlets and outlets
11. Construct sediment traps and temporary sediment basins
12. Use surface roughening or gradient terraces to slow and channel runoff.

No Action Alternative

Because the No Action Alternative would not replace or enhance drainage or wetland crossings, its implementation would continue to have short- and long-term, moderate, adverse impacts on sediment loading and on the natural hydrology at these crossings. Graveling of the currently ungraveled portions of the perimeter road would have long-term, minor beneficial impacts on water quality due to reduction of sediment loading from these segments.

Proposed Action

Under the Proposed Action, portions of the perimeter road would persist in their ungraveled condition. These ungraveled portions of the perimeter road are susceptible to erosion by wind and rain and, therefore, could contribute to sediment loading following heavy rain events. Therefore, the Proposed Action would be anticipated to have short- and long-term, minor, adverse impacts on sediment loading.

The Proposed Action would not substantially increase the amount of impervious surface due to the porous nature of the aggregate with which the perimeter road would be graveled. No impacts on storm water runoff per se are anticipated from implementation of the Proposed Action.

The Proposed Action would be anticipated to have short-term, minor, adverse impacts on the natural hydrology at drainage/wetland crossings and overall water quality due to construction activities associated with installation of Texas crossings or culvert systems. However, this would be offset by long-term, moderate, beneficial impacts due to restoration or augmentation of the natural hydrology at these sites and reduction of sediment load from graveled portions of the road.

Alternative Action

Paving the entire perimeter road within its current footprint, including both portions where the road splits, would substantially increase the total impervious surface of the installation, and the resulting storm water runoff. There are approximately 3,200 acres (1,295 hectares) of drainage area at Buckley AFB, of which 525 acres (212.5 hectares), or 16.4 percent, are impervious surface. The Alternative Action would increase the total impervious surface of the installation by approximately 16.24 acres, resulting in a new total of 541 acres (218.9 hectares) of impervious surface on the installation (an increase of 3.1% in installationwide impervious surface). Assuming an annual precipitation rate of 16.3 inches per year and no losses due to evaporation, the anticipated increase in storm water due to the Alternative Action would

be approximately 7.4 million gallons per year. While this impact can be minimized by implementation of BMPs such as the use of relatively pervious paving materials, the Alternative Action would still be anticipated to have moderately adverse, long-term impacts on storm water runoff. However, assuming adequate design, including consideration of local freeze-thaw conditions, these impacts would be offset by short- and long-term, minor, beneficial impacts on sediment loading due to the removal of erosion-prone, ungraveled portions of the road; and by improvements to the natural hydrology of drainage/wetlands crossings as described for the Proposed Action above.

3.7 Biological Resources

3.7.1 Affected Environment

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS or a state.

This section describes the affected environment for vegetation; wetlands; native and nonnative wildlife; and threatened, endangered, and other sensitive species known or likely to occur at Buckley AFB, and potential impacts on those resources for the Proposed Action and Alternatives. This analysis is based on site visits conducted in January, February, April, and May 2006, as well as literature and previous surveys conducted at Buckley AFB.

Impacts were assessed by comparison of the footprint of the perimeter road to the biological resources described under the Affected Environment section for each resource. The measures proposed to offset impacts are based on standard methods and actions recommended by wildlife management agencies and organizations. As all alternatives retain the current footprint of the perimeter road, it is assumed that there would be no permanent replacement or loss of vegetation, wetlands, or wildlife habitat as a result of implementing any of the alternatives.

Vegetation

Buckley AFB is in the Great Plains-Palouse Dry Steppe Province Ecoregion (Bailey 1995), an ecoregion also classified as shortgrass prairie (BAFB 2004a). The Draft Integrated Natural Resource Management Plan (BAFB 2004a) identifies 10 vegetation types occurring within the shortgrass ecosystem represented on Buckley AFB. The perimeter road crosses three major vegetation types:

- Midgrass prairie composed of blue grama, western wheatgrass, crested wheatgrass
- Crested wheatgrass
- Riparian corridors consisting of bottomland meadows or cottonwood/willow habitat.

Midgrass prairie is dominated by native grass species such as blue grama (*Bouteloua* sp.), western wheatgrass (*Agropyron smithii*), and buffalo grass (*Buchloe dactyloides*). Other common grasses include tumble grass (*Schedonnardus paniculatus*) and three-awns (*Aristida fendleriana* and *A. longiseta*). Fringed brome grass (*Bromus ciliatus*) dominates depressions and gullies within the mixed grass prairie. Herbaceous species associated with mixed grass prairie are scarlet globe mallow (*Sphaeralcea coccinea*), prickly pear (*Opuntia macrorhiza*), rabbitbrush (*Chrysothamnus nauseosus*), and snakeweed (*Gutierrezia sarothrae*).

Areas dominated by crested wheatgrass (*Agropyron cristatum*), a nonnative grass species historically used to revegetate disturbed ground, occur throughout the installation. Some of these areas contain primarily

crested wheatgrass and very little, in terms of cover or diversity, of other/native species. Other areas contain a more even distribution of crested wheatgrass, blue grama, western wheatgrass, and associated species.

Riparian habitats are characterized as bottomland meadows or cottonwood/willow. Bottomland meadows occur within the mixed grass prairie and can support wetlands. Fringed brome grass dominates the bottomland meadows and is generally associated with moist soil conditions (BAFB 2004a). Plains cottonwood (*Populus deltoides*)/willow *(Salix* sp.) communities dominate riparian corridors.

Midgrass prairie and crested wheatgrass are the main types of vegetation through which the perimeter road passes. Minor portions of the road cross riparian corridors consisting of either bottomland meadows or cottonwoods/willows.

Wetlands

Biological resources also include wetlands, which are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, providing wildlife habitat, supporting unique and niche flora and fauna, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the "waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The U.S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support—and under normal circumstances do support—a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328). EO 11990, *Protection of Wetlands*, directs Federal agencies to avoid destruction or modification of wetlands whenever there is a practicable alternative.

A total of 23 wetlands were identified during a 2001 survey (BAFB 2004a). Of these 23 wetlands, only those along East Toll Gate Creek and north of Williams Lake (see **Figure 3-3**) are susceptible to impacts from actions on the perimeter road. These wetlands are classified under the Cowardin system (Cowardin et al. 1979) as palustrine scrub-shrub or palustrine emergent wetlands. The perimeter road crosses one palustrine emergent wetland on the west side of the installation, and skirts just outside and upslope of a second palustrine emergent wetland on the north side of the installation (north of Williams Lake). The perimeter road crosses palustrine scrub-shrub wetlands associated with East Toll Gate Creek in two places along the southern edge of the installation.

Wildlife

This section describes the wildlife species and their habitat associations at Buckley AFB. No permanent aquatic habitat (outside of wetlands) occurs within the Proposed Action or alternatives; therefore, animals associated with permanent water sources are not included in this analysis.

Mammals. Although the perimeter fence excludes pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*) are occasionally observed within the installation boundary. Carnivores inhabiting Buckley AFB include red fox (*Vulpes vulpes*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and long-tailed weasel (*Mustela frenata*). Small mammals observed at Buckley AFB include rodents, rabbits, and jackrabbits. The most widely observed of the rodents is the black-tailed prairie dog (*Cynomys ludovicianus*). Prairie dogs are considered keystone species of the shortgrass prairie ecosystem as they support a diverse array of other

plant and wildlife species within their colonies. Other rodents known to inhabit Buckley AFB include plains pocket gopher (*Geomys bursarius*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), fox squirrel (*Sciurus niger*), deer mouse (*Peromyscus maniculatus*), and prairie vole (*Microtus ochragaster*). Black-tailed jackrabbit (*Lepus californicus*), white-tailed jackrabbit (*Lepus townsendii*), eastern cottontail (*Sylvilagus floridanus*), and desert cottontail (*Sylvilagus audubonii*) are common small mammals.

Birds. The midgrass prairie community supports numerous bird species, many of which are ground-nesters. The most common songbirds inhabiting prairie habitats include western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), lark bunting (*Calamospiza melanocorys*), killdeer (*Charadrius vociferous*), blackbilled magpie (*Pica hudsonia*), mourning dove (*Zenaida macroura*), western kingbird (*Tyrannus verticalis*), and eastern kingbird (*Tyrannus tyrannus*). Species more common in urbanized areas include house finch (*Carpodacus mexicanus*), common grackle (*Quiscalus quiscula*), nonnative house sparrow (*Passer domesticus*), rock dove (*Columba livia;* aka pigeon), and European starling (*Sturnus vulgaris*). Raptor species known or likely to occur at Buckley AFB include burrowing owl (*Athene cunicularia*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), and American kestrel (*Falco sparverius*). In addition, bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), and rough-legged hawk (*Buteo lagopus*) can be observed in winter.

Reptiles and Amphibians. Plains spadefoot toad (*Spea [Scaphiopus] bombifrons*) and Great Plains toads (*Bufo cognatus*) occupy grassland habitat along riparian floodplains and can occur on Buckley AFB (Hammerson 1999). Bullfrog (*Rana catesbeiana*) and northern leopard frog (*Rana pipiens*) have been observed on the installation but are generally found near a permanent water source, which does not occur in the vicinity of either the proposed or alternative sites. A variety of reptile species inhabit Buckley AFB; some of the more commonly observed species include northern prairie lizard (*Sceloporus undulatues garmani*), bullsnake (*Pituophis catenifer*), western hog-nosed snake (*Heterodon nasicus*), plains garter snake (*Thamnophis radix*), and prairie rattlesnake (*Crotalus viridis*) (BAFB 2004a).

Threatened, Endangered, and Other Sensitive Species

Threatened and endangered plant and animal species are protected under the Endangered Species Act (ESA) or Colorado State law. An endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range; a threatened species is one that is likely to become endangered in the foreseeable future. Other sensitive species include those listed by the Colorado Division of Wildlife (CDOW) as species of special concern. Special concern species receive no formal protection, but are still considered when assessing potential project impacts.

Federal- and Colorado state-listed threatened and endangered species, as well as CDOW species of concern, are shown in **Table 3-7**. A number of species that lack suitable habitat, are unlikely to occur, or would not be impacted are not discussed further. These species include black-footed ferret, swift fox, Preble's meadow jumping mouse, bald eagle, ferruginous hawk, plains sharp-tailed grouse, loggerhead shrike, Utes ladies'-tresses, and Colorado butterfly plant.

Black-tailed prairie dogs, burrowing owls, and northern leopard frogs are considered further because of their potential to occur in suitable habitats along the edge of the perimeter road footprint and might therefore be susceptible to impacts should the Alternative Action be implemented. These species are discussed in more detail below.

Table 3-7. Threatened and Endangered Species and Species of Special Concern

Common Name	Scientific Name	Status		Potential for Occurrence on Sites
		Federal	State	
Mammals				
Black-tailed prairie dog	*Cynomys ludovicianus*	--	SC	Present.
Black-footed ferret	*Mustela nigripes*	E	E	Not present; Buckley AFB is within Block Clearance Zone in Colorado.
Swift fox	*Vulpes velox*	--	SC	Unlikely; occurs in native prairie of easternmost Colorado; never observed at Buckley AFB.
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	T	Not present; Buckley AFB is within Denver Metropolitan Area Block Clearance Zone.
Birds				
Burrowing owl	*Athene cunicularia*	--	T	Present. Nesting locations change among years; one or more nests have previously been identified proximal to the perimeter road.
Ferruginous hawk	*Buteo regalis*	--	SC	Potentially present; no known nesting locations on Buckley AFB.
Bald eagle	*Haliaeetus leucocephalus*	--	T	Occasional visitor; no known nests or roosts on Buckley AFB.
Loggerhead shrike	*Lanius ludovicianus*	--	SC	Present as spring/fall migrant but not known to nest on Buckley AFB.
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*	--	E	Potentially present; no known nesting locations on Buckley AFB.
Amphibians				
Northern leopard frog	*Rana pipiens*	--	SC	Potentially present in/near permanent water sources/wetlands.
Plant Species				
Colorado butterfly plant	*Gaura neomexicana* ssp. *coloradensis*	T	--	Unlikely; survey conducted in 2004 found no occurrences.
Utes ladie's-tresses	*Spiranthes diluvialis*	T	--	Unlikely; survey conducted in 2001 found no occurrences.

Source: Buckley AFB 2005

Notes:

T = Threatened

E = Endangered

SC = Species of Special Concern in Colorado (CDOW listing)

Black-tailed Prairie Dog. The black-tailed prairie dog was a Candidate for Listing under the ESA in 2000, but was removed from this status in 2004. However, black-tailed prairie dogs are still considered a Species of Special Concern by the CDOW due to their role as a keystone species and their importance to the shortgrass prairie ecosystem.

Black-tailed prairie dogs occur in many areas throughout Buckley AFB. They inhabit burrows, which form networks of tunnels, typically 3 to 6 feet (0.7 to 1.8 meters) deep. Many other species inhabit prairie dog burrows, including burrowing owls, cottontails, other rodents, reptiles, insects, and spiders (Hoogland 1995).

Buckley AFB has a *Supplement to Environmental Assessment of Proposed Prairie Dog Practices at Buckley Air Force Base* (BAFB 2001) in place to address management of active black-tailed prairie dog colonies. This EA specifies that if a prairie dog colony would be impacted by a proposed action, then prairie dogs would be removed prior to construction using approved removal methods described in the EA. However, the supplemental EA (BAFB 2001) was prepared before removal of the black-tailed prairie dog from the Federal candidate species list in 2004. Subsequent to that decision by the USFWS, Buckley AFB has implemented additional management methods including trapping and transporting black-tailed prairie dogs to raptor or black-footed ferret facilities, and poisoning of black-tailed prairie dogs in critical areas.

Burrowing Owl. Burrowing owls are listed as threatened in Colorado but also receive Federal protection under the Migratory Bird Treaty Act. Burrowing owls nest in abandoned prairie dog burrows and are generally present on the installation from early March to late October. Burrowing owls have periodically been observed proximal to the perimeter road. They establish nests in new locations from year to year and it is possible that they might do so in proximity of the perimeter road in the future.

Northern Leopard Frog. Northern leopard frogs are a Colorado Species of Special Concern. These frogs have the potential to occur in wet meadows and banks and shallows of just about any type of water body. As such, they could occur in the wetlands through which the perimeter road passes.

3.7.2 Impacts

Impacts on Vegetation

This section describes impacts on vegetation anticipated to result from the Proposed Action or alternatives. In general, impacts on vegetation would be grading or construction-related, since operation of the perimeter road would have negligible impacts on vegetation beyond those already established. Grading impacts would be due to grading outside of (lateral to) the actual road bed. Construction impacts on vegetation would be generally direct and short-term in duration. Adverse impacts on vegetation would be reduced by revegetating disturbed areas after construction (i.e., after paving or after installation of Texas crossings or culvert systems). Disturbed areas would have native vegetation reestablished as soon as possible after construction is complete.

No Action Alternative. Because the No Action Alternative includes continued grading of ungraveled portions of the perimeter road, and the current practice is to grade outside of (lateral to) the actual roadbed, this would be anticipated to have long-term, minor, adverse impacts on roadside vegetation.

Proposed Action. Under the Proposed Action, current grading of ungraveled portions and graveling of such with a packed aggregate as funds and materials allow would continue. If the unnecessary practice of continuing to grade outside of (lateral to) the actual roadbed continues, this would result in continued minor adverse impacts on roadside vegetation. Another aspect of the Proposed Action that could result in

activity outside the current footprint of the perimeter road is the installation of Texas crossings or culvert systems where the road crosses drainages or wetlands. Installation of either type of crossing would have the potential for impacts outside the existing road footprint and therefore to adjacent vegetation. Such impacts, however, would be limited to the construction phase (i.e., installation of the crossing) and would be followed by active revegetation of disturbed areas with native vegetation. As such, the impacts of the Proposed Action on vegetation would be short-term, minor, and adverse at the construction site and short-term, negligible, and adverse at the installation level.

Alternative Action. Paving of the entire perimeter road as called for under the Alternative Action would require a work zone on either side of the road for movement of construction equipment and personnel. For purposes of analysis it is assumed that the construction limits would be at 15 feet (4.6 meters) to either side of the existing perimeter road footprint. This would result in potential construction-related impacts on a maximum of 49 acres (19.8 hectares) of existing vegetation. It is assumed that the installation of Texas crossings or culvert systems would be included in this impact zone. As with the Proposed Action, the impacts of this alternative should be limited to the construction (paving or crossing-installation) phase and ameliorated by reestablishment of native vegetation immediately following construction. Therefore, the potential direct, construction-related impacts of the Alternative Action on vegetation at both the site-specific and installationwide scale would be anticipated as short-term, moderate, and adverse. Indirect impacts could present as increased growth of vegetation along the sides of the paved perimeter road due to increased soil moisture from storm water runoff. If such increased growth is experienced by native plant species, this could represent a long-term, minor, beneficial impact. On the other hand, if increased growth is experienced by nonnative/invasive species, this indirect impact could be long-term, minor, and adverse.

Impacts on Wetlands

The filling of wetlands and waters of the United States is regulated under the CWA. There are a number of nationwide permits under which the wetlands-specific activities called for in the Proposed and Alternative Actions might be conducted. The number, extent, and nature of the wetlands crossings installed will determine which nationwide permit, if any, is most appropriate, or if the installation should apply for an individual permit.

No Action Alternative. Long-term, moderate, adverse impacts on wetlands would continue as no improvement of wetlands crossings is called for under the No Action Alternative

Proposed Action. Continued grading of unpaved portions of the perimeter road and graveling of such as funding and materials allows, as called for under the Proposed Action, would not impact wetlands. Impacts due to the installation of Texas crossings or culvert systems would be anticipated to be short-term, minor, and adverse, assuming implementation of SWPPP and BMP practices to minimize impacts on wetlands. However, long-term impacts, due to the installation of crossing types that would restore or augment natural hydrology, would result in long-term, moderate, beneficial impacts. No loss of wetland area is anticipated due to the implementation of this alternative.

Alternative Action. The impacts of the Alternative Action would be the same as those described for the Proposed Action.

Impacts on Wildlife

No Action Alternative. Although minimal and potentially difficult to observe or measure, the No Action Alternative is anticipated to have some adverse impacts on wildlife during road grading due to noise and grading of road shoulders. Therefore, short-term, minor adverse impacts to wildlife are anticipated during

grading. If funds and materials do not become available to gravel these portions, these impacts could become long-term in duration. Long-term, minor, adverse impacts on wildlife might occur due oncontinued erosion and sediment load at drainage and wetland crossings.

Proposed Action. Although minimal and potentially difficult to observe or measure, the Proposed Action is anticipated to have some adverse impacts on wildlife during the construction phase due to noise, prolonged human presence, and short-term impacts on habitat in and immediately surrounding the wetlands crossings. Therefore, short-term, minor, direct and indirect, adverse impacts on wildlife are anticipated during construction.

Alternative Action. Paving of the entire perimeter road as called for under the Alternative Action would require a work zone on either side of the road for movement of construction equipment and personnel. For purposes of analysis it is assumed that the construction limits would be at 15 feet (4.6 meters) to either side of the existing perimeter road footprint. This would result in potential construction-related impacts on a maximum of 49 acres (19.8 hectares) of potential wildlife habitat. It can be assumed that the installation of Texas crossings or culvert systems would be included in this impact zone. The impacted wildlife habitat would be limited to grassland habitat; no removal of trees is anticipated for this action. Direct impacts on ground-nesting birds and burrowing mammals, reptiles, and amphibians could be anticipated from movement of equipment and personnel in the work zones lateral to the current footprint. Therefore, the potential direct, construction-related impacts of the Alternative Action on wildlife at both the site-specific and installationwide scale would be anticipated as short-term, moderate, and adverse. As with the Proposed Action, the impacts of this alternative should be limited to the construction (paving or crossing-installation) phase and ameliorated by reestablishment of native vegetation/habitat following construction. Indirect impacts due to temporary loss of potential habitat would be anticipated to be short-term, minor, and adverse.

Impacts on Threatened, Endangered, and Other Sensitive Species

This section analyzes potential impacts on black-tailed prairie dogs (Colorado Species of Special Concern), burrowing owls (Colorado Threatened), and northern leopard frogs (Colorado Species of Special Concern) from implementation of the Proposed Action and alternatives for maintenance of the perimeter road. No federally listed species would incur impacts from the Proposed or Alternative Actions for perimeter road maintenance.

The ROI includes the construction limits of the perimeter road, as well as the metapopulation of the installation. Where applicable, measures to eliminate or minimize impacts are suggested.

No Action Alternative

Black-tailed Prairie Dogs. Field observations indicate that grading of road shoulders would have negligible impacts on prairie dogs as where colonies are particularly dense no grading occurs, and where grading of road shoulders does occur, only scattered burrow openings are established within the shoulder area. Grading of the shoulders would not permanently close these burrow openings and these openings represent only a small fraction of the openings of each burrow system. Therefore, implementation of the No Action Alternative is anticipated to have negligible impacts on black-tailed prairie dogs.

Burrowing Owls. Impacts of the No Action Alternative on burrowing owls would be short-term, moderate, and adverse due to grading of road shoulders, as described under the Proposed Action impacts.

Northern Leopard Frogs. Although their presence is not documented, if leopard frogs are present in wetlands adjacent to the perimeter road, failure to repair or enhance these road crossings and, therefore, the hydrology of those wetlands, could have long-term, minor adverse impacts on leopard frogs.

Proposed Action

Black-tailed Prairie Dogs. The only activities described for the Proposed Action which might extend outside the current perimeter road footprint are those associated with improvement of drainage/wetlands crossings—habitats which are neither occupied by nor depended upon by prairie dogs, and grading of road shoulders. Field observations indicate that grading of road shoulders would have negligible impacts on prairie dogs as where colonies are particularly dense no grading occurs, and where grading of road shoulders does occur, only scattered burrow openings are established within the shoulder area. Grading of the shoulders would not permanently close these burrow openings and these openings represent only a small fraction of the openings of each burrow system. Therefore, implementation of the Proposed Action is anticipated to have negligible impacts on black-tailed prairie dogs.

Burrowing Owls. Burrowing owls have nested in various locations throughout Buckley AFB where suitable prairie dog habitat occurs. As indicated above, the only activities of the Proposed Action that extend beyond the current perimeter road footprint are those associated with habitat unsuitable to prairie dogs (enhancement of drainage and wetlands crossings), and grading of road shoulders. No impacts on burrowing owls are anticipated as a result of repair or enhancement of drainage and wetland crossings. Short-term, moderate, adverse impacts could result if grading of road shoulders impacts a burrowing owl nest. If grading cannot be confined to the road bed, burrowing owl surveys should be conducted by a qualified biologist prior to road grading.

Northern Leopard Frogs. Northern leopard frogs could be impacted by installation of Texas crossings or culvert systems. However, given the mobility of this species and their resultant ability to move away from disturbances, this impact is anticipated to be short-term (during construction), minor, and adverse. Long-term, minor, beneficial impacts might result from reestablishment or augmentation of natural hydrology at these crossings, which might result in increased habitat availability for this species.

Alternative Action

As described for other biological resources above, the need to move equipment and personnel outside the current footprint of the perimeter road is anticipated to result in potential impacts on prairie dogs, burrowing owls, and northern leopard frogs. Preconstruction clearance surveys for all three taxa accompanied with capture and translocation of potentially impacted individuals should minimize these potential impacts to short-term, minor, and adverse. Long-term, minor, beneficial impacts would be anticipated due to cessation of shoulder grading and improvement of wetlands hydrology.

3.8 Socioeconomics and Environmental Justice

3.8.1 Affected Environment

Buckley AFB occupies approximately 3,283 acres, 8 miles east of Denver, Colorado, within the City of Aurora, in Arapahoe County. The City of Denver and Arapahoe County have populations of 557,478 and 487,697, respectively (U.S. Census Bureau 2000). The populations of Arapahoe County and Denver increased by 24.6 percent and 18.6 percent, respectively, between 1990 and 2000 (U.S. Census Bureau 2000). The population of Aurora increased by 24.6 percent between 1990 and 2000. These increases in population are lower than the statewide increase of 30.6 percent, but higher than the national increase of

13.1 percent (U.S. Census Bureau 2000). Buckley AFB supports 2,712 active-duty personnel, 1,716 Air Force Reserves, 2,497 Air/Army/Navy/Marine Reserves, and 2,811 contract and private citizens (Spann 2006). In addition, the installation serves approximately 16,363 military dependents and 77,000 retirees.

Employment Characteristics. **Table 3-8** lists industry of employment for residents in the ROI, Arapahoe County, and Colorado. As would be expected, a higher percentage of residents in the ROI are in the Armed Services than in Arapahoe County or Colorado. The largest employment type by percentage in the ROI is retail trade (13.1) while the largest employment type in Arapahoe County and Colorado is educational, health, and social services (15.7 and 17.0 respectively) (U.S. Census Bureau 2000). As of April 2006, the Denver Metropolitan Statistical Area (MSA) had an unemployment rate of 4.4 percent which is nearly identical to the 4.3 percent for Colorado for the same time period (BLS 2006).

Table 3-8. Employment by Industry

Employment by Industry	Region of Influence* %	Arapahoe County %	State of Colorado %
Percent of Employed Persons in Armed Forces	1.9	0.5	0.8
Industry of Civilian Labor Force			
Agriculture, forestry, fishing and hunting, and mining	1.0	0.7	2.0
Construction	9.8	7.2	9.1
Manufacturing	7.7	6.7	9.1
Wholesale trade	5.0	4.2	3.5
Retail trade	13.1	12.1	11.8
Transportation and warehousing, and utilities	8.8	5.6	4.9
Information	5.9	7.4	4.9
Finance, insurance, real estate, and rental and leasing	10.4	11.4	7.7
Professional, scientific, management, administrative, and waste management services	10.7	13.2	11.7
Educational, health and social services	11.9	15.7	17.0
Arts, entertainment, recreation, accommodation, and food services	6.2	6.9	9.0
Other services (except public administration)	4.8	4.7	4.8
Public administration	4.5	4.1	4.6

Source: U.S. Census Bureau 2000

Note: * The ROI consists of the U.S. Census Tract encompassing Buckley AFB (Tract #71.02) and the four tracts that are adjacent to the installation: 70.08, 70.33, 70.65, and 70.67.

Direct and indirect expenditures from Buckley AFB have had a beneficial economic impact on the ROI and surrounding areas. In 2006, Buckley AFB's annual payroll was $620,803,841, of which $240,669,609 was for military personnel; $168,749,176 for civilian payroll; and $211,385,056 for non-appropriated funds, contract civilians, and private businesses. The total annual Base impact from expenditures, services, and procurement of materials from Buckley AFB was $1,090,906,789 in 2006 (BAFB 2007). Buckley AFB's total annual Base expenditures represent approximately 0.5 percent of Colorado's $216 billion Gross State Product (FedStats 2007).

Environmental Justice. On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was created to ensure that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies.

For the purposes of this EA the ROI is defined as census tracts 71.02 (which contains Buckley AFB), 70.08, 70.33, 70.65, and 70.67. These census tracts contain the area that could be affected under the Proposed Action. **Table 3-9** shows race and poverty characteristics for the ROI, Colorado, and Arapahoe County. Demographic data from **Table 3-9** show that the ROI has a higher percentage of African Americans than Colorado and Arapahoe County. Demographic data from other minority populations in the ROI were comparable to Arapahoe County and Colorado. According to U.S. Census Bureau 2000 information, 5.7 percent of the population in the ROI lives below the poverty level. The percentage of persons living below the poverty level in the ROI (5.7) is lower than Colorado (6.2) but higher than Arapahoe County (4.2).

Table 3-9. Race and Poverty Characteristics

	Colorado	Arapahoe County	ROI*
Total Population	4,301,261	487,967	28,262
Percent White	82.8	79.9	72.6
Percent Black or African American	3.8	7.7	12.2
Percent American Indian, Eskimo, or Aleut	1.0	0.7	0.9
Percent Asian	2.2	3.9	3.9
Percent Native Hawaiian and Other Pacific Islander	0.1	0.1	0.2
Percent other	7.2	4.5	5.6
Percent reporting 2 or more races	2.8	3.2	5.6
Percent below poverty	6.2	4.2	5.7
Per Capita Income	$24,049	$28,147	$20,926

Source: U.S. Bureau of Census 2000

Note: * Data in the ROI are the average of the five census tracts evaluated.

Table 3-10 examines demographic data from each census tract in the ROI individually. Data from this table show that tracts 70.08, 70.33, 70.65, and 70.67 have higher percentages of minority or low-income residents when compared to Colorado and Arapahoe County. All of the census tracts in the ROI have a lower per capita income ($20,926) than both Colorado ($24,049) and Arapahoe County ($28,147) (U.S. Census Bureau 2000).

Table 3-10. Race and Economic Characteristics of Census Tract Residents

	Tract 70.08	Tract 70.33	Tract 70.65	Tract 70.67	Tract 71.02
Total Population	6,242	8,704	4,297	5,400	3,619
Percent White	57.8	76.2	64.7	75.9	88.3
Percent Black or African American	19.0	8.4	19.1	11.4	3.2
American Indian Alaska Native	1.2	0.6	1.2	0.6	0.9
Asian	4.4	5.9	4.5	3.9	1.2
Native Hawaiian and Other Pacific Islander	0.2	0.1	0.2	0.2	0.1
Some other race	11.9	4.6	5.2	4.7	3.4
Percent Reporting 2 or more races	5.5	4.0	5.0	3.4	2.9
Percent below poverty	12.5	1.3	7.8	2.0	4.9
Per Capita Income	$16,449	$23,124	$19,569	$22,057	$23,435
Median Household Income	$36,037	$62,875	$42,423	$55,263	$53,893

Source: U.S. Bureau of Census 2000

3.8.2 Impacts

No Action Alternative

Socioeconomics. Under the No Action Alternative, the installation would continue to maintain the perimeter road as currently practiced, grading ungraveled portions and graveling these portions with an aggregate base of recycled asphalt and concrete as funds and materials become available. No repair to or enhancement of existing water/wetlands crossings would occur. Implementation of this alternative would be anticipated to have the potential for negligible, beneficial, short-term, and no long-term impacts on socioeconomics or employment levels at Buckley AFB or in the ROI.

The No Action Alternative would have no effect on personal income, poverty levels, or other demographic employment indicators in the Denver MSA.

Environmental Justice. The No Action Alternative does not have the potential to disproportionately affect low-income or minority residents. Therefore no adverse impacts are expected on low-income or minority residents in the ROI under the No Action Alternative. Maintenance activities to the perimeter road at Buckley AFB would be minor with no chance to affect adjacent populations. Although some of the census tracts reported in the ROI have higher percentages of low-income and minority residents, the No Action Alternative activities do not have the potential to disproportionately affect these populations.

Proposed Action

Socioeconomics. The Proposed Action at Buckley AFB would have the potential for negligible short-term direct and indirect beneficial effects on economics and employment in the ROI. The Proposed Action would be a relatively small construction project. Costs for this project were not reported but it is

assumed that costs would be relatively low and associated with grading, graveling, and construction of drainage and wetland crossings. These costs would not provide any long-term economic gains to the surrounding area but could possibly provide short-term employment opportunities. The Proposed Action would not include a change in personnel at Buckley AFB and would not markedly affect employment levels at Buckley AFB or in the ROI. No long-term effects are expected on socioeconomics or employment levels under the Proposed Action.

The Proposed Action would have no effect on personal income, poverty levels, or other demographic employment indicators in the Denver MSA.

Environmental Justice. The Proposed Action does not have the potential to disproportionately affect low-income or minority residents. Therefore no adverse impacts are expected on low-income or minority residents in the ROI under the Proposed Action. Maintenance activities to the perimeter road at Buckley AFB would be minor with no chance to affect adjacent populations. Although some of the census tracts reported in the ROI have higher percentages of low-income and minority residents, the scale of construction does not have the possibility to disproportionately affect these populations.

Alternative Action

Socioeconomics. The Alternative Action would have the potential for negligible short-term direct and indirect beneficial effects on economics and employment in the ROI. Although the Alternative Action would be larger in effort than the Proposed Action, it would still be a small construction project relative to others being undertaken on the installation. Costs would be relatively low and associated with paving the road and construction of drainage and wetland crossings. These costs would not provide any long-term economic gains to the surrounding area but could possibly provide short-term employment opportunities. The Alternative Action would not include a change in personnel at Buckley AFB and would not markedly affect employment levels at Buckley AFB or in the ROI. No long-term effects are expected on socioeconomics or employment levels under the Alternative Action.

The Alternative Action would have no effect on personal income, poverty levels, or other demographic employment indicators in the Denver MSA.

Environmental Justice. The Alternative Action does not have the potential to disproportionately affect low-income or minority residents. Therefore no adverse impacts are expected on low-income or minority residents in the ROI under the Alternative Action. Although some of the census tracts reported in the ROI have higher percentages of low-income and minority residents, the scale of construction does not have the possibility to disproportionately affect these populations.

3.9 Summary

Table 3-11 provides a summary comparison of the anticipated environmental effects of the Proposed Action, Alternative Action, and the No Action Alternative.

Table 3-12 provides a summary of the BMPs or the plans providing BMPS identified in this EA for each resource topic.

Table 3-13 summarizes required mitigation measures identified for each resource in this EA.

Table 3-11. Comparison of Environmental Effects

Environmental Resource Areas	No Action	Proposed Action	Alternative Action
Air Quality	Short-term, negligible, adverse due to continued grading	Short-term, minor adverse due to continued grading and construction emissions	Short-term, minor adverse due to emissions from construction and paving
Noise	Short-term, negligible, adverse due to continued grading	Short-term, moderate, adverse due to construction activity	Short-term, moderate, adverse due to construction and paving noise
Hazardous Materials/Waste	No effect to long-term, minor, adverse (ERP)	No effect to long-term, minor, adverse (ERP)	No effect to short-term, moderate adverse (ERP) due to paving activities
Safety	Short-term, minor adverse due to road maintenance activities	Short-term, minor, adverse due to maintenance and construction activities Long-term beneficial due to improved access	Short-term, minor, adverse due to maintenance and construction activities Long-term beneficial due to improved access
Geology	Long-term, moderate, adverse due to continued erosion at water/wetland crossings and on ungraveled road segments	Short-term, minor, adverse due to construction and ungraveled road segments Long-term, moderate, beneficial due to improved water/wetland crossings	Short-term, moderate, adverse due to construction and paving Long-term, moderate, beneficial due to improved crossings and hardened surface
Water Resources	Short- and long-term, minor, adverse Impacts on Sediment Loading and on Natural Hydrology	Short- and long-term, minor, adverse impacts on Sediment Loading No impacts to Storm Water Runoff Short-term, minor, adverse impacts on Natural Hydrology Long-term, minor to moderate, beneficial impacts on Natural Hydrology	Moderately adverse, long-term impacts on Storm Water Runoff Short- and long-term, minor, beneficial impacts on Sediment Loading
Biological Resources			
Vegetation	Long-term, minor, adverse impacts on vegetation due to continued grading lateral to the actual roadbed	Short-term, minor, adverse due to construction of crossings Long-term, minor, and adverse due to continued grading.	Short-term, moderate, adverse impacts due to paving and construction of wetlands crossings Long-term, minor, beneficial impacts due to reestablishment of natural hydrology and potential for increased growth lateral to paved areas

Environmental Resource Areas	No Action	Proposed Action	Alternative Action
Wetlands	Long-term, moderate, adverse impacts due to no improvement of wetland crossings	Short-term, moderate adverse due to construction of crossings Long-term, moderate, beneficial due to construction of crossings and reestablishment or augmentation of natural hydrology	Short-term, moderate, adverse impacts during construction of crossings Long-term, moderate, beneficial due to reestablishment or augmentation of natural hydrology
Wildlife	Short-term, minor, adverse impacts due to noise associated with grading Long-term, minor, adverse impacts due to continued erosion and sediment loading at wetlands crossings	Short-term, minor, adverse impacts during construction	Short-term, moderate and adverse impacts during construction and paving Short-term, minor, adverse indirect impacts due to temporary loss of potential habitat
Threatened, Endangered and Special Concern Species	Negligible, adverse impacts on prairie dogs due to grading Short-term, moderate, adverse impacts on burrowing owls due to grading Long-term, minor, adverse impacts on potential for leopard frogs due to no improvement of wetland crossings	Negligible, adverse impacts on prairie dogs due to grading Short-term, moderate adverse impacts on burrowing owls due to grading Short-term, minor to moderate adverse impacts on potential for northern leopard frogs during construction of wetland crossings Long-term, minor, beneficial impacts on the potential for this species due to enhancement of wetlands crossings	Short-term, minor, adverse impacts to all three taxa during construction and paving Long-term, minor, beneficial impacts due to cessation of grading and improvement of wetlands hydrology
Socioeconomics and Environmental Justice	No effect due to grading/graveling or to continued operation	No to negligible short-term direct and indirect beneficial impacts due to construction activity No measurable impact from operation	No to negligible short-term direct and indirect beneficial impacts due to construction activity No measurable impact from operation

Table 3-12. BMPs or Plans Providing Applicable BMPs

Environmental Resource Area	BMPs or Plans Providing Applicable BMPs		
	No Action	**Proposed Action**	**Alternative Action**
Air Quality	General fugitive dust BMPs (e.g., daily watering of road during grading and graveling as needed)	General fugitive dust BMPs (e.g., daily watering of road during grading and construction sites as needed)	General fugitive dust BMPs (e.g., daily watering of road during paving and of construction sites as needed)
Noise	Limit road maintenance activities to normal working hours	Limit road maintenance activities to normal working hours	Limit road maintenance activities to normal working hours
Hazardous Materials/Waste	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan	Hazardous Waste Management Plan; Solid Waste Management Plan; Spill Prevention, Control and Countermeasure Plan
Safety	Contractor/installation personnel-established and -maintained safety programs per OSHA	Contractor/installation personnel-established and -maintained safety programs per OSHA	Contractor/installation personnel-established and -maintained safety programs per OSHA
Geology	None	Standard soil erosion and sediment retention BMPs: Stockpiling of soils, use of silt fencing to prevent soil movement in flowing water environments or during rain events, and wetting of soil surfaces to prevent dust. BMPs specified in SWPPP to be developed for project	Standard soil erosion and sediment retention BMPs: Stockpiling of soils, use of silt fencing to prevent soil movement in flowing water environments or during rain events, and wetting of soil surfaces to prevent dust. BMPs specified in SWPPP to be developed for project
Water Resources	None	1. Preserve natural vegetation 2. Use buffer zones of vegetation around construction areas 3. Stabilize stream banks using riprap, gabions, concrete, or other means 4. Use mulch, matting, netting, or chemical stabilization where immediate erosion control is needed 5. Use temporary or permanent seeding and planting with native vegetation to revegetate disturbed areas	1. Preserve natural vegetation 2. Use buffer zones of vegetation around construction areas 3. Stabilize stream banks using riprap, gabions, concrete, or other means 4. Use mulch, matting, netting, or chemical stabilization where immediate erosion control is needed 5. Use temporary or permanent seeding and planting with native vegetation to revegetate disturbed areas

Environmental Resource Area	BMPs or Plans Providing Applicable BMPs		
	No Action	**Proposed Action**	**Alternative Action**
Water Resources (cont'd.)	None	6. When seeding is not practical, use chemical or physical stabilization measures 7. Use interceptor dikes and swales to divert and slow runoff 8. Drain runoff using pipe slope and subsurface drains 9. Use silt or filter fences, straw bales or brush barriers, or gravel or stone filter berms for sediment control 10. Protect storm drain inlets and outlets 11. Construct sediment traps and temporary sediment basins 12. Use surface roughening or gradient terraces to slow and channel runoff. Additional BMPs might be provided in SWPPP developed for the project	6. When seeding is not practical, use chemical or physical stabilization measures 7. Use interceptor dikes and swales to divert and slow runoff 8. Drain runoff using pipe slope and subsurface drains 9. Use silt or filter fences, straw bales or brush barriers, or gravel or stone filter berms for sediment control 10. Protect storm drain inlets and outlets 11. Construct sediment traps and temporary sediment basins 12. Use surface roughening or gradient terraces to slow and channel runoff 13. Use relatively permeable paving materials Additional BMPs might be provided in SWPPP developed for the project
Biological Resources			
Vegetation	None	Post-action revegetation with native species as needed	Post-action revegetation with native species as needed
Wetlands	None	Soil erosion, sediment retention, and storm water runoff BMPs	Soil erosion, sediment retention, and storm water runoff BMPs
Wildlife	Prior to work activities, wildlife surveys need to be conducted to clear the area of possible migratory birds and/or nests that might be present After construction, native vegetation/habitat needs to be restored as quickly as feasible	Prior to work activities, wildlife surveys need to be conducted to clear the area of possible migratory birds and/or nests that might be present	Prior to work activities, wildlife surveys need to be conducted to clear the area of possible migratory birds and/or nests that might be present

Table 3-13. Required Mitigation Measures

Environmental Resource Area	Mitigation		
	No Action	**Proposed Action**	**Alternative Action**
Land Use	None	None	None
Utilities	None	None	None
Air Quality	None	None	None
Noise	None	None	None
Hazardous Materials/Waste	None	None	None
Safety	None	None	None
Geology	None	None	None
Water Resources	None	None	None
Biological Resources			
Vegetation	None	None	None
Wetlands	None	None	None
Wildlife	None	None	None
Threatened, Endangered, and Special Concern Species	None	None	None
Socioeconomics and Environmental Justice	None	None	None

Conclusion. Both the Proposed Action and the Alternative Action would provide improved access to outer regions of the installation. While the cost of paving the entire perimeter road (Alternative Action) might be higher than grading and graveling with the aggregate base (Proposed Action), reduced maintenance requirements for the paved road relative to frequent grading/regraveling could offset the cost difference. The Alternative Action would substantially increase the amount of impervious surface on the installation, and would potentially have greater impacts on threatened, endangered, or sensitive species and storm water. Therefore, the Proposed Action provides the most efficient and effective solution to addressing the purpose and need as described in **Section 1**.

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4. Cumulative Impacts

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

4.1 Impact Analysis

Other projects evaluated in the cumulative impact analysis include planned or reasonably foreseeable projects both on-installation and off-installation. Planned or reasonably foreseeable projects were identified through a review of public documents and coordination with multiple agencies, and include both on- and off-installation activities.

Off-Installation Activities. The land adjacent to Buckley AFB is split between developed, agricultural, and grassland conservation areas. The City of Aurora's 2003 Comprehensive Plan identifies three planning areas near the installation, each of which has its own identity and planned development pattern.

Colfax Corridor East of I-225. This area occurs adjacent to the northern boundary of Buckley AFB. The properties along Colfax Avenue tend to include older commercial uses, while many are vacant. The Northeast Colfax Area also includes the neighborhoods that are north and south of the corridor.

Strategies for development in this area include the following:

- Working to enhance open space corridors through additional dedications or other means; confining nonresidential uses to the corridor and to the planned industrial areas with the exception of neighborhood commercial or neighborhood institutional uses
- Locating multifamily and attached housing in appropriate areas, including those adjacent to major streets, similar existing housing types, and other properties in the corridor
- Promoting infill development in residential neighborhoods, maintaining the overall average residential density close to the current benchmarks
- Encouraging and supporting the consolidation of parcels in the corridor to allow well-planned businesses or mixed-use projects.

There are no known developments that would occur in this strategic area at this time.

I-225 Corridor and City Center Strategic Area. This area is to the west of Buckley AFB and is associated with I-225 and the Aurora City Center. The I-225 corridor is the geographic center of the City of Aurora and, on the east side of the highway, the Aurora Mall, Aurora City Place, and Abilene power corridors compose a regional retail location. Midway in the corridor lies the Aurora City Center, historically planned as the city's "downtown."

Strategies for development in this area include the following:

- Continuing to work for transportation improvements including improvements to interchanges and Park-n-Ride locations
- Developing a strategy to encourage adaptive reuse of empty big box retail buildings
- Encouraging additional retail and medical-related office development in the corridor
- Working to expand the restaurant node at Iliff Avenue.

Important development associated with the City Center includes the Aurora Municipal Center (complete), Arapahoe County administrative annex (complete), new ADT company office building, a 355-unit townhouse and elevator apartment complex (The Village), a 225-residential unit project (The Retreat at City Center), and a revitalization of the Aurora Mall. Additionally, the Regional Transportation District purchased property for development of a new bus transfer facility at the City Center. A light rail station could be constructed in the future. Finally, a much smaller single family housing development composing 36.5 acres is under construction approximately 0.5 mile west of Buckley AFB (Aurora 2003, 2006).

E470 Corridor Strategic Area. This area is adjacent to the eastern and extreme southern boundary of the installation and includes the prairie areas east of the developed portion of the city where development is expected through 2020. The major feature of this area is the E470 corridor from Denver International Airport in the north to Douglas County in the south. E470 is a major interstate running north-south near the eastern boundary of Buckley AFB. The 1999 completion of the E470 segment serving the Buckley AFB area, and the subsequent Jewell Avenue Extension, provides the installation with major highways on both its east and west sides with access to both the north and south gates. The E470 toll road also provides a major regional beltway connecting the northern and southern limits of the metropolitan area and linking Denver International Airport with the I-25 corridor, opening significant amounts of vacant land for development.

The City of Aurora E470 Corridor Land Use Study identifies regional activity centers and the following theme areas within the corridor (Aurora 2003):

- Airport Corporate
- Airport Commercial/Distribution
- Regional Retail/Commercial
- Light Industrial/Flex Office
- Buckley Research and Development
- Residential
- Regional Park and Open Space
- Recreation/Entertainment.

Strategies for development in the E470 Corridor Strategic Area include locating a major office park, retail centers, and airport-related activities in the corridor and working with the counties to ensure that critical, undeveloped enclaves of land in the corridor are annexed into Aurora.

Planned land use for the entire area abutting the eastern boundary of Buckley AFB is to incorporate the Buckley Research and Development theme. Small-scale office development is allowed to complement the Research and Development land use, and limited industrial and commercial services are permitted. Regionally, a residential development composing 435 acres is under construction within 0.5 mile of the southern limits of Buckley AFB. Just east of this development, a 490-acre residential development is also under construction (Aurora 2003).

On-Installation Activities. Buckley AFB has in place a General Plan (BAFB 2003b) to guide current and future development. Land use planning at Buckley AFB follows a rational and sequential decisionmaking process to reach a consensus for future growth while ensuring the efficient and compatible use of available land. The General Plan establishes long-range goals and provides starting points to discuss land acquisition or disposal actions and siting of new facilities. This plan helps to define the best layout of land uses and transportation corridors to support functional effectiveness, efficiency, and compatibility. Both on-and off-installation factors are considered. The General Plan would guide infill development on currently vacant land, functional consolidation, and redesignation of land uses to accommodate doubling of the installation's current population (BAFB 2003b).

There are a number of recent, current, and planned Capital Improvement Projects to support Buckley AFB's continuing transition from an ANGB to an AFB and to facilitate future growth (see **Appendix F**). As the prioritization, initiation, and completion of construction projects are dynamic, **Appendix F** represents the current schedule at the time of this EA; scope, priority, and schedule of individual projects could change. The information in **Appendix F** is provided as a reference to place the Proposed Action in the context of planned activities.

Cumulative effects were evaluated based on calculations incorporating data from projects occurring since 2002, current projects, and projects planned out to 2012, and are tiered from the Capital Improvement Projects EA (BAFB 2006c). Summary tables for these calculations, which are updated and current at the time of this EA, are provided in **Appendix E**.

Table 4-1 presents potential cumulative effects on resources from the Proposed Action, when combined with other past, present, and future activities.

4.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

Geological Resources. Under the Proposed Action, construction activities, such as excavating and recontouring of the roadbed at sites where Texas crossings or culvert systems are installed, would result in soil disturbance. Implementation of BMPs during construction would limit potential effects resulting from construction activities. Standard erosion control means would also reduce potential impacts related to these characteristics. Although unavoidable, impacts on soils at the installation are not considered significant.

Hazardous Materials and Wastes. The use of hazardous materials and generation of hazardous wastes is an unavoidable condition associated with the Proposed Action. However, the anticipated increase in the use of HAZMAT and generation of hazardous wastes would not be substantially higher than current usage and generation and, therefore, is not considered significant.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action, Alternative Action, or the No Action Alternative.

Table 4-1. Cumulative Effects on Resources

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Air Quality	Region was in nonattainment for CO, O_3 (1-hour standard), and PM_{10}. Currently in attainment/maintenance for CO and $PM_{10,}$ and deferred (early action compact) for O_3 (8 hour standard).	Emissions from aircraft, vehicles, buildings.	Potential dust generation during grading, and during installation of water crossings. Emissions from the construction equipment.	Growth at BAFB and Aurora anticipated to result in increased traffic and emissions.	Cumulative actions are anticipated to result in moderate, adverse impacts on air quality due to construction emissions and increased use-related and personnel-related emissions. Proposed Action would make minor contribution given small scope of project.
Noise	Aircraft activities have been dominant noise source.	Aircraft activities are dominant noise source.	Short-term noise from construction activities. Long-term noise from maintenance activities.	Installation growth will result in increased traffic and noise.	Cumulative actions are anticipated to result in moderate, adverse impacts on noise environment. Proposed Action would make negligible contribution as aircraft activities would be dominant noise source.
Hazardous Waste/Materials	Past activities on installation, including demolition and burial of ACMs and other hazardous substances, has resulted in contamination of some sites.	Some ERP sites are currently undergoing full delineation.	Long-term adverse impacts on ERP LF003 and Site 10 could occur where the perimeter road crosses these sites.	Continued development of Buckley AFB would incur use or generation of hazardous materials and wastes and probably necessitate remediation and use of ERP sites.	Cumulative actions are anticipated to result in moderate, adverse impacts relative to hazardous waste/materials. Proposed Action would make negligible contribution given footprint and siting.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Safety	Historically, ungraveled portions of the road have inhibited passage, potentially slowing response time to accidents or other incidents.	Continued development outside the boundary of the installation necessitates rapid and all-weather accessibility for safety and security.	Proposed Action addresses need for all-weather, rapid passage. Short-term adverse impacts on safety due to construction activities.	Growth and expansion of missions and developed areas at BAFB will continue to have adverse impacts on safety due to construction and traffic.	Cumulative actions are anticipated to result in minor, adverse impacts on safety due to increased activity and personnel. Proposed Action would make minor beneficial contribution due to improved access to distant portions of the installation.
Geological Resources	Past urban and BAFB development has modified soils.	Current development activities continue to alter soils.	Grading, and installation of water crossings would result in further soil disturbance.	Continued development on BAFB would locally impact soils.	Cumulative actions are anticipated to result in minor, adverse impacts on geologic resources, particularly soils. Proposed Action would make negligible contribution given existing disturbed footprint.
Water Resources	Surface water quality moderately impacted by development.	Surface water quality moderately impacted by development.	Potential short-term impacts on water quality during crossing installation would be ameliorated through use of BMPs. Insignificant increase in area of impervious surfaces.	Continued development of BAFB would result in sedimentation from construction activities, and further increase in impervious surface area.	Cumulative actions are anticipated to result in minor, adverse impacts on water resources. Proposed Action would make negligible adverse and beneficial contributions.

Resource	Past Actions	Current Background Activities	Proposed Action	Known Future Actions	Cumulative Effects
Biological Resources	Degraded historic habitat of sensitive and common species.	BAFB and Aurora operations and development impact plants and animals.	Minor, short-term disturbance of habitat during installation of water crossings.	Continued development of BAFB would impact biological resources.	Cumulative actions are anticipated to result in moderate, adverse impacts on biological resources. Proposed Action would make only a minor contribution given the small footprint and existing disturbed roadbed.
Socioeconomics and Environmental Justice	Installation contributes to local economic community.	Continued support of local economic community.	Negligible contribution to local construction industry.	Continued development of BAFB would impact local economy and services.	Cumulative actions are anticipated to result in moderate, beneficial impacts on the local economic community. Proposed Action would make negligible, beneficial contribution given small scope of project.

4.3 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts on the ground surface as a result of the Proposed Action would occur entirely within the boundaries of Buckley AFB. Continued grading and graveling of the perimeter road, and installation of Texas crossings or culvert systems, would not result in any incompatible land uses on or off the installation. Consequently, the Proposed Action would not conflict with Base land use policies or objectives. The Proposed Action would not conflict with any applicable off-installation land use ordinances or designated clear zones.

4.4 Relationship Between the Short-term Use of the Environment and Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in a significant intensification of land use at Buckley AFB and in the surrounding area. The Proposed Action does not represent a significant loss of open space. Therefore, it is anticipated that the Proposed Action would not result in any cumulative land use or aesthetic impacts. Long-term productivity of this site would be maintained by the implementation of the Proposed Action.

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5. List of Preparers

This EA has been prepared under the direction of DOD and Buckley AFB. The individuals who contributed to the preparation of this document are listed below.

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APPENDIX A

AIR FORCE FORM (AF) 813

REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

Report Control Symbol
RCS: 9903119 A# 2070

INSTRUCTIONS: *Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on Separate Sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO (Environmental Planning Function)	2. FROM (Proponent organization and functional address symbol)	2a. TELEPHONE NO.
460 CES/CEVP	460 CES/CEC	303-677-9261

3. Title of Proposed Action
Perimeter road paving, repair, and maintenance.

4. Purpose and Need for Action (identify decision to be made and need date)
Pave perimeter road to address the need for increased efficiency in maintenance and operation.

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPPA) (Provide sufficient details for evaluation of the total action)
See attached map for more details.

6. PROPONENT APPROVAL (*Name and Grade*)	6a. SIGNATURE	6b. DATE
David Wong, Capt	David Wong	6 Oct 03

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. (*Check appropriate box and describe potential environmental effects including cumulative effects.*) (+ = positive effect; 0 = no effect; - = adverse effect; U = Unknown effect.	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE (*Noise, accident potential, encroachment, etc.*)		X		
8. AIR QUALITY (*emissions, attainment status, state implementation plan, etc.*) Existing fugitive dust would be reduced, having a positive impact on air quality.	X			
9. WATER RESOURCES (Quality, quantity, source, etc.) Increased impervious surface would create more stormwater runoff.			X	
10. SAFETY AND OCCUPATIONAL HEALTH (*Asbestos/radiation/chemical exposure, explosives safety quantity-distance, etc.*)		X		
11. HAZARDOUS MATERIALS/WASTE (*Use/storage/generation, solid waste, etc*) Recycled asphalt from runway would result in diverting waste from a landfill	X			
12. BIOLOGICAL RESOURCES (*Wetlands/floodplains, flora, fauna, etc*)		X		
13 CULTURAL RESOURCES (*Native American burial sites, archeological, historical, etc.*)		X		
14.GEOLOGY AND SOILS (*Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.*)		X		
15.SOCIOECONOMIC (*Employment/population projections, school and local fiscal impacts, etc.*)		X		
16.OTHER (*Potential impacts not addressed above.*) *Cumulative Impacts : Minimal increase in stormwater runoff and decrease in fugitive dust.*		X		

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. [X] PROPOSED ACTION QUALIFIES FOR A CATEGORICAL EXCLUSION (CATEX #) A2.3.10 ; OR
[ ] PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS
A2.3.10. Routine facility maintenance and repair that does not involve disturbing significant quantities of hazardous materials such as asbestos and lead-based paint.

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION (*Name and Grade*)	19a. SIGNATURE	19b. DATE
Elise Sherva, GS 12	Elise Sherva	6 Oct 03

AF FORM 813, AUG 93 (EF-V1) THIS FORM CONSOLIDATES AF FORMS 813 AND 814. PREVIOUS EDITIONS OF BOTH FORMS OBSOLETE. PAGE 1 OF PAGE(S)

AF FORM 813 - PERIMETER ROAD PAVING, REPAIR, AND MAINTENANCE
RCS: 9903119

PROPOSED ACTION: Pave and repair the perimeter road using recycled asphalt from runway. The perimeter road would be paved with approximately six inches of recycled asphalt, approximately 10 feet in width, and approximately 26,000 feet in length. The action would include upgrades to an existing dirt road with no changes in alignment or compound access. No excavation or fill would occur. Alterations to surface drainage would result in an increased amount of stormwater runoff resulting from an increase in impervious surface.

The existing area impacted by the total increased impervious surface would amount to approximately 260,000 square feet. See attached map.

NO-ACTION ALTERNATIVE: The No-Action alternative would entail no improvements in the form of paving, repair and maintenance to the existing perimeter road. The existing perimeter road would continue to emit fugitive dust and would not contribute to improving air quality. The No-Action alternative could potentially degrade the ability to access portions of the base in a safe and timely manner as well as decreasing the efficiency of normal operations and maintenance.

REQUIREMENTS AND RESTRICTIONS:

1. Best Management Practices (BMPs) would be implemented to minimize fugitive dust during project construction.

2. BMPs should be implemented to minimize additional Stormwater runoff resulting from an increased amount of impervious surface.

3. Work would be stopped immediately if any construction material, asbestos containing material, or items of cultural or historical significance is found during construction. 460 CES/CEV would be contacted immediately at (303) 677-9977 or (303) 677-9218 for asbestos and (303) 677-6937 for cultural resources

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DEPARTMENT OF THE AIR FORCE
460TH AIR BASE WING (AFSPC)

September 25, 2003

MEMORANDUM FOR 460 CES/CEVP

FROM: 460 ABW/JA

SUBJECT: Legal Review – Perimeter Road Paving

1. SYNOPSIS. I have reviewed the AF Form 813 request to pave the previously unpaved base perimeter road and I find it legally sufficient for a Categorical Exclusion from further environmental analysis.

2. FACTS. This is a project to pave the base perimeter road with asphalt tailings from an unrelated runway-repaving project. The road is already in existence but is unpaved i.e. dirt. The road runs from the northeast corner of the base around the eastern boundary to the middle of the southernmost boundary (southern end of the runway). This covers an area 10' by 26,000' (approx. 6 acres). At one point above Williams Lake (in the northeast corner of the base) the road passes through a small wetlands area. Otherwise the perimeter road does not encroach on a sensitive species critical habitat, cultural resource, etc.

3. LAW. Environmental impact analysis of proposed actions is required to comply with the law.[1] Some proposed actions could be categorically excluded from environmental impact analysis because they either have a minimal adverse effect on environmental quality, no significant change to existing environmental conditions, or no significant cumulative environmental impact.[2] A categorical exclusion exists for routine facility maintenance and repair that does not involve disturbing significant quantities of hazardous materials such as asbestos and lead-based paint.[3] Roadways are included within the definition of "facilities."[4]

4. DISCUSSION. This action involves the use of waste from the runway repaving project and the upgrade of a security feature on the base. There are environmental benefits to using reclaimed waste from the runway project and at the same time upgrading base security (quicker response to a situation on the base perimeter). The only potential environmental detriment is that there will additional storm water runoff along the sides of the road (asphalt absorbs less moisture than dirt). Although the paved surface area will cover 260,000 square feet, unlike a parking lot this impervious surface will be a thin strip snaking along 26,000 feet of the base perimeter. Storm water runoff from every 5 square feet of paving will flow to every 1 foot of land.[5] I find this insignificant. I also find it insignificant that the road crosses through a wetlands area on

[1] See 32 CFR 989; National Environmental Policy Act of 1969 (NEPA); Executive Order 12114.
[2] See 32 CFR 989.13.
[3] See 32 CFR 989, Appendix B, para A2.3.10.
[4] See RCS: SAF-MIL (A) 715. This defines roads as facilities.
[5] Natural land bordering the roadway is 52,000 feet [26,000' (length of the road) x 2 (each side of the road) = 52,000']. 260,000 square feet of roadway surface [10' width x 26,000' length = 260,000 sq ft] divided by 52,000' = 5/1 ratio.

base. The paving doesn't change the nature of use, which is where most major impacts can occur. In conclusion, I find this project will have minimal impact on the environment; no significant change to existing environmental conditions; no significant impact to wetlands, sensitive species, or cultural resources; no significant cumulative environmental impact; and is proper for a categorical exclusion.

5. RECOMMENDATIONS. That this action be categorically excluded under A2.3.10 from further environmental analysis.

BRADFORD L. BUCHANAN
Attorney-Advisor

I concur.

FLOYD M. RUSSELL III, Lt Col, USAF
Staff Judge Advocate

APPENDIX B

NOTICE OF AVAILABILITY

The following ads ran in the Aurora Sentinel, Denver Post, and Rocky Mountain News on 28 February 2008, 3 March 2008, and 3 March 2008 respectively.

Notice of Availability
Environmental Assessment of
Perimeter Road Maintenance at Buckley AFB

Interested parties are hereby notified that Buckley Air Force Base (AFB) has prepared a Draft Environmental Assessment (EA) and a Draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) for perimeter road maintenance.

Statutory Authority. This notice is being issued to interested parties in accordance with the National Environmental Policy Act (Public Law [P.L.] 91-190, 42 United States Code 4321 et seq.) as amended in 1975 by P.L. 94-52 and P.L. 94-83.

Purpose. The purpose of and need for the Proposed Action is to maintain and improve the perimeter road so that it is accessible at all times for installation personnel to carry out security, emergency response, and training activities.

Proposed Action. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced. This entails grading ungraveled areas and graveling additional areas within the current footprint with an aggregate of recycled asphalt and concrete when materials and funds are available. Where the road crosses ditches, wetlands, or drainages, Texas Crossings or culvert systems would be constructed, as appropriate for each crossing, to maintain natural hydrology and permit vehicles to cross during inclement weather in a cost-effective manner.

Alternatives. There are two alternatives for perimeter road maintenance. Under the Alternative Action, the entire perimeter road would be paved within the current footprint. Low water crossings would be modified as described for the Proposed Action. Under the No Action Alternative, perimeter road maintenance would continue as currently practiced (graded and graveled as resources allow) with no enhancements of low water crossings.

Comments. Comments on the Draft EA and Draft FONSI/FONPA should be directed to Elizabeth Meyer, 460 CES/CEVP, 660 South Aspen Street (Stop 86), Bldg. 1005, Room 178, Buckley AFB, Colorado 80011-9551. The comment period is open for 30 days following the publication of this notice in the Aurora Sentinel. Copies of the Draft EA and Draft FONSI are available for review by the public at the Aurora Central Library, 14949 East Alameda Parkway, Aurora, Colorado 80012; Denver Public Library, Government Documents Section, 10 West 14th Avenue, Denver, Colorado 80204; and the Boulder Public Library, 1000 Canyon Blvd., Boulder, Colorado 80302. Copies can also be obtained by writing to Buckley AFB at the address provided above.

In addition, the following privacy advisory was published on the cover sheet of the Draft EA.

Privacy Advisory

Your comments on this EA are requested. Letters or other written comments provided may be published in the EA. Comments will normally be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the EA.

PUBLIC NOTICE

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MONDAY 3/3/08 ROCKY MOUNTAIN NEWS

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APPENDIX C

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) MATERIALS

DISTRIBUTION LIST AND AGENCIES AND INDIVIDUALS CONTACTED

Mr. Dan Beley
Colorado Dept. of Public Health & Environment
Water Quality Control Division
WQCD-OQ-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Mr. Brent Bibles
Wildlife Researcher
Colorado Division of Wildlife
Wildlife Research Center
317 W. Prospect Road
Fort Collins, CO 80526

Mr. Mac Callison
City of Aurora
Planning, Traffic Division
1515 E. Alameda
Aurora, CO 80012

Ms. Nancy Chick
Colorado Dept. of Public Health & Environment
Air Pollution Control Division
APCD-TS-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Georgianna Contiguglia
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Mr. John Fernandez
City of Aurora
Planning, Environmental Division
15151 E. Alameda
Aurora, CO 80012

Ms. Jane Hann
Environmental Project Manager
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Ms. Cynthia Holdeman
Government Publications
Denver Public Library
10 W. Fourteenth Ave. Pkwy.
Denver, CO 80204-2731

Mr. Eugene Jansak
Industrial Waste Specialist
Metro Wastewater Reclamation Dist.
6450 York Street
Denver, CO 80229-7499

Mr. Ed LaRock
Colorado Dept. of Public Health & Environment
Federal Facilities
HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Ms. Patricia Mehlhop
U.S. Fish & Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80228-1807

Ms. Eliza Moore
Wildlife Manager
Colorado Division of Wildlife
6060 South Broadway
Denver, CO 80216

Mr. Jim Paulmeno
Manager, Environmental Planning
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Mr. David Rathke
U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Mr. Bruce Rosenlund
Colorado Field Supervisor
U.S. Fish & Wildlife Service
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Lakewood, CO 80228-1807

Ms. Gina Sciosca
Boulder Public Library
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Mr. Larry Svoboda
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U.S. Environmental Protection Agency
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USDA United States Department of Agriculture

Natural Resources Conservation Service

Metro Field Office
655 Parfet Street, Rm. E300
Lakewood, CO 80215-5517

Phone: 303 236-2903 x270 E-mail: Eugene.Backhaus@co.nrcs.usda.gov Fax: 303 236-2703

January 12, 2001

Elise Sherva
821 SPPG/CEV
660 S. Aspen Stop 26
Buckley Air Force Base Colorado
Aurora, CO 80011-9559

Re: Soils Use as Potential Cropland

Dear Ms. :

After touring the facility I recognized a few areas with the potential for being converted into cropland (map enclosed) less areas of exclusion. These areas were related to soils identified as being of Statewide Importance if dry cropland (list enclosed). But the problems I saw for farming operations were related to the size of the parcels and relative accessibility for farming operations.

In the front-range of Colorado, 80+ acres is usually considered the smallest sized parcel that is economically feasible for dryland cropping depending on accessibility. On the Base there is only one parcel that is close to that size with the others being 20 acres or less. The total potential cropland is contained in three or four parcels for a maximum of about 150 acres. If cash rent is expected the price range would be from $15-25/acre depending on the accessibility.

Another concern is that the largest parcel is 50/50 for soils of Statewide Importance and soils that pose an erosion hazard. Proper farming operations would require installation of conservation practices to protect the wetlands from potential erosion from the identified field. Practices would possibly include terraces, field borders, filter strips, riparian buffer, conservation tillage, and contour farming. Of these practices, several can be installed for little cost while land is being plowed up for farming operations. The other practices will cost anywhere from $1.50/foot to $7.50/foot for installation.

We also would like to point out potential weed problems that may occur. In farming operations, presence of kochia and Russian thistle are common and most prominent after harvest through start of spring tillage operations. These weeds, better known as tumbleweed, could pose hazards for flight operations as could the chaff and straw from harvest operations. A potential solution that would reduce the weed problem is chemical application, but with the urban neighbors this could cause a public relations problem.

One last point we would like to make is the potential existence of homeostasis. This state is equilibrium in the ecosystem that is only altered by disturbance or introduction into the area. The farming operation will break this and is one reason for the influx of weeds.

Based on this information, it would not be feasible to introduce agricultural production onto the base without the added cost of installing conservation practices and/or irrigation system. Also, trying to find a farmer willing to farm according to these set specifications, i.e. weed control, terraces, buffers, and contour farming, will be difficult.

Sincerely,

Eugene H. Backhaus
District Conservationist

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

FEB 27 2008

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Cynthia Holdeman
Government Publications
Denver Public Library
10 W. Fourteenth Ave. Pkwy.
Denver, CO 80204-2731

Dear Ms. Holdeman,

The Air Force is pleased to provide the Denver Public Library a review copy of the Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. We appreciate the Denver Public Library's contribution in making this document available to the public for review and comment.

Public reviewers are asked to submit written comments (referencing Section, page, and line numbers to which comments apply) to the following address:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551

The public comment period for this EA is 30 days. Public reviewers are asked to submit any written comments by 5pm on Wednesday, 2 April 2008.

If you have any questions please feel free to contact Elizabeth Meyer at the address above.

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Ms. Carol Foreman
Central Library Reference Supervisor
Aurora Public Library Administrative Offices
14949 E. Alameda Pkwy.
Aurora, CO 80012

Dear Ms. Foreman,

The Air Force is pleased to provide the Aurora Public Library a review copy of the Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. We appreciate the Denver Public Library's contribution in making this document available to the public for review and comment.

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Bruce James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

FEB 27 2008

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Gina Sciosca
Boulder Public Library
1000 Canyon Blvd.
Boulder, CO 80302

Dear Ms. Sciosca,

The Air Force is pleased to provide the Boulder Public Library a review copy of the Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. We appreciate the Denver Public Library's contribution in making this document available to the public for review and comment.

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Bruce James

BRUCE JAMES
Chief, Environmental Planning & Conservation

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DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Ms. Jane Hann
Environmental Project Manager
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Dear Ms. Hann,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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Bruce James

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460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Jim Paulmeno
Manager, Environmental Planning
Colorado Dept. of Transportation
4201 East Arkansas Avenue
Denver, CO 80222

Dear Mr. Paulmeno,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Brent Bibles
Wildlife Researcher
Colorado Division of Wildlife
Wildlife Research Center
317 W. Prospect Road
Fort Collins, CO 80526

Dear Mr. Bibles,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Ms. Eliza Moore
Wildlife Manager
Colorado Division of Wildlife
6060 South Broadway
Denver, CO 80216

Dear Ms. Moore,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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Bruce James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

FEB 27 2008

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Ms. Nancy Chick
Colorado Dept. of Public Health & Environment
Air Pollution Control Division
APCD-TS-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Ms.Chick,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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Bruce James

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Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

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460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Ed LaRock
Colorado Dept. of Public Health & Environment
Federal Facilities
HMWM 2800
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Mr. LaRock,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Dan Beley
Colorado Dept. of Public Health & Environment
Water Quality Control Division
WQCD-OQ-B2
4300 Cherry Creek Drive, South
Denver, CO 80246-1530

Dear Mr. Beley,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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Bruce R James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

FEB 27 2008

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Mac Callison
City of Aurora
Planning, Traffic Division
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Callison,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. John Fernandez
City of Aurora
Planning, Environmental Division
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Fernandez,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Robert Watkins
Director of Planning
City of Aurora
15151 E. Alameda
Aurora, CO 80012

Dear Mr. Watkins,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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Bruce R James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. David Rathke
U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Dear Mr. Rathke,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Larry Svoboda
NEPA Unit Chief
U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202

Dear Mr. Svoboda,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Mr. Eugene Jansak
Industrial Waste Specialist
Metro Wastewater Reclamation Dist.
6450 York Street
Denver, CO 80229-7499

Dear Mr. Jansak,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Ms. Georgianna Contiguglia
State Historic Preservation Officer
Colorado History Museum
1300 Broadway
Denver, CO 80203-2137

Dear Ms.Contiguglia,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

The public comment period for this EA is 30 days. Please provide any written comments by 5pm on Wednesday, 2 April 2008 to:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551

If you have any questions please feel free to contact Elizabeth Meyer at 720-847-7159, or via e-mail: elizabeth.meyer@buckley.af.mil.

Bruce James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

FEB 27 2008

Ms. Patricia Mehlhop
U.S. Fish & Wildlife Service
134 Union Blvd., Suite 645
Lakewood, CO 80028-1807

Dear Ms.Mehlhop,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

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660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551

If you have any questions please feel free to contact Elizabeth Meyer at 720-847-7159, or via e-mail: elizabeth.meyer@buckley.af.mil.

Bruce R James

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

FEB 27 2008

Mr. Bruce James
Environmental Flight
460th Civil Engineering Squadron
660 South Aspen Street
Buckley AFB, CO 80011-9551

Mr. Bruce Rosenlund
Colorado Field Supervisor
U.S. Fish & Wildlife Service
134 Union Blvd., Suite 675
Lakewood, CO 80028-1807

Dear Mr. Rosenlund,

The Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI)/Draft Finding of No Practical Alternative (FONPA) for perimeter road maintenance at Buckley Air Force Base (AFB), Colorado. Under the Proposed Action, the Buckley AFB perimeter road would continue to be maintained as currently practiced, with road grading as needed, and graveling with an aggregate road base of recycled asphalt and concrete when feasible (i.e., materials and funds are available), along the current footprint which is approximately 10 feet wide and 13.4 miles long. In areas where the road splits into two separated paths, both portions would receive continued maintenance as described above. The Proposed Action also calls for the repair or upgrade of existing water/wetland crossings with either Texas crossings or culvert systems as appropriate. The Proposed Action is needed to improve air and water quality, normal operations, security at the installation, and ensure that installation personnel can access all segments of the installation's perimeter in any weather, while minimizing damage to natural resources.

The public comment period for this EA is 30 days. Please provide any written comments by 5pm on Wednesday, 2 April 2008 to:

Ms. Elizabeth Meyer
460 CES/CEVP
660 South Aspen Street, Stop 86
Building 1005, Room 178
Buckley AFB, CO 80011-9551

If you have any questions please feel free to contact Elizabeth Meyer at 720-847-7159, or via e-mail: elizabeth.meyer@buckley.af.mil.

BRUCE JAMES
Chief, Environmental Planning & Conservation

GUARDIANS OF THE HIGH FRONTIER

OFFICE of ARCHAEOLOGY and HISTORIC PRESERVATION

March 7, 2008

Bruce James
Chief, Environmental Planning & Conservation
Environmental Flight
460th Civil Engineer Squadron
660 South Aspen Street, Stop 86
Buckley AFB CO 80011-9551

Re: Draft Environmental Assessment for Perimeter Road Maintenance at Buckley Air Force Base, Colorado. (CHS #51987)

Dear Mr. James:

Thank you for your correspondence dated February 27, 2008 and received by our office on February 29, 2008 regarding consultation of the above-mentioned project under Section 106 of the National Historic Preservation Act (Section 106).

We have reviewed the draft EA and there is no reference to the project's effect on cultural resources. Cultural resources are not included in the Affected Environment and Environmental Consequences. Also, after review of our files, it does not appear Section 106 of the National Historic Preservation Act has been initiated with our office for this project.

We request being involved in the consultation process with the local government, which as stipulated in 36 CFR 800.3 is required to be notified of the undertaking, and with other consulting parties. Additional information provided by the local government or consulting parties might cause our office to re-evaluate our eligibility and potential effect findings.

Please note that our compliance letter does not end the 30-day review period provided to other consulting parties. If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Coordinator, at (303) 866-4678.

Sincerely,

Mark Wolfe

For Georgianna Contiguglia
State Historic Preservation Officer

cc: Elizabeth Meyer/Buckley AFB

COLORADO HISTORICAL SOCIETY
1300 BROADWAY DENVER COLORADO 80203 TEL 303/866-3395 FAX 303/866-2711 www.coloradohistory-oahp.org

OFFICE *of* ARCHAEOLOGY *and* HISTORIC PRESERVATION

March 20, 2008

Bruce James
Chief, Environmental Planning & Conservation
Environmental Flight
460th Civil Engineer Squadron
660 South Aspen Street, Stop 86
Buckley AFB CO 80011-9551

Re: Draft Environmental Assessment for Perimeter Road Maintenance at Buckley Air Force Base, Colorado. (CHS #51987)

Dear Mr. James:

Thank you for the additional information received by our office on March 19, 2008 by phone regarding consultation of the above-mentioned project. After review of the additional information, we have no comments related to cultural resources in regards to the Draft EA.

If we may be of further assistance, please contact Amy Pallante, our Section 106 Compliance Coordinator, at (303) 866-4678.

Sincerely,

Mark Wolfe

for Georgianna Contiguglia
State Historic Preservation Officer

cc: Elizabeth Meyer/Buckley AFB

COLORADO HISTORICAL SOCIETY
1300 Broadway Denver Colorado 80203 Tel 303/866-3395 Fax 303/866-2711 www.coloradohistory-oahp.org

STATE OF COLORADO

Bill Ritter, Jr., Governor
James B. Martin, Executive Director

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

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
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Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

March 26, 2008

Elizabeth Meyer
460 CES/CEVP
660 S. Aspen St. #86
Building 1005, Room 178
Buckley AFB, CO 80011-9551

Dear Ms. Meyer:

On February 27, 2008 the Colorado Air Pollution Control Division (CAPCD) received a request for comment on the Environmental Assessment of Perimeter Road Maintenance At Buckley Air Force Base. Thank you for taking the time to inquire about the air quality impacts of the proposed project.

The Air Division has the following comments on the Draft EA for the Buckley AFB Perimeter Road Project.

1. In the Air Quality, Affected Environment Section, indicate that the Metropolitan Denver Air Quality Control Region (AQCR) exceeded the 8 hour Ozone standard during the summer of 2007, and therefore the AQCR is a Marginal Non-attainment Area for the 8 hour ozone standard. This Environmental Protection Agency non-attainment ranking renders the Early Action Compact invalid. The AQCR continues to be in full compliance with 1 hour Ozone standard.
2. Given the one-year duration of the maintenance project, applicable Air Quality Control Commission Regulation No. 3 applies, and the Buckley AFB should complete and submit an Air Pollution Emissions Notice (APEN) to the APCD. Please contact Mr. Adam Wozniak at 303.692.3160 for instructions on filing an APEN. A construction permit is not required for the project.
3. In Appendix D, General Conformity Air Quality Emissions Estimates, the User Input Parameters/Assumptions, which calculate PM10 Emissions due to Site Preparation, should be revised as follows:
    a. Wind speed for the calculation should be derived from the NWS monitor at the Denver International Airport, rather than from wind speed at Spokane, WA, as listed.
    b. The average TSP fraction of PM10 in the Denver Area is .38 and should be used instead of the .5 from CEQA 1993 data.

If you have any questions or need any further information please call me directly at 303.692.3127. I can also be reached by email at jim.dileo@state.co.us.

Sincerely,

James A. DiLeo
Air Quality Planner
Colorado Air Pollution Control Division

cc: Adam Wozniak, CAPCD

DEPARTMENT OF THE AIR FORCE
460TH SPACE WING (AFSPC)

APR 14 2008

Bruce James
Environmental Flight, 460th Civil Engineer Squadron
660 S. Aspen St., Stop 86
Buckley AFB, CO 80011-9551

James A. DiLeo
Air Pollution Control Division
Colorado Dept. of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Mr. DiLeo

Thank you for your letter, dated 26 March 2008, on the Perimeter Road Environmental Assessment (EA) and Finding of No Significant Impact (FONSI).

The 8 hour ozone non-attainment status comment will be incorporated into the Final EA. The current non-attainment should not affect the calculations or outcome identified in the EA. Buckley AFB will follow all applicable regulations and will coordinate with the CDPHE prior to "construction" to determine whether a Land Development - Specialty Air Pollution Emissions Notice (APEN) would be required. The User Input Parameter/Assumptions in Appendix D will be updated to reflect Denver, Colorado.

Please contact Ms. Elizabeth Meyer, NEPA Program Manager, at 720-847-7159 or elizabeth.meyer@buckley.af.mil, if you have any questions or require further information.

Sincerely

BRUCE JAMES, YF-2
Chief, Planning and Conservation

GUARDIANS OF THE HIGH FRONTIER

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APPENDIX D

GENERAL CONFORMITY AIR QUALITY EMISSIONS ESTIMATES

Emissions Estimates Paving Road EA

Summary	Summarizes total emissions by calendar year. (this worksheet)
Combustion	Estimates emissions from non-road equipment exhaust as well as painting. (one worksheet for each calendar year)
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust (one worksheet for each calendar year)
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissio (one worksheet for each calendar year)

		NOx (ton)	VOC (ton)	CO (ton)	SO2 (ton)	PM10 (ton)
CY2006	Combustion	0.81	0.13	1.09	0.02	0.02
(one table for each	Fugitive Dust					19.87
calendar year)	TOTAL CY2006	0.81	0.13	1.09	0.02	19.89

Buckley Paving Road EA

Construction Combustion Emissions for CY 2006
Combustion Emissions of VOC, NOx, SO2, CO and PM10 Due to Construction

Includes:

1	Grading of Road	707,850	ft²	16.25	acres
2	Paving of Road	707,850	ft²	16.25	acres

Total Paved Area:	707,850	ft²	
Total Disturbed Area:	707,850	ft²	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	(assume 230 days/year unless project-specific data known)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	707,850	16.25	5	(from "Grading" worksheet)
Paving:	707,850	16.25	39	
Demolition:	0	0.00	0	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994 version)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2 for CY 2005. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NOx (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NOx (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NOx (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NOx (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NOx (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day) NOx	VOC	CO	SO2**	PM10
Grading Equipment	2	121.02	18.04	141.38	2.42	4.06
Paving Equipment	2	25.88	4.46	37.92	0.52	0.72
Demolition Equipment	1	28.75	4.95	42.14	0.58	0.80
Building Construction	1	67.16	9.98	78.03	2.02	2.27
Air Compressor for Architectural Coating	1	6.83	0.85	5.82	0.14	0.27
Architectural Coating**			0.00			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Annual Emissions by Activity (lbs/yr)

	NOx	VOC	CO	SO2	PM10
Grading Equipment	605.1	90.2	706.9	12.1	20.3
Paving	1009.3	173.9	1478.9	20.2	28.1
Demolition	0.0	0.0	0.0	0.0	0.0
Building Construction	0.0	0.0	0.0	0.0	0.0
Architectural Coatings	0.0	0.0	0.0	0.0	0.0
Total Emissions (lbs/yr):	**1614.4**	**264.1**	**2185.8**	**32.3**	**48.4**

Results: Daily and Annual Emission Rates

	NOx	VOC	CO	SO2	PM10
Emissions, average lbs/day	1614.42	264.14	2185.78	32.29	48.38
Emissions, tons/yr	0.81	0.13	1.09	0.02	0.02

Buckley Paving Road EA

Construction Fugitive Dust Emissions for CY 2006

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	16.25	acres/yr	(From "CY2006 Combustion" worksheet)
Grading days/yr:	4.54	days/yr	(From "CY2006 Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr	rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	18	%	Ave. of wind speed at Boulder, CO (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/colorado/boulder/)
Fraction of TSP, J:	0.38	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	6.00	vehicles	(From "CY2006 Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
PM10 Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM10 for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	2.2	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	30	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]$ [(365-P)/365]	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	2.2 hr/acre	0.40 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 5.1 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.51 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.40 lbs/acre	16.25	NA	7	0.00
Grading	0.80 lbs/acre	16.25	NA	13	0.01
Vehicle Traffic	22.30 lbs/acre	16.25	NA	362	0.18
Erosion of Soil Piles	0.51 lbs/acre/day	16.25	90	746	0.37
Erosion of Graded Surface	26.40 lbs/acre/day	16.25	90	38,610	19.31
TOTAL				39,738	19.87

Soil Disturbance EF: 23.50 lbs/acre
Wind Erosion EF: 26.91 lbs/acre/day

Back calculate to get EF: 538.86 lbs/acre/grading day

Buckley Paving Road EA

Construction (Grading) Schedule for CY 2006

Estimate of time required to grade a specified area.

Input Parameters
Construction area: 16.25 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 6.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	16.25	2.03
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	16.25	7.94
2315 432 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	8.13	8.19
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	8.13	3.36
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	16.25	5.70
TOTAL								27.23

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 27.23
Qty Equipment: 6.00
Grading days/yr: 4.54

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APPENDIX E

SUMMARY TABLES FOR CUMULATIVE IMPACTS CALCULATIONS

NOTE:

The tables on the following pages are from an Excel spreadsheet that was developed for the CIP EA (BAFB 2006c) and is now maintained by 460 CES/CEV with frequent updates as construction projects enter the system. A note at the bottom of each table on the following pages indicates the corresponding table in the spreadsheet.

The data presented in these tables are current as of the publication of this EA.

The assumptions for all calculations are as follows:

(1) Total Building Land Disturbance is estimated at six-times the Building Area, providing contingency for contractor lay-down and preparation areas.

(2) Parking Lot size is estimated on 300 ft2 per parking space, including turning areas. Total Land Disturbance is estimated at 1.5-times the Parking Lot Areas, providing contingency for contractor lay-down and preparation areas.

(3) Land Disturbance for Landscaping Areas is estimated at 20% of the Building Area, and provides contingency for contractor lay-down and preparation areas.

(4) Walkway and Sidewalks lengths were measured from maps included in the Buckley Air Force Base General Plan (Preliminary Submittal; 460 Air Base Wing, Buckley AFB, Colorado; Prepared by HB&A; Colorado Springs, CO; June 2002).

(5) Utility connection lengths were measured from maps included in the Buckley Air Force Base General Plan (see above). Lengths were measured to closest major roadway, where utilities are assumed to exist.

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Table E-1: Annual Breakdown of Construction and Demolition Activities 2002 to 2012+									
				Ground Disturbance					
Year	Days of Demolition	Demolition Area (ft^2)	Construction Demolition Days of Ground Disturbance	Construction Acres/year	Construction % of total	Demolition Acres/year	Demolition % of total	Total Acres/year	Construction and Demolition % of Total
2002	90	0	967	62.39	7.56%	1.38	7.36%	63.77	7.56%
2003	24	12,000	2,384	83.69	10.14%	0.55	2.94%	84.24	9.98%
2004	60	20,378	1,938	176.30	21.37%	0.94	5.00%	177.24	21.01%
2005	245	51,539	2,446	80.70	9.78%	7.23	38.66%	87.93	10.42%
2006	60	264	1,579	42.10	5.10%	0.01	0.07%	42.11	4.99%
2007	76.654	9,697	3,195	75.40	9.14%	0.45	2.43%	75.85	8.99%
2008	160	20,420	1,000	13.89	1.68%	0.94	5.01%	14.83	1.76%
2009	600	14,059	3,332	50.17	6.08%	0.65	3.45%	50.82	6.02%
2010	77.806	22,403	708	21.98	2.66%	3.51	18.77%	25.49	3.02%
2011	39.516	15,541	2,970	71.21	8.63%	0.71	3.81%	71.93	8.53%
2012	415	49,236	1,090	15.94	1.93%	2.26	12.09%	18.20	2.16%
Beyond 2012	150	1,660	4,455	131.23	15.91%	0.08	0.41%	131.30	15.56%
Totals	**1997.976**	**217,197**	**26,063**	**825**	**100.00%**	**18.71**	**100.00%**	**843.71**	**100.00%**

Updated from CIP EA Ground Disturbance Spreadsheet

Buckley AFB Expansion Estimates - Impervious Surfaces

Table E-2: Increased Impervious Surface Calculations			
Year	**Increased Impervious Surfaces Due to Construction (Acres)**	**Decreased Impervious Surfaces Due to Demolition (Acres)**	**Net Increased Impervious Surfaces (Acres)**
2002	28.77	0.00	28.77
2003	41.48	0.28	41.20
2004	74.99	0.47	74.52
2005	25.27	2.10	23.17
2006	3.37	0.01	3.37
2007	13.28	0.22	13.05
2008	3.62	0.47	3.15
2009	37.94	0.32	37.62
2010	2.34	2.41	(0.06)
2011	27.72	0.36	27.37
2012	3.06	1.13	1.93
Beyond 2012	69.00	0.04	68.96
Totals	**330.85**	**7.80**	**323.05**

Updated from CIP EA Table 4.27.

Table E-3: Cumulative Increased Impervious Surface Calculations			
Year	**Buckley AFB Increased Impervious Surfaces (Acres)**	**City of Aurora Increased Impervious Surfaces (Acres)**	**Cumulative Increased Impervious Surfaces (Acres)**
2002	29	452	481
2003	41	1,121	1,162
2004	75	1,681	1,756
2005	23	2,242	2,265
2006	3	2,802	2,805
2007	13	3,363	3,376
2008	3	3,923	3,926
2009	38	4,483	4,521
2010	0	5,044	5,044
2011	27	5,604	5,632
2012	2	6,165	6,167
Beyond 2012	69	6,725	6,794
Totals	**323**	**43,605**	**43,928**

Updated from CIP EA Table 4.28

Buckley AFB Expansion Estimates - Impervious Surfaces (continued)

Table E-4: Cumulative Increased Storm Water Loading Calculations			
Year	**Buckley AFB Increased Storm Water Loading (Million Gallons)**	**City of Aurora Increased Storm Water Loading (Million Gallons)**	**Cumulative Increase in Increased Storm Water Loading (Million Gallons)**
2002	11.91	187	199
2003	17.05	464	481
2004	30.84	696	727
2005	9.59	928	937
2006	1.39	1,160	1,161
2007	5.40	1,391	1,397
2008	1.30	1,623	1,625
2009	15.57	1,855	1,871
2010	-0.03	2,087	2,087
2011	11.32	2,319	2,330
2012	0.80	2,551	2,552
Beyond 2012	28.54	2,783	2,811
Totals	**134**	**18,044**	**18,178**

Updated from CIP EA Table 4.29

Buckley AFB Expansion Estimates – Cumulative Utilities Calculations

Table E-5: Cumulative Electrical Demand Increases			
Year	**Buckley AFB Electrical Demand Increase (kWh)**	**City of Aurora Construction Electrical Demand Increase (kWh)**	**Total Cumulative Electrical Demand Increase (kWh)**
2002	10,733,252	612,846,000	623,579,252
2003	14,396,347	1,471,284,000	1,485,680,347
2004	30,328,124	2,206,926,000	2,237,254,124
2005	13,881,556	2,942,568,000	2,956,449,556
2006	7,241,723	3,678,210,000	3,685,451,723
2007	12,970,324	4,413,852,000	4,426,822,324
2008	2,389,115	5,149,494,000	5,151,883,115
2009	8,630,832	5,885,136,000	5,893,766,832
2010	3,781,267	6,620,778,000	6,624,559,267
2011	12,250,504	7,356,420,000	7,368,670,504
2012	2,741,954	8,092,062,000	8,094,803,954
Beyond 2012	22,574,070	8,827,704,000	8,850,278,070
Totals	**141,919,068**	**57,257,280,000**	**57,399,199,068**

Updated from CIP EA Table 4.18

Table E-6: Cumulative Natural Gas Demand Increases			
Year	**Buckley AFB Natural Gas Demand Increase (kWh)**	**City of Aurora Construction Natural Gas Demand Increase (kWh)**	**Total Cumulative Natural Gas Demand Increase (kWh)**
2002	16	681	697
2003	21	1,635	1,656
2004	45	2,452	2,497
2005	20	3,270	3,290
2006	11	4,087	4,098
2007	19	4,904	4,923
2008	4	5,722	5,725
2009	13	6,539	6,552
2010	6	7,356	7,362
2011	18	8,174	8,192
2012	4	8,991	8,995
Beyond 2012	33	9,809	9,842
Totals	**210**	**63,619**	**63,829**

Updated from CIP EA Table 4.19

Buckley AFB Expansion Estimates - Cumulative Utilities Calculations (continued)

Table E-7: Heating and Hot Water Unit Air Emissions										
Year	Emissions Generated from Operation of Heating, Hot Water and Air Conditioning Units (Tons/Year)									
	Hydrocarbons		NOx		SO_2		CO		PM_{10}	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
2002	0.04	0.04	0.79	0.79	0.00	0.00	0.67	0.67	0.06	0.06
2003	0.06	0.10	1.06	1.85	0.01	0.01	0.89	1.56	0.08	0.14
2004	0.12	0.23	2.24	4.09	0.01	0.02	1.88	3.44	0.17	0.31
2005	0.06	0.28	1.02	5.12	0.01	0.03	0.86	4.30	0.08	0.39
2006	0.03	0.31	0.53	5.65	0.00	0.03	0.45	4.75	0.04	0.43
2007	0.05	0.36	0.96	6.61	0.01	0.04	0.80	5.55	0.07	0.50
2008	0.01	0.37	0.18	6.79	0.00	0.04	0.15	5.70	0.01	0.52
2009	0.04	0.41	0.64	7.42	0.00	0.04	0.54	6.24	0.05	0.56
2010	0.02	0.42	0.28	7.70	0.00	0.05	0.23	6.47	0.02	0.59
2011	0.05	0.47	0.90	8.61	0.01	0.05	0.76	7.23	0.07	0.65
2012	0.01	0.48	0.20	8.81	0.00	0.05	0.17	7.40	0.02	0.67
TBD[3]	0.09	0.58	1.67	10.48	0.01	0.06	1.40	8.80	0.13	0.80
Cumulative Totals	**0.58**	**0.58**	**10.48**	**10.48**	**0.06**	**0.06**	**8.80**	**8.80**	**0.80**	**0.80**

Updated from CIP EA Table 4.3

Buckley AFB Expansion Estimates - Water Use

Table E-8: Construction and Demolition Water Suppression Consumption			
Year	**Water Required for Construction Projects (Gallons)**	**Water Required for Demolition Projects (Gallons)**	**Total (Gallons)**
2002	7,840,097	0	7,840,097
2003	9,073,522	6,612	9,080,134
2004	6,089,438	525,350	6,614,788
2005	9,434,143	133,060	9,567,204
2006	172,314	1,608,835	1,781,149
2007	3,156,541	1,972,083	5,128,624
2008	1,104,665	18,944	1,123,609
2009	7,417,231	25,335	7,442,567
2010	2,862,971	19,129	2,882,100
2011	10,909,957	10,180	10,920,137
2012	1,742,383	106,467	1,848,851
Beyond 2012	10,933,001	12,434,846	23,367,847
Totals	**70,736,263**	**16,860,842**	**87,597,104**

Updated from CIP EA Table 4.12

Table E-9: Finished Building Operational Water Consumption		
Year	**Water Required for Human Consumption (Million Gallons)**	
	Annual	**Cumulative**
2002	1.716	1.716
2003	2.301	4.017
2004	4.848	8.866
2005	2.219	11.085
2006	1.158	12.243
2007	2.074	14.316
2008	0.382	14.698
2009	1.380	16.078
2010	0.604	16.682
2011	1.958	18.641
2012	0.438	19.079
Beyond 2012	3.609	22.688
Totals	**22.688**	**22.688**

Updated from CIP EA Table 4.13

Buckley AFB Expansion Estimates - Water Use (continued)

Table E-10: Irrigation Water Consumption			
Year	**Area Requiring Irrigation**	**Annual Water Required for Irrigation (Million Gallons)**	**Cummulative Water Required for Irrigation (Million Gallons)**
2002	0.924	0.990	0.990
2003	4.856	5.205	6.196
2004	1.727	1.851	8.047
2005	11.391	12.210	20.257
2006	5.289	5.669	25.926
2007	0.609	0.653	26.579
2008	2.159	2.314	28.893
2009	4.397	4.713	33.606
2010	7.530	8.071	41.676
2011	9.823	10.529	52.205
2012	0.251	0.269	52.475
Beyond 2012	2.651	2.841	55.316
Totals	**51.607**	**55.316**	**55.316**

Updated from CIP EA Table 4.14

Table E-11: Cumulative Water Consumption			
Year	**Buckley AFB Cumulative Water Increase (Million Gallons)**	**City of Aurora Construction Water Increase (Million Gallons)**	**Total Cumulative Water Increase (Million Gallons)**
2002	11	842	852
2003	18	1,743	1,761
2004	32	2,614	2,646
2005	24	3,486	3,510
2006	9	4,357	4,366
2007	6	5,229	5,235
2008	4	6,100	6,104
2009	14	6,972	6,985
2010	12	7,843	7,855
2011	24	8,714	8,738
2012	3	9,586	9,588
Beyond 2012	18	10,457	10,475
Totals	**173**	**67,943**	**68,116**

Updated from CIP EA Table 4.16

Buckley AFB Expansion Estimates - Solid Waste

Table E-12: Construction and Demolition Waste Generation - Proposed Action		
Year	**Construction and Demolition Solid Waste Generation (Tons)**	**Percent of Total Waste Received by Denver-Arapahoe Disposal Site Landfill**
2002	8,469	0.37%
2003	20,284	0.89%
2004	509	0.02%
2005	50,030	2.19%
2006	648	0.03%
2007	16,341	0.72%
2008	899	0.04%
2009	118,595	5.20%
2010	50,298	2.21%
2011	26,022	1.14%
2012	71,653	3.14%
Beyond 2010	3,801	0.17%
Totals	**367,550**	**16.12%**

Updated from CIP EA Table 4.15

Table E-13: Cumulative Solid Waste Generation			
Year	**Buckley AFB Cumulative Solid Waste Generation Increase (Tons)**	**City of Aurora Construction Solid Waste Generation Increase (Tons)**	**Total Cumulative Solid Waste Generation Increase (Tons)**
2002	10,088	110,632	120,720
2003	21,902	261,105	283,007
2004	2,128	391,657	393,785
2005	51,648	522,210	573,858
2006	2,266	652,762	655,029
2007	17,959	783,315	801,274
2008	2,518	913,867	916,385
2009	120,214	1,044,420	1,164,634
2010	51,916	1,174,972	1,226,889
2011	27,641	1,305,525	1,333,165
2012	73,272	1,436,077	1,509,349
Beyond 2012	5,419	1,566,630	1,572,049

Updated from CIP EA Table 4.17

Buckley AFB Expansion Estimates - Solid Waste (continued)

Table E-14: Construction/Demolition Debris Handling Traffic - Proposed Action			
Year	**Weight of Debris Generated (tons)**	**Volume of Debris Generated (yd^3)**	**Number of Truck Trips Required**
2002	8,469	3,826	174
2003	20,284	11,216	510
2004	509	278	13
2005	50,030	27,692	1,259
2006	648	360	16
2007	16,341	9,035	411
2008	899	499	23
2009	118,595	382	17
2010	50,298	26,286	1,195
2011	26,022	14,408	655
2012	71,653	40,156	1,825
Beyond 2012	3,801	2,109	96
Totals	**367,550**	**136,248**	**6,193**

Updated from CIP EA Table 4.23

Buckley AFB Expansion Estimates - Cumulative Traffic and Emissions

Table E-15: Construction and Demolition Vehicles Entering the South Gate			
Year	**Construction and Demolition Contractor Employee Traffic (Vehicles/Day)**	**Construction and Demolition Delivery Traffic (Vehicles/Day)**	**Total (Vehicles/Day)**
2002	10	40	50
2003	28	112	140
2004	32	128	160
2005	32	128	160
2006	14	56	70
2007	32	128	160
2008	14	56	70
2009	40	160	200
2010	10	40	50
2011	26	104	130
2012	22	88	110
Beyond 2012	44	176	220
Totals	**304**	**1,216**	**1,520**

Updated from CIP EA Table 4.25

Table E-16: New Personal Vehicle Pollutant Emissions						
	Emissions Generated from New Personal Vehicles (Tons/Year)					
	Hydrocarbons		**NOx**		**CO**	
Year	**Annual**	**Cumulative**	**Annual**	**Cumulative**	**Annual**	**Cumulative**
2002	1.48	1.48	1.48	1.48	31.04	31.04
2003	1.98	3.46	1.98	3.46	41.63	72.67
2004	4.18	7.64	4.18	7.64	87.71	160.38
2005	1.91	9.55	1.91	9.55	40.14	200.52
2006	1.00	10.55	1.00	10.55	20.94	221.47
2007	1.79	12.33	1.79	12.33	37.51	258.97
2008	0.33	12.66	0.33	12.66	6.91	265.88
2009	1.19	13.85	1.19	13.85	24.96	290.84
2010	0.52	14.37	0.52	14.37	10.94	301.78
2011	1.69	16.06	1.69	16.06	35.43	337.21
2012	0.38	16.44	0.38	16.44	7.93	345.14
TBD[3]	3.11	19.54	3.11	19.54	65.28	410.42
Cumulative Totals	**19.54**	**19.54**	**19.54**	**19.54**	**410.42**	**410.42**

Updated from CIP EA Table 4.4

Buckley AFB Expansion Estimates - Cumulative Traffic and Emissions (continued)

Table E-17: Construction and Demolition Project Emissions					
	Emissions Generated from Construction and Demolition Site Disturbance Activities (Tons/Year)				
Year	**VOC**	**NOx**	**SO_2**	**CO**	**PM_{10}**
2002	1	4	0	10	13
2003	5	26	3	73	40
2004	11	37	4	112	32
2005	20	57	6	156	139
2006	11	39	4	114	32
2007	6	31	3	82	43
2008	10	50	5	144	26
2009	6	30	3	82	60
2010	3	15	1	36	8
TBD*	1	9	0	13	26
Cumulative Totals	**74**	**298**	**29**	**822**	**419**

Updated from CIP EA Table 4.2

Buckley AFB Expansion Estimates - Cumulative Traffic and Emissions (continued)

Table E-18: Proposed Action Air Emission Totals										
Year	Emissions (Tons/Year)									
	Hydrocarbons		NOx		SO_2		CO		PM_{10}	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
2002	2.52	2.52	6.27	6.27	0.00	0.00	41.71	41.71	13.06	13.06
2003	7.04	9.56	29.05	35.32	3.01	3.01	115.53	157.23	40.08	53.14
2004	15.30	24.86	43.42	78.73	4.01	7.02	201.59	358.82	32.17	85.31
2005	21.97	46.83	59.94	138.67	6.01	13.03	197.00	555.82	139.08	224.39
2006	12.03	58.86	40.53	179.20	4.00	17.03	135.39	691.21	32.04	256.43
2007	7.84	66.70	33.74	212.94	3.01	20.04	120.31	811.53	43.07	299.50
2008	10.34	77.03	50.51	263.45	5.00	25.04	151.06	962.58	26.01	325.52
2009	7.22	84.26	31.83	295.27	3.00	28.04	107.49	1,070.08	60.05	385.56
2010	3.54	87.79	15.80	311.07	1.00	29.05	47.17	1,117.25	8.02	393.59
TBD[3]	4.20	91.99	13.77	324.85	0.01	29.06	79.68	1,196.93	26.13	419.71
Cumulative Totals	**91.99**	**550.41**	**324.85**	**1,845.76**	**29.06**	**171.33**	**1,196.93**	**6,963.16**	**419.71**	**2,456.21**

Updated from CIP EA Table 4.5

APPENDIX F

PAST, PRESENT, AND PLANNED FUTURE BUCKLEY AFB CAPITAL IMPROVEMENT PROJECTS CONSIDERED FOR CUMULATIVE IMPACTS ANALYSES

Table F-1. Past, Present, and Planned Future Buckley AFB Capital Improvement Projects Considered for Cumulative Impacts Analyses

FY	Bldg No.	Project	Project Footprint (ft^2)*
02	1	BX/Commissary (completed)	
02	35	Fitness Center (completed)	54500
02	2	Telluride Gate (completed)	120
02	34	Gas Meter House	379
03	1030	460 SW Headquarters (Completed)	25000
03		ADAL SBIRS Mission Control (Completed)	18000
03	725	Child Development Center 4 room Addition	743
03	1530	Control Tower (COANG) (Completed)	5800
03	960	Engine Shop Addition Bldg 960 (COANG)	2000
03	1019	Entomology (O&M) Replace Entomology Shop (Completed)	2255
03	806	Fire Station Addition (Completed)	21531
03	703	H-70 (Hydrazine) Fuel Storage Facility	1045
03		Golf Driving Range	144
03	n/a	Two Pavilions at Williams Lake (Completed)	60
03	1015 and 1017	Two Warehouses - Civil Engineering. Originally one warehouse.(Completed)	10000
04	830	Civil Engineering Complex (COANG)	37350
04	205	Dormitory II (144 person) (Completed)	28,000
04		East Restricted/Official Use Only Access Point	128
04	17906	Fire Training Facility - (Completed)	3,400 buildings, 41,112 concrete pads
04	n/a	Military Family housing = 71 acres total land (for houses, landscaping, roads etc). Total acreage includes the clubhouse/pool and playgrounds. MFH 734,789 and Clughouse 22,500 sf (Under Construction)	757298
05	1500	Army Aviation Support Facility (COARNG) (Complete)	120000
05	316	Chapel Center (Complete)	26080
05	351	Child Development Center CDCII (Under Construction)	24197
05	n/a	Construct 2 SWS/MCS Force Protection - just installing barriers	
05	600	Medical Clinic ADAL (Completed)	4563
05		Visitor Center Addition and Parking	1000

FY	Bldg No.	Project	Project Footprint (ft^2)*
05		Install two temporary modulars DSOC	33000
06	204	Car Wash (AAFES) 4 bay (Under Construction)	2000
06	1024	Haz Materials Storage (Env. Level 1) HAZMART Pharmacy Construction initiated in 06. (Under Construction)	5457
06	1025	Haz Waste Facility (Env. Level 1) Construction initiated in 06. (Under Construction)	5457
06		Medical (Clinic) Warehouse (Poss construct with '06 funds) (Under Construction)	4000
06	1022	Outdoor Rec Equip Rental (NAF) - originally 05, then awarded 06 (Under Construction)	9310
07	1051	Consolidated Fuels -POL Ops Building	2745
07	1054	Consolidated Fuels -Pump house	1001
07	1053	Consolidated Fuels- Storage Pol Bulk Ops Building	452
07	911	Alert Crew Quarters (COANG)	6500
07	730	Communications Center (ADAL 730) orig 05 - moved to 07	60988
07	347	Consolidated Services Facility Admin	15892
07		Construct ADF Admin Facility	30000
07		Freight Transfer Facility	12000
07	1032	Leadership Development Center (Under Construction)	17631
07		Military Working Dog Kennel	3500
07	701	Squadron Ops Facility (COANG)	22950
07	332	Temporary Lodging Facility (NAF) Originally 03	69434
07	331	Visitors Quarters	39568
07	350	Youth Center (NAF) 06 MILCON project	28586
07		926th Security Forces Squadron	9376
08	n/a	Athletic Fields Concession (NAF)	1399
08	1540	BITC Mailroom	4000
09		NSA CSS, was '08	500000
09	208	Satellite Pharmacy	6000
10		Bowling Center and Community Activities (Peterson)_	5274
10	1026	Logistics Readiness Complex - now states in clear zone	24650
11		Visitors Center (6th Ave)	1000
11		Arts, Crafts, Auto Skills Development Ctr	11119
11	345	Education Center/Library	23605

FY	Bldg No.	Project	Project Footprint (ft^2)*
12	35	Fitness Center ADAL (estimate based on existing swimmint pool at Peterson AFB)	36000
12	807	SF Operations Facility -	35000
12	1027	Vehicle Maintenance Facility - (joint COANG)	37717
14		Fire/Crash Rescue Station	23000
15		6th Ave Entry Gate. Was'11	9528
15	805	ADAL Weapons Release Complex (ADAL COANG).	4000
15	1023	Consolidated Base Warehouse Originally 08	50000
15		Entry Control Facility (upgrade-was 08)	14391
15		Mississippi Entry Gate	9709
15	1600	Small Arms Range Indoor Arm Range - indoor with outdoor grenade launcher (originally 06)	23735
15		Telluride Entry Gate	6107
15		Weapons Loading Training Facility (COANG)	10000
16		Dormitory 3 (96 PN)	40000
16	447	Spaced Based Infrared (SBIR) Operational Support Facility Originally 09.	94940
16	447	Spaced Based Infrared (SBIR) Remote Ground Station. Was FY'11	20451
16		Upgrade Weapons Live Load Area (COANG)	10000
TBD		Expand Bldg 700 (COANG)	

Note: * Project footprint does not include disturbance due to construction; such as, laydown areas and generally doesn't include parking lots

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