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14. ABSTRACT

The U.S. Air Force proposes to construct a Space Innovation and Development Center (SIDC). Pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing procedural provisions of NEPA, the Department of Defense gives notice that an environmental assessment (EA) was prepared for the proposed construction of the SIDC at Schriever AFB. The EA is attached and incorporated by reference to the Finding of No Significant Impact (FONSI) document, which was signed on 29 March 2006.

15. SUBJECT TERMS

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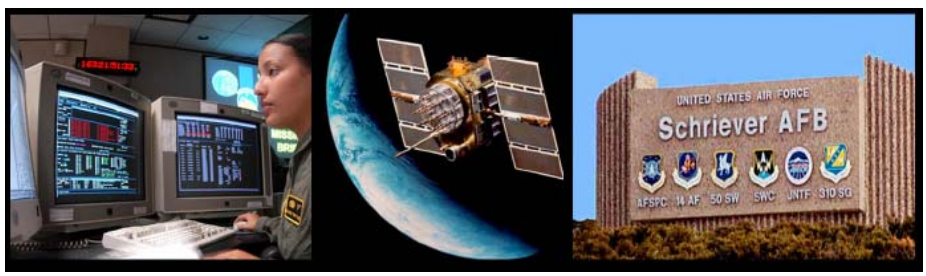
Schriever AFB, Colorado

Final Environmental Assessment Space Innovation and Development Center



March 2006

COVER SHEET

Agency: U.S. Air Force

Title: Construct Space Innovation and Development Center (SIDC) at Schriever Air Force Base, Colorado

Date: March 2006

Contact: 50 CES/CEV, Mr. Albert Fernandez, 500 O'Malley Avenue, Suite 19, Schriever Air Force Base, Colorado, 80912-5019. Telephone (719) 567-4026

Designation: Final Environmental Assessment (EA)

Abstract: This Final EA was prepared in accordance with the *National Environmental Policy Act* (NEPA) of 1969, as amended. The SIDC mission (formerly the Space Warfare Center [SWC] and Space Test and Evaluation Facility [STEF]) currently operates out of five separate facilities, including temporary facilities and a downtown facility. As a result of a mission change at the Joint National Integration Center on Schriever AFB, where the SIDC currently utilizes 75,000 square feet of space, Air Force officials determined that a new facility would be constructed for use by the SIDC. The Proposed Action is to construct a new SIDC outside of the Restricted Area near the corner of Enoch Road and Irwin Avenue. An alternative site location was considered and was assessed in the EA. The following paragraphs provide a brief discussion of the findings.

Construction of the SIDC would have short-term, but not significant impacts on air quality. The proposed project conforms to the State Implementation Plan and is exempt from further conformity review. While the base could become a major source of criteria pollutants, they would remain below the thresholds for Prevention of Significant Deterioration review requirements.

Topography and soils would be directly impacted from grading, excavation, and compaction by equipment during construction. About 10 acres of soil would be disturbed for construction and exposed to potential erosion by wind and water. Best management practices such as daily watering and revegetating the site after construction would reduce the risk of erosion. Impacts to soils and topography would not be significant.

Construction of the SIDC would not disturb the unconfined surficial aquifer. Impacts to surface water from erosion or storm water runoff would not be significant. No long-term impacts to water resources were identified from water usage or storm water flow.

Impacts to biological resources would result from construction activities associated with excavation and grading for the SIDC. Approximately 10 acres of vegetative cover would be removed. No critical habitat, threatened or endangered

species, or wetlands would be affected by the construction. Prior to construction, base personnel would conduct a survey to identify any prairie dog dens and burrowing owls. If owls are located in the project area, construction would be postponed until after the last owls have abandoned their nests.

Impacts from the resource areas described above were evaluated to determine if they would disproportionately impact any minority populations, low-income populations, or children. No significant environmental justice impacts were identified.

No significant cumulative impacts were identified during the analysis.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES ..... **iii**

LIST OF TABLES ..... **iv**

ACRONYMS ..... **v**

1. PURPOSE AND NEED FOR ACTION **1-1**
1.1 INTRODUCTION 1-1
1.2 PURPOSE OF AND NEED FOR ACTION 1-1
1.3 LOCATION OF SCHRIEVER AFB AND THE ALTERNATIVES 1-2
1.4 PUBLIC REVIEW PROCESS 1-2

1. ALTERNATIVES INCLUDING THE PROPOSED ACTION **2-1**
2.1 ALTERNATIVE 1 – NO ACTION ALTERNATIVE 2-1
2.2 ALTERNATIVE 2 – PROPOSED ACTION ENOCH ROAD AND IRWIN AVE 2-1
2.3 SITING ALTERNATIVE 2-4
2.3.1 ALTERNATIVE 3 – NAVSTAR STREET AND BELTWAY 2-4
2.4 ALTERNATIVE CONSIDERED, BUT ELIMINATED FROM FURTHER CONSIDERATION 2-5

3. AFFECTED ENVIRONMENT **3-1**
3.1 AIR RESOURCES 3-2
3.1.1 Climate and Meteorology 3-3
3.1.2 Air Quality Standards 3-3
3.1.3 Air Pollutant Sources 3-5
3.1.4 Regional Air Quality 3-7
3.2 GEOLOGICAL RESOURCES 3-8
3.2.1 Geology and Topography 3-8
3.2.2 Soils 3-9
3.3 WATER RESOURCES 3-10
3.3.1 Groundwater 3-10
3.3.2 Surface Water 3-11
3.3.3 Floodplains 3-12
3.4 BIOLOGICAL RESOURCES 3-14
3.4.1 Vegetation 3-14
3.4.2 Wildlife 3-16
3.4.3 Natural Communities and Rare, Threatened or Endangered Plants and Animals 3-16
3.4.4 Wetlands 3-17
3.4.5 Noxious Weeds 3-19
3.5 ENVIRONMENTAL JUSTICE 3-20
3.6 SAFETY 3-21
3.6.1 Traffic Safety 3-21
3.6.2 Radiofrequency Radiation 3-21

4. ENVIRONMENTAL CONSEQUENCES....4-1
4.1 AIR RESOURCES....4-1
4.1.1 Analysis Methods....4-1
4.1.2 Potential Impacts of Alternative 1 – No Action Alternative....4-2
4.1.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-2
4.1.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-6
4.2 GEOLOGICAL RESOURCES....4-6
4.2.1 Analysis Methods....4-6
4.2.2 Potential Impacts of Alternative 1 – No Action Alternative....4-7
4.2.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-7
4.2.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-9
4.3 WATER RESOURCES....4-9
4.3.1 Analysis Methods....4-9
4.3.2 Potential Impacts of Alternative 1 – No Action Alternative....4-10
4.3.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-10
4.3.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-12
4.4 BIOLOGICAL RESOURCES....4-12
4.4.1 Analysis Methods....4-12
4.4.2 Potential Impacts of Alternative 1 – No Action Alternative....4-13
4.4.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-13
4.4.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-14
4.5 ENVIRONMENTAL JUSTICE....4-14
4.5.1 Analysis Methods....4-15
4.5.2 Potential Impacts of Alternative 1 – No Action Alternative....4-15
4.5.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-15
4.5.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-15
4.6 SAFETY....4-15
4.6.1 Analysis Methods....4-16
4.6.2 Potential Impacts of Alternative 1 – No Action Alternative....4-16
4.6.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue....4-16
4.6.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway....4-17
4.7 COMPATIBILITY OF THE PROPOSED ACTION WITH OBJECTIVES OF FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS....4-17
4.8 RELATIONSHIPS BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY....4-17
4.9 CUMULATIVE IMPACTS....4-18
4.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES....4-18

5. REGULATORY REVIEW AND PERMIT REQUIREMENTS....5-1
5.1 FEDERAL AND STATE LAWS AND REGULATIONS....5-1
5.2 PERMIT REQUIREMENTS....5-3
6. AGENCIES AND PERSONS CONTACTED....6-1

7. LIST OF PREPARERS 7-1
8. REFERENCES CITED 8-1

APPENDICES

APPENDIX A Agency Consultation A-1
APPENDIX B Air Emission Calculations B-1
APPENDIX C Site Photographs C-1
APPENDIX D AF Form 813 ..... D-1

LIST OF FIGURES

1.1 General Location of Schriever AFB 1-3
1.2 Proposed and Alternative Locations for the SIDC 1-4
2.1 Proposed Space Test and Evaluation Facility and Utilities 2-3
3.1 Water Features in the Project Area 3-13
3.2 CNHP Potential Conservation Areas in El Paso County 3-15
3.3 Prairie Dog Management at Schriever AFB 3-18

LIST OF TABLES

3.1-1 NAAQS and CAAQS 3-4
3.1-2 Installation-Wide 2002 Air Pollutant Emissions at Schriever AFB 3-7
3.4-1 Invasive Species Found on Schriever AFB 3-20
3.5-1 Census 2000 Characteristics 3-22
4.1-1 Air Pollutant Generation from Construction 4-3
4.1-2 Estimated Stationary Emissions from Proposed Action with Emergency Generators 4-3
4.1-3 Stationary Emissions from the Proposed Action Without Emergency Generators 4-4

ACRONYMS AND ABBREVIATIONS

ACRONYMS/ABBREVIATIONS

AAFES	Army Air Force Exchange Service
AAM	Annual arithmetic mean
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AFTENCAP	Air Force Tactical Exploitation of National Capabilities
APEN	Air Pollutant Emissions Notice
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
ASIF	Air and Space Integration Facility
CAA	Clean Air Act
CAAQS	Colorado Ambient Air Quality Standards
CCR	Colorado Code of Regulations
CEQ	Council on Environmental Quality
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CNHP	Colorado Natural Heritage Program
CO	Carbon monoxide
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EMR	Electromagnetic radiation
EO	Executive Order
°F	Degrees Fahrenheit
FY	Fiscal year
GHz	Gigahertz
HAP	Hazardous air pollutants
Hz	Hertz
JNIC	Joint National Integration Center
MHz	Megahertz
MSL	Mean sea level
mW/m^2	milliwatts per square meter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NWS	National Weather Service
O_3	Ozone
Pb	Lead
PEL	Permissible exposure limit
PM_{10}	Particulate matter 10 microns in diameter
$PM_{2.5}$	Particulate matter 2.5 microns in diameter
ppm	Parts per million
PSD	Prevention of significant deterioration
RFR	Radio frequency radiation
SIDC	Space Innovation and Development Center
SIP	State Implementation Plan
SO_x	Sulfur oxide
SO_2	Sulfur dioxide
STEF	Space Test and Evaluation Facility
SWC	Space Warfare Center
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USBC	United States Bureau of Census
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOCs	Volatile organic compounds
XR	Planning
W/m^2	Watts per square meter
$\mu g/m^3$	micrograms per cubic meter

CHAPTER 1

PURPOSE AND NEED FOR ACTION

1. PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Air Force proposes to support the requirements of the Space Innovation and Development Center (SIDC), formerly the Space Warfare Center (SWC) and Space Test and Evaluation Facility (STEF) by constructing a new facility at Schriever Air Force Base (AFB). The SIDC is Air Force Space Command's lead agency for space innovation. The SIDC mission is to advance America's space capabilities and employment concepts through tactics development, testing, analysis, and training programs. The *National Environmental Policy Act* (NEPA) of 1969, as amended, requires Federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA that include provisions for both the content and procedural aspects of the required environmental analysis. The Air Force is preparing this environmental assessment (EA) through adherence to procedures set forth in the CEQ regulations (Title 40 Code of Federal Regulations (CFR) 1500-1508) and 32 CFR 989, 15 Jul 99, and amended 01 Jun 2001 (*Air Force Environmental Impact Analysis Process*). These Federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation, designed to ensure deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. This EA provides an analysis of potential environmental consequences that could result from construction of the SIDC.

The remainder of this section describes the purpose of and need for the action and the location of the project area.

1.2 PURPOSE OF AND NEED FOR ACTION

The SIDC currently operates out of five separate facilities. They operate out of a temporary facility on base (T-609), Buildings 440 and 442 on base, a downtown facility, and 75,000 square feet of the Joint National Integration Center (JNIC) facility on Schriever AFB. The missions of the JNIC and SIDC were intermingled; however, the events of September 11, 2001 identified a major shift in mission for both the JNIC and the SIDC. As a result of the JNIC mission change, they have notified the SIDC that they need to recall this 75,000 square feet of space.

The Air Force reviewed existing facilities on Schriever AFB and nearby Peterson AFB and did not identify any that could accommodate the 537 personnel who support the SIDC mission. The Air Force is integrating elements of the SIDC with the Air Warfare Center at Nellis AFB, but no physical movement of units or closing of facilities is planned (USAF, 2005a). The search was limited to Schriever and Peterson AFBs because of the number of highly specialized personnel already in the area that support the SIDC mission. The SIDC mission requires a facility with adequate floor space to accommodate varied users which include the:

- Command Section
- Space BattleLab
- 595th Space Group
- 14th and 17th Test Squadrons

- 26/527th Space Aggressor Squadrons
- 595th Operations Support Squadron
- Air Force Tactical Exploitation of National Capabilities (AFTENCAP)
- Planning (XR)
- 25th Space Control Tactics Squadron

The SIDC also requires secure, reliable, and adequate communication connectivity to multiple users to allow for the full integration of space assets conducting developmental and operational concept tests and analysis.

As listed in the Requirements Document for the SIDC, the site selection criteria that were used to identify the available sites for the SIDC included:

• If available, use an existing facility on Schriever or Peterson AFBs that is large enough to accommodate all the SIDC personnel scattered throughout five facilities into one facility

• The site should be outside of the Restricted Area in accordance with the base mission to move non-direct mission and/or non-emergency key essential personnel out of the Restricted Area

• Sufficient available open space

• The new facility should be easily accessible from the North and West gates without constricting traffic into the Restricted Area

• The new facility should provide sufficient parking to accommodate all authorized personnel and allow for expansion of future facilities

• The new facility should provide the least disruption to daily base functions

1.3 LOCATION OF SCHRIEVER AFB AND THE ALTERNATIVES

Schriever AFB, located approximately 10 miles east of Peterson AFB, was established in the mid-1980s (initially as Falcon AFB). The base consists of a secure area (640 acres) surrounded by a buffer two miles by three miles (a total of 3,840 acres). The base is accessed from Colorado Highway 94 via Enoch Road, or from Bradley Road via Irwin Road. Schriever AFB is surrounded by grasslands and ranches in a sparsely populated setting. Figure 1.1 shows the general location of Schriever AFB.

The proposed location for the SIDC is on the northwest corner of Enoch Road and Irwin Avenue, outside the restricted area (see Figure 1.2). The main part of the base lies directly east of the proposed site. To the south is an open area with no current plans for development, to the north is the Main Gate visitors pass and identification center, and to the west is Air Force property that is scheduled for future development.

Alternative locations considered were on the corner of Beltway and Irwin and Navstar and Beltway.

1.4 PUBLIC REVIEW PROCESS

Scoping was conducted with representatives from Schriever AFB and Federal, state, and local agencies. Scoping letters and a copy of the Description of the Proposed Action and Alternatives were sent to the agencies listed in Section 6. Responses received from the agencies and a sample scoping letter are provided in Appendix A.

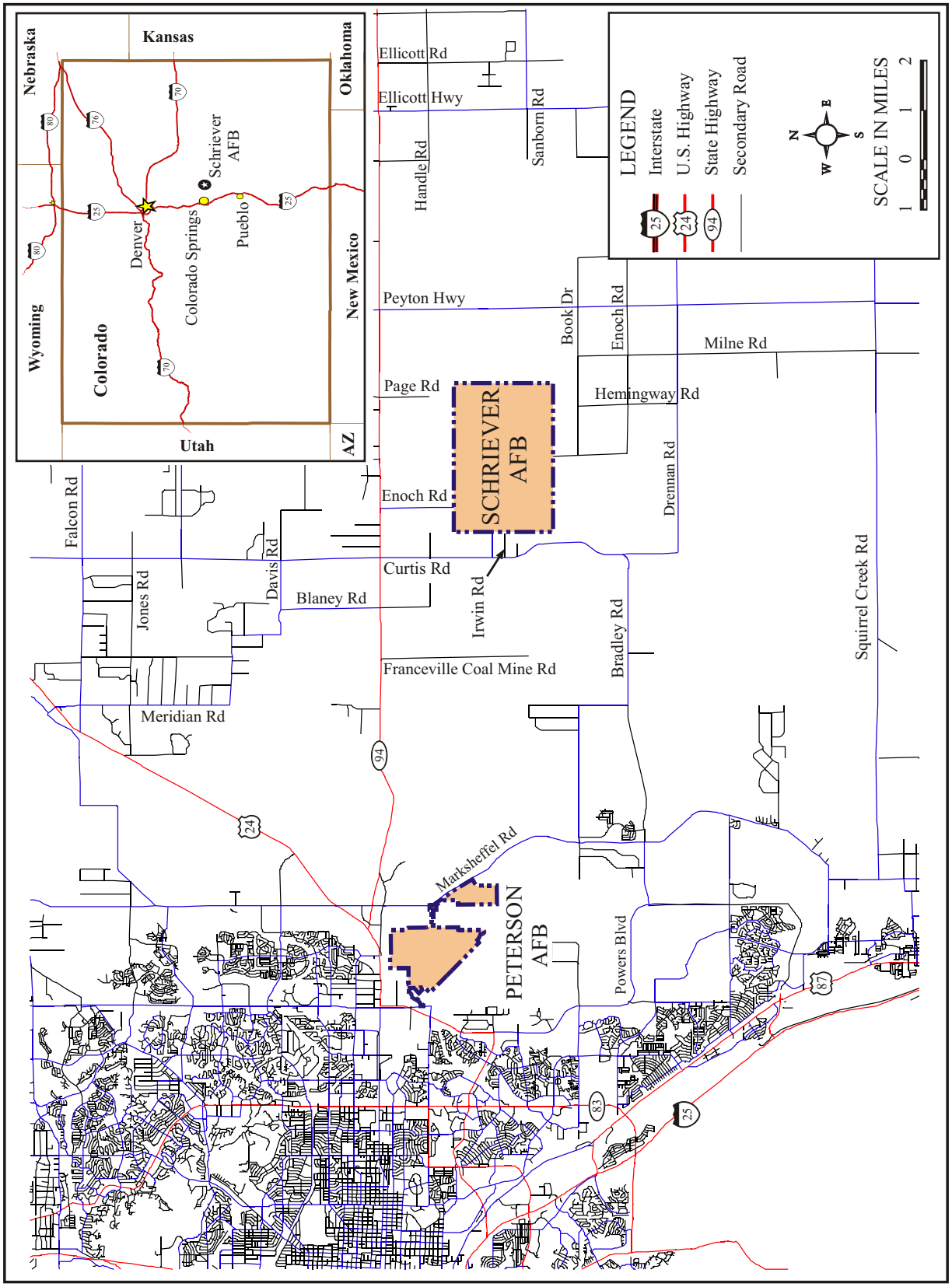


Figure 1.1 General Location of Schriever AFB

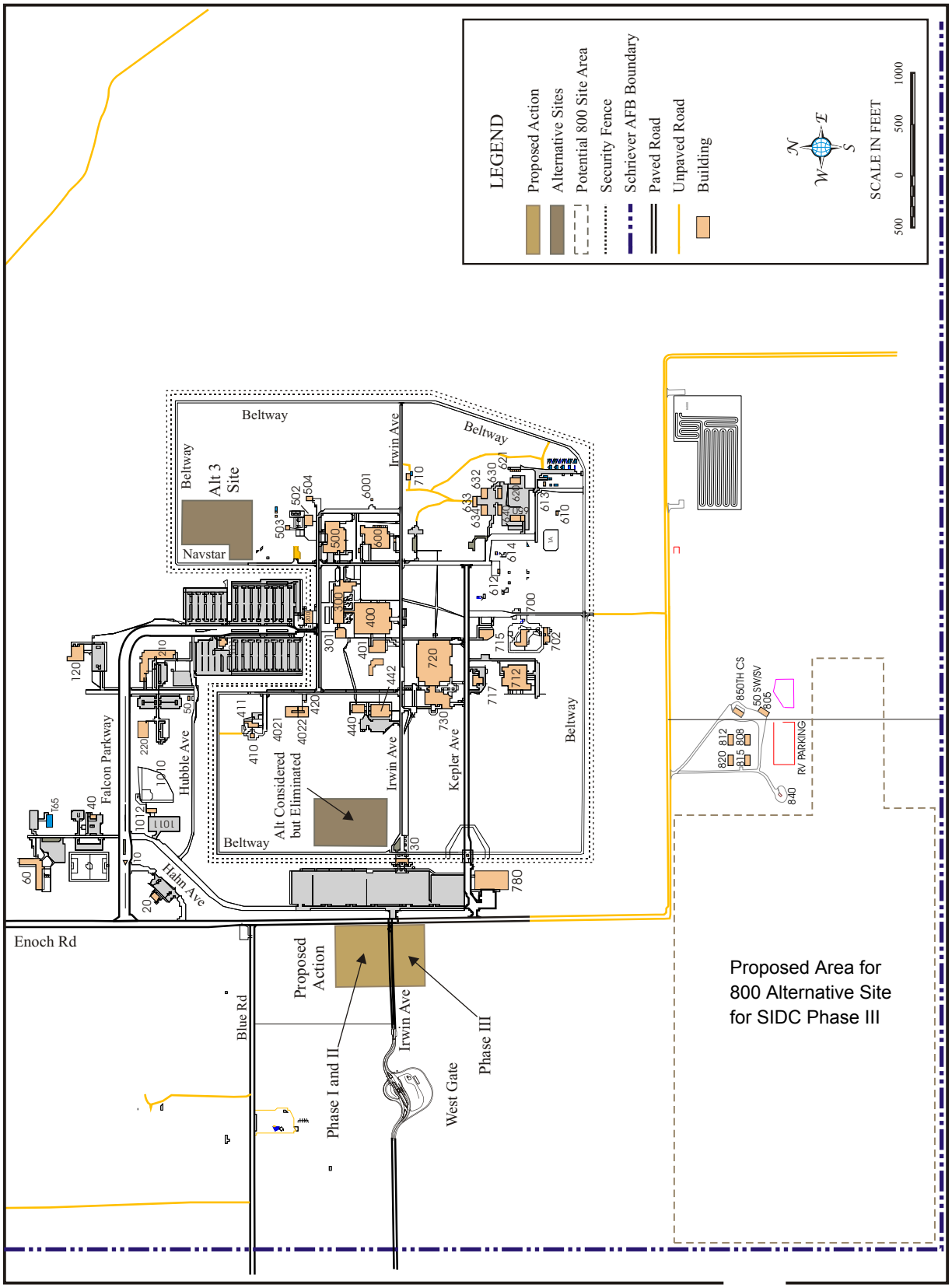


Figure 1.2 Proposed and Alternative Locations for the SIDC

CHAPTER 2

DESCRIPTION OF THE ALTERNATIVES INCLUDING THE PROPOSED ACTION

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes three alternatives: the No Action Alternative, the Proposed Action, and an alternative site location. An additional alternative was considered, but eliminated from further consideration.

2.1 ALTERNATIVE 1 — NO ACTION ALTERNATIVE

Under the No Action Alternative, a new facility for the SIDC would not be constructed. The SIDC has been notified that they need to vacate the JNIC facility; therefore, they would have to operate out of temporary trailer facilities. The classification level and extensive communication links of certain SIDC efforts require a permanent facility and are not possible to pursue in temporary structures. Operating the SIDC mission out of temporary facilities would result in a degradation of mission accomplishment. If a permanent facility is not constructed prior to the SIDC relocation from the JNIC facility, efforts such as XI's Aerospace Fusion Center and the Space and Air Integration Facility will not be able to continue operations.

2.2 ALTERNATIVE 2 — PROPOSED ACTION ENOCH ROAD AND IRWIN AVENUE

The new facility for the SIDC mission would be constructed in three phases. Phase I is currently planned for Fiscal Year (FY) 07and Phase II for FY 08. Phase III space requirements are currently being identified and have not yet been validated through the base programming and facilities board.

Phases I and II

The Proposed Action is to construct new facilities outside of the Restricted Area near the corner of Enoch Road and Irwin Avenue (see Figure 2.1 and Photos 1, 2, and 3). The area is currently an open, undeveloped field that was historically used for livestock grazing.

Phase I and II of the proposed facility would consist of a building northwest of Enoch Road and Irwin Avenue. The current plan is for approximately 115,112 square feet, but this could change in the final design process. Phase I would include the main lobby and second floor Headquarters area and a two-story wing off the south end of the facility. In addition to the south wing of the Space Innovation and Development Center (SIDC), Phase I would include supporting utilities, a loading dock, basement storage, pavements, site improvements, exterior communications support, and force protection measures. Phase I would provide space for the SIDC missions currently operating at Schriever AFB including the Command Section, XR, Space BattleLab, 595th Space Group, 14th and 17th Test Squadrons, and 26/527th Space Aggressor Squadrons. Phase II would include a two-story wing off the north end of the SIDC facility, a Space Range Control Center, and supporting utilities, pavements, site improvements, interior communications support, antenna farm on ground separate from facility, and force protection measures. Phase II would provide space for the AFTENCAP, XR, and 25th Space Control Tactics Squadron.

Phase III

Phase III would consist of an office building, a storage facility, and electronic warfare chamber. It is currently estimated that about 25,300 square feet of building space would be constructed. Phase III would also include a parking lot and access road. Two locations are being considered for Phase III, south of Phase I and II near the southwest corner of Enoch Road and Irwin Avenue (see Figure 1.2) and in the "800" area in the southwest part of the base (see Figure 1.2).

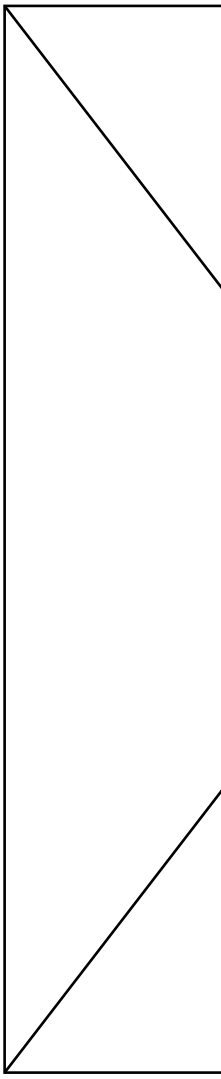
A parking lot adjacent to the new SIDC facility would be constructed to accommodate 50 to 80 percent of personnel. A fire lane would be constructed around the perimeter of the Phase I and II building. Access roads from Irwin Avenue and Blue Road would be constructed as part of the Proposed Action. To meet force protection standards, all parking areas would be a minimum of 82 feet away from any exterior wall of the new facility. About seven acres would be disturbed during site preparation for constructing Phase I and II facilities, parking lots, antenna farms, and access roads. An additional three acres would be disturbed for constructing Phase III facilities, parking lots, and access roads.

Storm water runoff from these sites would consist of surface flow to open drainage along Enoch Road to an outfall near the southern end of Enoch Road. Design measures would be incorporated to reduce the velocity of flow before entering the drainage.

Utilities

New underground utilities would be incorporated into the design to support the facility's mechanical, electrical, plumbing, and fire protection requirements.

- There is an existing underground electrical service east of Enoch Road that originates inside the Restricted Area. The new SIDC would require installation of approximately 1,600 linear feet of underground electrical service. If necessary, an emergency generator would be installed to provide backup power to maintain power to the SIDC.
- There is an existing underground communications network east of Enoch Road that originates inside the Restricted Area. The new SIDC would require installation of approximately 5,500 linear feet of new fiber-optic underground communications service. Micro-boring under Enoch Road would be necessary to connect the existing communications network to the new SIDC facility.
- There is an existing natural gas line that extends from Enoch Road to the West Gate entrance. The new SIDC would require installation of approximately 1,400 linear feet of underground gas service.
- There is a new eight-inch potable water supply line being installed north of the project site. The new SIDC would require installation of approximately 1,600 linear feet of new underground water service.
- There is an existing underground sanitary sewer system. The new SIDC facility would require approximately 3,500 linear feet of new underground sanitary sewer lines.



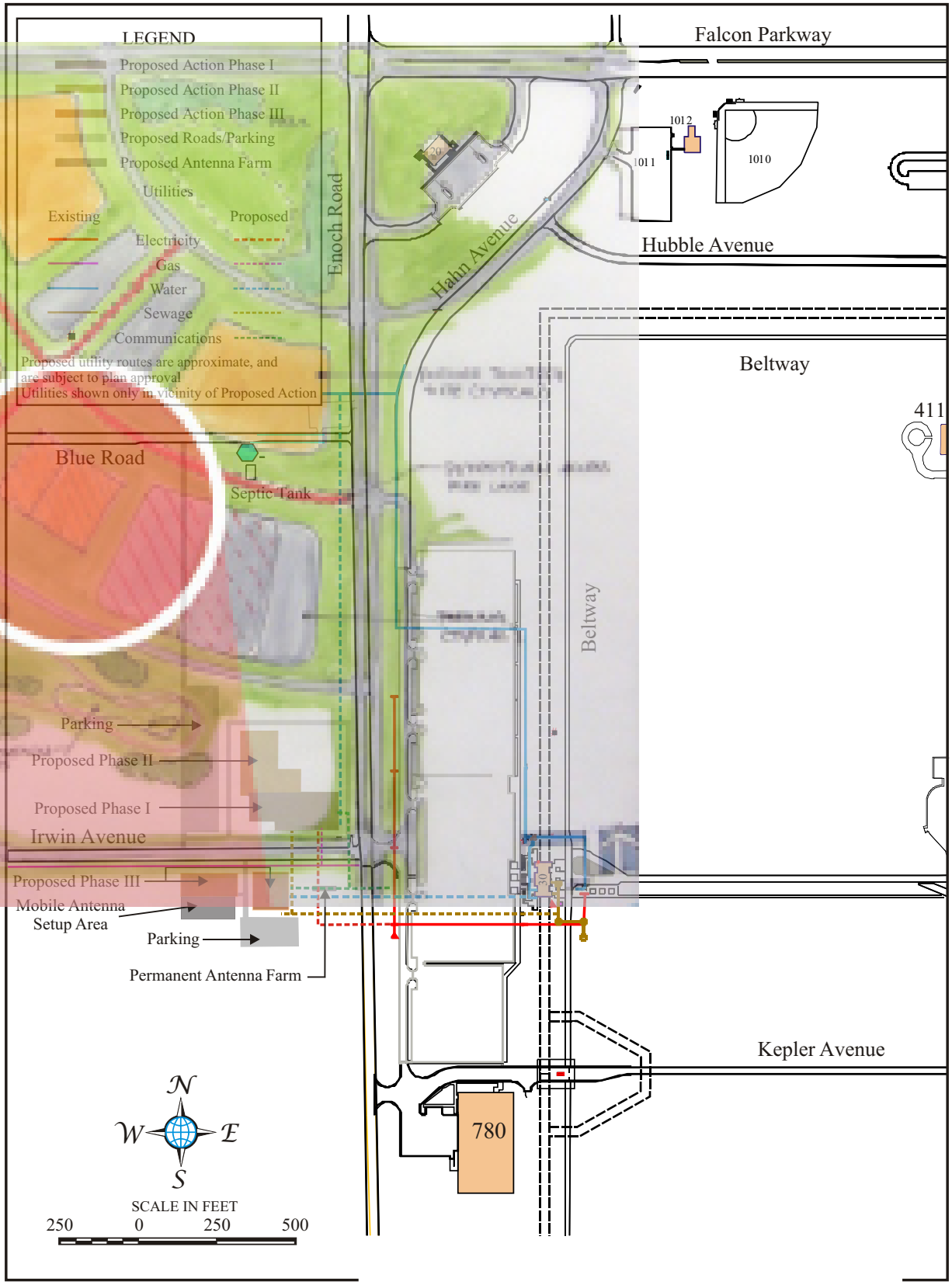


Figure 2.1 Proposed Space Innovation and Development Center and Utilities

About 13,600 linear feet of utilities would be needed to support Phase I and II of the proposed facilities. Additional utilities (several thousand linear feet) would be needed in support of Phase III. Assuming a three foot wide corridor of disturbance for emplacement of utilities, about 1.5 acres would be temporarily disturbed during this process.

Antenna Farm

The existing antennas that support the SIDC mission are located on the roof of the JNIC facility and would be moved to the roof of the new SIDC facility during Phase I. A 3,000 square-foot antenna farm would be built during Phase II outside of the Restricted Area on the southwest corner of Enoch Road and Irwin Avenue just east of the West Gate entrance (see Figure 2.1 and Photos 4 and 5). The antenna farm needs to be in close proximity to the new SIDC building while allowing for necessary safety and operational clearances and distance criteria from the new SIDC and other adjacent facilities. The antenna farm needs to be located in an area with southern sky exposure that is free of buildings and people in order to operate equipment. Communication cables would connect the antenna farm to Phases I and III of the SIDC facilities. About 0.35 acres would be graded to construct the antenna farm.

A mobile antenna setup area (about 12,000 square feet) would be constructed to the south of the Phase III storage facility.

2.3 SITING ALTERNATIVE

Alternatives to constructing a new SIDC facility included the use of existing Schriever AFB facilities, relocation of SIDC operations to Peterson AFB, and alternative site locations on Schriever AFB. No existing facilities were identified on Schriever or Peterson AFBs that could accommodate the 537 personnel currently assigned to support the SIDC mission. The Air Force is integrating elements of the SIDC with the Air Warfare Center at Nellis AFB, but no physical movement of units or closing of facilities is planned (USAF, 2005a). The Air Force is evaluating an additional site for construction of the SIDC inside the Restricted Area on the southeast corner Navstar Street and Beltway. These locations are described in the following paragraphs.

2.3.1 ALTERNATIVE 3 — NAVSTAR STREET AND BELTWAY

The Air Force evaluated an alternative location for construction of the SIDC facility on the southeast corner of Navstar Street and Beltway. This location is inside the Restricted Area just across from and east of the north parking lot (see Figure 1.2 and Photos 6, 7, and 8). This site is approximately four acres and is a sparsely covered grass area that drops off to the north and east along the fenceline. The area has small trees along the west and south perimeters, and contains dirt roads or trails used for physical training purposes. This site is not adequate to allow for parking to accommodate SIDC personnel; the north parking lot would have to be used. This site is also not adequate for an antenna farm; the antennas would have to be placed on the roof of the SIDC facility. There is no room for expansion at this site to accommodate parking and a separate antenna farm. The facility would be constructed as described under the Proposed Action, but would likely require expansion at a future time.

2.4 ALTERNATIVE CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

The Air Force evaluated an alternative site for construction of the SIDC facility inside the Restricted Area on the northeast corner of Beltway and Irwin Avenue (see Figure 1.2). This site is approximately four acres and just across from the west portal and west parking lot. This site is not large enough to accommodate a separate parking area; SIDC employees would have to use the west parking lot. This site is not large enough for an antenna farm; the antennas would have to be placed on the roof of the facility. There is no room for expansion at this site to accommodate parking and a separate antenna farm. The site is within the safety zone established for radio frequency radiation (RFR) generated by the Colorado Tracking Station (Building 410). This alternative was eliminated from further consideration due to the restrictions of permissible exposure limits (PEL) for occupied areas within RFR safety zones under Air Force Occupational Safety and Health (AFOSH) Standard 48-9.

CHAPTER 3

AFFECTED ENVIRONMENT

3. AFFECTED ENVIRONMENT

This chapter describes the environment in the project area (as appropriate), providing baseline information to allow the evaluation of potential environmental impacts that could result from any of the Alternatives. As stated in 40 CFR Sec. 1508.14, the human environment includes natural and physical resources and the relationship of people to those resources. The environmental baseline resource areas described in this chapter were selected after identifying the potential issues and concerns of constructing the SIDC. In accordance with 40 CFR Sec. 1502.15, the resource areas that would not be impacted are not carried forward for further analysis. These resource areas are listed below, with a brief explanation for their omission from the analysis.

Noise. Noise is defined as unwanted sound, or any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise would temporarily increase during construction of the proposed SIDC, but the action would occur away from sensitive receptors. The Child Care Center (Bldg 60) is located over 2,000 feet from the proposed construction activities. Noise generated by the proposed construction would diminish to near background levels at these distances. Off-base areas would be at a sufficient distance that the noise generated would be at or below background levels. Noise levels from periodic operation of emergency generators at the SIDC would be at or slightly above background levels at the Child Care Center. The short- and long-term increase in noise would not be significant and is not carried forward for further analysis.

Cultural Resources. Cultural resources are archaeological and historical items, places, or events considered important to a culture, community, tradition, religion, or science. Schriever AFB has been completely surveyed for historic and archaeological resources. Five separate surveys were conducted between 1982 and 1997, to include Cold War historic sites. The surveys did not identify any significant sites within the boundaries of the base; therefore, cultural resources will not be further analyzed. Consultation was conducted with the Colorado Historical Society (see correspondence in Appendix A). Should unidentified archaeological resources be discovered during construction activities, work would halt until the resources could be evaluated in terms of the National Register criteria, 36 CFR 60.4, in consultation with the Colorado Historical Society.

Socioeconomics. Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population, housing, and economic activity. There would be small beneficial impacts to local employment and income from construction of the proposed SIDC. Construction jobs would most likely be filled by persons already living in the area, no increase in population would occur. Overall impacts to the local economy would be small, but beneficial, and are not further analyzed.

Visual Resources. Visual resources are defined as the natural and manufactured features that constitute the aesthetic

qualities of an area. These features form the overall impression that an observer receives of an area. The visual environment at Schriever AFB is characteristic of a military installation and the project area for the SIDC is near existing buildings in the main installation area. Constructing the SIDC would be visually compatible with existing structures and would not significantly impact visual resources. Visual resources will not be further analyzed.

Solid Waste. Solid wastes include all waste materials that are neither hazardous nor toxic, and which are normally disposed of by landfilling or incineration, or are recycled or recovered. There are no active landfills on base; solid waste is taken by a contractor to the Colorado Springs landfill (USAF, 2003e). There is adequate existing and planned capacity to dispose of solid waste in El Paso County. Solid waste generated during construction would be minimal and would be recycled to the extent practical under existing programs and any remaining waste would be disposed of at the Colorado Springs landfill. Building T-609, a temporary facility, could be demolished after all phases of the proposed SIDC are constructed. This facility is currently being leased, and the Air Force would exercise one of three options, demolish the building, purchase it for reuse by the Air Force or DoD, or purchase and reconvey it to a non-DoD agency for reuse off-base. Building T-609 is comprised of 22 modular facilities covering an area of 150 by 136 feet (20,400 square feet). Impacts would not be significant, and solid waste will not be further analyzed.

Hazardous Materials and Wastes. Hazardous materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present a substantial danger to public health or the environment if released. The use or release of a hazardous material usually results in the generation of a hazardous waste. Only small amounts of hazardous materials (such as sealants) would be utilized in construction of the proposed SIDC, and any hazardous waste generated would be disposed of in accordance with applicable regulations. Building T-609 would likely be demolished after completion of the proposed SIDC, but the building does not contain lead-based paint or asbestos, per construction specifications (Fernandez, 2005). Therefore, lead-based paint and asbestos are not issues. If emergency generators are installed and operated at the SIDC, fuel storage tanks would also be installed. It has not yet been determined if these would be above or underground. Applicable permits requirements and regulations would be followed. Impacts would not be significant. Hazardous materials and wastes will not be further analyzed.

The resource areas that may be impacted by the Alternatives include air, geology and soils, water resources, biological resources, and environmental justice. The order of resource description is based on introducing the physical environment (air, geology, and water), the natural environment (biology), and the human environment (environmental justice). A brief summary of applicable laws and regulations that may be applicable to the proposed project are provided in Chapter 5.

3.1 AIR RESOURCES

This section discusses the climate and meteorology of the area, air quality standards, existing air pollutant sources,

and regional air quality. The air quality of an area at any given time depends on the meteorological conditions (temperature, wind speed and direction, and temperature inversions), the amount and type of pollutants in the atmosphere, and the geographic setting of the area (in particular, features such as mountains or basins which inhibit the dispersion of pollutants). Pollutant concentrations are generally highest with a calm atmosphere or with a strong temperature inversion, where pollutants are trapped near the surface by warm air aloft. These conditions are more common in the autumn and winter.

3.1.1 Climate and Meteorology

Schriever AFB is located near the border of the Great Plains and the Front Range of the Rocky Mountains, which results in a moderate semi-arid climate. The average July temperature is 70° F and the average January temperature is 28° F. The area is subject to thunderstorms and heavy rainfall, which primarily occur from May through August. Mean precipitation is about 17.40 inches per year. Most rain occurs from March through September, with peak rainfall occurring in August (NWS, 2003). The most rainfall in a 24 hour period was 3.98 inches which occurred in August 1999. Total annual potential evaporation is about 25 inches. Net annual precipitation (precipitation minus evaporation) is minus 9 inches (potential evaporation exceeds annual rainfall). Relative humidity ranges from about 55 percent in early morning to 35 percent in the early afternoon. Prevailing winds are predominantly from the north throughout the year. Wind speeds usually range from 7 to 10 knots (8 to 12 miles per hour), with the highest speeds occurring in the spring and the lowest in late summer and early fall.

3.1.2 Air Quality Standards

The National Ambient Air Quality Standards (NAAQS), established by the United States Environmental Protection Agency (USEPA), and adopted by the Colorado Department of Public Health and Environment (CDPHE), define the maximum allowable concentrations of pollutants that may be reached but not exceeded within a given time period. These standards were selected to protect human health with a reasonable margin of safety. Section 110 of the Clean Air Act (CAA) requires states to develop air pollution regulations and control strategies to ensure that state air quality meets the NAAQS established by USEPA. These ambient standards are established under Section 109 of the CAA, and they currently address six criteria pollutants. These pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulate matter, and sulfur dioxide (SO_2).

Particulate matter has been further defined by size. There are standards for particulate matter smaller than 10 microns in diameter (PM_{10}) and smaller than 2.5 microns in diameter ($PM_{2.5}$). Table 3.1-1 presents the current NAAQS and the Colorado Ambient Air Quality Standards (CAAQS) for the criteria pollutants.

Generally, criteria pollutants directly originate from mobile and stationary sources. Tropospheric O_3 is an exception, since it is rarely directly emitted from sources. Most O_3 forms as a result of volatile organic compounds (VOCs) and nitrogen oxides (NO_x) reacting with sunlight. In 1997, an eight-

Table 3.1-1
National Ambient Air Quality Standards (NAAQS)
and Colorado Ambient Air Quality Standards (CAAQS)

Pollutant	*Averaging Time*	*NAAQS µg/m³ (ppm)*[a]		*CAAQS*
		Primary[b]	*Secondary*[c]	
O_3	1 hr 8 hr	235 (0.12)[d] 157 (0.08)	Same Same	Same
CO	1 hr 8 hr	40,000 (35) 10,000 (9)	None None	Same
NO_2	AAM[e]	100 (0.053)	Same	Same
SO_2	3 hr 24 hr AAM	None 365 (0.14) 80 (0.03)	1,300 (0.5) none none	700 µg/m³ 100 µg/m³ 15 µg/m³
PM_{10}	AAM 24 hour	50 150	Same Same	Same Same
$PM_{2.5}$	AAM 24 hr	65 15	Same Same	None
Pb	¼ year	1.5	Same	Same

[a] µg/m³ — micrograms per cubic meter; ppm — parts per million

[b] National Primary Standards establish the level of air quality necessary to protect the public health from any known or anticipated adverse effects of a pollutant, allowing a margin of safety to protect sensitive members of the population.

[c] National Secondary Standards establish the level of air quality necessary to protect the public welfare by preventing injury to agricultural crops and livestock, deterioration of materials and property, and adverse impacts on the environment.

[d] On July 26, 2005, the USEPA issued a final rule revoking the 1-hour ozone standard for all of Colorado except the Denver Area. El Paso County was designated as attainment effective June 15, 2004.

[e] AAM —Annual Arithmetic Mean

PM_{10} is particulate matter equal to or less than 10 microns in diameter

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

Source: 40 CFR 50; Code of Colorado Regulations, Title 5, Chapter 1001, Regulation 14

hour average standard of 0.08 parts per million (ppm) was adopted to replace a one-hour standard. The one-hour standard for ozone of 0.12 ppm was retained as a transition to the new eight-hour standard for those areas that were in nonattainment. El Paso County, Colorado was designated as attainment for the eight-hour ozone standard. On July 26, 2005, the USEPA issued a final rule revoking the 1-hour ozone standard for all of Colorado except the Denver Area.

Exceeding the concentration levels within a given time period is a violation, and constitutes a nonattainment of the pollutant standard. All areas of the country are classified as attainment, nonattainment, or unclassifiable. Areas which meet the national primary and secondary ambient air quality standards are classified as attainment. Any area that does not meet air quality standards is designated as nonattainment. Areas in nonattainment of ambient air quality standards must develop a plan to achieve attainment, as outlined in Section 172 of the CAA. These plans are usually a revision of the State Implementation Plan (SIP) for achieving air quality standards.

When the USEPA certifies that a nonattainment area has achieved

attainment of the NAAQS, the area is redesignated as attainment. The State submits a revision of the applicable SIP to provide for the maintenance of the national primary ambient air quality standard for such air pollutant in the area concerned for at least 10 years after the redesignation (42 U.S. Code (USC) Sec. 7505).

Proposed federal actions within a nonattainment or maintenance area must conform to the SIP. Conformity thresholds, as defined in 40 CFR 51, Subpart W, are used to determine conformity of an action with a SIP. The thresholds are determined by nonattainment or maintenance status. For nonattainment areas, the thresholds are determined by the severity of nonattainment. For maintenance areas, the thresholds are 100 tons per year of CO, NO_x, sulfur oxides (SO_x), and particulate matter. The threshold for VOCs is 50 tons per year if the maintenance area is inside an ozone transport region or 100 tons per year if the maintenance area is outside an ozone transport region. These provisions are known as the General Conformity Rule.

The intent of conformity requirements is to ensure that federal actions do not significantly affect the timely attainment and maintenance of air quality standards or increase the frequency or severity of any existing violation of any standard in any area; or any required interim emission reductions or other milestones in any area.

Hazardous air pollutants (HAP) are regulated under 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP) and 40 CFR 63, NESHAP for Source Categories. A major source, defined as one emitting, or having the potential to emit, 10 tons per year of any single HAP or 25 tons per year total HAPs, requires a permit, and as specified in 40 CFR 63, the implementation of maximum achievable control technology. A minor source is defined as one emitting, or having the potential to emit, less than 10 tons per year of any single HAP or 25 tons per year total HAPs.

3.1.3 Air Pollutant Sources

Particulate matter (PM_{10} and $PM_{2.5}$) is generated during ground disturbing activities and during combustion. El Paso County requires an air quality permit for fugitive particulate emissions from disturbed ground of more than one acre in size. If this ground is disturbed for more than 6 months, and is 25 acres or more in size, a Colorado Air Pollutant Emissions Notice (APEN) is also required.

The principal source of CO and SO_2 is combustion. The precursors of O_3 (VOCs and NO_x) are also primarily emitted from combustion. Emissions of CO, SO_2, VOCs, and NO_x are generated at Schriever AFB by mobile sources, such as motor vehicles, construction equipment, and stationary sources, such as boilers and generators. VOCs are also emitted by vehicle refueling, storage tanks, and other stationary sources. Stationary sources installed during construction require a construction permit if they exceed the specified thresholds. These limits are specified for attainment or nonattainment areas Code of Colorado Regulations (CCR), Title 5, Chapter 1001, Regulation 3, Part A, Section II.B.3.a) and are actual emissions of two tons per year of any pollutant in an attainment or maintenance area.

Stationary sources of emissions are categorized as major or minor. A major source emits, or has the potential to emit, 100 tons per year of any air pollutant (40 CFR 52.21, 5 CCR 1001, Regulation 3, Part A, Section I.B.23.b). A minor source emits or has the potential to emit less than 100 tons per year of any pollutant. Under Title V of the CAA, a major source must obtain an operating permit. Minor sources do not need an operating permit; however, if they emit two tons per year or more of a pollutant, they are required to obtain an APEN, sometimes referred to as a construction permit. All of the actual and potential emissions within the same industrial grouping at the same installation are included for determining whether it is a major or minor source. This includes stationary emissions from both permitted and non-permitted sources. Fugitive emissions are not included in these calculations because Schriever AFB is not within one of 21 industrial groupings which must include stationary fugitive emissions. Schriever AFB has chosen to limit its total actual and potential emissions to less than 100 tons under a synthetic minor operating permit (95 EP772), approved by the Colorado Air Pollution Control Division on November 4, 2004. This permit contains federally enforceable limits on emissions from stationary sources requiring an APEN (permitted sources). These permitted sources include 4 boilers and 13 diesel emergency generators at the base. Emission limits for these sources are listed in Table 3.1-2. Many of the stationary sources at Schriever AFB do not require a permit to operate because the criteria pollutants they generate are below the thresholds of 2 tons per year.

Actual and potential emissions of any pollutant from the operation of the 18 permitted sources and the non-permitted sources must be less than 100 tons per year to qualify Schriever AFB as a synthetic minor source. In the current construction permit (also known as a synthetic minor operating permit), Schriever AFB has limited emissions from permitted sources to 68.0 tons per year of NO_x, 30 tons per year each of CO and SO_x, and 20 tons per year of VOCs to keep total stationary emissions (from permitted and non-permitted sources) below the thresholds of a major source. Operation of the Army Air Force Exchange Service (AAFES) gas station storage tanks is regulated by a separate operating permit obtained by AAFES, but are included in the total emissions for Schriever AFB for purposes of the operating permit. Schriever AFB completed an Air Emissions Inventory for calendar year 2002 (USAF, 2003c). Emissions from permitted and non-permitted sources are shown in Table 3.1-2. Actual emissions were calculated with emission factors and actual usage times for equipment. As defined in 40 CFR 52.21, the potential to emit is the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. For purposes of potential to emit calculations, operating hours for emergency equipment (such as emergency generators) is limited to 500 hours per year by the USEPA (USEPA, 1995a). Actual and potential emissions from permitted sources are below permit limits, in accordance with the 2004 Construction (synthetic minor operating) Permit (CDPHE, 2004). Potential emissions of NO_x from non-permitted sources (stationary sources with emissions below the requirements thresholds for APENs) were estimated at

Table 3.1-2
Installation-Wide 2002 Air Pollutant Emissions at Schriever AFB
(values in tons per year)

	PM_{10}	$PM_{2.5}$	SO_x	NO_x	VOCs	CO	HAPs
Actual Emissions							
Stationary, Permitted[1]	0.37	0.33	0.11	15.89	0.49	4.85	0.04
Stationary, Non-permitted[2]	0.67	0.66	0.18	8.60	1.55	6.52	0.63
Total Stationary	**1.03**	**0.98**	**0.29**	**24.49**	**2.04**	**11.38**	**0.66**
Potential to Emit							
Stationary, Permitted[1]	1.52	1.37	2.46	60.46	1.87	18.76	0.16
Permit limits	*100.00*	*100.00*	*30.00*	*68.00*	*20.00*	*30.00*	*25.00*
Stationary, Non-permitted[2]	2.81	2.79	1.72	38.11	8.69	94.30	15.33
Total Stationary	**4.33**	**4.16**	**4.18**	**98.57**	**10.56**	**113.06**	**15.49**

[1] Permitted under Colorado Construction Permit finalized on November 4, 2004. Permitted sources include 4 boilers and 14 generators. Emissions from permitted sources were calculated with the 2004 Construction Permit conditions.

[2] Stationary fugitive sources are not included, per 40 CFR 52.20 and 5 CCR 1001, Regulation 3, Part A, Section I.B.23.b.

Sources: USAF, 2003c (modified); CDPHE, 2004

38.11 tons in the 2002 Air Emissions Inventory, and the potential to emit CO from non-permitted sources was 94.30 tons in 2002. The largest source of potential CO emissions was small equipment, such as portable generators and light carts (USAF, 2003c). Permitted and non-permitted sources of NO_x and CO were about 98.6 and 113.0 tons, respectively (using 2004 permit limits and 2002 non-permitted source emissions). HAPs include a wide range of materials or chemicals that are toxic or potentially harmful to human health. While HAPs are found in numerous products and used in many processes, few types and small amounts of HAPs are generated during internal combustion processes or earth-moving activities. The largest source of HAPs at Schriever AFB is from operation of small equipment (small generators, light carts, parts washers, and air compressors). HAPs are also generated by chemical usage, diesel generators, boilers, fuel storage tanks at the AAFES Gas Station, the cooling tower, and vehicle refueling (USAF, 2003c).

Schriever AFB is a minor source of HAPs, with actual emissions of 0.66 tons per year. The potential to emit HAPs is 15.49 tons per year. HAPs emissions are below the thresholds for specific requirements under 40 CFR 61 and 63 for source categories. The base monitors the amount of HAP emissions and reports them to the State of Colorado.

3.1.4 Regional Air Quality

Schriever AFB is located in the Colorado Springs Metropolitan Area, which lies within the San Isabel Intrastate Air Quality Control Region (AQCR). The Colorado Springs Metropolitan Area is currently in attainment for all criteria pollutants, but has only been in attainment for CO since August 1999 (USEPA, 2005a; USEPA, 2005b; CAQCC, 2004). As part of the redesignation as an attainment area, the Colorado Springs area is under a maintenance plan (effective October 25, 1999) for 10 years to demonstrate compliance with the CO standard, as provided for in Section 110 of the CAA (42 USC Sec. 7410). Under this

maintenance plan, implemented under the SIP and approved by the USEPA, the Colorado Springs Maintenance Area has a budget of 292.8 tons per day (106,872 tons per year) of CO. The Colorado Springs Metropolitan Area is in maintenance for CO, but in attainment for other criteria pollutants; the conformity with the SIP is focused on CO.

New stationary sources are subject to limitations on particulate emissions under the Standards of Performance for New Stationary Sources (40 CFR 60 and 5 CCR 1001 Regulation 6). New emergency generators with a fuel-burning capacity of more than one million British thermal units per hour are subject to a limit on particulate matter emissions.

Schriever AFB is not subject to Prevention of Significant Deterioration (PSD) review requirements of 40 CFR 52.21 and Code of Colorado Regulations, Title 5, Chapter 1001, Regulation 3, Part B, Section IV.D.3 because the actual or potential emissions of any criteria pollutant does not exceed 250 tons per year.

3.2 GEOLOGICAL RESOURCES

Geological resources discussed in this section include physical features of the earth such as geology (surface and subsurface features), topography, and soils.

3.2.1 Geology and Topography

The project area is situated in the Colorado Piedmont section of the Great Plains Physiographic Province. The Southern Rocky Mountain Physiographic Province is located about 18 miles to the west. The Colorado Piedmont is a mature elevated plain, dissected by numerous streams. In the local area, this includes Chico and Black Squirrel Creeks and their tributaries.

Elevations in the project area for Phase I and II range from about 6,300 near the northwest corner of the site to 6,275 feet above mean sea level (MSL) in the southeast corner and generally slope to the south and southeast at about 3 percent grades. Elevations in the project area for the proposed Phase III site south of Phase I and II range from about 6,275 feet at the north and northwest areas to about 6,270 feet at the southern and southeastern edges. The slope is to the south and southeast at about 1 percent. Elevations in the "800" area of Schriever at potential alternative locations for Phase III range from about 6,225 feet to 6,250 feet, with slopes generally from 1 to 5 percent. Elevations at the Beltway and Irwin Alternative site range from 6,280 feet at the western edge to 6,260 feet in the eastern part, with 2 to 8 percent slopes. Elevations at the Navstar and Beltway Alternative site range from 6,270 feet in the northwest to 6,245 in the eastern part. Slopes are generally between 3 and 9 percent, but are 50 percent or more in the vicinity of a drainageway near the center of the site. The drainageway has cut a channel about 10 feet deep into the small valley.

The Proposed and Alternative sites are underlain by about 25 to 100 feet of Quaternary alluvium (primarily sand and gravel) from tributaries of the Arkansas River (EPCPD, 2003). These deposits are underlain by the Arapahoe Formation which consists of a 400 to 700 foot-thick sequence of interbedded conglomerate, sandstone, siltstone, and shale (the thickness of the Arapahoe Formation is around 50 to 100 feet near Schriever AFB, due to the base's location near the edge of the Denver Aquifer System). The deposits

of the Laramie and Fox Hills Formations underlie the Arapahoe Formation. The Laramie Formation (500 to 600 feet thick) is composed of sandstone and shale. The sandstone is fine to medium, friable, and carbonaceous. The Fox Hills Formation is comprised of sandstone and siltstone interbedded with shale. Pierre Shale underlies the Laramie-Fox Hills Formation (USGS, 1995a). Deposits of sand and gravel are common in El Paso County. However, most of these are unsuited for commercial use and are rated as poor for fill material (USDA, 1981).

There are no major faults in the Colorado Springs vicinity; the nearest major faults are located about 80 to 90 miles from the area.

- The Sangre de Cristo Fault, with a characteristic magnitude (the anticipated magnitude of an earthquake based on fault geology and stress in the fault) of 7.5, is located about 80 miles southwest of the project area.
- The Sawatch Range Fault, with a characteristic magnitude of 7.2, is located about 90 miles southwest of the project area.
- The Poncha Pass Fault, with a characteristic magnitude of 6.9, is about 75 miles to the southwest.
- The Cheraw Fault, with a characteristic magnitude of 7.1, is located about 70 miles southeast of the project area.

The peak horizontal ground acceleration anticipated from seismic events is about 2.5 percent of gravity (with a 10 percent probability of exceeding this in 50 years) (USGS, 2005a). This corresponds to a magnitude of about 5.4 on the Richter Scale or about VI on the Modified Mercalli Scale. Earthquakes of this magnitude would typically cause slight damage. The project site is located in Zone 1 for potential earthquake damage, with slight damage anticipated from any seismic event (USAF, 1992). Since 1973, there have been 10 earthquakes within 100 kilometers (62 miles) of the site, with magnitudes ranging from 2.2 to 4.0 (USGS, 2005b).

3.2.2 Soils

Soils at Schriever AFB were formed in arkosic (derived from quartz and feldspar-rich granite) sedimentary rocks derived from windblown and stream-deposited sediment. Soils at the proposed site (Alternative 2) are Ascalon sandy loam soil series (3 to 9 percent slope). These soils consist of sandy loam from 0 to 8 inches deep, sandy clay loam from 8 to 22 inches and sandy loam and loamy sand from 22 inches to a depth of 60 inches.

Ascalon soils occur on uplands. Slopes are generally moderate, from 3 to 9 percent. The depth to the water table is greater than 6 feet. These soils are well drained; water is removed from the soil readily, but not rapidly. Internal free water occurrence commonly is very rare or very deep (USDA, 1981). The shrink-swell potential, a measure of potential changes in soil volume due to varying moisture conditions, is low to moderate.

Permeability of the soil is moderate and runoff is slow to medium. However, in brief heavy storms, runoff is greater, and due to the texture of the soils, overland flow can cause erosion in areas where vegetation is disturbed. The soil has a moderate hazard of erosion by wind and water when vegetation is removed.

Development of buildings and facilities at Schriever AFB has resulted in increasing amounts of impermeable surface which has increased the potential for erosion within and near developed areas. These soils do not flood.

These soils have moderate limits for construction (the soils are unfavorable for construction in their native state, but the limitations can be overcome with special planning and design). The limitations in these soils are for a moderate shrink-swell potential (a 3 to 6 percent change in soil volume as moisture levels in the soil change), frost action (soils expand as they freeze and have low strength as they thaw), and piping (a phenomenon where erosion causes subsurface tunnels in the soil and subsequent subsidence).

The Ascalon, soil series has soil inclusions (areas of soil too small to be mapped separately) with different physical properties. Included in the Ascalon series is the Olney sandy loam, Vona sandy loam, and Fort Collins sandy loam. The Olney and Vona soils have a severe hazard of wind blowing. The Fort Collins soil rarely floods.

Soils in the "800" area of the base (south of Enoch Road), a potential alternative site for Phase III, are classified as Ascalon sandy loam (1 to 9 percent slope) and Sampson loams. These soils consist of clay loam grading to sandy clay loam. Permeability is moderate, runoff is slow, and the risk of erosion (by water and wind) is slight. Engineering properties are similar to the Ascalon soils, with moderate limitations due to low strength, piping, shrink-swell and potential frost action. Ellicott soils occur in the drainageway east of Buildings 805, 810, and 812. Construction is not recommended in these soils due to flooding (USDA, 1981).

Soils at the Navstar and Beltway site (Alternative 3) are classified as Ascalon sandy loams (3 to 9 percent) and Truckton sandy loam (3 to 9 percent slopes). Truckton soils formed on uplands. These soils have physical properties and potential limitations for construction similar to Ascalon soils in most respects, but are more highly erodible by wind and water when vegetation is removed.

3.3 WATER RESOURCES

Water resources include surface and groundwater sources, quantity, and quality. The hydrologic cycle results in the transport of water into various media such as the air, the ground surface, and subsurface. Natural and human-induced factors determine the quality of water resources. Water resources discussed in this section include groundwater, surface water (including storm water runoff), and floodplains.

3.3.1 Groundwater

The area's principal unconfined aquifer is in the alluvial sediments of the Chico and Black Squirrel Creeks. This shallow aquifer ranges in depth from 25 feet to more than 100 feet (EPCPD, 2003). This aquifer is hydraulically isolated from the Denver Basin aquifer system by an impermeable layer between the alluvium and formations comprising the Denver Aquifer System. Groundwater in this aquifer flows to the south towards Chico Creek and east towards Black Squirrel Creek.

Colorado Springs lies on the southern edge of the Denver Basin Aquifer System. The aquifer system underlies an area of about 7,000 square miles that extends from Greeley south to near Colorado Springs and from the Front Range east to near Limon. This system is comprised of four

aquifers (Dawson, Denver, Arapahoe, and Laramie-Fox Hills) in five geologic formations and is up to 3,000 feet thick. These formations are deepest in the central part of the aquifer, and shallow near the edges, outcropping in concentric circles at the edges of the Denver Basin. At the outer edge of the system lies the Laramie-Fox Hills Aquifer, which underlies Schriever AFB. The Arapahoe Aquifer also underlies Schriever AFB. The Denver Aquifer underlies about 32 acres of the northern edge of Schriever AFB and the Dawson Aquifer is about nine miles to the north (EPCPD, 2003; USGS, 1995a).

The Arapahoe Formation consists of up to 700 foot-thick sequences of interbedded conglomerate, sandstone, siltstone, and shale. The thickness of this formation near Schriever AFB is about 50 to 100 feet. It contains the Arapahoe aquifer (which ranges in depth from 0 to 400 feet throughout the aquifer system). In the vicinity of Schriever AFB, the Arapahoe Aquifer underlies the alluvial sediments of the Chico and Black Squirrel Creeks, at a depth of 25 to 100 feet. Water in the Arapahoe Aquifer generally is a sodium bicarbonate or sodium sulfate type. The dissolved-solids concentrations of the water generally range from 200 to 400 milligrams per liter in the vicinity of Schriever AFB. The Laramie-Fox Hills Aquifer underlies the Arapahoe Formation and varies between 50 and 300 feet in thickness and is 150 to 250 feet deep in the vicinity of Schriever AFB (USGS, 1995a). Water yields in the Laramie-Fox Hills Aquifer are low, and therefore have not been used extensively as water supplies. Water taken from some areas of the Laramie-Fox Hills Aquifer can be of marginal value due to oxygen deficient conditions which give rise to hydrogen sulfide and methane gases (USGS, 1995a). The Denver Basin is recharged principally by the downward percolation of only a small part of the area's precipitation (USGS, 1995a). Hydraulic conductivity (how fast the water moves through the aquifer) in the Arapahoe Aquifer is between 0 and 100 feet squared per day in the vicinity of the base. Hydraulic conductivity in the Laramie-Fox Hills Aquifer near the project area is less than 0.5 feet squared per day. Groundwater flow in both of these aquifers is toward the north-northeast (USGS, 1995a).

Most water wells in the project area obtain water from the alluvial aquifers. Some wells draw water from the Arapahoe and Laramie-Fox Aquifers. In 2000, there were about 57 water wells (off-base) within a mile of Schriever AFB and 7 on-base wells. These wells were used for stock watering and domestic supply (EPCPD, 2003). Schriever AFB obtains its water supply from 12 wells drawing water from the alluvial aquifer of the Black Squirrel Creek.

3.3.2 Surface Water

Schriever AFB is located in a semi-arid environment which is typified by a limited number of perennial streams (those with water flows above the stream bed year round), and an abundance of intermittent and ephemeral streams. Intermittent streams are characterized by a water flow above the stream bed in some portions of the stream or during some months of the year, where the water table is above the level of the stream bed. Ephemeral streams are not connected with the water table, but flow only during or after precipitation or snowmelt. The water level in ephemeral streams often rises quickly and causes substantial erosion or deposition of sediment.

Schriever AFB lies within the Chico Creek Watershed (U. S. Geological Survey

(USGS) hydrologic unit catalog 11020004), which drains into the Arkansas River (located about 35 miles to the south of the project area). Chico Creek, an intermittent stream, heads about 1.7 miles southwest of the base and flows into the Arkansas River. Black Squirrel Creek, an intermittent stream, heads about 15 miles northwest of the base, flows about 6 miles east of the base, and flows into Chico Creek about 25 miles south of the base. On base, there are three streams defined by the USGS as intermittent (USGS, 2005c). Two of these streams flow from north to south through the secure area and then south of Schriever AFB (see Figure 3.1). An intermittent tributary of the western intermittent stream flows about 500 feet south of the proposed site for Phase III. The other intermittent stream, a tributary of the West Fork of the Black Squirrel Creek, flows southeast of the base. These intermittent streams have cut channels as deep as 15 feet from the surrounding land (USAF, 2003e). One of these flows about 7 miles south of the base where it discharges into the ground near Chico Creek. The other flows about 2 miles south of the base and discharges into the ground (EPCPD, 2003; USGS, 2005c; USGS, 1975; USGS, 1961).

There are storm water drainage ditches along Enoch Road and Irwin Avenue in the vicinity of the proposed site for Phase I and II. These ditches drain to a drainage channel about 750 feet south of the intersection of Irwin Avenue and Enoch Road. This drainage channel drains into an intermittent stream about 1,700 feet southeast of the proposed site.

There is a small ephemeral drainageway at the proposed site (Alternative 2) for the Phase III buildings and antenna farm. This joins another drainageway about 225 feet to the south. Stormwater in this drainageway flows to an intermittent stream about 1,350 feet to the southeast (see Figure 3-1).

An intermittent stream flows to the east of Buildings 805, 810, and 812, in the 800 area. Two small ephemeral lakes are located about 0.3 miles to the west of these buildings. There are no other surface water features in the 800 area.

Thunderstorms can result in stream flows of several thousand cubic feet per second in these channels, causing temporary flooding of these waterways. The stream bed and banks are susceptible to erosion as they are comprised of sand with little or no vegetation. Culverts have been constructed in these drainages in the improved and semi-improved land areas. Energy dissipation structures (such as concrete aprons and riprap) have been constructed at culvert openings and discharge points to minimize erosion. In addition, five erosion control dams have been constructed north of the secure area (USAF, 2001b). Chico Creek and Black Squirrel Creek meet all water quality standards (USEPA, 2003a).

A sanitary sewer collection system conveys wastewater to a treatment plant operated by the Cherokee Metro District. This system is currently sized to sustain current planned growth (USAF, 2003e).

3.3.3 Floodplains

Schriever AFB includes about 8.5 acres that are situated within the delineated 100-year floodplain for the West Fork of the Black Squirrel Creek, in the northeast corner of the installation. This floodplain is nearly 2.5 miles from the proposed site (Alternative 2) and over 1.5 miles from the Navstar and Beltway site (Alternative 3). The floodplain of an intermittent tributary of Chico Creek is about ¾ mile

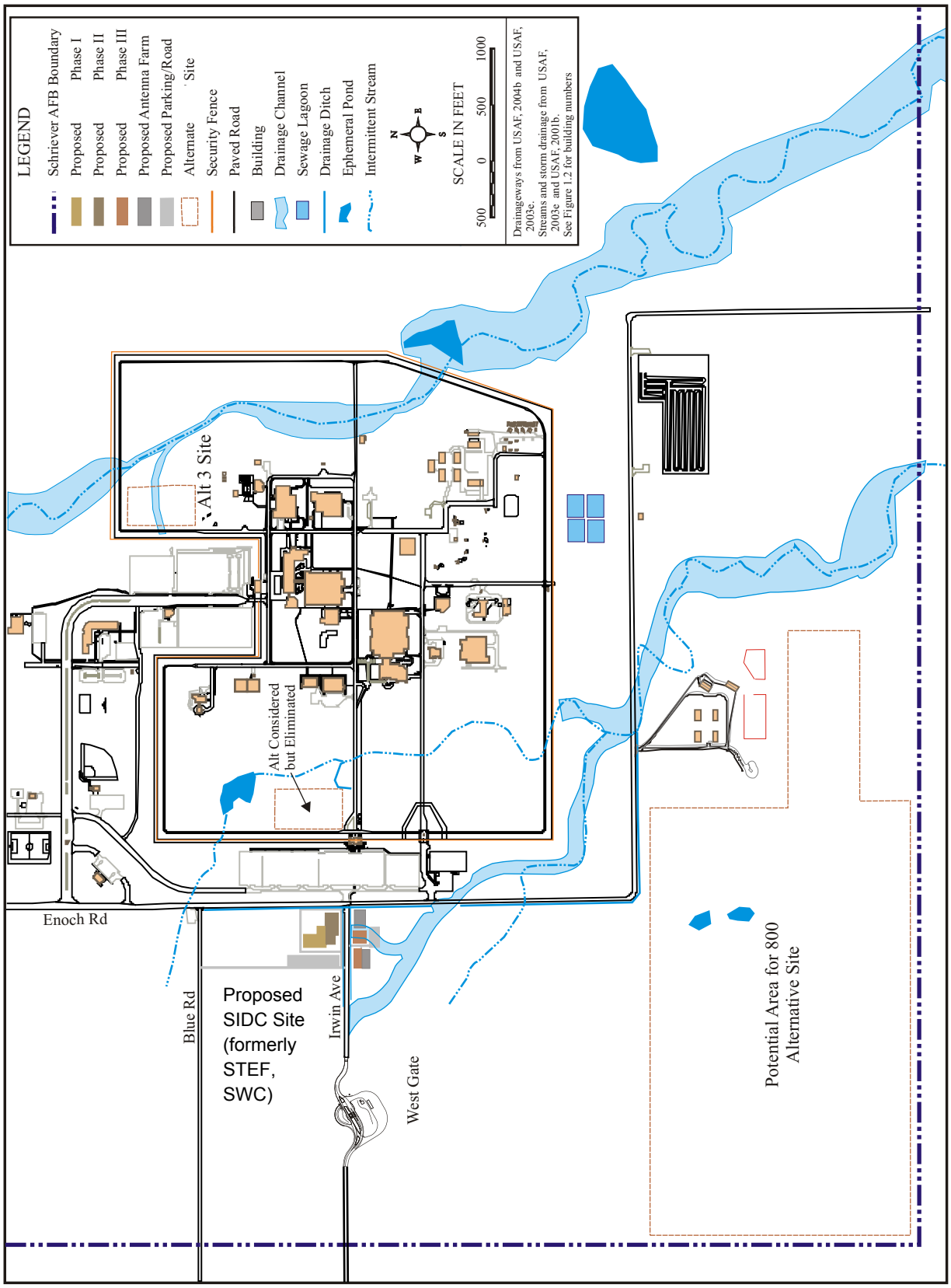


Figure 3.1 Water Features in the Project Area

southwest of the proposed site and from the alternative site for Phase III. These floodplains would not be impacted by the Proposed Action or Alternatives, and are not further discussed.

3.4 BIOLOGICAL RESOURCES

Biological resources include the native and introduced plants and animals that make up natural communities. The natural communities are closely linked to the climate and topography of the area. Biological resources discussed below include vegetation; wildlife; natural communities and rare, threatened or endangered plants and animals; wetlands; and noxious weeds.

3.4.1 Vegetation

Historical and present land use on Schriever AFB has altered the original landscape. Visible signs of altered landscape include livestock grazing, fragmentation of continuous habitat by roads, and the construction of base facilities, power lines, and fences.

Schriever AFB lies within the shortgrass prairie of the Great Plains. The prairie landscape is dominated by blue grama (*Bouteloua gracilis*), buffalo grass (*Buchloe dactyloides*), three-awned grass (*Aristida purpurea*), dropseed (*Sporobolus cryptandrus*), and needle and thread grass (*Stipa comata*) (USAF, 2000). Trees are rare on the shortgrass prairie, but a few small, isolated stands are present on Schriever AFB. A stand of mature plains cottonwood (*Populus sargentii*) lies along a draw south of Enoch Road. Box elder (*Acer negundo*) and hawthorn (*Crataegus sp*.) are present in and around three farmsteads, two of which were located in the northwestern corner of the base, while the third was located between the intermittent draw containing the cottonwoods and the Schriever Activity Center (USAF, 2001b). The trees around the farmsteads are suspected to have been planted for windbreak, shade, or landscaping purposes.

Vegetation on the improved areas of Schriever AFB consists of irrigated turf grasses, native grass plantings, and native and ornamental shrub and tree plantings. Sixty acres of improved grounds are irrigated and manual weed control methods and herbicides are used. Other practices on improved grounds include fertilizing, mowing, and aerating. The proposed project site (Alternative 2) lies within non-irrigated, unimproved grounds.

Scattered playas occur within the rolling hills of shortgrass prairie in central El Paso County. Playas are a feature of the arid southwest, occurring in natural depressions. During wet years, especially in the spring when moisture is plentiful, saturated soils and an elevated water table slow the dissipation of surface water, allowing it to collect in playa depressions. Most of the year, however, playas only distinguish themselves from the surrounding grassland by a circle of greener vegetation. The Schriever Playas site contains four of these small, periodically inundated, closed basins. The playas support stands of western wheatgrass with mixed species of spikerush (*Pascopyrum smithii-Eleocharis* spp.). The Schriever playas are located north and west of the proposed project site (Alternative 2) (see Figure 3-2). The playas global rank G1 which is considered globally critically imperiled and the state rank is S2 which is considered state imperiled. Additional information on the playas can be found in the Colorado Natural Heritage Program (CNHP) letter located in Appendix A.

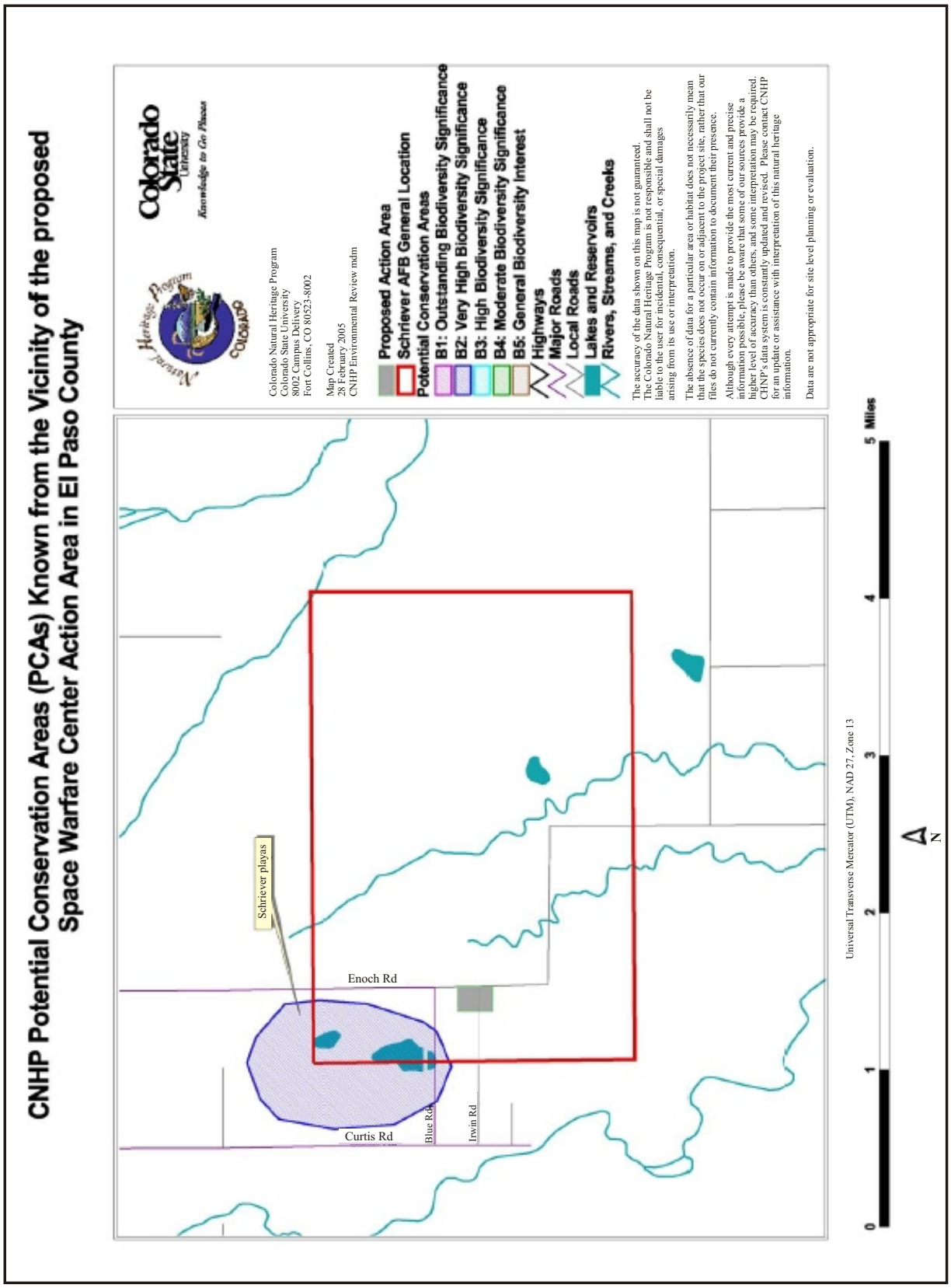


Figure 3.2 Potential Conservation Areas at Schriever AFB

3.4.2 Wildlife

The native fauna of Schriever AFB consists of species typically associated with shortgrass prairie. Pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), and raccoon (*Procyon lotor*) characterize the large mammal component of the shortgrass community. Pocket gophers (*Thomomys sp.*), Ord's kangaroo rat (*Dipodymis ordii*), prairie voles (*Microtus pennsylvanicus*), deer mice (*Peromyscus maniculatus*), black-tailed jackrabbits (*Lepus californicus*), western harvest mouse (*Reithrodontomys megalotis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), and desert cottontail (*Sylvilagus audubonii*) comprise the small mammal species of the area. A detailed survey was performed by the Nature Conservancy's CNHP in 2000. This survey identified 11 mammalian species on Schriever AFB. None of these species are considered rare, threatened, or endangered by state or federal agencies.

Migratory birds are protected through International Treaties and the *Migratory Bird Treaty Act*. Schriever AFB is located within the Central Flyway which extends from Canada to the Gulf of Mexico. A number of common prairie-based birds such as the lark bunting (*Calamospiza melanocorys*), western meadowlark (*Sturnella neglecta*), and horned lark (*Eremophila alpestris*), and several species of raptors such as Swainson's hawk (*Buteo swansoni*) and American kestrel (*Falco sparverius*) inhabit the shortgrass community around the base (USAF, 2001b). The CNHP review indicated the Mountain Plover (*Charadrius montanus*) is likely to occur within a two-mile radius of the base (CNHP Letter, 2005). Trees associated with old homesteads or planted on developed portions of Schriever AFB support additional bird species that may not otherwise be found in the area. Species likely to use such trees include American robin (*Turdus migratorius*), house sparrow (*Passer domesticus*), and great horned owl (*Bubo virginianus*) (USAF, 2001b). During the 2000 CNHP inventory, a total of 21 bird species were identified. None of the bird species identified are considered threatened or endangered by state or federal agencies.

3.4.3 Natural Communities and Rare, Threatened or Endangered Plants and Animals

The *Endangered Species Act* requires that any action authorized by a federal agency shall not jeopardize the continued existence of a threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat of such species. A listed species provided protection under the *Endangered Species Act* is so designated because of danger of its extinction as a consequence of economic growth and development without adequate concern and conservation. There are no known threatened or endangered species in the project area. The following rare and/or imperiled species and natural communities are known or likely to occur within a two-mile radius of the proposed SIDC (CNHP Letter, 2005).

Plains ragweed (*Ambrosia linearis*) – The plains ragweed flowers from mid-June to August and fruits from early August to late September. It is wind pollinated, but asexual reproduction by rhizomes also appears to be important to this species. Plains ragweed is a plant of seasonally moist habitats of sandy soils within the shortgrass prairie region of east-central Colorado between 4,300 and 6,700 feet in elevation. In natural settings, it is frequently encountered in

association with intermittent streams and around the margins of intermittent ponds or playas (USAF, 2000).

The 2000 CNHP inventory identified approximately 1,000 individuals of plains ragweed (*Ambrosia linearis*), a globally rare species endemic to eastern Colorado. The plains ragweed community was found in a once natural playa that has been enhanced by a berm to improve its use as a cattle pond. The area containing plains ragweed or displaying potential habitat is less than 40 acres and located near the southern boundary of the base (not near the proposed project area).

Burrowing owl (*Athene cunicularia*) – Burrowing owls occupy dry, open, treeless grasslands where they typically nest in burrows of prairie dogs or ground squirrels. Burrowing owls feed primarily on nocturnal rodents such as voles and kangaroo rats as well as nocturnal insects. In Colorado, burrowing owls are declining in abundance and distribution, and have been extirpated from some areas. On the eastern plains of Colorado, the species remain a locally uncommon to fairly common summer resident and casual winter resident (CNHP, 2001). The Burrowing owl is listed as threatened by the state of Colorado (USFWS Letter, 2005).

Base personnel reported sightings of a nesting pair of burrowing owls (*Athene cunicularia*), listed as threatened in Colorado, in two locations on Schriever AFB. Owls have been sighted on the west-central base boundary and near the north-central base boundary. Initial owl sightings were reported in April 2002; however, no sightings occurred in 2003 (Trenchik, 2003). Observations from 2002 note the owls' arrived in April and departed in September.

During 2004, 3 nesting pair of burrowing owls were seen with 13 babies. There are 2 adult owls and 5 babies near the contractor grounds maintenance area and near the proposed action site for the SIDC (Trenchik, 2004). During a 2005 survey of the Phase III project area near Enoch Road and Irwin Avenue, no prairie dog dens or burrowing owls were observed (Trenchik, 2005).

Black-tailed prairie dog (*Cynomys ludocivianus*) – Black-tailed prairie dogs occupy shortgrass and mixed-grass prairie habitats with well-drained, friable soils that permit the construction of complex burrow systems. Black-tailed prairie dogs are diurnal, burrowing, colonially-dwelling, herbivorous rodents that are active aboveground throughout the year (they do not hibernate) (CNHP, 2001).

The base prepared a black-tailed prairie dog management plan in March 2005. Findings in the plan are that prairie dogs on base are relatively small but expanding rapidly. In 2002 there were three separate towns occupying 62 acres. Mapping in August of 2004 showed approximately 129 acres occupied in five towns (see Figure 3-3). According to the CNHP letter (Feb 2005), the global status of the black-tailed prairie dog is G3 globally vulnerable and G4 globally apparently secure. The state status is S4, apparently secure. During the 2004 site survey of the proposed SIDC area, prairie dogs were observed approximately 200 feet to the west.

3.4.4 Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under

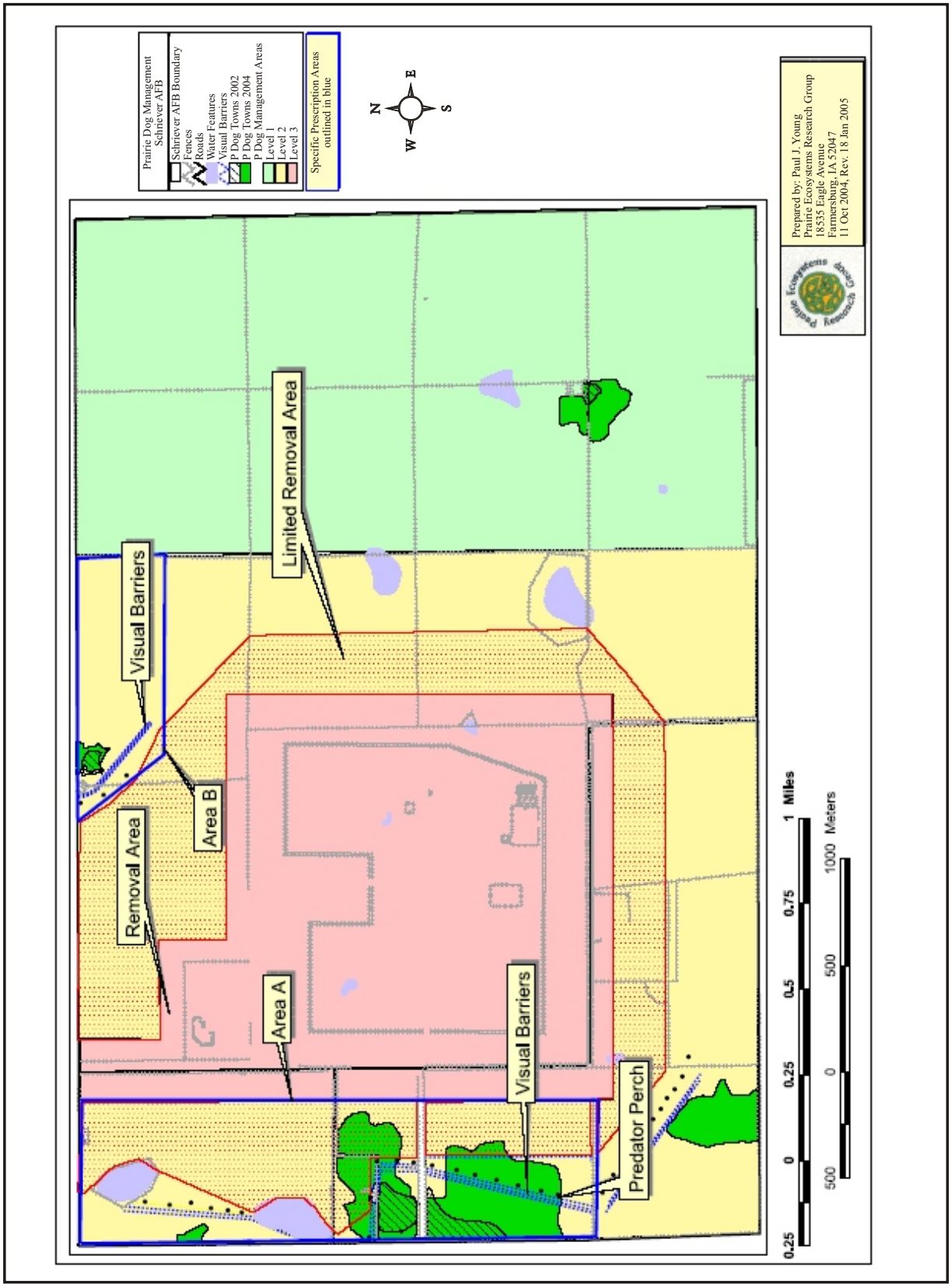


Figure 3.3 Prairie Dog Management at Schriever AFB

normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987). Wetlands are diverse ecosystems that provide ecological benefits by supporting commercial fisheries, controlling floods, filtering wastes from water, and serving as recreation areas. They also provide habitat for many plant and animal species, including economically valuable waterfowl and one-third of the nation's endangered species. Wetlands are regulated under Section 404 of the Clean Water Act (CWA) and Executive Order (EO) 11990 (*Protection of Wetlands*).

A wetland determination for nine potential wetland sites on Schriever AFB was performed by the U.S. Army Corps of Engineers (USACE) in June and August of 2000. This wetland determination updated a previous determination performed by the USACE on the same nine sites in 1991. The 2000 determination found a dramatic decrease in sites and acreage that meet wetland criteria as defined by the *1987 Corps Wetlands Delineation Manual*. Three of the nine sites (Site 1, 2, and 8) currently contain areas that are positive for wetland determination. Wetland Site 1 is approximately 0.4 miles from the proposed project site and is discussed below. The other wetland sites are over a mile from the proposed and alternative projects sites and are not further discussed. Figure 3.2 shows the location of Wetland Site 1 within the playa.

Wetland Site 1, located just inside the northwest base boundary, is a 17-acre depression that appears to have been natural in origin and diked to enhance runoff retention (USAF, 2001a). The 1991 wetland determination assigned 7.46 acres in the center of the site as jurisdictional wet meadow or playa lake wetlands, and 0.12 acres located at the northern end of the site as jurisdictional wet meadow or playa lake wetlands. However, the 2000 wetland determination recognizes only a 900 square foot "remnant" of the former center pond-like area as jurisdictional wet meadow or playa lake wetlands.

3.4.5 Noxious Weeds

The Colorado Department of Agriculture, Division of Plant Industry develops and coordinates integrated weed management programs in the state. "Noxious weed" is defined by the *Colorado Noxious Weed Act*, Section 35-5.5-103, C.R.S. (2000) as an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board, and meets one or more of the following criteria;

(a) Aggressively invades or is detrimental to economic crops or native plant communities;

(b) Is poisonous to livestock;

(c) Is a carrier of detrimental insects, diseases, or parasites;

(d) The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems.

The County Forestry and Noxious Weeds Department regulates noxious weeds and pests on public and private lands within its jurisdiction. The Air Force actively manages noxious weeds on Schriever AFB pursuant to Air Force Instruction (AFI) 32-1053, *Pest Management*. Schriever AFB implements mowing or spot herbicide treatment, applied by a commercial contractor under the

Table 3.4-1
Invasive Species Found on Schriever AFB (non-cantonment lands)

Common Name	Scientific Name	Acreage	Category*
Diffuse knapweed	*Centaurea diffusa*	3.0	A
Canada thistle	*Cirsium arvense*	1.9	A
Field bindweed	*Convolvulus arvensis*	25.4	A
Yellow sweetclover	*Melilotus officinalis*	2,023.7	B
Russian thistle	*Salsola iberica*	2,382.7	B
Goatsbeard	*Tragopogon dubius*	59.0	B
Tumble mustard	*Sisymbrium altissimum*	34.9	B
Kochia	*Kochia scorpia*	38.4	C

*A – Colorado top 10 weed species.
B – Not known as widespread in state, but has economic impact.
C – Other listed state species
Source: USACE, 2001

management of base Civil Engineering, to control noxious weeds.

According to an invasive plant species survey performed by the USACE in 2001, eight species of noxious weeds listed by the *Colorado Noxious Weed Act* were identified on base property. Table 3.4-1 lists these eight species and their associated acreages. Of the eight listed invasive plant species detected during the 2001 survey, two are found on the El Paso County list of noxious weeds. These were diffuse knapweed (*Centaurea diffusa*) and Canada thistle (*Cirsium arvense*). The survey reports that diffuse knapweed was present in a 3.0-acre patch along the east side of Enoch Road, and that Canada thistle populations exist in several patches totaling 1.9 acres in rangeland bordering the west side of Enoch Road. Base personnel have noticed an increase of noxious weeds since the 2001 survey. The increase of noxious weeds may be attributed to the overgrazing of cattle herds on the installation.

3.5 ENVIRONMENTAL JUSTICE

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed by the President on February 11, 1994. This EO requires that each federal agency identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. In order to evaluate these potential effects, demographic data on minority populations and low-income populations are provided in this section.

The terms “low-income” and “minority” are defined according to guidance published by the Air Force Center for Environmental Excellence (AFCEE). Under this guidance, “low-income” is defined as persons below the poverty level. “Minority” means persons designated in census data as Black (African-American); American Indian, Eskimo, or Aleut (Native American); Asian or Pacific Islander (now two separate designations in the 2000 Census); Other; or of Hispanic origin

(AFCEE, 1997). The 1997 AFCEE Guidance did not address the new census category, "Two or more Races;" for this analysis, that category is also considered as a minority. According to the United States Bureau of Census (USBC) definition (USBC, 2001), the Hispanic origin designation is separate from the ethnic (racial) designation, as "people who identify their origin as Spanish, Hispanic, or Latino may be of any race." Within this document, to eliminate double-counting, the Hispanic population is differentiated from ethnic (racial) minority populations.

Environmental Justice also takes into consideration EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which was signed by the President on April 21, 1997. This EO requires that each federal agency identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on children, who are more at risk because of developing body systems, comparatively higher consumption-to-weight ratios, behaviors that may expose them to more risks and hazards than adults, and less ability than adults to protect themselves from harm.

In accordance with AFCEE guidance, an environmental justice analysis only needs to be done when there is a potential for adverse (significant) environmental impacts (AFCEE, 1997). The SIDC would be constructed within base boundaries. At its closest point, construction would occur about 2,000 feet (0.4 miles) from the base boundary. The area surrounding Schriever AFB is sparsely populated, with about 280 people within census blocks within about one mile of the project area.

Data from the 2000 Census of Population and Housing indicate that the area surrounding Schriever AFB has a lower percentage of minorities than El Paso County and the State of Colorado. Table 3.5-1 summarizes the proportions of ethnic, Hispanic, and low-income populations in El Paso County. Per capita income in 1999 for the area near Schriever was about $17,500. The 1999 per capita income for El Paso County was $22,005, which represents nearly 92 percent of Colorado's per capita income and 102 percent of the U.S. per capita income (USBC, 2004).

3.6 SAFETY

The Air Force, in accordance with Air Force Policy Directive 91-2 *Safety Programs*, has established instructions and programs to enhance the safety of personnel on AFBs. Two areas of safety are considered for this EA – transportation safety in the vicinity of Irwin Avenue and Enoch Road, and potential radiofrequency hazards in the vicinity of the proposed antenna farm for the proposed SIDC facility.

3.6.1 Traffic Safety

The intersection of Irwin Avenue and Enoch Road is currently congested from 0630 to 0800 and from 1500 to 1645 (Lawrence, 2005). Traffic flow at the corner of Irwin and Enoch is currently controlled by a stop sign on Irwin Avenue.

3.6.2 RFR

Electromagnetic radiation (EMR) is defined as the transmission of energy by electromagnetic waves traveling at the speed of light. EMR travels through the atmosphere at different wavelengths and frequencies, depending on the source

Table 3.5.1
Census 2000 Characteristics:
Population Segment as a Percentage of the Total Population, Proposed Sites Vicinity

	Census blocks in affected area[1]	El Paso County	CO
White (a)	92.2%	81.2%	82.8%
Black or African American (a)	1.8%	6.5%	3.8%
American Indian and Alaska Native (a)	1.4%	0.9%	1.0%
Asian (a)	0.4%	2.5%	2.2%
Native Hawaiian and Other Pacific Islander (a)	0.0%	0.2%	0.1%
Some other race (a)	3.2%	4.7%	7.2%
Two or more races	1.1%	3.9%	2.8%
Hispanic Origin (can be any race)	9.6%	11.3%	17.1%
Children (age 17 or less)	29.1%	27.6%	25.6%
Below poverty level[2]	5.4%	8.0%	9.3%

(a) Includes persons reporting only one race. Population by race is from Census 2000 Summary File 1.
[1] Census blocks off-base within 2 miles of the proposed site.
[2] Values for the percent of persons below poverty level are from Census 2000 Summary File 3.
Sources: USBC, 2004.

from which they are generated. The wavelength of EMR is the distance traveled during one cycle, while the frequency is the number of waves formed in a unit of time, most commonly measured in waves per second. One wave per second is a hertz (Hz). Transmitters and receivers that support missions at Schriever AFB generally utilize RFR. Radio waves vary from 10,000 Hz (10 megahertz, or MHz) to 300 gigahertz (GHz) (one GHz equals one billion cycles per second).

The RFR environment at any location consists of natural (the sun, Earth's magnetic field, and lightning) and manmade (radio and television stations, navigation aids, radar, and electrical equipment, such as computers, lighting, and appliances) sources. RFR fields are generally measured by the power density generated, in watts per square meter (W/m^2) or milliwatts (one –thousandth of a watt) per square centimeter (mW/cm^2). Typically, the strength of electromagnetic fields decreases as the inverse square of the distance between two points. For example, as the distance from a source increases 5 times, the strength of the field would decrease 25 times. Guidelines (not Federally enforceable standards) have been established to protect human health and safety from excessive RFR. Due to potential health hazards at varying frequencies, these standards are based on the frequency of the RFR transmitted. Air Force Occupational Safety and Health (AFOSH) Standard 48-9 sets a PEL for exposure in uncontrolled environments (where people who are not aware of the existence of RFR currents would have access) at the frequency in MHz generated by the equipment divided by 1,500, measured in mW/cm^2. For example, if the frequency is 1,800 MHz, the PEL would be 1.33 mW/cm^2. The Air Force has defined safety areas around RFR equipment at Schriever AFB, with areas above PELs fenced off with warning signs.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4. ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential for significant impacts to the human environment as a result of implementing any of the four Alternatives. As defined in 40 CFR Section 1508.14, the human environment is interpreted to include natural and physical resources, and the relationship of people with those resources. Accordingly, this analysis has focused on identifying types of impacts and estimating their potential significance. This chapter discusses the effects that the Alternatives could generate on the environmental resource areas described in Chapter 3.

The concept of "significance" used in this assessment includes consideration of both the context and the intensity or severity of the impact, as defined by 40 CFR 1508.27. Severity of an impact could be based on the magnitude of change, the likelihood of change, the potential for violation of laws or regulations, the context of the impact (both spatial and temporal), and the resilience of the resource. Significant impacts are effects that are most substantial and should receive the greatest attention in decision making. Impacts that are not significant include those that result in little or no effect to the existing environment and cannot be easily detected. If a resource would not be affected by a proposed activity, a finding of no impact was declared. If a resource would be improved by a proposed activity, a beneficial impact was noted.

This chapter is organized by resource element in the same order as introduced in Chapter 3. This chapter provides a discussion of the analysis methods and the potential impacts of the Alternatives. Best management practices are included in the discussion as well as mitigation measures. The chapter concludes with an evaluation of the relationships between short-term uses of the environment and long-term productivity, cumulative impacts, and irreversible and irretrievable commitments of resources.

4.1 AIR RESOURCES

Air quality would not change under the No Action Alternative (Alternative 1). The Proposed Action (Alternative 2) would have short-term, but not significant, impacts on air quality generated by construction and operation of the proposed SIDC. If emergency generators would be installed, they would likely require an APEN. The Proposed Action conforms to the SIP and is exempt from further conformity review (this is discussed in more detail below). Schriever AFB could potentially become a major source of criteria pollutants, but would remain below the thresholds for PSD review requirements. The base would continue to be a minor source of HAPs. Impacts from the Siting Alternative (Alternative 3) would be similar to the Proposed Action.

4.1.1 Analysis Methods

The analysis was based on a review of existing air quality in the region, the latest air emissions inventory for Schriever AFB, projections of emissions from the proposed activities, a review of the federal and Colorado regulations for air quality, and the use of air emission factors from the USEPA and U.S. Air Force (USAF).

4.1.2 Potential Impacts of Alternative 1 – No Action Alternative

Emissions of criteria pollutants and HAPs would remain the same under the No Action Alternative. Impacts from the No Action Alternative would not be significant.

4.1.3 Potential Impacts of Alternative 2 - Proposed Action Enoch Road and Irwin Avenue

Phases I and II

Construction of the proposed SIDC facility would generate emissions of criteria pollutants from grading, construction equipment, trucks driving on paved and unpaved roads, and worker vehicles. Approximately 7 acres of soil would be disturbed during construction of Phase I and II. An El Paso County Dust Control Permit would be needed since the project would disturb more than one acre. A Colorado APEN would not be needed since ground disturbance would be less than 25 acres and less than six months in duration (the time of disturbance is only counted for days when particulate emissions are uncontrolled). The majority of emissions would be generated by operation of construction equipment and worker vehicle trips. Estimated emissions from construction are shown in Table 4.1-1. Best management practices (such as application of water or chemical stabilizers to disturbed areas as needed, and revegetating sites as soon as possible) would be implemented to control fugitive dust (a source of PM_{10}).

The Proposed Action could include the installation and operation of about four emergency generators for backup power for the SIDC. Emergency generators are considered stationary sources, subject to APEN requirements and Standards of Performance for New Stationary Sources. These generators would likely be similar to those recently installed at Building 712 (with a capacity of 1,350 horsepower). The design rating of the generators would be approximately 3.4 million British thermal units per hour. These generators would likely need an APEN and would be added to the construction permit for the base. Estimated actual emissions from these generators are shown in Table 4.1-2. The total estimated emissions from permitted stationary sources at the base would remain within permit limits.

Boilers for space heating at the proposed SIDC would be installed and operated as part of the project. Estimated emissions from the boilers are shown in Table 4.1-2. Due to the amount of emissions generated from these boilers, they would be exempt from APEN permit requirements.

The total actual emissions of NO_x from stationary sources at the base would increase to an estimated 26.11 tons per year if the emergency generators and boilers are installed at the SIDC, with lesser amounts of other criteria pollutants. If the emergency generators are installed and operated at the SIDC, the estimated potential to emit NO_x from permitted and non-permitted sources at the base would exceed 100 tons and Schriever AFB would become a major source unless the potential to emit was reduced to below 100 tons per year through smokestack testing at

Table 4.1-1
Air Pollutant Generation from Construction
Proposed Action (tons per year)

	CO	VOCs	NO_x	SO_x	PM_{10}	HAPs
Phase I and II						
Construction emissions	6.54	0.66	4.61	0.71	1.95	0.09
Regionally significant	9,855.00					
Conformity thresholds	100.00					
Phase III						
Construction emissions	6.38	0.66	4.07	0.63	2.23	0.09
Regionally significant	9,855.00					
Conformity thresholds	100.00					

Source: Calculated with emission factors from USEPA, 1995b; USEPA, 1998a; USEPA, 2001; USEPA, 2003b; USEPA, 2004a; and USEPA, 2004b; USAF, 2002.
Regionally significance and conformity thresholds per 40 CFR 51, Subpart W

Table 4.1-2
Estimated Stationary Emissions from the Proposed Action with Emergency Generators
(values in tons per year)

	PM_{10}	$PM_{2.5}$	SO_x	NO_x	VOCs	CO	HAPs
Actual Emissions							
Current Stationary, Permitted[1]	0.37	0.33	0.11	15.89	0.49	4.85	0.04
Proposed SIDC Generators	0.01	0.01	0.00	1.35	0.03	0.04	0.00
Projected Stationary, Permitted	**0.37**	**0.33**	**0.11**	**17.25**	**0.52**	**4.89**	**0.04**
Current Stationary, Non-permitted[2]	0.67	0.66	0.18	8.60	1.55	6.52	0.63
Projected SIDC Boilers Phase I & II	0.02	0.02	0.00	0.26	0.01	0.22	0.00
Total Stationary with Phase I &II	**1.06**	**1.01**	**0.29**	**26.11**	**2.08**	**11.63**	**0.67**
Projected SIDC Boilers Phase III	0.00	0.00	0.00	0.06	0.00	0.05	0.00
Total Stationary with Phase III	**1.06**	**1.01**	**0.29**	**26.16**	**2.09**	**11.68**	**0.67**
Increase from Current Emissions	***0.03***	***0.03***	***0.00***	***1.67***	***0.05***	***0.30***	***0.01***
Potential to Emit							
Stationary, Permitted[1]	1.52	1.37	2.46	60.46	1.87	18.76	0.16
Proposed SIDC Generators	0.06	0.05	0.01	5.63	0.14	0.16	0.00
Projected Stationary, Permitted	**1.57**	**1.42**	**2.47**	**66.10**	**2.01**	**18.92**	**0.16**
Permit limits	*100.00*	*100.00*	*30.00*	*68.00*	*20.00*	*30.00*	*25.00*
Stationary, Non-permitted[2]	2.81	2.79	1.72	38.11	8.69	94.30	15.33
Projected SIDC Boilers Phase I&II	0.04	0.04	0.00	0.52	0.03	0.44	0.01
Total Stationary with Phase I &II	**4.42**	**4.25**	**4.19**	**104.73**	**10.73**	**113.65**	**15.50**
Projected SIDC Boilers Phase III	0.01	0.01	0.00	0.11	0.01	0.10	0.00
Total Stationary with Phase III	**4.43**	**4.26**	**4.19**	**104.85**	**10.73**	**113.75**	**15.50**
Major Source Thresholds	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*25.00*
Increase from Current Emissions	*0.10*	*0.10*	*0.01*	*6.28*	*0.17*	*0.69*	*0.01*

[1] Permitted under Colorado Construction Permit finalized on November 4, 2004. Permitted sources include 4 boilers and 14 generators.
[2] Stationary fugitive sources are not included, per 40 CFR 52.20 and 5 CCR 1001, Regulation 3, Part A, Section I.B.23.b.
Sources: USAF, 2003c (modified); CDPHE, 2004
Calculated with emission factors from USEPA, 1995a; USEPA, 1996; USEPA, 1998b; USEPA, 1998c; USEPA 2004c; USAF, 1999.
Some numbers do not add due to rounding. See Table 3.1-2 for current actual and potential stationary source emissions.

Table 4.1-3
Estimated Stationary Emissions from the Proposed Action without Emergency Generators
(values in tons per year)

	PM_{10}	$PM_{2.5}$	SO_x	NO_x	VOCs	CO	HAPs
Actual Emissions							
Current Stationary, Permitted[1]	**0.37**	**0.33**	**0.11**	**15.89**	**0.49**	**4.85**	**0.04**
Current Stationary, Non-permitted[2]	0.67	0.66	0.18	8.60	1.55	6.52	0.63
Total Stationary Emissions[2]	**1.03**	**0.98**	**0.29**	**24.49**	**2.04**	**11.38**	**0.66**
Projected SIDC Boilers Phase I & II	0.02	0.02	0.00	0.26	0.01	0.22	0.00
Total Stationary with Phase I &II	**1.05**	**1.00**	**0.29**	**24.75**	**2.05**	**11.59**	**0.67**
Projected SIDC Boilers Phase III	0.00	0.00	0.00	0.06	0.00	0.05	0.00
Total Stationary with Phase III	**1.06**	**1.01**	**0.29**	**26.16**	**2.09**	**11.68**	**0.66**
Increase from Current Emissions	***0.03***	***0.03***	***0.00***	***1.67***	***0.05***	***0.30***	***0.01***
Potential to Emit							
Stationary, Permitted[1]	**1.52**	**1.37**	**2.46**	**60.46**	**1.87**	**18.76**	**0.16**
Permit limits	*100.00*	*100.00*	*30.00*	*68.00*	*20.00*	*30.00*	*25.00*
Stationary, Non-permitted[2]	2.81	2.79	1.72	38.11	8.69	94.30	15.33
Total Stationary Emissions[2]	**4.33**	**4.16**	**4.18**	**98.57**	**10.56**	**113.06**	**15.49**
Projected SIDC Boilers Phase I&II	0.04	0.04	0.00	0.52	0.03	0.44	0.01
Total Stationary with Phase I &II	**4.37**	**4.20**	**4.18**	**99.10**	**10.58**	**113.50**	**15.50**
Projected SIDC Boilers Phase III	0.01	0.01	0.00	0.11	0.01	0.10	0.00
Total Stationary with Phase III	**4.38**	**4.21**	**4.18**	**99.21**	**10.59**	**113.60**	**15.50**
Major Source Thresholds	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*25.00*
Increase from Current Emissions	*0.05*	*0.05*	*0.00*	*0.64*	*0.03*	*0.54*	*0.01*

[1] Permitted under Colorado Construction Permit finalized on November 4, 2004. Permitted sources include 4 boilers and 14 generators.

[2] Stationary fugitive sources are not included, per 40 CFR 52.20 and 5 CCR 1001, Regulation 3, Part A, Section I.B.23.b.

Sources: USAF, 2003c (modified); CDPHE, 2004

Calculated with emission factors from USEPA, 1998b; USEPA, 1998c; USEPA, 2004c; and USAF, 1999.

Some numbers do not add due to rounding. See Table 3.1-2 for current actual and potential stationary source emissions.

the Central Heat Plant, or further reducing the potential to emit from existing permitted and non-permitted sources. If the generators are not installed, Schriever AFB would likely remain below the thresholds for a major source of NO_x. Actual and potential emissions of other criteria pollutants, and HAPs, would minimally increase and would not be significant.

Estimated emissions would not exceed the NAAQS or CAAQS due to the amount of criteria pollutants generated (see Tables 4.1-1 and 4.1-2), the relatively large area in which the emissions would occur, and the dispersive meteorological conditions (winds average between 8 and 12 miles per hour) in which the emissions would be generated. Therefore, the focus of the analysis centers on conformity with the SIP for the CO maintenance area.

Schriever AFB, as part of the Colorado Springs Metropolitan Area, is located within a maintenance area for CO. Emissions would be regionally significant if they exceeded 10 percent of the inventory for any affected pollutant (in this case, CO). The SIP budget for CO in the Colorado Springs Metropolitan Area is 270 tons per day, or 98,550 tons per year. Emissions from the Proposed Action do not comprise 10 percent of the daily inventory and are not regionally significant.

Conformity thresholds, as defined in 40 CFR 51, Subpart W, are used to determine conformity with a SIP. The threshold for CO is 100 tons per year. An exceedance of this threshold would result in non-conformity with the SIP. Estimated emissions from the Proposed Action are less than this threshold, would conform to the SIP, and are not significant. The Proposed Action is not regionally significant and the total direct and indirect emissions would be below the 100 tons per year de minimus threshold for CO. Therefore, this project is exempt from further conformity analysis pursuant to 40 CFR 93.153.

Construction equipment and the proposed emergency generators and boilers at the SIDC would generate small amounts of HAPs. Actual emissions and the potential to emit HAPs from stationary sources (see Table 4.1-2) would remain below the thresholds of a major source. These emissions would not be significant.

Detailed calculations of air emissions are shown in Appendix B. Because the activities would not exceed or contribute to an exceedance of air quality standards and would conform with the SIP, the impacts would not be significant. No other air pollutants of note would be generated from the project.

The Proposed Action would have unavoidable short-term and long-term impacts on air quality. Exhaust emissions from construction equipment would be generated, and fugitive dust would be generated during construction activities. These emissions would not be significant, given the short duration of time for the activities. Other emissions from construction would be unavoidable, but not significant. Long-term emissions from the proposed generators and boilers would be

generated, but these emissions would not be significant.

Phase III

An additional three acres would be disturbed during construction of Phase III. An El Paso County Dust Control Permit would be needed; however, a Colorado APEN would not be needed. Air emissions from construction would not be significant.

Estimated emissions from installation and operation of boilers for space heating at the proposed SIDC (Phase III) are shown in Table 4.1-2. Due to the amount of emissions generated from these boilers, they would be exempt from APEN requirements. Emissions would not exceed the NAAQS or CAAQS, would conform with the SIP, and would not be significant. Phase III of the project would be exempt from further conformity analysis pursuant to 40 CFR 93.153.

4.1.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

Impacts from this Alternative would be similar to those described under Alternative 2. Impacts from construction would be about the same as those described in Alternative 2 even though a parking lot would not be built at this location. This site would need somewhat more grading than the Alternatives 2 and 3 due to the steep slopes near the center of this site. Impacts from operation (emergency generators and boilers) would be the same as those described under Alternative 2.

4.2 GEOLOGICAL RESOURCES

Geological resources are limited, non-renewable earth resources whose characteristics can easily be degraded by physical disturbances. About two acres of alluvial sands and gravel would be excavated to a depth of up to 15 feet for construction of Phase I of the SIDC. Topography and soils would be directly impacted from grading and compaction by equipment during construction. About 10 acres of soil would be disturbed by Phases I, II, and III. Impacts would not be significant. Siting Alternative 3 would potentially require more grading and site preparation due to the presence of a drainageway near the center of the site. Locating Phase III of the SIDC in the 800 area of the base would disturb about four to five acres, but would not be significant. Geological resources would not be impacted under the No Action Alternative.

4.2.1 Analysis Methods

The geological resources within the proposed project area were studied to determine the potential impacts from implementing any of the three alternatives. Geological studies, the soil survey for the El Paso County area, previous EAs, topographic contours from Schriever AFB, and a USGS topographical map were reviewed to characterize the existing environment. Construction activities that could influence geological resources were evaluated to predict the type and magnitude of potential impacts. For example, soils would be disturbed by grading, excavating, and compacting during construction activities. The predicted post-

construction environment was compared to the existing environment and the change was evaluated to determine if significant changes in any existing conditions would occur.

4.2.2 Potential Impacts of Alternative 1 - No Action Alternative

The proposed SIDC facilities would not be constructed under the No Action Alternative; therefore, geological resources would not be impacted.

4.2.3 Potential Impacts of Alternative 2 - Proposed Action Enoch Road and Irwin Avenue

Only areas within the base boundaries would be disturbed by construction of the proposed SIDC; no areas off-base would be physically disturbed.

Phases I and II

An area of about 20,000 square feet (0.5 acres) would be excavated to a depth of about 15 feet to construct a partial basement for Phase I and II of the proposed SIDC. An additional 1.5 acres would be excavated to depths ranging up to 8 to 10 feet during construction. An area of alluvial sediments (primarily sand and gravel) below the soil would be impacted. This disturbance would be short term, and impacts would not be significant. The remaining areas (about 5 acres) which would be disturbed for constructing the parking lot, firelane, access roads, and storm drainage would be disturbed to lesser depths, generally less than 5 feet. Alluvial sediments would not be disturbed in these areas and impacts would not be significant.

As discussed in Section 3.2, there are no major faults in the project area. The area is located in Zone 1 for potential earthquake damage with slight damage anticipated from any seismic event. No special design would be required. Impacts from seismicity would not be significant.

Phase I and II of the proposed SIDC would be constructed in areas ranging from about 6,275 to 6,300 feet in elevation. The slope ranges from about 1 to 3 percent in this area. The area for the proposed parking lot (about 1.5 acres) would be graded and leveled and areas around the proposed SIDC would be graded for storm water drainage. The topography at the site would undergo minor changes, but impacts would not be significant.

About 7 acres of Ascalon soils would be disturbed by grading, excavation, and compaction from equipment during construction of Phase I and II of the proposed SIDC. Installation of utilities would disturb a total of about 5,500 linear feet. Assuming a 5-foot wide corridor is disturbed, about 0.3 acres would be impacted. The affected areas would be regraded after this disturbance.

Disturbance of these soils during construction activities would expose the soil to potential erosion by wind and water. If the soil was left disturbed for extended periods of time, erosion could be substantial, as most of these soils have a moderate risk of erosion by wind and water. Due to the limited area impacted and the length of construction, impacts to soils would not be significant. Best management

practices (such as daily watering as needed, chemical stabilization, maintaining existing vegetation as much as possible, and revegetating sites as soon as possible) would be implemented to reduce the risk of wind erosion. An El Paso County grading permit would be required for this project, since it would disturb more than one acre. The permit includes mandatory controls to reduce potential erosion and a drainage plan to control storm water runoff (and potential erosion) during construction. Storm water runoff could be controlled by sediment barriers such as silt fences or straw bales, or structural controls such as a temporary sediment basin. Measures to control erosion must conform with the City of Colorado Springs/El Paso County Drainage Criteria Manual (CCS, 1994; CCS, 2002). The El Paso County Land Development Code also requires a final site plan for stabilizing steep slopes and limiting storm water runoff from completed structures. The best management practices listed above would be implemented in accordance with County requirements.

Engineering studies would be conducted to determine the suitability of the soils to support construction of the proposed building, roads, and parking lot. As discussed in Section 3.2.2, the Soil Survey for El Paso County indicates that there are moderate limits for construction due to a moderate shrink-swell potential, frost action, low strength of soils, and piping. A combination of design and soil modification (changing physical properties, such as soil texture) can be used to overcome these limits. Impacts to soils from construction would not be significant.

Long-term soil productivity in affected areas would not be significantly impacted. Topsoil would be restored to disturbed areas and vegetation would be reestablished, maintaining soil productivity.

Phase III

Construction of Phase III would minimally impact the alluvial sand and gravel layers during excavation of footings. Impacts would not be significant. No special seismic designs would be needed. The site of the proposed Phase III (southwest of Enoch Road and Irwin Avenue) ranges from about 6,270 to 6,275 feet in elevation, with slopes of about 1 percent. Impacts from construction to topography would be minor, and not significant.

Construction of Phase III would disturb about 3 acres of Ascalon soils. Engineering studies would be conducted to determine the suitability of the soils to support construction. Impacts would not be significant.

Topography in the “800” area of the base generally ranges from gently sloping (one percent or less slope) to rolling (up to 5 percent slope).

Soils in the “800” area include Ascalon sandy loam and Sampson loam. If this site is chosen for construction, engineering studies would be conducted to determine the suitability of the soils to support the proposed building, roads, and parking lot. Both of these soils have moderate limitations for construction of buildings and roads due to low strength, and moderate shrink-swell and frost action potential. The Sampson loams are less erosive than

the Ascalon sandy loams. If Phase III is sited in this area, the drainageway to the east of Buildings 805, 810, and 812 should be avoided due to flooding and a high potential for erosion.

The distance to existing utilities varies. Depending on where the Phase III facilities would be developed, water and electric lines would need to be extended 500 to 3,500 feet. Communication lines would need to be extended about 1,100 to 4,100 feet. Sewer and gas lines would need to be extended about 2,600 feet. Assuming a 5-foot wide corridor of disturbance, between one and two acres would be disturbed to a depth of about 3 feet. Construction would be subject to permit requirements and impacts to soils would not be significant.

4.2.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

Impacts to alluvial sediments and seismicity would be similar to those described under Alternative 2, and would not be significant. Slopes at this site are steeper than the proposed site, generally ranging from 3 to 9 percent. A drainageway oriented in an easterly direction cuts across the middle of this site. Depending upon the final design, this drainageway might be altered or filled. Moderate to potentially large amounts of fill could be required to construct the SIDC at this site. Soils at this site are more highly erodible than at the proposed site (Alternative 2). An El Paso County grading would be required. Erosion control measures similar to those discussed under Alternative 2 would be implemented, and impacts would not be significant.

Existing primary gas and communication lines are adjacent to this site. Water, sewer, and electric lines are within 600 feet. About 0.3 acres would be disturbed, and impacts would not be significant.

4.3 WATER RESOURCES

Constructing the proposed SIDC would not disturb the unconfined surficial aquifer. Impacts to groundwater would not be significant. The project would not impact waters of the U.S. Impacts to surface water from erosion or storm water runoff would not be significant. There would not be any long-term impacts to water resources from water usage or storm water flow. Site Alternative 3 for Phases I and II would potentially impact a drainageway flowing to an intermittent stream. If the No Action Alternative were selected, there would be no change in water resources.

4.3.1 Analysis Methods

To establish the potential impacts of the Proposed Action, Siting Alternative, and the No Action Alternative, documents on the hydrology and hydrogeology of the area were reviewed. Maps showing topography, watersheds, and base drainage were examined. The review focused on the proximity of the proposed activities to surface waters, hydrogeology in the project area, and water quality in the local area. Federal Emergency Management Agency Flood Insurance Rate Maps were reviewed to identify floodplains in the project areas. The assessment of potential impacts focused on the potential for impacting water quality, stormwater flow, and physical changes impacting aquifers and surface water.

4.3.2 Potential Impacts of Alternative 1 - No Action Alternative

Under the No Action Alternative, there would be no impact to groundwater, surface water, or floodplains.

4.3.3 Potential Impacts of Alternative 2 - Proposed Action Enoch Road and Irwin Avenue

Phases I and II

About 0.5 acres would be excavated to a depth of about 15 feet to construct a partial basement for Phases I and II of the proposed SIDC. An additional 1.5 acres would be excavated to depths ranging up to 8 to 10 feet during construction. An area of alluvial sediments (primarily sand and gravel) would be impacted. The unconfined alluvial aquifer, at depths of 25 to 100 feet, would not be directly impacted. Disturbance from the excavation would be short term, and impacts would not be significant. A spill or leak of fuel or lubricants is not likely during excavation in this area, but if one occurs, it would be cleaned up immediately in accordance with the Schriever AFB Spill Response Plan, to prevent contamination of the aquifer. Given the small amount of oil and fluids used by construction equipment, impacts to the water quality of aquifers underlying the base would not be significant. Wells obtaining stock and domestic water in the vicinity of the base would not be impacted by the Proposed Action.

Construction of the proposed SIDC would increase impermeable surfaces by about three acres, slightly decreasing the recharge area of the unconfined surficial aquifer. This site also overlies the perennially saturated Laramie-Fox Hills and Arapahoe Aquifers. This would negligibly impact recharge of these aquifers. Impacts to the aquifer system would not be significant.

Disturbed areas would be vulnerable to wind and water erosion during grading of the site and construction. Particulate matter would be transported and deposited by wind in the local area. Deposition of particulate matter and siltation of streams would not be significant due to the dispersive wind conditions and small amounts of particulate matter that would be generated by the construction activities (see Section 4.1). Soil disturbed during construction would be watered as needed to control wind erosion. Water erosion could occur on steeper slopes near storm water drainage channels at the edges of the site (see Figure 3.1), but would not be significant due to NPDES permit requirements to prevent an increase in sediment yield and flow velocity from pre-construction conditions. This would include such practices as installing and maintaining silt fences near drainage channels, limiting the area disturbed to the extent practical, installing a sediment basin as needed, and stabilizing soil as soon as practical. Native vegetation would be reestablished as soon as practical after construction of the facilities. Impacts to water quality from construction would be minimal, temporary, and would not be significant.

The existing drainage channels near Enoch Road and Irwin Avenue would not be substantially altered. Current

plans are to construct an access road to the site from Blue Road and/or Irwin Avenue. A culvert could be placed at this crossing to maintain storm water flow. The remainder of the proposed construction activities would not directly impact any stream or drainage channel. As discussed in Section 3.3, drainage channels which drain to intermittent streams are not considered waters of the U.S. unless there is an ordinary high water mark within the channel. An inspection of the site and aerial photos do not indicate the presence of an ordinary high water mark.

Construction of about three acres of impermeable surfaces would slightly increase the amount and potential velocity of stormwater flow from rain events, but impacts to the existing stormwater system would not be significant. An adequately designed storm water flow system would be incorporated in the construction of Phase I and II facilities to prevent an increase in sediment yield and flow velocity from pre-construction conditions (this could include a sediment basin or a velocity dissipation structure). Post-construction impacts to water quality would be minimal and would not be significant.

The proposed construction would not impact any floodplains.

No long-term impacts are anticipated to result from the Proposed Action. Water usage on Schriever AFB would not substantially increase. A minimal increase in wastewater would be handled by the existing wastewater discharge system. No significant impacts to water resources would occur from Phase I and II of the Proposed Action.

Phase III

Two sites are being considered for Phase III of the SIDC. Impacts to groundwater at either site would be similar to the Proposed Action and would not be significant.

The site being considered south of the proposed Phase I and II of the SIDC is located near a drainageway and just north of a tributary of an intermittent stream. As discussed in Section 3.3, this drainageway was identified as waters of the U.S. in the 2001 Integrated Natural Resources Management Plan, but the extent of potential waters of the U.S. is unclear. There are no indications of an ordinary high water mark associated with most of this drainageway.

The alternative location for Phase III, in the "800" area of the base is west of an intermittent stream which flows off-base and toward Chico Creek (see Figure 3.1). Potential locations for Phase III in this area have not yet been defined, but other than the intermittent stream, the area has no surface water features except two small ephemeral lakes about 0.3 miles to the west of existing buildings in the area. Impacts from constructing Phase III of the SIDC in this area would minimally impact surface water flow and quality.

Best management practices similar to those discussed for Phase I and II would be implemented (both during and after construction). Impacts to water quality from construction would be minimal and temporary and would not be significant.

4.3.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

Impacts would be similar to the Proposed Action. A somewhat smaller area would be impacted by construction of the SIDC at this location because there would not be sufficient space to construct the proposed parking lot at this site.

An ephemeral drainageway flows from west to east across the middle of this site. Due to space limitations at this site, it would be difficult to construct the SIDC without filling in or altering the drainageway. This would impact about 360 linear feet of streambed. With implementation of best management practices, impacts to surface water flow and quality would not be significant. As discussed under Alternative 2, permanent stabilization of the site after construction would be required. Measures must be implemented to prevent an increase in sediment yield and storm water flow velocity above pre-construction conditions.

4.4 BIOLOGICAL RESOURCES

Impacts to biological resources would result primarily from construction activities associated with excavation and grading for the new SIDC. These activities would include digging, grading, stockpiling soil, and compaction from construction equipment. The effects of all three phases of construction would remove approximately 10 acres of vegetation. No critical habitat, threatened or endangered species, or wetlands would be affected by the Proposed Action, and (assuming best management practices are followed) no increases in noxious weed populations are expected. Therefore, impacts to biological resources would not be significant. Impacts to biological resources from the siting alternative would be similar to those described under Alternative 2; however, less acreage disturbance would occur as no parking lots would be constructed. Under the No Action Alternative, there would be no change in the biological environment of the project area.

4.4.1 Analysis Methods

The assessment of potential impacts to biological resources focused on the proposed location of the SIDC and the existing habitat in areas with planned project activities. The *Integrated Natural Resources Management Plan for Schriever AFB* (USAF, 2001b), the *Natural Heritage Inventory of Schriever AFB* (USAF, 2000), the *Wetlands Re-examination of Schriever AFB* (USAF, 2001a), the *General Plan for Schriever AFB* (USAF, 2003e), the *Survey of Critical Biological Resources in El Paso County* (CNHP, 2001), the *Management Plan for Black-tailed Prairie Dogs* (USAF, 2005b), and the *Invasive Plant Species Survey and Management Guidelines for Schriever AFB* (USACE, 2001) were reviewed, along with past NEPA documents, to provide data on existing biological resources in the project area. Scoping was conducted with the Colorado Division of Wildlife, USFWS, and the Colorado Natural Heritage Program (see Appendix A).

4.4.2 Potential Impacts of Alternative 1 – No Action Alternative

Under the No Action Alternative, the SIDC would not be constructed. Subsequently, current conditions in the project area would not change and no impacts to biological resources would occur.

4.4.3 Potential Impacts of Alternative 2 – Proposed Action Enoch Road and Irwin Avenue

Phases I and II

The loss of seven acres of vegetation and temporary displacement of wildlife during construction activities would be an unavoidable impact, but not significant. Best management practices and control measures would be implemented to ensure that impacts to biological resources are kept at a minimum. The amount of vegetation disturbed during construction activities would be kept to the minimum amount required. Taking into account the normal application of best management practices during construction of the SIDC (e.g., measures to control soil erosion and replacement of vegetation as soon as possible), the impacts to biological resources would not be significant. The Schriever playas and associated wetland site 1, located to the north and west of the project site, would not be disturbed during construction of the SIDC (see Figure 3-2). Plains ragweed has not been observed on the proposed SIDC site and the current community associated with the playa would not be disturbed.

Although sites would be revegetated with grasses, which would help to control weed growth, additional measures to control weeds may be needed. Noxious weeds may persist on-site after the SIDC is constructed. The grounds maintenance personnel would continue to manage noxious weeds by timely mowing, spraying, and pulling of the weeds by hand. With the continued rigorous management of noxious weeds practiced on base, impacts from construction of the SIDC is not expected to have a significant impact on the spread of noxious weeds.

Wildlife such as Pocket gophers, Ord's kangaroo rat, prairie voles, deer mice, black-tailed jackrabbits, western harvest mouse, thirteen-lined ground squirrel, and desert cottontail could be displaced as part of the action. Impacts to these species are not considered significant due to the mobility of these species to seek similar habitat in the surrounding area. Once the SIDC is constructed, the contractor would be required by the grading permits to revegetate the open areas within two weeks of completing construction. The wildlife species previously displaced would readily return to the area. No long-term impact to wildlife would occur.

Prior to construction of the SIDC, base personnel would conduct a survey of the project site to identify any prairie dog dens and burrowing owls. If burrowing owls are located in the project area, construction would be postponed until after the last burrowing owls have abandoned their nests. Prairie dogs would be managed in accordance with the base's management plan for black-tailed

prairie dogs (USAF, 2005b). No significant impacts to species of special concern would occur under the Proposed Action (USFWS, 2005).

Phase III

Approximately three acres of vegetation and temporary displacement of wildlife during construction for Phase III would be an unavoidable impact, but not significant. Best management practices and control measures would be implemented to ensure that impacts to biological resources are kept at a minimum. The amount of vegetation disturbed during construction activities would be kept to the minimum amount required. Taking into account the normal application of best management practices during construction of Phase III (e.g., measures to control soil erosion and replacement of vegetation as soon as possible), the impacts to biological resources would not be significant.

The Schriever playas and associated wetland site 1, located to the north and west of the project site near Enoch Road and Irwin Avenue, would not be disturbed during Phase III construction activities. Plains ragweed has not been observed on this site and the current community associated with the playa would not be disturbed. A 2005 site survey of this site was conducted by base personnel and no prairie dog dens or burrowing owls were identified.

If the "800" area is chosen for the location of Phase III, the base would conduct a site survey for prairie dog dens and burrowing owls prior to construction. There are no potential conservation areas located in this project area.

4.4.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

Approximately four acres of vegetation and temporary displacement of wildlife during construction of the SIDC at this site would be an unavoidable impact, but not significant. Best management practices and control measures would be implemented to ensure that impacts to biological resources are kept at a minimum. The amount of vegetation disturbed during construction activities would be kept to the minimum amount required. Taking into account the normal application of best management practices during construction (e.g., measures to control soil erosion and replacement of vegetation as soon as possible), the impacts to biological resources would not be significant. There would be no impacts to prairie dog dens, burrowing owls, or other critical habitat at this location.

4.5 ENVIRONMENTAL JUSTICE

Activities related to the Proposed Action were evaluated to determine if they would disproportionately impact a minority population or low-income population, or children. None of the impacts from construction of the proposed SIDC would be significant, and they would not disproportionately impact a minority population or low-income population, or children. No significant environmental justice impacts were identified from the Proposed Action.

4.5.1 Analysis Methods

The potential impacts to air, water quality, soils, and biological and cultural resources were analyzed to determine if off-base populations could be impacted by significant changes to the environment. Demographic and income data was obtained from the U.S. Bureau of Census to characterize the population in the area near Schriever AFB.

4.5.2 Potential Impacts of Alternative 1 - No Action Alternative

Under the No Action Alternative, no impacts to the affected environment were identified. There would be no change in current conditions affecting low-income populations, minority populations, and children.

4.5.3 Potential Impacts of Alternative 2 - Proposed Action Enoch Road and Irwin Avenue

Phases I and II

Construction and operation of the SIDC would result in increased emissions of criteria pollutants, noise generated by construction equipment, and limited disturbance of soil, alluvial sediments, and surface water on Schriever AFB. None of these impacts would be significant. Emissions of criteria pollutants and HAPs would not exceed the NAAQS or CAAQS. Noise generated during construction and from occasional operation of the emergency generators would be near background levels at sensitive receptor locations on-base and at or below background levels off-base. Soil, sediment, and surface water disturbance would be limited to areas on base. The Proposed Action would take place in a sparsely populated area. According to the 2000 U.S. Census, there are 282 off-base residents within about one mile of the project. The percentages of minorities and population below the poverty level within this area are lower than the average for El Paso County and the State of Colorado. No disproportionate impacts to minority populations or low-income populations would occur. The proportion of children is slightly higher than the County average. However, no significant impacts from the Proposed Action have been identified and impacts to children would not be significant.

Phase III

No significant impacts would occur from construction and operation of Phase III of the SIDC at either of the proposed locations. No disproportionate impacts to minority populations, low-income populations, or children would occur.

4.5.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

No significant impacts would occur from construction and operation of the SIDC at this site. No disproportionate impacts to minority populations, low-income populations, or children would occur.

4.6 SAFETY

Traffic congestion and the potential for accidents near the intersection of Irwin Avenue and Enoch Road would increase with the Proposed Action.

Exposure to RFR would increase in the vicinity of the proposed antenna farm, but impacts would not be significant.

4.6.1 Analysis Methods

Traffic safety was assessed using information from the ground safety office at Schriever. Changes in the RFR environment were assessed using information from bioenvironmental engineering.

4.6.2 Potential Impacts of Alternative 1 - No Action Alternative

The No Action Alternative would not affect traffic or RFR safety, as no changes from existing conditions would occur.

4.6.3 Potential Impacts of Alternative 2 - Proposed Action Enoch Road and Irwin Avenue

Phases I and II

Traffic Safety

The Proposed Action would increase traffic to the area near the intersection of Irwin Avenue and Enoch Road and add at least one additional intersection to Irwin Avenue or Enoch Road. A traffic study is in progress to determine potential impacts and methods to reduce congestion and improve safety at this intersection. The results of the study will be implemented when it is completed, and impacts are not anticipated to be significant.

RFR Safety

The existing antennas that support the SIDC mission are located on the roof of the JNIC facility and would be moved to the roof of the new SIDC facility during Phase I. Safety impacts to controlled and uncontrolled environments would not be significant due to required setbacks, and controls such as fences and warning signs would be placed to control access in areas exposed to levels of RFR above PELs for uncontrolled environments. Procedures would be implemented to control occupational exposure in accordance with AFOSH Standard 48-9. A 3,000 square-foot antenna farm would be built during Phase II outside of the Restricted Area on the southwest corner of Enoch Road and Irwin Avenue (see Figure 2.1). The antenna farm would be constructed in close proximity to the new SIDC building while allowing for necessary safety and operational clearances and distance criteria from the new SIDC and other adjacent facilities. The antenna farm would be set back from Irwin Avenue and Enoch Road to allow sufficient distance for RFR safety zones, and a fence would be constructed to limit access where the RFR field would be above the PEL for uncontrolled environments. Currently, the safety zone is estimated at 24 meters (about 80 feet) (Stolzmann, 2005). There is sufficient room in this area to accommodate the antenna farm in this area while protecting public safety (see Figure 2.1). Procedures would be implemented to control occupational exposure in accordance with AFOSH Standard 48-9. Impacts to human health and safety would not be significant.

Phase III

Traffic Safety

Phase III would add additional traffic from facilities southwest of Irwin and Enoch.

RFR Safety

No additional sources of RFR would be added in Phase III. Two additional buildings would be constructed near the antenna field, but these could be located at a sufficient distance from the antennae, and would not interfere with transmission or reception of data. The buildings would be located outside of the fenced area surrounding the antenna field and people would not be exposed to RFR above the PEL. Impacts from Phase III would not be significant.

4.6.4 Potential Impacts of Alternative 3 – Navstar Street and Beltway

Traffic safety impacts would not be significant at this location. Under Alternative 3, the antennae would be placed on the roof of the proposed SIDC building. Proper warnings would be established for areas exposed to RFR above the PEL, but there are no other facilities within 24 meters at the height of the antennae location, and RFR impacts would not be significant.

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

The Proposed Action would be compatible with the existing federal, Colorado, and El Paso County land use plans, policies, and controls. The action is also compatible with Department of Defense goals to support both the JNIC and SIDC missions.

4.8 RELATIONSHIPS BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The definitions of short-term and long-term are based on the scope of the Proposed Action. Short-term use of the environment, as it relates to the Proposed Action, would encompass the construction period. Long-term productivity would occur after the construction period has ended. During construction soil would be excavated and there would be associated particulate emissions. Excavation and construction would not have a significant environmental effect and impacts would be minimized through best management practices. Areas of disturbed soil would be revegetated and storm water flow velocity to drainage channels would not change from pre-construction conditions (in accordance with NPDES requirements). The SIDC would have a long useful life and therefore, high long-term productivity.

4.9 CUMULATIVE IMPACTS

Cumulative impacts are those changes to the physical and biological environments that would result from the Proposed Action in combination with reasonably foreseeable future actions. Significant cumulative impacts could result from impacts that are not significant individually, but when considered together with other impacts, are collectively significant.

Cumulative impacts associated with construction and operation of the SIDC include the increase in air emissions from stationary and mobile sources, soil disturbance, and impacts to water resources. Emissions of criteria pollutants has been increasing at Schriever AFB over the last several years as more development has occurred and additional stationary sources, such as emergency generators and boilers have been installed. However, air quality in El Paso County has been improving for several years. Pollutant levels are lower than federal and State standards (PPACG, 2005; PPACG, 2003). The use of construction-related vehicles and their short-term impacts on air quality is unavoidable. The short-term increases in air emissions and the impacts predicted for other resource areas would not be significant when considered cumulatively with other previous, ongoing, or reasonably foreseeable activities at Schriever AFB or El Paso County.

About 3 acres would be converted from grassland to impermeable surface (building and pavement areas). Only about 15 percent of Schriever AFB has been developed; about 3,200 acres are undeveloped (USAF, 2003e; USAF, 2001b). The proposed development represents less than 0.1 percent of undeveloped land on the base. Cumulative impacts from land development would not be significant. The proposed development would potentially generate increased stormwater flow from impermeable surfaces. Other past development has generated increased flows and significant erosion along drainage channels in the Restricted Area (USAF, 2003e). Much of this development took place before National Pollutant Discharge Elimination System permit requirements limited discharge from new construction to pre-construction sediment yield and storm water flow velocity levels. Modifications to the existing drainage system are planned, which would stabilize storm water flow and reduce the potential for erosion and sedimentation (USAF, 2003e). Post-construction storm water flow would not significantly impact the existing drainage system.

Any future federal actions that may have potentially significant cumulative impacts to the environment would be assessed in separate NEPA documents.

4.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The irreversible and irretrievable commitment of resources would most likely involve the commitment of building materials, energy, fuel, and labor. The irretrievable resources to be committed are typical for the scale of the proposed project. Implementation of best construction management practices, standard

equipment maintenance schedules, and use of energy conservation and recycling measures during the SIDC construction would minimize the use of irretrievable resources. None of these materials are considered rare and the long-term commitment of these resources would not have a substantial effect on their future availability.

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CHAPTER 5

REGULATORY REVIEW AND PERMIT REQUIREMENTS

5. REGULATORY REVIEW AND PERMIT REQUIREMENTS

This section lists a brief summary of Federal and state laws and regulations that may be applicable to the Proposed Action or Alternatives and addresses regulatory review and permitting requirements.

5.1 Federal and State Laws and Regulations

Environmental Policy

The *National Environmental Policy Act* of 1969 [42 United States Code (U.S.C.) Sec. 4321, *et seq*.] establishes national policy, sets goals, and promotes efforts, which will prevent or eliminate damage to the environment and biosphere. The NEPA process is intended to help public officials make decisions that are based on an understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. The process is also intended to provide information regarding the analyses of proposed major federal actions that may significantly affect the environment to the public. The President's CEQ regulations [40 CFR 1500-1508] implement the procedural provisions of NEPA.

32 CFR 989, *Environmental Impact Analysis Process (EIAP)*, implements the Air Force EIAP and provides procedures for environmental impact analysis.

Executive Order (EO) 11514, *Protection and Enhancement of Environmental Quality*, as amended by EO 11991, sets the policy for directing the Federal Government in providing leadership in protecting and enhancing the quality of the nation's environment.

Air Quality

The *Clean Air Act* (CAA) [42 U.S.C. Sec. 7401, *et seq*., as amended] establishes as federal policy the protection and enhancement of the quality of the Nation's air resources to protect human health and the environment. The CAA sets national primary and secondary ambient air quality standards as a framework for air pollution control.

The *Colorado Air Pollution Prevention and Control Act* [Article 7 of the Title 25, *Colorado Revised Statutes*, 1973, as amended] establishes provisions to achieve and maintain levels of air quality that will protect human health and safety, and to require the use of all available practicable methods to reduce, prevent, and control air pollution for the protection of the health, safety, and general welfare of the people of the State of Colorado.

Air Force Instruction (AFI) 32-7040, *Air Quality Compliance*, instructs the Air Force on compliance with the CAA, and federal, state, and local regulations.

Water Quality

The *Clean Water Act* (CWA) [33 U.S.C. Sec. 1251, *et seq*., as amended] establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters in order to restore and maintain the chemical, physical, and biological integrity of the water. A NPDES permit, or modification to an existing permit, would be required for any change from the present parameters in the quality or

quantity of wastewater discharge and/or storm water runoff to waters of the U.S.

AFI 32-7041, *Water Quality Compliance*, instructs the Air Force on how to assess, attain, and sustain compliance with the CWA and federal, state, and local environmental regulations.

The *Colorado Water Quality Control Act* [Title 25] establishes provisions for the control and prohibition of air and water pollution within the state. In addition, the Colorado Department of Public Health and Environment (CDPHE) is responsible for administering the permitting program created under the act. No stationary installation that is reasonably expected to be a source of water pollution may be operated, maintained, constructed, expanded, or modified without an appropriate permit issued by the department.

EO 11988, *Floodplain Management*, requires federal agencies to evaluate the potential effects of actions on floodplains and to avoid adverse floodplain impacts wherever possible.

Wetlands

EO 11990, *Protection of Wetlands*, requires federal agencies to take action to avoid, to the extent practicable, the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The intent of EO 11990 is to avoid direct or indirect construction in wetlands if a feasible alternative is available. All federal and federally supported activities and projects must comply with EO 11990.

AFI 32-7064, *Integrated Natural Resource Management*, Section 3, provides the Air Force with guidance for no net loss of wetlands on Air Force installations.

Biological Resources

The *Endangered Species Act* (ESA) [16 U.S.C. Sec. 1531-1543] requires federal agencies that authorize, fund, or carry out actions to avoid jeopardizing the continued existence of threatened or endangered species and to avoid destroying or adversely modifying their critical habitat. Federal agencies must evaluate the effects of their actions on threatened or endangered species of fish, wildlife, and plants, and their critical habitats, and take steps to conserve and protect these species. All potentially adverse impacts to federally threatened and endangered species must be avoided or mitigated.

The *Migratory Bird Treaty Act* [16 U.S.C. Sec. 703-711] imposes substantive obligations on federal agencies to protect migratory birds and their habitats.

AFI 32-7064, *Integrated Natural Resource Management*, provides the Air Force with guidance on compliance with the ESA and federal, state, and local environmental regulations.

AFI 32-1053 *Pest Management*, provides the Air Force with guidance on managing noxious weeds.

Cultural Resources

The *National Historic Preservation Act* (NHPA) of 1966 [16 U.S.C. Sec. 470, *et seq*., as amended] requires federal agencies to determine the effect of their actions on cultural resources and take certain steps to ensure these resources are located, identified, evaluated, and preserved.

The *Archaeological Resources Protection Act* (ARPA) [16 U.S.C. Sec.

470a-11, as amended] protects archeological resources on federal lands. If archaeological resources are discovered that may be disturbed during site activities, the Act requires permits for excavating and removing the resource.

AFI 32-7065, *Cultural Resource Management*, provides the Air Force with guidance on compliance with the NHPA, ARPA, and applicable federal, state, and local regulations.

Solid Waste

AFI 32-7042, *Solid and Hazardous Waste Compliance*, provides guidance to the Air Force on compliance with RCRA and applicable federal, state, and local regulations.

Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, directs federal agencies to identify and address any disproportionately high and adverse human or environmental impacts of federal actions on minority or low-income populations.

Environmental Justice also takes into consideration EO 13045, Protection of Children from *Environmental Health Risks and Safety Risks*, which was signed by the President on April 21, 1997. This EO requires that each federal agency identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on children, who are more at risk because of developing body systems, comparatively higher consumption-to-weight ratios, behaviors that may expose them to more risks and hazards than adults, and less ability than adults to protect themselves from harm.

5.2 Permit Requirements

The permit requirements identified for resource categories analyzed as part of this EA are identified below.

El Paso County Dust Control Permit. A permit must be obtained from El Paso County prior to the start of construction activities that disturb more than 1 acre and less than 25 acres.

Colorado Air Pollutant Emissions Notice (APEN). An APEN for particulate matter would not be required for this project since the ground would not be disturbed for more than 6 months and is less than 25 acres in size. An APEN could be required for the installation of four emergency generators. Depending on estimated hours that the generators would be operated, emissions of NO_x could exceed the threshold of two tons per year, requiring a permit.

Hazardous Air Pollutant (HAP) Permit. Only negligible amounts of HAPs would be generated and they would be well below the thresholds required for permits.

Prevention of Significant Deterioration (PSD) Requirements. Schriever AFB is not subject to Prevention of Significant Deterioration (PSD) review requirements of 40 CFR 52.21 and Code of Colorado Regulations, Title 5, Chapter 1001, Regulation 3, Part B, Section IV.D.3 because the actual or potential emissions of any criteria pollutant does not exceed 250 tons per year. Additional emissions from generators and boilers would not exceed this threshold.

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CHAPTER 6

AGENCIES AND PERSONS CONTACTED

6. AGENCIES AND PERSONS CONTACTED

A scoping letter and copy of the Description of Proposed Action and Alternatives (Chapters 1 and 2 of the EA) were sent to the following agencies on February 3, 2005. Copies of the response letters received from the agencies are provided in Appendix A.

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CHAPTER 7

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7. LIST OF PREPARERS AND CONTRIBUTORS

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CHAPTER 8

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8. REFERENCES

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CAQCC — *see* Colorado Air Quality Control Commission

CCS — *see* City of Colorado Springs

CDPHE — *see* Colorado Department of Public Health and Environment

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APPENDIX A

AGENCY CONSULTATION

APPENDIX A —
Agency Consultation

To assist EA preparers, letters requesting comments on possible issues of concern related to the Alternatives were sent to Federal, state, and local agencies with pertinent resource responsibilities. A description of the Alternatives was attached to the letter. A copy of these scoping letters are included in this appendix. The list of agencies that received a scoping letter are included in Chapter 6.

Table A-1 lists the agencies that received a scoping letter and the date of response to the scoping letter. The letters are in order according to how they are presented in this Appendix. The Colorado Historical Society and the U.S. Fish and Wildlife Service asked that additional studies be done to identify resources which could potentially be impacted by the proposed Space Innovation and Development Center (formerly referred to as the Space Test and Evaluation Facility [STEF] and the Space Warfare Center [SWC]). Schriever AFB has completed these studies, and responded to these agencies. These letters, both dated May 3rd, are also included in this Appendix, following the letters received from these agengies. A further response from the Colorado Historical Society is included in this Appendix. The U.S. Fish and Wildlife Service acknowledged in a telephone conversation with the Natural Resources Manager at Schriever AFB that there would not be any impact on protected species.

The scoping letters sent to the Pikes Peak Area Council of governments and the U.S. Army Corps of Engineers did not receive a response. These letters are included in this Appendix for reference.

Table A-1
Agency Letters Sent

Number	*Agency*	*Date of Response*
1	Colorado Historical Society	February 8, 2005
2	Colorado Department of Wildlife	February 18, 2005
3	Colorado Natural Heritage Program	February 28, 2005
4	U.S. Fish and Wildlife Service	March 2, 2005
5	Pikes Peak Area Council of Governments	No response
6	U.S. Army Corps of Engineers	No response

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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

1

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

Colorado Historical Society
Ms Georgianna Contiguglia, SHPO
1300 Broadway
Denver, Colorado 80203-2137

Dear Ms Contiguglia:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

The proposed project area for the SWC was surveyed and no historic properties were identified. The Air Force notified the SHPO of these findings in a February 1998 letter.

According to the National Environmental Policy Act (NEPA), the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other Federal, state, and local agencies on the proposal. Please identify any resources within your agency's purview that may be potentially impacted.

Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

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COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

February 8, 2005

Albert F. Fernandez, GS-12, DAF
Environmental Engineer/EIAP Manager
50 CES/CEV (AFSPC)
500 O'Malley Ave., Suite 19
Schriever AFB, CO 80912-5019

Re: New Space Warfare Center, Schriever AFB, CO. (CHS #44870)

Dear Mr. Fernandez,

Thank you for your correspondence dated February 3, 2005 and received by our office on February 7, 2005 regarding the above-mentioned project.

After review of the submitted information, we recommend that the Section 106 studies, as required under 36 CFR 800, be completed simultaneously with the studies for the Draft Environmental Assessment. The finding under Section 106 may have the potential to affect the final decision document released under the Environmental Assessment. (Please refer to the attached flow charts regarding the NEPA and Section 106 studies.)

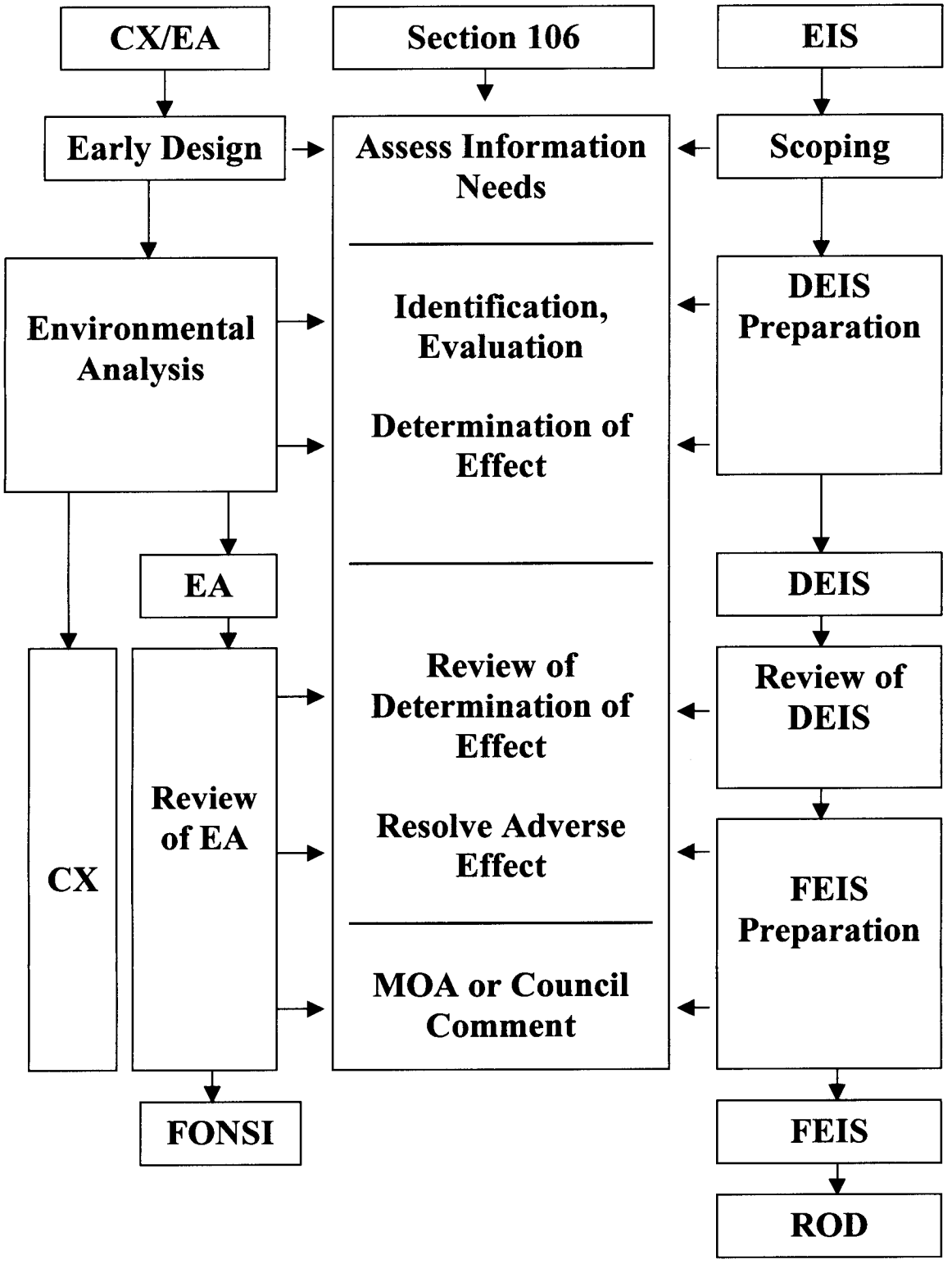
Since the 1998 survey is over 5-years old, we recommend re-evaluating the survey of the Area of Potential Effect, as defined in 36 CFR 800.16(d). Properties that might have been considered not eligible in 1998 due to the 50-years rule, may now have come of age.

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

Sincerely,

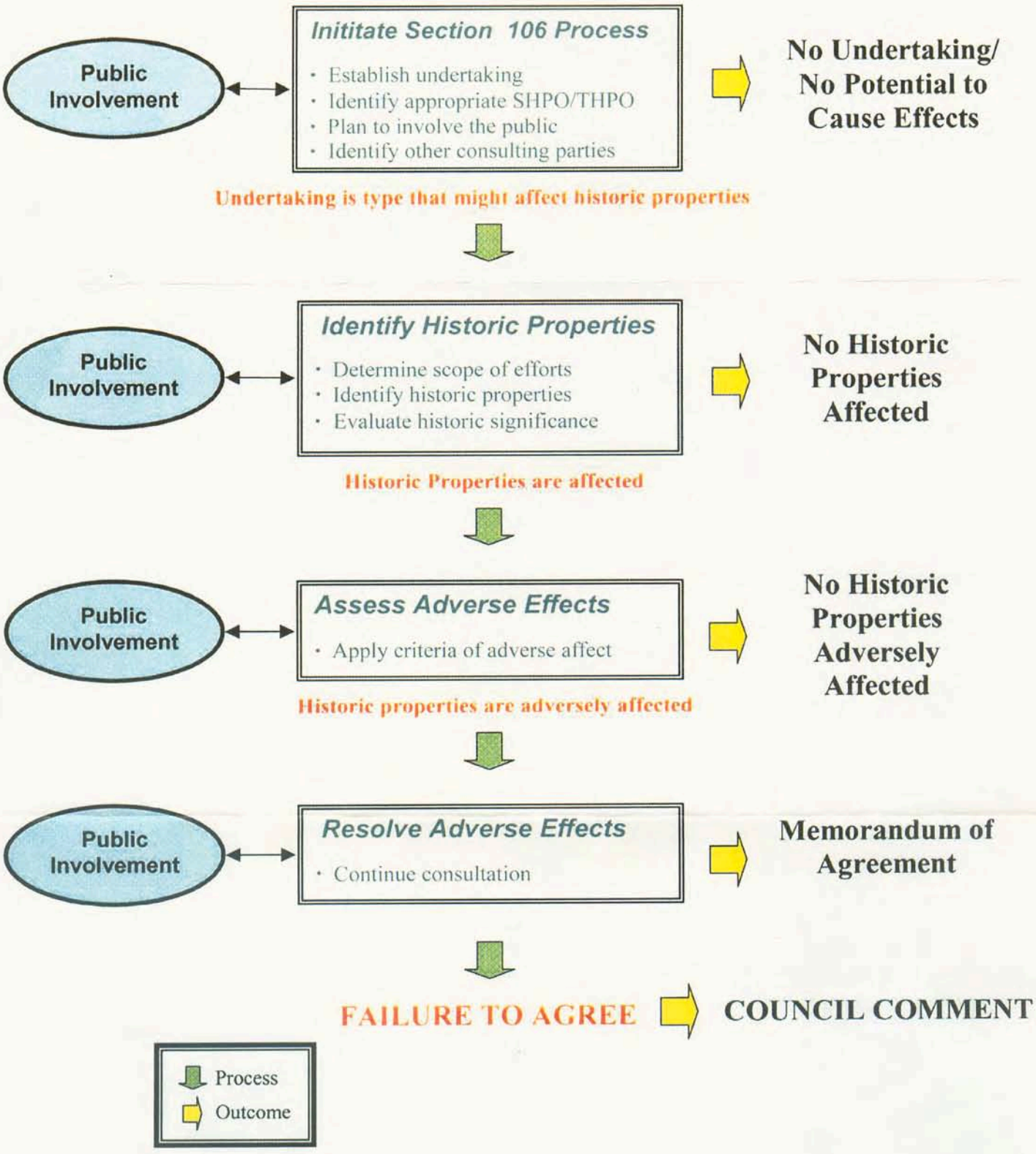
for Georgianna Contiguglia
State Historic Preservation Officer

COORDINATION BETWEEN NEPA AND SECTION 106



The Public and Consulting Parties must be notified and given the opportunity to comment during each step of the Section 106 review process.

THE SECTION 106 PROCESS



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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

May 3, 2005

50 CES/CEV (AFSPC)
Attn: Ms. Melissa Trenchik
500 O'Malley Avenue, Suite 19
Schriever AFB, CO 80912-5019

Colorado Historical Society
Ms. Georgianna Contiguglia, SHPO
1300 Broadway
Denver, Colorado 80203-2137

Re: New Space Warfare Center, Schriever AFB, CO (CHS #44870)

Dear Ms. Contiguglia:

In response to your letter dated February 8, 2005, we have evaluated the Area of Potential Effect for the proposed and alternative sites for the Space Warfare Center project.

We are in the process of updating our Integrated Cultural Resources Management Plan (ICRMP), which is in draft as of March 2005. The updated ICRMP documents that the entire base has been surveyed for archaeological and architectural Cold War-era resources. None of the resources have been determined eligible, or potentially eligible, for the National Register of Historic Places (NRHP). We have determined that construction of the proposed Space Warfare Center will have no adverse impact to the Area of Potential Effect.

We are aware that although the base has been surveyed and no NRHP-eligible properties exist, there remains the potential for inadvertent discoveries of archaeological deposits or American Indian (Native American) burials. Should Schriever AFB acquire additional lands in the future, survey work would be completed to maintain compliance with Sections 106 and 110. We will follow our Standard Operating Procedures for inadvertent discoveries.

Responses should be sent directly to the address listed above or via electronic mail to melissa.trenchik@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any question, please call me at (719) 567-3360.

Sincerely,

MELISSA R. TRENCHIK
Cultural Resources Manager

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COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

June 3, 2005

Melissa Trenchik
Cultural Resources Manager
50 CES/CEV (AFSPC)
500 O'Malley Ave., Suite 19
Schriever AFB, CO 80912-5019

Re: New Space Warfare Center, Schriever AFB, CO. (CHS #44870)

Dear Mr. Fernandez,

Thank you for your additional information correspondence dated May 3, 2005 and received by our office on May 31, 2005 regarding the above-mentioned project.

After review of your submitted information, we concur with your finding that there are no properties eligible for listing in the National Register of Historic Places within the Area of Potential Effect for the proposed project. Therefore, the proposed project will result in a finding of *no historic properties affected* under Section 106 of the National Historic Preservation Act (36 CFR 800.4(d)(1)) for the above-mentioned undertaking.

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,

for Georgianna Contiguglia
State Historic Preservation Officer

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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

2

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

Colorado Division of Wildlife
Mr. Mark Konishi
1313 Sherman Street, Room 718
Denver, Colorado 80203

Dear Mr. Konishi:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

Impacts to wildlife and migratory birds will be analyzed in the environmental assessment. There are no known endangered species on the site; however, the site is potential habitat for the black-tailed prairie dog and the burrowing owl. A site inspection in October, 2004, identified an active prairie dog town to the west of the proposed development, with scattered mounds located to the east and north of the main prairie dog town. The nearest mounds at the time of the site visit were two hundred feet or more to the west of the proposed project site. Base personnel reported three nesting pairs of burrowing owls in 2004; two adults and five babies were not on the project site but in the vicinity of the proposed project site. The base would conduct a survey of the site prior to construction and, if sightings of the owls are seen in the area, construction would not begin until after the owls have abandoned their nests.

According to the National Environmental Policy Act (NEPA), the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other Federal, state, and local agencies on the proposal. Please identify any resources within your agency's purview that may be potentially impacted.

Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil.

Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

STATE OF COLORADO

Bill Owens, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

Bruce McCloskey, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

For Wildlife-
For People

February 18, 2005

Mr. Al Fernandez
50 CES/CEV (AFSPC)
500 O'Malley Avenue, Suite 19
Schriever AFB, CO 80912-5019

Re: Proposed construction of the Space Warfare Center (SWC) at Schriever AFB

Dear Mr. Fernandez:

Thank you for the opportunity to comment on the proposed development of the Space Warfare Center at Schriever AFB. The Division of Wildlife provides the following comments for this proposed development.

The Division supports Alternative 2 – Proposed Action alternative near the corner of Enoch Road and Irwin Avenue.

In regard to the surrounding wildlife habitat to the west of the site which is currently inhabited by black-tailed prairie dogs and burrowing owls, the Division has the following comments. You stated in your letter that the nearest prairie dog mounds were 200 feet to the west of the proposed development. It would be in the best interest of the prairie dogs that development be limited to the boundaries of the proposed project site. We would also request that development of the site be postponed until after the last burrowing owls have abandoned their nests.

If you have any questions or require additional information, please contact District Wildlife Manager Trina Romero at 719-227-5284 or via e-mail at trina.romero@state.co.us

Sincerely,

Robert D. Clippinger
Area Wildlife Manager

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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

3

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

Colorado Natural Heritage Program
College of Natural Resources
Ms Beth Van Dusen, Environmental Review Coordinator
254 General Services
Fort Collins, Colorado 80523-6021

Dear Ms Van Dusen:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

According to the National Environmental Policy Act (NEPA), the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other Federal, state, and local agencies on the proposal. Please identify any resources within your agency's purview that may be potentially impacted.

Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

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Colorado State University

Knowledge to Go Places

February 28, 2005

Colorado Natural Heritage Program
Colorado State University
8002 Campus Delivery
Fort Collins, Colorado 80523-8002
(970) 491-1309
FAX: (970) 491-3349
www.cnhp.colostate.edu

Department of the Air Force
Attn: Mr. Albert F. Fernandez
50 CES/CEV (AFSPC)
Schriever AFB, CO 80912-5019

Dear Albert:

The Colorado Natural Heritage Program (CNHP) is in receipt of your request for information regarding the proposed Space Warfare Center facility at Schriever Air Force Base. In response, I have searched our Biodiversity Tracking and Conservation System (BIOTICS) for natural heritage elements (occurrences of significant natural communities and rare, threatened or endangered plants and animals) documented from the vicinity of the area specified in your request, specifically within a two-mile radius of the proposed project area as depicted on the map provided by Mr. Fernandez as an attachment to his letter to the Colorado Natural Heritage Program dated February 3, 2005.

The enclosed report describes natural heritage resources known from this area and gives location (by Township, Range, and Section), precision information, and the date of last observation of the element at that location. This report includes elements known to occur within the specified project site, as well as elements known from similar landscapes near the site. Please note that "precision" reflects the resolution of original data. For example, an herbarium record from "4 miles east of Colorado Springs" provides much less spatial information than a topographic map showing the exact location of the occurrence. "Precision" codes of Seconds, Minutes, and General are defined in the footer of the enclosed report.

The report also outlines the status of known elements. We have included status according to Natural Heritage Program methodology and legal status under state and federal statutes. Natural Heritage ranks are standardized across the Heritage Program network, and are assigned for global and state levels of rarity. They range from "1" for critically imperiled or extremely rare elements, to "5" for those that are demonstrably secure.

You may notice that some occurrences do not have sections listed. Those species have been designated as "sensitive" due to their rarity and threats by human activity. Peregrine falcons, for example, are susceptible to human breeders removing falcon eggs from their nests. For these species, CNHP does not normally provide location information beyond township and range. Please contact us should you require more detailed information for sensitive occurrences.

There is one CNHP designated Potential Conservation Area (PCA) located near the proposed project area (Schriever Playas PCA, see enclosed map and site profile). The Schriever Lakes Playa PCA hosts populations of the *Playa Grassland* plant community type, an imperiled plant community type both globally and here in Colorado. In order to successfully protect populations or occurrences, it is necessary to delineate conservation areas. These conservation areas focus on capturing the ecological processes that are necessary to support the

Natural Heritage Program
COLORADO

continued existence of a particular element of natural heritage significance. Conservation areas may include a single occurrence of a rare element or a suite of rare elements or significant features.

The goal of the process is to identify a land area that can provide the habitat and ecological processes upon which a particular element or suite of elements depends for their continued existence. The best available knowledge of each species' life history is used in conjunction with information about topographic, geomorphic, and hydrologic features, vegetative cover, as well as current and potential land uses. The proposed boundary does not automatically exclude all activity. It is hypothesized that some activities will cause degradation to the element or the process on which they depend, while others will not. Consideration of specific activities or land use changes proposed within or adjacent to the preliminary conservation planning boundary should be carefully considered and evaluated for their consequences to the element on which the conservation unit is based.

The Colorado Division of Wildlife has legal authority over wildlife in the state. CDOW would therefore be responsible for the evaluation of and final decisions regarding any potential effects a proposed project may have on wildlife. If you would like more specific information regarding these or other vertebrate species in the vicinity of the area of interest, please contact the Colorado Division of Wildlife.

The information contained herein represents the results of a search of Colorado Natural Heritage Program's (CNHP) Biodiversity Tracking and Conservation System (BIOTICS), and can be used as notice to anticipate possible impacts or identify areas of interest. Care should be taken in interpreting these data. Sensitive elements are currently known from within the proposed project area, and additional, but undocumented, elements may also exist (see enclosed report). Please note that the absence of data for a particular area, species, or habitat does not necessarily mean that these natural heritage resources do not occur on or adjacent to the project site, rather that our files do not currently contain information to document their presence. CNHP information should not replace field studies necessary for more localized planning efforts, especially if impacts to wildlife habitat are possible.

Although every attempt is made to provide the most current and precise information possible, please be aware that some of our sources provide a higher level of accuracy than others, and some interpretation may be required. CNHP's data system is constantly updated and revised. Please contact CNHP for an update or assistance with interpretation of this natural heritage information.

Sincerely,

Michael Menefee
Environmental Review Coordinator

Enc.

Natural Heritage Program
COLORADO

Colorado Natural Heritage Program Environmental Review

Locations and Status of Rare and/or Imperiled Species and Natural Communities known from or likely to occur within a two-mile radius of the proposed Space Warfare Center at Schriever Air Force Base

Report generated: 28 February 2005

EO_ID	major group	scientific name	common name	prec	last obs	trs	grank	srank	eorank	ESA	fed stat	st stat
9,561	Birds	*Charadrius montanus*	Mountain Plover	G	1913-99-99	016S064W 01,02;	G2	S2B	H	PT	BLM/ USFS	SC
3,515	Insects	*Amblyscirtes simius*	Simius Roadside Skipper	M	1986-07-16	014S064W 04,09,16,15,11, 03,10,14;	G4	S3	H			
10,404	Insects	*Euphilotes rita coloradensis*	Colorado Blue	G	1972-08-05	014S064W 12,13;	G3G4T2 T3	S2				
6,557	Mammals	*Cynomys ludovicianus*	Black-tailed Prairie Dog	S	2000-07-15	014S064W 28;	G3G4	S4	C	C	USFS	SC
262	Natural Communities	*PASCOPYRUM SMITHII-ELEOCHAR IS SPP.*	Playa Grassland	S	2000-10-24	014S064W 27;	G1	S2	C			
2,166	Natural Communities	*PASCOPYRUM SMITHII-ELEOCHAR IS SPP.*	Playa Grassland	S	2000-10-27	014S064W 22,27;	G1	S2	B			
5,639	Vascular Plants	*Ambrosia linearis*	Plains Ragweed	S	1993-07-99	014S063W 16,17,20,21;	G3	S3	C			
5,673	Vascular Plants	*Ambrosia linearis*	Plains Ragweed	S	2000-05-31	014S064W 36;	G3	S3	C			

precision codes: S = "seconds", location known within 100m; M = "minutes", location known within 1 mile; G = "general", location known within 5 miles

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Conservation Site Report

Name Schriever Playas **Site Code** S.USCOHP*21998

IDENTIFIERS

Site ID 975 **Site Class** Standard site

Site Alias None

Network of Conservation Areas (NCA)

NCA Site ID	NCA Site Code	NCA Site Name
-		No Data

Site Relations No Data

LOCATORS

Nation United States

State Colorado

Quad Code	Quad Name
38104-G5	Corral Bluffs

County

El Paso (CO)

Watershed Code	Watershed Name
11020004	Chico

Township/Range	Section	Meridian	Note
014S064W	22	6P	
014S064W	27	6P	

SITE DESCRIPTION

Minimum Elevation	6,320.00	**Feet**	1,926.00	**Meters**
Maximum Elevation	6,380.00	**Feet**	1,945.00	**Meters**

Site Description

Scattered playas occur within the rolling hills of shortgrass prairie in central El Paso County. Schriever Playas Site contains four of these small, periodically inundated, closed basins. The playas support stands of western wheatgrass with mixed species of spikerush (Pascopyrum smithii-Eleocharis spp.), a plant community previously documented in only a few playas in Wyoming (G. Jones, pers. comm., Wyoming NHP). The vegetation in the playas occurs in two zones, resulting from differences in the period of inundation. The lowest part of the stand, which is inundated most often and for the longest time, is dominated by spikerush (Eleocharis acicularis and E. palustris) and bare ground; the higher part of the stand is dominated by western wheatgrass (Pascopyrum smithii), a cool-season perennial. These basins remain dry throughout most of the year and collect water only after heavy rainfall. Heavy rains generally fall in the late summer and in many cases a series of storms are required in order for the playas to retain water (Weathers 2000). Runoff collecting in a dry playa infiltrates cracks in the clay bottom of the playa and swells the clay effectively sealing the playa bottom (Zartman et al. 1994). After the clay has been wetted, subsequent storms can result in playa filling. The playas may hold water for periods ranging from days to weeks, depending on the local topography and intensity of the rainstorm (Weathers 2000). In dry years, the playas may remain dry year round. The most common explanation for the origin of playas is deflation, or wind erosion, though theories on playa formation are controversial (Osterkamp and Wood 1987). These playas are also consistent with descriptions of buffalo wallows which are formed by bison pawing the ground, creating patches of bare ground in which to dust bathe (Uno 1989), or perhaps mud bathe to protect against biting insects or aid in shedding their heavy fur (F. Knopf, pers. comm., USGS). Active wallows range from 3 to 5 meters in diameter and merging of adjacent wallows can create wallows larger than about 0.5 acre (1,400 square meters) (Uno 1989, Knopf 1996a). Bison were extirpated from the area by 1875 (Hornaday 1889) but evidence of their wallows can remain evident on the landscape for more than a hundred years (Knopf 1996a). Perennial grasses invade wallows not used by bison (Uno 1989). It is possible that the playas result from of a combination of factors including deflation and buffalo wallowing. The land within the site is owned and managed by Schriever Air Force Base, State Land Board, or private owners. The area has historically been used for cattle grazing. Limited cattle grazing probably continues, but housing developments are increasingly encroaching from the west.

Key Environmental Factors

No Data

Conservation Site Report

Name Schriever Playas **Site Code** S.USCOHP*21998

Climate Description

No Data

Land Use History

No Data

Cultural Features

No Data

SITE DESIGN

Site Map Y - Yes **Mapped Date** 06/15/2001

Designer Doyle, G.A.

Boundary Justification

The site boundary includes four playas and most of the surrounding lands acting as the catchment basin for the playas. The catchment basin boundary was roughly delineated using the 1:24,000 scale USGS topographic quadrangle. Scattered playas occurring within a few miles of these playas were not surveyed and are not included within the site.

Primary Area 514.17 **Acres** 208.08 **Hectares**

SITE SIGNIFICANCE

Biodiversity Significance Rank B2: Very High Biodiversity Significance

Biodiversity Significance Comments

This site contains a good (B-ranked) occurrence of a globally imperiled (G2 S2) playa grassland community (Pascopyrum smithii-Eleocharis spp.).

Other Values Rank No Data

Other Values Comments

No Data

MANAGEMENT/PROTECTION

Land Use Comments

No Data

Natural Hazard Comments

No Data

Exotics Comments

No Data

Offsite

No Data

Information Needs

No Data

ELEMENTS OF BIODIVERSITY

Element State ID	State Scientific Name	State Common Name	Global Rank	State Rank	Driving Site Rank
24718	*PASCOPYRUM SMITHII-ELEOCHARIS SPP.*	Playa Grassland	G1	S2	No
24718	*PASCOPYRUM SMITHII-ELEOCHARIS SPP.*	Playa Grassland	G1	S2	Yes

REFERENCES

Reference ID	Full Citation
169085	Doyle, G. 2000. Colorado Natural Heritage Program Field inventory of wetlands and riparian areas in Pueblo and El Paso counties.
162855	Doyle, G., J. Gionfriddo, D. Anderson, and D. Culver. 2000. Survey of Critical Wetlands and Riparian Areas in El Paso and Pueblo Counties, Colorado. Colorado Natural Heritage Program, College of Natural Resources, Colorado State University, Fort Collins, Colorado. Final report prepared for and submitted to Colorado Department of Natural Resources, Denver, Colorado.

Conservation Site Report

Name Schriever Playas **Site Code** S.USCOHP*21998

ADDITIONAL TOPICS

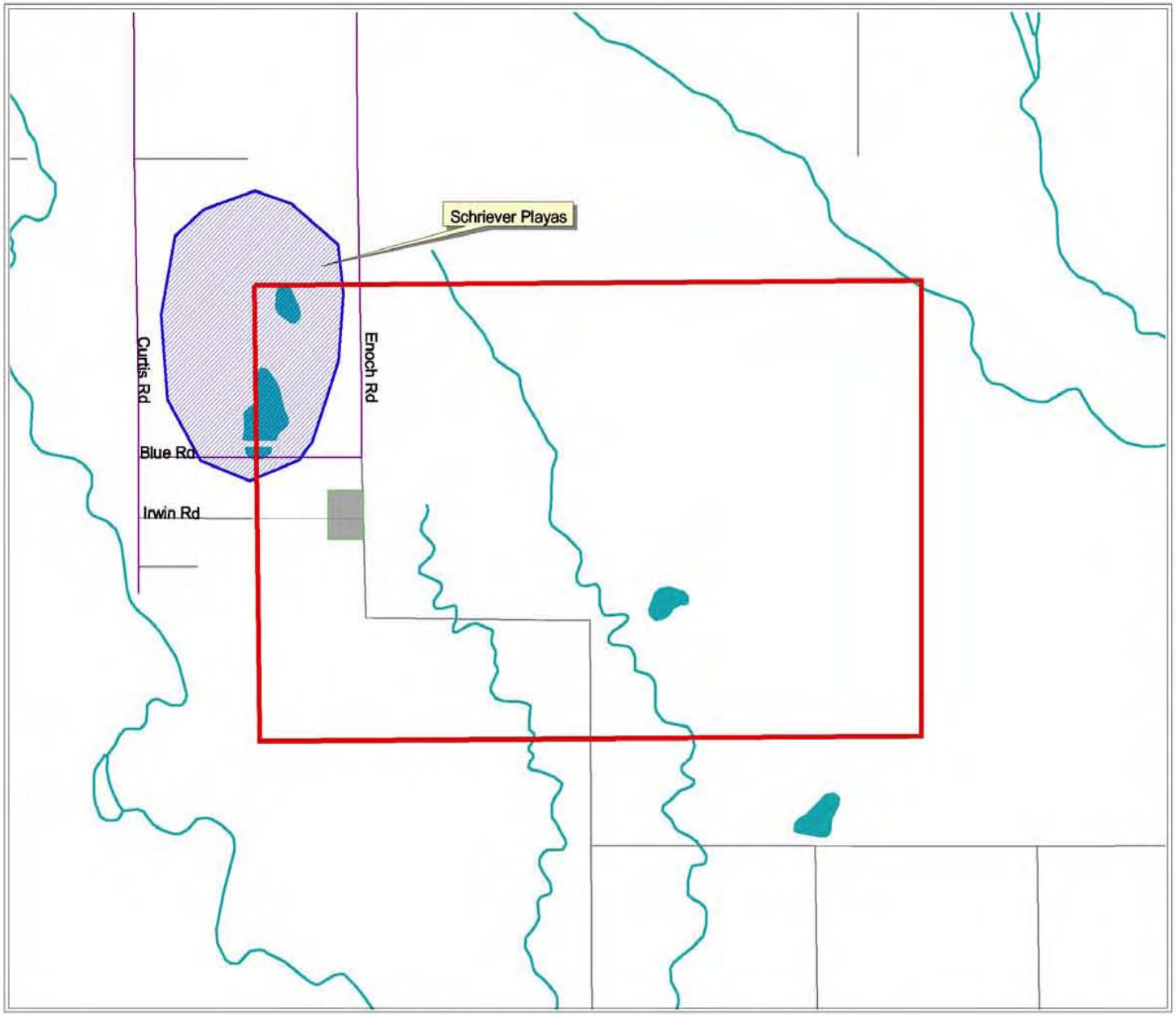
Additional Topics

No Data

VERSION

Lead Responsibility No Data
Version Date 06/16/2001
Version Author G. Doyle

CNHP Potential Conservation Areas (PCAs) Known from the Vicinity of the proposed Space Warfare Center Action Area in El Paso County



Natural Heritage Program COLORADO

Colorado State University
Knowledge to Go Places

Colorado Natural Heritage Program
Colorado State University
8002 Campus Delivery
Fort Collins, CO 80523-8002

Map Created
28 February 2005
CNHP Environmental Review mdm

- **Proposed Action Area**
- **Schriever AFB General Location**

Potential Conservation Areas

- **B1: Outstanding Biodiversity Significance**
- **B2: Very High Biodiversity Significance**
- **B3: High Biodiversity Significance**
- **B4: Moderate Biodiversity Significance**
- **B5: General Biodiversity Interest**
- **Highways**
- **Major Roads**
- **Local Roads**
- **Lakes and Reservoirs**
- **Rivers, Streams, and Creeks**

The absence of data for a particular area or habitat does not necessarily mean that the species does not occur on or adjacent to the project site, rather that our files do not currently contain information to document their presence.

Although every attempt is made to provide the most current and precise information possible, please be aware that some of our sources provide a higher level of accuracy than others, and some interpretation may be required. CNHP's data system is constantly updated and revised. Please contact CNHP for an update or assistance with interpretation of this natural heritage information.

Data are not appropriate for site level planning or evaluation.

Universal Transverse Mercator (UTM), Nad 27, Zone 13

0 1 2 3 4 5 Miles

N

DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

4

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

United States Fish and Wildlife Service
Mr. LeRoy W. Carlson, Colorado Field Supervisor
Colorado Field Office
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

Dear Mr. Carlson:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

Impacts to wildlife and migratory birds will be analyzed in the environmental assessment. There are no known endangered species on the site; however, the site is potential habitat for the black-tailed prairie dog and the burrowing owl. A site inspection in October, 2004, identified an active prairie dog town to the west of the proposed development, with scattered mounds located to the east and north of the main prairie dog town. The nearest mounds at the time of the site visit were two hundred feet or more to the west of the proposed project site. Base personnel reported three nesting pairs of burrowing owls in 2004; two adults and five babies were not on the project site but in the vicinity of the proposed project site. The base would conduct a survey of the site prior to construction and, if sightings of the owls are seen in the area, construction would not begin until after the owls have abandoned their nests.

According to the National Environmental Policy Act (NEPA), the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other Federal, state, and local agencies on the proposal. Please identify any resources within your agency's purview that may be potentially impacted.

Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

04-12-2005 RCVD

IN REPLY REFER TO:
ES/CO: T&E/Species list
Mail Stop 65412

MAR - 2 2005

Mr. Al Fernandez
500 O'Malley Avenue, Suite 19
Schriever Air Force Base, Colorado 80912-5019

Dear Mr. Fernandez:

The U.S. Fish and Wildlife Service (Service) received your letter dated February 3, 2005, regarding the proposed new Space Warfare Center (SWC) at Schriever Air Force Base (AFB), Colorado. These comments have been prepared under the provisions of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et. seq.), the Bald and Golden Eagle Protection Act of 1940 (BGEPA), as amended (16 U.S.C. 668 et. seq.), and the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 et. seq.).

For your convenience, we have enclosed a list of Colorado's threatened and endangered species, as well as the counties in which they are known to occur. We do not have site specific information available to us.

While species such as the black-tailed prairie dog (*Cynomys ludovicianus*) presently have no legal protection under the ESA, it is within the spirit of this Act to consider project impacts to this and other, potentially sensitive species. It is the intention of the Service to protect these species before human-related activities adversely impact their habitat to a degree that they would need to be listed and, therefore, protected under the ESA. Another important issue is the protection of the State-listed threatened Western burrowing owl (*Athene cunicularia*) and other migratory birds and raptors in accordance with the MBTA and BGEPA.

If questions regarding site-specific presence of an endangered species, the extent of its habitat, or the effects of a particular action need to be resolved, the Service recommends that a knowledgeable consultant be contacted to conduct habitat and population assessments or to provide recommendations regarding options under the ESA. Due to staffing constraints, the Colorado Field Office cannot provide you with these services.

Once you have completed an assessment of your project's potential effects on listed and sensitive species, we would be happy to reply to a request for section 7 consultation under the ESA, including our concurrence/non-concurrence with any effects determinations you provide for Federally listed species. If you have any questions regarding this matter, please contact Sandy Vana-Miller of my staff at (303) 275-2370.

Sincerely,

Susan C. Linner
Colorado Field Supervisor

Enclosure: Species List

cc: S. Vana-Miller

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

Change of Supervisor

Colorado Field Office

SUSAN LINNER
COLORADO FIELD SUPERVISOR

Effective 7-28-03

MAIL/DELIVERY ADDRESS

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
COLORADO FIELD OFFICE
755 PARFET STREET, SUITE 361
LAKEWOOD, COLORADO 80215

FIELD OFFICE TELEPHONE NUMBER

(303) 275-2370

FIELD OFFICE FAX NUMBER

(303) 275-2371

Colorado Field Office County List
Updated February 2005

Symbols:
* Water depletions in the Upper Colorado River and San Juan River Basins, may affect the species and/or critical habitat in downstream reaches in other states.
▲ Water depletions in the South Platte River may affect the species and/or critical habitat in downstream reaches in other states.
© There is designated critical habitat for the species within the county.
T Threatened
E Endangered
P Proposed
X Experimental
C Candidate

For additional information contact: U.S. Fish and Wildlife Service, Colorado Field Office, 755 Parfet Street, Suite 361, Lakewood, Colorado 80215, telephone 303-275-2370
U.S. Fish and Wildlife Service, Western Colorado Field Office, 764 Horizon Drive, Building B, Grand Junction, Colorado 81506, telephone 970-243-2778

Species	Scientific Name	Status
ADAMS		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ALAMOSA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
ARAPAHOE		
Bald eagle	Haliaeetus leucocephalus	T

Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
ARCHULETA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
BACA		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
BENT		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
BOULDER		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T

Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Slender moonwort	Botrychium lineare	C
Ute ladies'-tresses	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
BROOMFIELD		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sterna antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
CHAFFEE		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
CHEYENNE		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
CLEAR CREEK		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Slender moonwort	Botrychium lineare	C
Whooping crane ▲	Grus americana	E
CONEJOS		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E

Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
COSTILLA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
CROWLEY		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
CUSTER		
Bald eagle	Haliaeetus leucocephalus	T
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Mexican spotted owl	Strix occidentalis lucida	T
DELTA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow©	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
DENVER		

Bald eagle	Haliaeetus leucocephalus	T
Least tern (interior population) ▲	Sterna antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
DOLORES		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
DOUGLAS		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
EAGLE		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E

Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
ELBERT		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population) ▲	Sterna antillarum	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Whooping crane ▲	Grus americana	E
EL PASO		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Slender moonwort	Botrychium lineare	C
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
FREMONT		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Mexican spotted owl	Strix occidentalis lucida	T
GARFIELD		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T

Parachute beardtongue	Penstemon debilis	C
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
GILPIN		
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
GRAND		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Osterhout milkvetch	Astragalus osterhoutii	E
Penland beardtongue	Penstemon penlandii	E
Razorback sucker*	Xyrauchen texanus	E
Slender moonwort	Botrychium lineare	C
Yellow-billed cuckoo	Coccyzus americanus	C
GUNNISON		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
HINSDALE		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E

Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
HUERFANO		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Mexican spotted owl	Strix occidentalis lucida	T
JACKSON		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Least tern (interior population) ▲	Sterna antillarum	E
North Park phacelia	Phacelia formosula	E
Pallid sturgeon ▲	Scaphirhynchus albus	E
Piping plover ▲	Charadrius melodus	T
Whooping crane ▲	Grus americana	E
JEFFERSON		
Bald eagle	Haliaeetus leucocephalus	T
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population) ▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon ▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover ▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane ▲	Grus americana	E
KIOWA		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
KIT CARSON		

Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
LAKE		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Penland alpine fen mustard	Eutrema penlandii	T
Slender moonwort	Botrychium lineare	C
Uncompahgre fritillary butterfly	Boloria acrocnema	E
LA PLATA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Knowlton cactus	Pediocactus knowltonii	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
LARIMER		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Boreal toad	Bufo boreas bdreas	C
Canada lynx	Lynx canadensis	T
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
North Park phacelia	Phacelia formosula	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
LAS ANIMAS		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T

Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Mexican spotted owl	Strix occidentalis lucida	T
LINCOLN		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sterna antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
LOGAN		
Bald eagle	Haliaeetus leucocephalus	T
Least tern (interior population)▲	Sterna antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane▲	Grus americana	E
MESA		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail©	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
De Beque phacelia	Phacelia submutica	C
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub©	Gila cypha	E
Razorback sucker©	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MINERAL		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
MOFFAT		

Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail©	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Humpback chub©	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker©	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
MONTEZUMA		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Mancos milkvetch	Astragalus humillimus	E
Mesa Verde cactus	Sclerocactus mesae-verdae	T
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Sleeping Ute milkvetch	Astragalus tortipes	C
Southwestern willow flycatcher	Empidonax traillii extimus	E
Yellow-billed cuckoo	Coccyzus americanus	C
MONTROSE		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Canada lynx	Lynx canadensis	T
Clay-loving wild buckwheat	Eriogonum pelinophilum	E
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uinta Basin hookless cactus	Sclerocactus glaucus	T
Yellow-billed cuckoo	Coccyzus americanus	C
MORGAN		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E

Piping plover	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
OTERO		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Piping plover	Charadrius melodus	T
OURAY		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
PARK		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Penland alpine fen mustard	Eutrema penlandii	T
Piping plover▲	Charadrius melodus	T
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Whooping crane▲	Grus americana	E
PHILLIPS		
Bald eagle	Haliaeetus leucocephalus	T
PITKIN		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C

Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
PROWERS		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Least tern (interior population)	Sterna antillarum	E
Lesser prairie chicken	Tympanuchus pallidicinctus	C
Piping plover	Charadrius melodus	T
PUEBLO		
Arkansas darter	Etheostoma cragini	C
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Canada lynx	Lynx canadensis	T
Greenback cutthroat trout	Oncorhynchus clarki stomias	T
Mexican spotted owl	Strix occidentalis lucida	T
RIO BLANCO		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow©	Ptychocheilus lucius	E
Dudley Bluffs bladderpod	Lesquerella congesta	T
Dudley Bluffs twinpod	Physaria obcordata	T
Graham beardtongue	Penstemon grahamii	C
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
White River beardtongue	Penstemon scariosus var. albifluvis	C
Yellow-billed cuckoo	Coccyzus americanus	C
RIO GRANDE		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E

Gunnison sage-grouse	Centrocercus minimus	C
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
ROUTT		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Razorback sucker*	Xyrauchen texanus	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAGUACHE		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN JUAN		
Bald eagle	Haliaeetus leucocephalus	T
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SAN MIGUEL		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E

Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Gunnison sage-grouse	Centrocercus minimus	C
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Razorback sucker*	Xyrauchen texanus	E
Southwestern willow flycatcher	Empidonax traillii extimus	E
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
SEDGWICK		
Bald eagle	Haliaeetus leucocephalus	T
Least tern (interior population)	Sterna antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover	Charadrius melodus	T
Whooping crane▲	Grus americana	E
SUMMIT		
Bald eagle	Haliaeetus leucocephalus	T
Bonytail*	Gila elegans	E
Boreal toad	Bufo boreas boreas	C
Canada lynx	Lynx canadensis	T
Colorado pikeminnow*	Ptychocheilus lucius	E
Humpback chub*	Gila cypha	E
Mexican spotted owl	Strix occidentalis lucida	T
Penland alpine fen mustard	Eutrema penlandii	T
Razorback sucker*	Xyrauchen texanus	E
Slender moonwort	Botrychium lineare	C
Uncompahgre fritillary butterfly	Boloria acrocnema	E
Yellow-billed cuckoo	Coccyzus americanus	C
TELLER		
Bald eagle	Haliaeetus leucocephalus	T
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Pawnee montane skipper	Hesperia leonardus montana	T
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse©	Zapus hudsonius preblei	T
Whooping crane▲	Grus americana	E
WASHINGTON		
Bald eagle	Haliaeetus leucocephalus	T

Black-footed ferret	Mustela nigripes	E
Least tern (interior population)▲	Sterna antillarum	E
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Whooping crane▲	Grus americana	E
WELD		
Bald eagle	Haliaeetus leucocephalus	T
Black-footed ferret	Mustela nigripes	E
Colorado butterfly plant	Gaura neomexicana spp. coloradensis	T
Least tern (interior population)▲	Sterna antillarum	E
Mexican spotted owl	Strix occidentalis lucida	T
Pallid sturgeon▲	Scaphirhynchus albus	E
Piping plover▲	Charadrius melodus	T
Preble's meadow jumping mouse	Zapus hudsonius preblei	T
Ute ladies'-tresses orchid	Spiranthes diluvialis	T
Whooping crane▲	Grus americana	E
YUMA		
Bald eagle	Haliaeetus leucocephalus	T

DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

May 3, 2005

50 CES/CEV (AFSPC)
Attn: Ms. Melissa Trenchik
500 O'Malley Avenue, Suite 19
Schriever AFB, CO 80912-5019

U.S. Fish and Wildlife Service
Ms. Susan Linner
Colorado Field Supervisor
755 Parfet Street, Suite 361
Lakewood, Colorado 80215

Re: New Space Warfare Center (SWC), Schriever AFB, CO (ES/CO: T&E/Species List, Mail Stop 65412)

Dear Ms Linner:

In response to your letter dated March 2, 2005, we have completed an assessment of the SWC's potential effects on listed and sensitive species. Following are the conclusions from our assessment:

The base is currently preparing a black-tailed prairie dog management plan (in draft as of March 2005). Findings in the plan are that prairie dogs on base are relatively small but expanding rapidly. In 2002 there were three separate towns occupying 62 acres. Mapping in August of 2004 showed approximately 129 acres occupied in five towns. During the 2004 site survey of the proposed SWC area, prairie dogs were observed approximately 200 feet to the west. A survey for prairie dog dens would be conducted in the project area prior to the start of construction. If prairie dogs are located in the project area they would be managed in accordance with options identified in the base's management plan. The base's objective is to prevent the existing prairie dog population from expanding into the secure area of the base where it may pose a problem for maintaining the security systems. The base plans to maintain a healthy prairie dog population on base where it will not conflict with the mission.

Base personnel have been conducting annual surveys for burrowing owls and as needed surveys of project sites prior to the start of construction activities. During 2004, 3 nesting pair of burrowing owls were seen with 13 babies. There are 2 adult owls and 5 babies near the contractor grounds maintenance area approximately 1,350 feet from the proposed action site for the SWC. During a 2005 survey of the Phase III project area near Enoch Road and Irwin Avenue, no prairie dog dens or burrowing owls were observed. Prior to construction of the SWC, base personnel would conduct a survey of the project site to identify any prairie dog dens

and burrowing owls. If burrowing owls are located in the project area, construction would be postponed until after the last burrowing owls have abandoned their nests.

While there is currently no evidence of other bird species of concern on the project site, another survey will be taken prior to the start of construction. If any nests are observed, construction would be postponed until the birds have abandoned their nests.

Responses should be sent directly to the address listed above or via electronic mail to melissa.trenchik@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any question, please call me at (719) 567-3360.

Sincerely,

Melissa R Trenchik

MELISSA R. TRENCHIK
Natural Resources Manager

-----Original Message-----
From: Trenchik Melissa R Civ 50 CES/CEV
Sent: Wednesday, June 08, 2005 9:07 AM
To: 'sandy_vana-miller@fws.gov'
Cc: Fernandez Albert F Civ 50 CES/CEV
Subject: No Effect on Endangered Species Schriever AFB

Sandy,
To clarify my May 3, 2005 letter regarding the New Space Warfare Center at Schriever AFB, Colorado, I have concluded that there is no effect on listed species or habitat.

It has been a pleasure working with you and I look forward to working with you again in the future. As I mentioned on the phone, Schriever AFB is in the process of updating our Integrated Natural Resources Management Plan (INRMP). I look forward to your future input as we develop that plan.

Thanks,
Melissa Trenchik
Environmental Biologist
Schriever Air Force Base
719-567-3360

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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

5

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

Pikes Peak Area Council of Governments
Mr. Rich Muzzy, Environmental Planning Program Manager
15 South Seventh Street
Colorado Springs, Colorado 80905

Dear Mr. Muzzy:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

According to the National Environmental Policy Act (NEPA), the Air Force must assess the potential environmental impacts of the proposed and alternative actions. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, the Air Force is requesting input from other Federal, state, and local agencies on the proposal. Please identify any resources within your agency's purview that may be potentially impacted.

Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

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DEPARTMENT OF THE AIR FORCE
50TH SPACE WING (AFSPC)

6

February 3, 2005

50 CES/CEV (AFSPC)
Attn: Mr. Al Fernandez
500 O'Malley Ave, Suite 19
Schriever AFB, CO 80912-5019

U.S. Army Corps of Engineers
Mr. Van Truan, Chief
720 N. Main St. Rm. 205
Southern Colorado Regulatory Office
Pueblo, Colorado 81003

Dear Mr. Van Truan:

The Air Force is proposing to construct a new Space Warfare Center (SWC) at Schriever AFB. The SWC currently shares facilities with the Joint National Integration Center (JNIC) because their missions were intermingled. The events of September 11, 2001 identified a major shift in mission change for both the JNIC and the SWC. As a result of the JNIC mission change, they need to recall the space that the SWC currently occupies. Construction is currently planned for Fiscal Year 2006. A Description of the Proposed Action and Alternatives describing the project in more detail is attached.

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Please provide any comments or information by February 28, 2005. Responses should be sent directly to the address listed above or via electronic mail to albert.fernandez@schriever.af.mil. Your assistance in providing information is greatly appreciated. If you have any questions, please call me at (719) 567-4026.

Sincerely

ALBERT F. FERNANDEZ, GS-12, DAF
Environmental Engineer/EIAP Manager

Attachment:
Description of the Proposed Action and Alternatives

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APPENDIX B

AIR CALCULATIONS

APPENDIX B —
Air Emission Calculations

This section includes the calculations performed for estimating air emissions generated from activities related to the Proposed Action. Emissions were estimated using emission factors from AP-42, Volume I, Stationary Sources (USEPA 1995b; USEPA, 1998a; USEPA, 1998b; USEPA, 1998c; USEPA, 2001; USEPA, 2001; USEPA, 2003b; USEPA, 2004b), USEPA Factor Information Retrieval Data System (USEPA, 2004c), and the Nonroad Engine and Vehicle Emission Study (USEPA, 2004a). Additional factors were used from the U.S. Air Force (USAF, 1999a; USAF, 2002c). Information from the 2002 Air Emissions Inventory for Schriever AFB (USAF, 2003c) was updated in accordance with the November 2004 Synthetic Minor Construction Permit (CDPHE, 2004).

Table of Contents

Table B-1 Estimated Air Emissions from Constructing the SIDC.....B-3

Table B-2 Estimated Area Disturbed by the Construction.....B-11

Table B-3 Estimated Stationary Emissions at Schriever AFB.....B-12

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Table B-1 Estimated Air Emissions from Constructing the SIDC at Schriever AFB

This table includes calculations performed for estimating air emissions generated from activities related to the construction of a Space Test and Evaluation Facility at Schriever AFB.

Phase I and II

Emissions Years - FY 07 and 08

Estimate 24 months to construct (520 work days)

Emissions were estimated using emission factors from AP-42 (USEPA, 1995-2004), AFIERA (USAF, 2002), and Exhaust and Crankcase Emission Factors for Non Road Engine Modeling (USEPA, 2004)

Summary (emissions in tons per year)

CO	VOC	NOx	SOx	PM-10	HAPs			
6.54	**0.66**	**4.61**	**0.71**	**1.95**	**0.09**			

Summary (emissions in tons per day)

CO	VOC	NOx	SOx	PM-10	HAPs			
0.03	**0.00**	**0.02**	**0.00**	**0.01**	**0.00**			

PM_{10} emissions from grading (fugitive dust)

$PM = \frac{1.0*s^{1.5}}{M^{1.4}}$		9.397	lb/hr PM	336	hours	
		7.05	lbs/hr PM_{10}	2368.0	lbs PM_{10}	
				1.18	**tons PM_{10}**	

where s = silt (%), M = moisture (%)
PM_{10} = PM * 0.75
Sandy loam, sandy clay loam and loamy sand are typically 0-40 percent silt, an average of 20 percent was used.
5 percent soil moisture was assumed.
Sources: AP-42 Vol I, Chapter 13.2.3 Heavy Construction Operations, January 1995
AP-42 Vol I, Chapter 11.9 Western Surface Coal Mining, October 1998

Area disturbed	7	acres

Construction Equipment Emissions

Equipment	Days	Hours/day	Pieces	CO	VOC	NOx	SOx	PM-10
Crane	150	6	2	*73.85*	*30.53*	*549.46*	*91.58*	*24.62*
Emissions (grams)				132934.5	54946.3	989032.7	164838.8	44311.5
Emissions (lbs)				292.81	121.03	2178.49	363.08	97.60
Bulldozer	42	8	2	*114.06*	*30.02*	*459.67*	*79.76*	*29.16*
Emissions (grams)				76648.9	20170.8	308900.7	53596.6	19594.4
Emissions (lbs)				168.83	44.43	680.40	118.05	43.16
Roller	42	8	2	*101.29*	*26.66*	*408.22*	*76.16*	*25.89*
Emissions (grams)				68068.8	17912.8	274322.2	51179.5	17401.0
Emissions (lbs)				149.93	39.46	604.23	112.73	38.33
Scraper	25	8	12	*486.16*	*51.05*	*1385.56*	*218.77*	*60.77*
Emissions (grams)				1166784	122512	3325334	525053	145848
Emissions (lbs)				2570.01	269.85	7324.53	1156.50	321.25
Backhoe/loader	150	8	2	*277.55*	*54.78*	*282.12*	*38.80*	*42.45*
Emissions (grams)				666124.8	131472.0	677080.8	93126.0	101890.8
Emissions (lbs)				1467.24	289.59	1491.37	205.12	224.43
Trencher	30	8	3	*276.35*	*53.30*	*338.45*	*48.13*	*46.06*
Emissions (grams)				198968.4	38377.8	243680.4	34651.8	33161.4
Emissions (lbs)				438.26	84.53	536.74	76.33	73.04

Roller	4	8	5	*101.29*	*26.66*	*408.22*	*76.16*	*25.89*
Emissions (grams)				16206.8	4265.0	65314.8	12185.6	4143.1
Emissions (lbs)				35.70	9.39	143.87	26.84	9.13
Paving Equipment	4	8	5	*102.21*	*26.90*	*411.92*	*69.17*	*26.13*
Emissions (grams)				16353.7	4303.6	65906.6	11066.4	4180.6
Emissions (lbs)				36.02	9.48	145.17	24.38	9.21
Asphalt Paver	4	8	5	*154.86*	*23.10*	*226.73*	*39.79*	*24.81*
Emissions (grams)				24778.2	3696.2	36277.4	6365.7	3970.0
Emissions (lbs)				54.58	8.14	79.91	14.02	8.74
Dump Truck	4	8	5	*491.34*	*51.59*	*1400.32*	*218.65*	*61.42*
Emissions (grams)				78614.4	8254.5	224051.0	34983.4	9826.8
Emissions (lbs)				173.16	18.18	493.50	77.06	21.64
Air Compressors	150	8	2	*33.70*	*23.59*	*232.50*	*40.10*	*24.26*
Emissions (grams)				80870.4	56609.3	558005.8	96235.8	58226.7
Emissions (lbs)				178.13	124.69	1229.09	211.97	128.25
Generators	150	8	2	*56.17*	*39.32*	*387.55*	*66.84*	*40.44*
Emissions (grams)				134798	94359	930109	160410	97054
Emissions (lbs)				296.91	207.84	2048.70	353.33	213.78
Cement mixer	60	8	2	*18.41*	*1.97*	*23.43*	*1.79*	*2.02*
Emissions (grams)				17676.3	1892.4	22493.2	1720.3	1935.4
Emissions (lbs)				38.93	4.17	49.54	3.79	4.26
Total Emissions	lbs			5900.5	1230.8	17005.5	2743.2	1192.8
	tons			**2.95**	**0.62**	**8.50**	**1.37**	**0.60**

Emission factors from USEPA, 2004 Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling
Assumes Tier 1 equipment (model years between 1996 and 2000)
Emission factors (EF) (in italics) are calculated with the following formula: EF in grams/horsepower-hour multiplied by horsepower, multiplied times the typical load factor for each type of equipment.
EFs and horsepower are derived from USEPA, 2004, using the steady state EF multiplied by the transient adjustment factor.
Typical load factor from AFIERA, USAF, 2002d Air Emissions Inventory Guidance for Mobile Sources

Hazardous Air Pollutants from Construction Equipment

Total HAPs		367.14	lbs					
		0.18	**tons**					

Total HAPs calculated from emission factors in Table 7.10 USAF, 2002 Air Emissions Inventory Guidance for Mobile Sources

Estimated Emissions from Highway Trucks

Water truck							
Exhaust emissions			**CO**	**HC**	**NOx**	**SOx[1]**	**PM-10**
Number of trucks	1	EF (g/mi)	17.900	4.700	6.500	0.512	0.124
Distance (miles)	10	lbs/mi	0.0394	0.0104	0.0143	0.0011	0.0003
Days	500	Amt (lbs)	197.14	51.76	71.59	5.64	1.366
Total Miles	5,000	**Amt (tons)**	**0.10**	**0.03**	**0.04**	**0.00**	**0.001**

[1] SOX factor considered conservatively high, since it uses high sulfur fuel
EF = Emission Factor for calendar year 2005 in grams per mile
Emission factors from AFIERA Tables 4-41, 4-42, 4-43, and 4-50 (USAF, 2002)
Assumes average vehicle model year of 2000 for high altitude heavy duty diesel powered trucks

Trucks for asphalt

Amount of asphalt		2,306	tons					
Amount per load		15	tons					

Loads		154	loads					
Days		4	days					
Truck trips per day		8	(1 hour round trip for each truck)					
Trucks		5						
Asphalt								
	SIDC parking							
		31,125	Cubic feet					
		1,153	Cubic yds					
		2,306	tons					

Hot mix asphalt plant (off site)

		CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**		
Emission factors		0.4	0.0082	0.025	0.0046	0.027	lbs/ton HMA	
Tons of HMA		2,306						
Emissions		922	19	58	11	62	lbs	
Emissions		**0.46**	**0.01**	**0.03**	**0.01**	**0.03**	**tons**	

HMA = hot mix asphalt
Emission factors are for batch mix plants using a natural gas fired dryer, hot screens, and mixer
Emission factors are from AP-42 Vol I Chapter 11.1 Hot Mix Asphalt Plants, April 2004.
PM_{10} emission factor from Table 11.1-1, using fabric filter control
CO, SO_2, and No_x emission factors from Table 11.1-5
VOC emission factor from Table 11.1-6
About 85 percent of HMA plants in use are batch mix plants, and 70 to 90 percent use natural gas.

Hazardous Air Pollutants from Batch Mix Asphalt Plant

Total HAPs		0.0077	emission factor				
		0.15	lbs				
		0.00	**tons**				
Total HAPs calculated from emission factors in Table 11.1-9 of AP-42 Vol I, Chapter 11.1							

Worker Vehicle Trips Emissions

Exhaust			**CO**	**VOC**	**NOx**	**SOx**	**PM-10**
Number of workers	40	EF (g/mi)	14.600	1.000	1.00	0.072	0.011
Commute (miles)	30	lbs/mi	0.03216	0.00220	0.00220	0.00016	2.42E-05
Days	520	Amt (lbs)	20066.96	1374.45	1374.45	98.96	15.119
Total Miles	624,000	**Amt (tons)**	**10.03**	**0.69**	**0.69**	**0.05**	**0.008**

EF = Emission Factor for calendar year 2005 in grams per mile
Emission factors from AFIERA Tables 4-5, 4-6, 4-7, and 4-50 (USAF, 2002)
Assumes average vehicle model year of 2000 for high altitude light duty gas vehicles

PM-10 from Trucks Driving on Paved Roads

			$EF = k(sL/2)^{0.65}(W/3)^{1.5}$	**0.012**	**EF**	
Miles/round trip	30					
Trucks/hour	3		where k= particle size multiplier for PM_{10} (0.016)			
Hours of activity	2		where sL = silt loading (g/m^2), W = mean vehicle weight (tons)			
Days	4		EF = emission factor for normal conditions on low traffic roads			
VMT	720					
EF (lbs/mile)	0.012					
TOTAL (lbs)	8.7075					
Total (tons)	**0.00**					

Emission factor formula from AP-42, Vol I, Chapter 13.2.1 Paved Roads (August 2003)

PM-10 from Trucks Driving on Unpaved Roads

Miles/round trip	2		EF = $\underline{k(s/12)^a}(S/30)^d$		2.250		
Trucks/hour	3		$(M/0.5)^c$		1.585		
Hours of activity	8				**1.420**	**EF**	
Days	62		where s = silt (%), M = moisture (%), S = mean vehicle speed (mph)				
VMT	2976		k = particle size multiplier (1.8 for PM_{10})				
EF (lbs/mile)	1.420		EF = emission factor for PM10 on unpaved roads (uncontrolled)				
TOTAL (lbs)	4224.9		Sandy loam and loamy sand are typically 10-20 percent silt, an average of 15 percent was used.				
Total (tons)	**2.11**		5 percent surface moisture was assumed for unpaved roads. Mean vehicle speed assumed is 30 mph				

Emission factor formula from AP-42 Chapter 13.2.2 Unpaved Roads (October 2001)

SUMMARY	**Amounts in tons**							
	CO	**VOC**	**NOx**	**SOx**	**PM-10**	**HAPs**		
Grading (fugitive dust)					1.18			
Trucks - paved roads					0.00			
Trucks - unpaved roads					2.11			
Construction Equipment	2.95	0.62	8.50	1.37	0.60	0.18		
Highway vehicles	0.10	0.03	0.04	0.00	0.00			
Worker Vehicles	10.03	0.69	0.69	0.05	0.008			
Asphalt	0.46	0.01	0.03	0.01	0.03	0.00		
TOTAL Construction	**13.08**	**1.33**	**9.23**	**1.42**	**3.91**	**0.18**		
TONS PER YEAR	**6.54**	**0.66**	**4.61**	**0.71**	**1.95**	**0.09**		
Pounds	26165	2657	18452	2848	7811	367		
Pounds / day avg	**50**	**5**	**35**	**5**	**15**	**1**		
Tons/day avg	**0.03**	**0.00**	**0.02**	**0.00**	**0.01**	**0.00**		

See Chapter 8 (References) of the EA for complete reference information

Grading

Acres graded	7						
Site clearing	2	days per acre					
	14	days					
Fill, site leveling	4	days per acre					
	28	days					
Assumes leveling of about 5 feet height difference based on 3 percent slope							
Total grading	42	days					

Estimated volume of grading/removal for buildings and parking lots

		Cubic ft	**Cubic yards**				
		1,100,000	40,741				
Moving earth			17	cubic yards per scraper			
			2,397	scraper loads			
			1	hours per scraper load			
			8	loads per scraper per day			
			12	scrapers			
			96	total loads per day			

			25	days				
			1.2	months				
			200	hours				

The amount of earth to be removed and graded was estimated using topographic contours for the site area and the requirements document and site plans

Phase III

Emissions Years - FY 08 or later

Estimate 12 months to construct (260 work days)

Emissions were estimated using emission factors from AP-42 (USEPA, 1995-2004), AFIERA (USAF, 2002), and Exhaust and Crankcase Emission Factors for Non Road Engine Modeling (USEPA, 2004)

Summary (emissions in tons per year)

CO	VOC	NOx	SOx	PM-10	HAPs			
6.38	**0.66**	**4.07**	**0.63**	**2.23**	**0.09**			

Summary (emissions in tons per day)

CO	VOC	NOx	SOx	PM-10	HAPs			
0.02	**0.00**	**0.02**	**0.00**	**0.01**	**0.00**			

PM_{10} emissions from grading (fugitive dust)

$PM = \frac{1.0*s^{1.5}}{M^{1.4}}$		9.397	lb/hr PM	144	hours		
		7.05	lbs/hr PM_{10}	1014.9	lbs PM_{10}		
				0.51	**tons PM_{10}**		

where s = silt (%), M = moisture (%)
PM_{10} = PM * 0.75
Sandy loam, sandy clay loam and loamy sand are typically 0-40 percent silt, an average of 20 percent was used.
5 percent soil moisture was assumed.
Sources: AP-42 Vol I, Chapter 13.2.3 Heavy Construction Operations, January 1995
AP-42 Vol I, Chapter 11.9 Western Surface Coal Mining, October 1998

Area disturbed	3	acres						

Construction Equipment Emissions

Equipment	Days	Hours/day	Pieces	CO	VOC	NOx	SOx	PM-10
Crane	80	6	2	*73.85*	*30.53*	*549.46*	*91.58*	*24.62*
Emissions (grams)				70898.4	29304.7	527484.1	87914.0	23632.8
Emissions (lbs)				156.16	64.55	1161.86	193.64	52.05
Bulldozer	18	8	2	*114.06*	*30.02*	*459.67*	*79.76*	*29.16*
Emissions (grams)				32849.5	8644.6	132386.0	22970.0	8397.6
Emissions (lbs)				72.36	19.04	291.60	50.59	18.50
Roller	18	8	2	*101.29*	*26.66*	*408.22*	*76.16*	*25.89*
Emissions (grams)				29172.3	7676.9	117566.7	21934.1	7457.6
Emissions (lbs)				64.26	16.91	258.96	48.31	16.43
Scraper	8	8	12	*486.16*	*51.05*	*1385.56*	*218.77*	*60.77*
Emissions (grams)				373371	39204	1064107	168017	46671
Emissions (lbs)				822.40	86.35	2343.85	370.08	102.80
Backhoe/loader	80	8	2	*277.55*	*54.78*	*282.12*	*38.80*	*42.45*
Emissions (grams)				355266.6	70118.4	361109.8	49667.2	54341.8
Emissions (lbs)				782.53	154.45	795.40	109.40	119.70
Trencher	20	8	3	*276.35*	*53.30*	*338.45*	*48.13*	*46.06*
Emissions (grams)				132645.6	25585.2	162453.6	23101.2	22107.6
Emissions (lbs)				292.17	56.36	357.83	50.88	48.70

Roller	2	8	5	*101.29*	*26.66*	*408.22*	*76.16*	*25.89*
Emissions (grams)				8103.4	2132.5	32657.4	6092.8	2071.6
Emissions (lbs)				17.85	4.70	71.93	13.42	4.56
Paving Equipment	2	8	5	*102.21*	*26.90*	*411.92*	*69.17*	*26.13*
Emissions (grams)				8176.8	2151.8	32953.3	5533.2	2090.3
Emissions (lbs)				18.01	4.74	72.58	12.19	4.60
Asphalt Paver	2	8	5	*154.86*	*23.10*	*226.73*	*39.79*	*24.81*
Emissions (grams)				12389.1	1848.1	18138.7	3182.8	1985.0
Emissions (lbs)				27.29	4.07	39.95	7.01	4.37
Dump Truck	2	8	5	*491.34*	*51.59*	*1400.32*	*218.65*	*61.42*
Emissions (grams)				39307.2	4127.3	112025.5	17491.7	4913.4
Emissions (lbs)				86.58	9.09	246.75	38.53	10.82
Air Compressors	80	8	2	*33.70*	*23.59*	*232.50*	*40.10*	*24.26*
Emissions (grams)				43130.9	30191.6	297603.1	51325.8	31054.2
Emissions (lbs)				95.00	66.50	655.51	113.05	68.40
Generators	80	8	2	*56.17*	*39.32*	*387.55*	*66.84*	*40.44*
Emissions (grams)				71892.5	50324.7	496058.1	85552.1	51762.6
Emissions (lbs)				158.35	110.85	1092.64	188.44	114.01
Cement mixer	40	8	2	*18.41*	*1.97*	*23.43*	*1.79*	*2.02*
Emissions (grams)				11784.19	1261.57	14995.46	1146.88	1290.24
Emissions (lbs)				25.96	2.78	33.03	2.53	2.84
Total Emissions	lbs			2618.91	600.38	7421.89	1198.08	567.79
	tons			**1.31**	**0.30**	**3.71**	**0.60**	**0.28**

Emission factors from USEPA, 2004 Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling
Assumes Tier 1 equipment (model years between 1996 and 2000)
Emission factors (EF) (in italics) are calculated with the following formula: EF in grams/horsepower-hour multiplied by horsepower, multiplied times the typical load factor for each type of equipment.
EFs and horsepower are derived from USEPA, 2004, using the steady state EF multiplied by the transient adjustment factor.
Typical load factor from AFIERA, USAF, 2002d Air Emissions Inventory Guidance for Mobile Sources

Hazardous Air Pollutants from Construction Equipment								
Total HAPs		179.09	lbs					
		0.09	**tons**					

Total HAPs calculated from emission factors in Table 7.10 USAF, 2002 Air Emissions Inventory Guidance for Mobile Sources

Estimated Emissions from Highway Trucks

Water truck							
Exhaust emissions			**CO**	**HC**	**NOx**	**SOx[1]**	**PM-10**
Number of trucks	1	EF (g/mi)	17.900	4.700	6.500	0.512	0.124
Distance (miles)	10	lbs/mi	0.0394	0.0104	0.0143	0.0011	0.0003
Days	250	Amt (lbs)	98.57	25.88	35.79	2.82	0.683
Total Miles	2,500	**Amt (tons)**	**0.05**	**0.01**	**0.02**	**0.00**	**0.000**

[1] SOX factor considered conservatively high, since it uses high sulfur fuel
EF = Emission Factor for calendar year 2005 in grams per mile
Emission factors from AFIERA Tables 4-41, 4-42, 4-43, and 4-50 (USAF, 2002)
Assumes average vehicle model year of 2000 for high altitude heavy duty diesel powered trucks

Trucks for asphalt								
Amount of asphalt		1,056	tons					
Amount per load		15	tons					

Loads		70	loads					
Days		2	days					
Truck trips per day		8	(1 hour round trip for each truck)					
Trucks		5						
Asphalt								
	SIDC parking							
		14,263	cu feet					
		528	cu yds					
		1,056	tons					
Hot mix asphalt plant (off site)								
		CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**		
Emission factors		0.4	0.0082	0.025	0.0046	0.027	lbs/ton HMA	
Tons of HMA		1,056						
Emissions		423	9	26	5	29	lbs	
Emissions		**0.21**	**0.00**	**0.01**	**0.00**	**0.01**	**tons**	
HMA = hot mix asphalt Emission factors are for batch mix plants using a natural gas fired dryer, hot screens, and mixer Emission factors are from AP-42 Vol I Chapter 11.1 Hot Mix Asphalt Plants, April 2004. PM_{10} emission factor from Table 11.1-1, using fabric filter control CO, SO_2, and No_x emission factors from Table 11.1-5 VOC emission factor from Table 11.1-6 About 85 percent of HMA plants in use are batch mix plants, and 70 to 90 percent use natural gas.								
Hazardous Air Pollutants from Batch Mix Asphalt Plant								
Total HAPs		0.0077	emission factor					
		0.07	lbs					
		0.00	**tons**					
Total HAPs calculated from emission factors in Table 11.1-9 of AP-42 Vol I, Chapter 11.1								
Worker Vehicle Trips Emissions								
Exhaust			**CO**	**VOC**	**NOx**	**SOx**	**PM-10**	
Number of workers	40	EF (g/mi)	14.600	1.000	1.00	0.072	0.011	
Commute (miles)	30	lbs/mi	0.03216	0.00220	0.00220	0.00016	2.42E-05	
Days	260	Amt (lbs)	10033.48	687.22	687.22	49.48	7.559	
Total Miles	312,000	**Amt (tons)**	**5.02**	**0.34**	**0.34**	**0.02**	**0.004**	
EF = Emission Factor for calendar year 2005 in grams per mile Emission factors from AFIERA Tables 4-5, 4-6, 4-7, and 4-50 (USAF, 2002) Assumes average vehicle model year of 2000 for high altitude light duty gas vehicles								
PM-10 from Trucks Driving on Paved Roads								
			$EF = k(sL/2)^{0.65}(W/3)^{1.5}$		**0.012**	**EF**		
Miles/round trip	30		where k= particle size multiplier for PM_{10} (0.016) where sL = silt loading (g/m^2), W = mean vehicle weight (tons) EF = emission factor for normal conditions on low traffic roads					
Trucks/hour	3							
Hours of activity	2							
Days	2							
VMT	360							
EF (lbs/mile)	0.012							
TOTAL (lbs)	4.35							
Total (tons)	**0.00**							
Emission factor formula from AP-42, Vol I, Chapter 13.2.1 Paved Roads (August 2003)								

PM-10 from Trucks Driving on Unpaved Roads

Miles/round trip	2	$EF = k(s/12)^a(S/30)^d$		2.250		
Trucks/hour	3	$(M/0.5)^c$		1.585		
Hours of activity	8			**1.420**	**EF**	
Days	42	where s = silt (%), M = moisture (%), S = mean vehicle speed (mph)				
VMT	2016	k = particle size multiplier (1.8 for PM_{10})				
EF (lbs/mile)	1.420	EF = emission factor for PM10 on unpaved roads (uncontrolled)				
TOTAL (lbs)	2862	Sandy loam and loamy sand are typically 10-20 percent silt, an average of 15 percent was used.				
Total (tons)	**1.43**	5 percent surface moisture was assumed for unpaved roads. Mean vehicle speed assumed is 30 mph				

Emission factor formula from AP-42 Chapter 13.2.2 Unpaved Roads (October 2001)

SUMMARY	Amounts in tons							
	CO	**VOC**	**NOx**	**SOx**	**PM-10**	**HAPs**		
Grading (fugitive dust)					0.51			
Trucks - paved roads					0.00			
Trucks - unpaved roads					1.43			
Construction Equipment	1.31	0.30	3.71	0.60	0.28	0.09		
Highway vehicles	0.05	0.01	0.02	0.00	0.00			
Worker Vehicles	5.02	0.34	0.34	0.02	0.004			
Asphalt	0.21	0.00	0.01	0.00	0.01	0.00		
TOTAL Construction	**6.38**	**0.66**	**4.07**	**0.63**	**2.23**	**0.09**		
TONS PER YEAR	**6.38**	**0.66**	**4.07**	**0.63**	**2.23**	**0.09**		
Pounds	12751	1313	8145	1250	4457	179		
Pounds / day avg	**49**	**5**	**31**	**5**	**17**	**1**		
Tons/day avg	**0.02**	**0.00**	**0.02**	**0.00**	**0.01**	**0.00**		

See Chapter 8 (References) of the EA for complete reference information

Grading

Acres graded	3		**Fill, site leveling**	4	days per acre	
Site clearing	2	days per acre		12	days	
	6	days				

Assumes leveling of about 5 feet height difference based on 3 percent slope

Total grading	18	days					

Estimated volume of grading/removal for buildings and parking lots

		Cubic ft	**Cubic yards**	
		368,750	13,657	
Moving earth			17	cubic yards per scraper
			803	scraper loads
			1	hours per scraper load
			8	loads per scraper per day
			12	scrapers
			96	total loads per day
			8	days
			0.4	months
			67	hours

The amount of earth to be removed and graded was estimated using topographic contours for the site area and the requirements document and site plans

Table B-2 Estimated Area Disturbed by the Proposed Action				
Phase I and II				
Project	**Length (ft)**	**Width (ft)**	**Area (ft)**	**Acres**
Building site	420	360	151,200	3.47
Parking lot	420	155	65,100	1.49
Access road	330	45	14,850	0.34
Total			**231,150**	**5.31**
Utilities				
Electric	1600	5	8,000	0.18
Communications	5500	5	27,500	0.63
Gas	1400	5	7,000	0.16
Water	1600	5	8,000	0.18
Sanitary Sewer	3500	5	17,500	0.40
Total			**68,000**	**1.56**
Antenna Farm	180	110	**19,800**	**0.45**
Total Area Disturbed			**318,950**	**7.32**
Pavement Areas				
Parking lot	400	135	54,000	1.24
Access road	330	25	8,250	0.19
Total			**62,250**	**1.43**
Roof Areas				
Phase I Building			28392	0.65
Phase II Building			26094	0.60
Total Building Area			**54,486**	**1.25**
Total Impermeable Area			**116,736**	**2.68**
Phase III				
Building and parking lot site	590	250	147,500	**3.39**
Utilities				
Electric	515	5	2,575	0.06
Communications	200	5	1,000	0.02
Gas	825	5	4,125	0.09
Water	945	5	4,725	0.11
Sanitary Sewer	250	5	1,250	0.03
Total			**13,675**	**0.31**
Total Area Disturbed				**3.70**
Impermeable Areas				
Building site	174	72	12,528	0.29
Building site	111	115	12,765	0.29
Parking lot	210	115	24,150	0.55
Access Road	175	25	4,375	0.10
Total Impermeable Area			**53,818**	**1.24**
Pavement Area				
Parking lot	210	115	24,150	0.55
Access Road	175	25	4,375	0.10
			28,525	0.65

Table B-3 Estimated Stationary Emissions at Schriever AFB

Permitted Sources

Boilers - Natural Gas

Fuel Usage Year	**2002**	
Actual Natural Gas Usage	**33.11**	mmcf/yr
Calculated Operating Hours	**2,539**	hrs/yr
Potential Fuel Usage[a]	**141.00**	mmcf/yr
Potential Operating Hours	**10,814**	hrs/yr
Burner Rating[b]	**13.3**	mmbtu/hr each
Natural Gas Heat Content[c]	**1,020**	btu/ft^3

a This value was obtained from the limit in the Schriever AFB Synthetic Minor Construction Permit (CDPHE, 2004).
b Three of the boilers have a rating of 13.3 mmbtu/hr and the fourth boiler has a rating of 13.80 mmbtu/hr.
As the emission factors used apply to boilers with a rating between .03 - 100 MMBtu,
The differences in the boiler ratings do not alter the emission calculations.
c From USEPA, 1998b, Section 1.4.1
mmcf = million cubic feet
mmbtu = million British thermal units

Criteria Pollutant Emission Estimation[a]

Pollutant	Emission Factor (lb/mmcf)	Actual Emissions (tpy)	Potential Emissions (tpy)
PM	7.6	0.126	0.536
PM_{10}[b]	7.6	0.126	0.536
$PM_{2.5}$[b]	7.6	0.126	0.536
NOx	100.0	1.656	7.050
SOx	0.6	0.010	0.042
VOC	5.5	0.091	0.388
CO	84.0	1.391	5.922
Totals		**3.525**	**15.009**

a Emission factors are for natural gas combustion in small boilers (<100 MMBtu/hr), uncontrolled in USEPA, 1998b and USEPA, 2004c)
b All PM generated is assumed to be less than 1 micrometer in diameter, per AP-42 (Table 1.4-2).
Emissions = Emission factor multiplied by natural gas usage divided by 2000 (lbs per ton).
tpy = tons per year

HAP Emission Estimation[a]

HAP	CAS Number	Emission Factor (lb/mmcf)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Arsenic	7440382	0.0002	0.000003	0.000014
Benzene	71432	0.0021	0.000035	0.000148
Beryllium	7440417	0.000012	0.000000	0.000001
Cadmium	7440439	0.0011	0.000018	0.000078

Chromium	7440473	0.0014	0.000023	0.000099
Cobalt	7440484	0.000084	0.000001	0.000006
Dichlorobenzene (1,4 isomer)	25321226	0.0012	0.000020	0.000085
Formaldehyde	50000	0.075	0.001242	0.005288
Hexane	110543	1.8	0.029800	0.126900
Lead	7439921	0.0005	0.000008	0.000035
Manganese	7439965	0.00038	0.000006	0.000027
Mercury	7439976	0.00026	0.000004	0.000018
Naphthalene	91203	0.00061	0.000010	0.000043
Nickel	7440020	0.0021	0.000035	0.000148
POM	None	0.0000882	0.000001	0.000006
Selenium	7782492	0.000024	0.000000	0.000002
Toluene	108883	0.0034	0.000056	0.000240
Totals			**0.031**	**0.133**

a Emission factors are for natural gas combustion sources (USEPA, 1998b; USEPA, 2004c)
Emissions = Emission factor multiplied by natural gas usage divided by 2000 (lbs per ton).

Boilers - Diesel Fuel

Calendar Year	**2002**	
Actual Fuel Usage	**2.12**	mgal/yr
Calculated Operating Hours	**22.35**	hrs/yr
Potential Fuel Usage[a]	**65.00**	mgal/yr
Potential Operating Hours	**684.21**	hrs/yr
Burner Rating[b]	**13.3**	mmbtu/hr each
Fuel Sulfur Content[c]	**0.5**	%
Fuel Heat Content[d]	**140,000**	btu/gal

a This value was obtained from the limit in the 2004 Schriever AFB Synthetic Minor Construction Permit (CDPHE, 2004).
b Three of the boilers have a rating of 13.39 mmbtu/hr and the fourth boiler has a rating of 13.80 mmbtu/hr.
The emission calculations are calculated according to a boiler rating of less than 100 mmbtu.
c Sulfur content per fuel delivery contract requirements as stated in the Schriever AFB Synthetic Minor Construction Permit.
d From USEPA, 1998c, Section 1.3.4.3.
mgal = mega gallon (1,000 gallons)

Criteria Pollutant Emission Estimation[a]

Pollutant	Emission Factor (lb/mgal)	Actual Emissions (tpy)	Potential Emissions (tpy)
PM[b]	3.3	0.0035	0.11
PM_{10}	2.38	0.0025	0.08
$PM_{2.5}$	2.38	0.0025	0.08
SO_x	72.00	0.0764	2.34
NO_x	20.00	0.0212	0.65

VOC	0.34	0.0004	0.01
CO	5.00	0.0053	0.16
Totals		**0.112**	**3.426**

a Emission factors are for distillate fuel fired boilers <100 MMBtu/hr (USEPA, 1998c)

b Emissions equals filterable plus total condensable for both PM and PM10

Emissions = Emission factor multiplied by natural gas usage divided by 2000 (lbs per ton).

HAP Emission Estimation[a]

HAP	CAS Number	Emission Factor (lb/mmbtu)	Emission Factor (lb/mgal)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Arsenic	7440382	0.000004	0.00056000	0.000000594	0.0000182
Benzene	71432	---	0.00275000	0.000002919	0.0000894
Beryllium	7440417	0.000003	0.00042000	0.000000446	0.0000137
Cadmium	7440439	0.000003	0.00042000	0.000000446	0.0000137
Chromium	7440473	0.000003	0.00042000	0.000000446	0.0000137
Chrysene	218019	0.000001	0.00019460	0.000000207	0.0000063
Fluoranthene	206440		0.00000276	0.000000003	0.0000001
Formaldehyde	50000	---	0.03500000	0.000037153	0.0011375
Lead	7439921	0.000009	0.00126000	0.000001337	0.0000410
Manganese	7439965	0.000006	0.00084000	0.000000892	0.0000273
Mercury	7439976	0.000003	0.00042000	0.000000446	0.0000137
Napthalene	91203		0.00033000	0.000000350	0.0000107
Nickel	7440020	0.000003	0.00042000	0.000000446	0.0000137
POM	None	---	0.00330000	0.000003503	0.0001073
Selenium	7782492		0.00067100	0.000000712	0.0000218
Total				**0.00005**	**0.002**

a Emission factors are for fuel oil combustion sources from USEPA, 1998c and USEPA, 2004c

Emissions = Emission factor multiplied by natural gas usage divided by 2000 (lbs per ton).

7 generators at Bldg 600

Calendar Year	**CY 2002**	
Actual Fuel Usage	**56,852**	gal/yr
Actual Operating Hours[a]	**747.0**	hrs/yr
Potential Fuel Usage[b]	**200,000**	gal/yr
Potential Operating Hours[c]	**1667**	hrs/yr
Generator Output Rating[d]	**2300**	kW
Engine Rating[e]	**22.89**	MMBtu/hr
Fuel Sulfur Content[f]	**0.50%**	
Fuel Heat Content[g]	**137,000**	Btu/gal

a Actual operating hour data obtained from Schriever AFB air emissions inventory.
b From operating limits in the Schriever AFB Minor Synthetic Construction Permit (CDPHE, 2004).
c Potential operating hours = Potential fuel usage/120 gal/hr engine fully-loaded fuel consumption rate (air emissions inventory)
d Generator high altitude output rating obtained from air emissions inventory. Generator 7 is rated at 2700 kW
e Engine Rating is the design rate listed in the 2004 Schriever AFB Synthetic Minor Construction Permit.
f Sulfur content per fuel delivery contract requirements as stated in the Schriever AFB Synthetic Minor Construction Permit.
g Diesel fuel heat content from USEPA, 1996, Table 3.4-1.

Criteria Pollutant Emission Estimation[a]

Pollutant	Emission Factor (lb/mmbtu)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
PM	0.07	0.27	0.95
PM_{10}	0.06	0.22	0.79
$PM_{2.5}$	0.05	0.19	0.66
SO_x	0.01	0.02	0.07
NO_x	3.20	12.46	43.84
VOC	0.09	0.35	1.23
CO	0.85	3.31	11.65
Total		**16.82**	**59.18**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only.
Emission factor from USEPA, 1996 and USAF, 1999a.
b Emissions = Emission factor multiplied by fuel usage divided by 1,000,000 (BTus) divided by 2000 (lbs per ton).

HAP Emission Estimation[a]

HAP	CAS Number	Emission Factor (lb/mmbtu)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Acetaldehyde	75070	0.0000252	0.000098	0.00035
Acrolein	107028	0.0000079	0.000031	0.00011
Benzene	71432	0.0007760	0.003022	0.01063
Formaldehyde	50000	0.0000789	0.000307	0.00108
Mercury	7439976	0.0000003	0.000001	0.00000
Naphthalene	91203	0.0001300	0.000506	0.00178
Toluene	108883	0.0002810	0.001094	0.00385
Xylene	1330207	0.0001930	0.000752	0.00264
Total			**0.00581**	**0.02044**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only.
Emission factor from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
b Emissions = Emission factor multiplied by fuel usage divided by 1,000,000 (BTus) divided by 2000 (lbs per ton).

Building 700 Generators

Calendar Year	**CY 2002**	
Actual Fuel Usage[a]	**1,833**	gal/yr total
Actual Operating Hours[b]	**90**	hrs/yr total

Potential Fuel Usage[c]	**15,000**	gal/yr total
Potential Operating Hours[d]	**413**	hrs/yr total
Generator Output Rating[e]	**500.0**	kW each
Engine Rating[f]	**4.98**	MMBtu/hr each
Fuel Sulfur Content[g]	**0.5%**	
Fuel Heat Content[h]	**137,000**	btu/gal

a Actual operating hour data obtained from Schriever AFB air emissions inventory.
b Actual operating hour data obtained from Schriever AFB air emissions inventory.
c Potential fuel usage obtained from the Schriever AFB Synthetic Minor Construction Permit (November 2004) (CDPHE, 2004).
d Potential operating hours = Potential fuel usage x Fuel Heat Content/1000000/Engine Rating
e Generator output rating was obtained from the Schriever AFB air emissions inventory (USAF, 2003c).
f Engine rating from the 2004 Schriever AFB Synthetic Minor Construction Permit.
g Sulfur content per fuel delivery contract requirements as stated in the Schriever AFB Synthetic Minor Construction Permit.
h Diesel fuel heat content from USEPA, 1996, Table 3.4-1.

Criteria Pollutant Emission Estimation[a]

Pollutant	Emission Factor (lb/mmbtu)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
PM	0.07	0.01	0.07
PM_{10}	0.06	0.01	0.06
$PM_{2.5}$	0.05	0.01	0.05
SO_x	0.01	0.00	0.01
NO_x	3.20	0.40	3.29
VOC	0.09	0.01	0.09
CO	0.85	0.11	0.87
Total		**0.54**	**4.44**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only.
Emission factor from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
b Emissions = Emission factor multiplied by fuel usage divided by 1,000,000 (BTus) divided by 2000 (lbs per ton).

HAP Emission Estimation[a]

HAP	CAS Number	Emission Factor (lb/mmbtu)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Acetaldehyde	75070	2.52E-05	0.00000316	0.0000259
Acrolein	107028	7.88E-06	0.00000099	0.0000081
Benzene	71432	7.76E-04	0.00009743	0.0007973
Formaldehyde	50000	7.89E-05	0.00000991	0.0000811
Mercury	7439976	3.01E-07	0.00000004	0.0000003
Naphthalene	91203	1.30E-04	0.00001632	0.0001336
Toluene	108883	2.81E-04	0.00003528	0.0002887
Xylene	1330207	1.93E-04	0.00002423	0.0001983
Total			**0.00018737**	**0.0015333**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only.
Emission factor from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
b Emissions = Emission factor multiplied by fuel usage divided by 1,000,000 (BTus) divided by 2000 (lbs per ton).

Building 712 Generators

Calendar Year	**CY 2004**		
Actual Fuel Usage[a]	**7,224**	gal/yr total	***Generators:***
Actual Operating Hours[b]	**120**	hrs/yr total	4 Cummins QST30-G3
Potential Fuel Usage[c]	**67,760**	gal/yr total	
Potential Operating Hours[d]	**1,126**	hrs/yr total	
Generator Output Rating[e]	**500.0**	kW each	
Engine Rating[f]	**3.43**	MMBtu/hr each	
Horsepower[g]	**1350**		
Fuel Sulfur Content[h]	**0.5%**		
Fuel Heat Content[i]	**137,000**	btu/gal	

a Actual fuel usage estimated from estimated actual hours multiplied by fuel consumption rate (Cummins, 2005).
b Actual operating hour data estimated from Schriever AFB air emissions inventory (similar to Bldg 700).
c Potential fuel usage obtained from the Schriever AFB Synthetic Minor Construction Permit (November 2004) (CDPHE, 2004).
d Calculated from the 2004 Schriever AFB Synthetic Minor Construction Permit limits on potential fuel usage and the fuel consumption rate per hour from the QST30-G3 Data Sheet (Cummins, 2005).
e Generator output rating was obtained from the Schriever AFB air emissions inventory.
f Engine rating from the 2004 Schriever AFB Synthetic Minor Construction Permit.
g Horsepower obtained from Cummins Power Generation Data Sheet (Cummins, 2005)
h Sulfur content per fuel delivery contract requirements as stated in the Schriever AFB Synthetic Minor Construction Permit.
i Diesel fuel heat content from USEPA, 1996, Table 3.4-1.

Criteria Pollutant Emission Estimation

Pollutant	Emission Factor g/HP-hour[a]	Emission Factor (lb/mmbtu)[b]	Actual Emissions (tpy)[c]	Potential Emissions (tpy)
PM	0.08		0.01	0.06
PM_{10}		0.06	0.01	0.06
$PM_{2.5}$		0.05	0.01	0.05
SO_x		0.01	0.00	0.01
NO_x	7.58		1.35	5.63
VOC	0.19		0.03	0.14
CO	0.21		0.04	0.16
Total			**1.45**	**6.11**

a Emission factors for PM, Nox, VOC, and CO are from QST30 fact sheet (Cummins, 2005).
b Emission factors for PM_{10}, $PM_{2.5}$, and SO_x are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel) only.
These emission factors are from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
c Emissions of PM, NOx, VOC, and CO = emission factor * horsepower * operating hours divided by 454 (grams per pound) divided by 2000lbs
c Emissions of PM10, PM2.5, and SOx = fuel usage (estimated from Bldg 700 generator) * emission factor * heat content of fuel (per million BTus) divided by 1 million divided by 2000 (pounds per ton)

HAP Emission Estimation

HAP	CAS Number	Emission Factor (lb/mmbtu)[a]	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Acetaldehyde	75070	2.52E-05	0.00000316	0.0000259
Acrolein	107028	7.88E-06	0.00000099	0.0000081
Benzene	71432	7.76E-04	0.00009743	0.0007973
Formaldehyde	50000	7.89E-05	0.00000991	0.0000811
Mercury	7439976	3.01E-07	0.00000004	0.0000003
Naphthalene	91203	1.30E-04	0.00001632	0.0001336
Toluene	108883	2.81E-04	0.00003528	0.0002887
Xylene	1330207	1.93E-04	0.00002423	0.0001983
Total			**0.00018737**	**0.0015333**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only.
Emission factor from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
c Emissions = fuel usage (estimated from Bldg 700 generator) * emission factor * heat content
of fuel (per million BTus) divided by 1 million divided by 2000 (pounds per ton)

Proposed SIDC Building Generators

Calendar Year	**CY 2008**		
Actual Fuel Usage[a]	**7,224**	gal/yr total	***Generators:***
Actual Operating Hours[b]	**120**	hrs/yr total	4 Cummins QST30-G3
Potential Fuel Usage[c]	**67,760**	gal/yr total	
Potential Operating Hours[d]	**1,126**	hrs/yr total	
Generator Output Rating[e]	**500.0**	kW each	
Engine Rating[f]	**3.43**	MMBtu/hr each	
Horsepower[g]	**1350**		
Fuel Sulfur Content[h]	**0.5%**		
Fuel Heat Content[i]	**137,000**	btu/gal	

a Actual fuel usage estimated from estimated actual hours multiplied by fuel consumption rate (Cummins, 2005).
b Actual operating hour data estimated from Schriever AFB air emissions inventory (similar to Bldg 700).
c Potential fuel usage obtained from the Schriever AFB Synthetic Minor Construction Permit (November 2004) (CDPHE, 2004).
d Calculated from the Schriever AFB Synthetic Minor Construction Permit limits on potential fuel usage and the fuel.
consumption rate per hour from the QST30-G3 Data Sheet (Cummins, 2005).
e Generator output rating was obtained from the Schriever AFB air emissions inventory..
f Engine rating from Schriever AFB Synthetic Minor Construction Permit.
g Horsepower obtained from Cummins Power Generation Data Sheet (Cummins, 2005)
h Sulfur content per fuel delivery contract requirements as stated in the Schriever AFB Synthetic Minor Construction Permit.
i Diesel fuel heat content from USEPA, 1996), Table 3.4-1.

Criteria Pollutant Emission Estimation

Pollutant	Emission Factor g/HP-hour[a]	Emission Factor (lb/mmbtu)[b]	Actual Emissions (tpy)[c]	Potential Emissions (tpy)
PM	0.08		0.01	0.06

PM_{10}		0.06	0.01	0.06
$PM_{2.5}$		0.05	0.01	0.05
SO_x		0.01	0.00	0.01
NO_x	7.58		1.35	5.63
VOC	0.19		0.03	0.14
CO	0.21		0.04	0.16
Total			**1.45**	**6.11**

a Emission factors for PM, Nox, VOC, and CO are from QST30 fact sheet (Cummins, 2005).
b Emission factors for PM_{10}, $PM_{2.5}$, and SO_x are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel) only. These emission factors are from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
c Emissions of PM, NOx, VOC, and CO = emission factor * horsepower * operating hours divided by 454 (grams per pound) divided by 2000lbs
c Emissions of PM10, PM2.5, and SOx = fuel usage (estimated from Bldg 700 generator) * emission factor * heat content of fuel (per million BTus) divided by 1 million divided by 2000 (pounds per ton)

HAP Emission Estimation[a]

HAP	CAS Number	Emission Factor (lb/mmbtu)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Acetaldehyde	75070	2.52E-05	0.00000316	0.0000259
Acrolein	107028	7.88E-06	0.00000099	0.0000081
Benzene	71432	7.76E-04	0.00009743	0.0007973
Formaldehyde	50000	7.89E-05	0.00000991	0.0000811
Mercury	7439976	3.01E-07	0.00000004	0.0000003
Naphthalene	91203	1.30E-04	0.00001632	0.0001336
Toluene	108883	2.81E-04	0.00003528	0.0002887
Xylene	1330207	1.93E-04	0.00002423	0.0001983
Total			**0.00018737**	**0.0015333**

a Emission factors are for internal combustion engines > 600 hp which burn fuel oil #2 (diesel fuel) only. Emission factor from USEPA, 1996; USEPA, 2004c; and USAF, 1999a.
c Emissions = fuel usage (estimated from Bldg 700 generator) * emission factor * heat content of fuel (per million BTus) divided by 1 million divided by 2000 (pounds per ton)

Natural Gas Consumption from Boilers SIDC

Phase I and II

115,112	square feet		
7.57	ft^3 natural gas per ft^2 per month		
30	days per month		
29046.59	consumption per day (ft^3)		
29.05	consumption per day (1000 ft^3)	5,228,387	consumption per year (ft^3)
		5.23	mmcf

Consumption of natural gas estimated from current basewide usage

Estimated Emissions Proposed SIDC boilers

	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Emission Factors (lbs/million ft^3)	84	5.5	100	0.6	7.6	7.6
Emission Factors (lbs/ 1,000 ft^3)	0.0840	0.0055	0.1000	0.0006	0.0076	0.0076
lbs/day	2.4399	0.1598	2.9047	0.0174	0.2208	0.2208
lbs/year	439.1845	28.7561	522.8387	3.1370	39.7357	39.7357
tons/year	0.220	0.014	0.261	0.002	0.020	0.020

Emission factors from Table 1.4-1 (CO, Nox) and Table 1.4-2 (VOC, SOx, and PM_{10})
Source: AP-42 Vol I Chapter 1.4 Natural Gas Combustion, July 1998 (USEPA, 1998b)
CO and NOx emission factors for heating units less than 100 Million British thermal units for uncontrolled combustion from Table 1.4-1
VOC, SOx, and PM10 emission factors are for general natural gas combustion (Table 1.4-2)
Estimated emissions are calculated on the basis of 180 days (6 months) operation of furnaces/boilers

HAP Emission Estimation[a]

HAPs	CAS Number	Emission Factor (lb/mmcf)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Arsenic	7440382	0.00020	0.0000005	0.0000010
Benzene	71432	0.00210	0.0000055	0.0000110
Beryllium	7440417	0.00001	0.0000000	0.0000001
Cadmium	7440439	0.00110	0.0000029	0.0000058
Chromium	7440473	0.00140	0.0000037	0.0000073
Cobalt	7440484	0.00008	0.0000002	0.0000004
Dichlorobenzene (1,4 isomer)	25321226	0.00120	0.0000031	0.0000063
Formaldehyde	50000	0.07500	0.0001961	0.0003921
Hexane	110543	1.80000	0.0047055	0.0094111
Lead	7439921	0.00050	0.0000013	0.0000026
Manganese	7439965	0.00038	0.0000010	0.0000020
Mercury	7439976	0.00026	0.0000007	0.0000014
Naphthalene	91203	0.00061	0.0000016	0.0000032
Nickel	7440020	0.00210	0.0000055	0.0000110
POMc	None	0.00009	0.0000002	0.0000005
Selenium	7782492	0.00002	0.0000001	0.0000001
Toluene	108883	0.00340	0.0000089	0.0000178
Total			**0.0049368**	**0.0098736**

Emission factors from USEPA, 1998b, Table 1.4-3 and 1.4-4

Potential to Emit

CO	VOC	NOx	SOx	PM10
0.439	0.029	0.523	0.003	0.040

PTE based on continuous operation

Natural Gas Consumption from Boilers SIDC

Phase III

25,300	square feet building space		
7.57	ft^3 natural gas per ft^2 per month		
30	days per month		
6384.03	consumption per day (ft^3)		
6.38	consumption per day (1000 ft^3)	1,149,126	consumption per year (ft^3)
		1.15	mmcf

Consumption of natural gas estimated from current basewide usage

Estimated Emissions Proposed SIDC boilers (Phase III)

	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Emission Factors (lbs/million ft^3)	84	5.5	100	0.6	7.6	7.6
Emission Factors (lbs/ 1,000 ft^3)	0.0840	0.0055	0.1000	0.0006	0.0076	0.0076
lbs/day	0.5363	0.0351	0.6384	0.0038	0.0485	0.0485
lbs/year	96.5266	6.3202	114.9126	0.6895	8.7334	8.7334
tons/year	0.048	0.003	0.057	0.000	0.004	0.004

Emission factors from Table 1.4-1 (CO, Nox) and Table 1.4-2 (VOC, SOx, and PM_{10})
Source: AP-42 Vol I Chapter 1.4 Natural Gas Combustion, July 1998 (USEPA, 1998b).
CO and NOx emission factors for heating units less than 100 Million British thermal units for uncontrolled combustion from Table 1.4-1
VOC, SOx, and PM10 emission factors are for general natural gas combustion (Table 1.4-2)
Estimated emissions are calculated on the basis of 180 days (6 months) operation of furnaces/boilers

HAP Emission Estimation[a]

HAPs	CAS Number	Emission Factor (lb/mmcf)	Actual Emissions (tpy)[b]	Potential Emissions (tpy)
Arsenic	7440382	0.00020	0.0000001	0.0000002
Benzene	71432	0.00210	0.0000012	0.0000024
Beryllium	7440417	0.00001	0.0000000	0.0000000
Cadmium	7440439	0.00110	0.0000006	0.0000013
Chromium	7440473	0.00140	0.0000008	0.0000016
Cobalt	7440484	0.00008	0.0000000	0.0000001
Dichlorobenzene (1,4 isomer)	25321226	0.00120	0.0000007	0.0000014
Formaldehyde	50000	0.07500	0.0000431	0.0000862
Hexane	110543	1.80000	0.0010342	0.0020684
Lead	7439921	0.00050	0.0000003	0.0000006
Manganese	7439965	0.00038	0.0000002	0.0000004
Mercury	7439976	0.00026	0.0000001	0.0000003
Naphthalene	91203	0.00061	0.0000004	0.0000007

Nickel	7440020	0.00210	0.0000012	0.0000024
POMc	None	0.00009	0.0000001	0.0000001
Selenium	7782492	0.00002	0.0000000	0.0000000
Toluene	108883	0.00340	0.0000020	0.0000039
Total			**0.0010850**	**0.0021701**

Emission factors from USEPA, 1998b, Table 1.4-3 and 1.4-4

Potential to Emit

CO	VOC	NOx	SOx	PM10
0.097	0.006	0.115	0.001	0.009

PTE based on continuous operation

Stationary Sources - Actual Emissions

Criteria Pollutants - Actual, in Tons per Year

Source	PM_{10}	$PM_{2.5}$	NO_x	SO_x	VOC	CO
Bldg 600 Boilers (Natural Gas)	0.13	0.13	1.66	0.01	0.09	1.39
Bldg 600 Boilers (Diesel Fuel)	0.00	0.00	0.02	0.08	0.00	0.01
Bldg 600 Generators	0.22	0.19	12.46	0.02	0.35	3.31
Bldg 700 Generators	0.01	0.01	0.40	0.00	0.01	0.11
Bldg 712 Generators	0.01	0.01	1.35	0.00	0.03	0.04
Total - Permitted Sources	**0.37**	**0.33**	**15.89**	**0.11**	**0.49**	**4.85**
Permit Limit[1]	*100.00*	*100.00*	*68.00*	*30.00*	*20.00*	*30.00*
Non Permitted Sources	0.67	0.66	8.60	0.18	1.55	6.52
Total Stationary Emissions[2]	1.03	0.98	24.49	0.29	2.04	11.38
Proposed SIDC Generators	0.01	0.01	1.35	0.00	0.03	0.04
Proposed SIDC Boilers Phase I & II	0.02	0.02	0.26	0.00	0.01	0.22
Total with Proposed SIDC Phase I&II	**1.06**	**1.01**	**26.11**	**0.29**	**2.08**	**11.63**
Proposed SIDC Boilers Phase III	0.00	0.00	0.06	0.00	0.00	0.05
Total with Proposed SIDC Sources	**1.06**	**1.01**	**26.16**	**0.29**	**2.09**	**11.68**

[1] Permit limit for PM_{10} is the threshold of a major source (total PM_{10} and HAPs is not specifically limited in the construction permit).

[2] Does not include fugitive sources, since none of the fugitive sources are within industrial categories relevant to Title V permit requirements.

Stationary Sources - Potential to Emit

Criteria Pollutants - Potential to Emit, in Tons per Year

Source	PM_{10}	$PM_{2.5}$	NO_x	SO_x	VOC	CO
Bldg 600 Boilers (Natural Gas)	0.54	0.54	7.05	0.04	0.39	5.92
Bldg 600 Boilers (Diesel Fuel)	0.08	0.08	0.65	2.34	0.01	0.16
Bldg 600 Generators	0.79	0.66	43.84	0.07	1.23	11.65
Bldg 700 Generators	0.06	0.05	3.29	0.01	0.09	0.87
Bldg 712 Generators	0.06	0.05	5.63	0.01	0.14	0.16

Total - Permitted Sources	**1.52**	**1.37**	**60.46**	**2.46**	**1.87**	**18.76**
Permit Limit	*100.00*	*100.00*	*68.00*	*30.00*	*20.00*	*30.00*
Non Permitted Sources	2.81	2.79	38.11	1.72	8.69	94.30
Total Stationary Emissions[2]	4.33	4.16	98.57	4.18	10.56	113.06
Proposed SIDC Generators	0.06	0.05	5.63	0.01	0.14	0.16
Proposed SIDC Boilers Phase I & II	0.04	0.04	0.52	0.00	0.03	0.44
Total with Proposed SIDC Phase I&II	**4.42**	**4.25**	**104.73**	**4.19**	**10.73**	**113.65**
Proposed SIDC Boilers Phase III	0.01	0.01	0.11	0.00	0.01	0.10
Total with Proposed SIDC Sources	**4.43**	**4.26**	**104.85**	**4.19**	**10.73**	**113.75**

[1] Permit limit for PM_{10} is the threshold of a major source (total PM_{10} and HAPs is not specifically limited in the construction permit).

[2] Does not include fugitive sources, since none of the fugitive sources are within industrial categories relevant to Title V permit requirements.

Stationary Sources - HAPs

Actual Emissions		**Potential to Emit**	
Source	**HAPs**	**Source**	**HAPs**
Bldg 600 Boilers (Natural Gas)	0.031	Bldg 600 Boilers (Natural Gas)	0.133
Bldg 600 Boilers (Diesel Fuel)	0.000	Bldg 600 Boilers (Diesel Fuel)	0.002
Bldg 600 Generators	0.006	Bldg 600 Generators	0.020
Bldg 700 Generators	0.000	Bldg 700 Generators	0.002
Bldg 712 Generators	0.000	Bldg 712 Generators	0.002
Total - Permitted Sources	**0.038**	**Total - Permitted Sources**	**0.158**
Permit Limit[1]	*25.000*	*Permit Limit*	*25.000*
Non Permitted Sources	0.625	Non Permitted Sources	15.330
Total Stationary Emissions	0.663	Total Stationary Emissions[2]	15.488
Proposed SIDC Generators	0.000	Proposed SIDC Generators	0.002
Proposed SIDC Boilers Phase I & II	0.005	Proposed SIDC Boilers Phase I & II	0.010
Total with Proposed SIDC Phase I&II	**0.668**	**Total with Proposed SIDC Phase I&II**	**15.500**
Proposed SIDC Boilers Phase III	0.001	Proposed SIDC Boilers Phase III	0.002
Total with Proposed SIDC Sources	**0.669**	**Total with Proposed SIDC Sources**	**15.502**

[1] Permit limit for HAPs is the threshold of a major source (HAPs is not specifically limited in the construction permit).

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APPENDIX C

SITE PHOTOGRAPHS

APPENDIX C — SITE PHOTOGRAPHS

This appendix contains photographs taken at the Schriever AFB during a site visit that took place in October 2004.

Photo 1 Proposed SIDC Site, Looking East C-3
Photo 2 Proposed SIDC Site, Looking North Along Enoch Road C-3
Photo 3 Proposed SIDC Site, Looking West From Irwin Ave to West Gate C-4
Photo 4 Proposed Antenna Site Looking Southwest From Irwin and Enoch..... C-4
Photo 5 Proposed Antenna Site Looking West Along Irwin Ave C-5
Photo 6 SIDC Alternative 3 Site Looking East From Navstar C-5
Photo 7 SIDC Alternative 3 Site Looking North From Navstar..... C-6
Photo 8 SIDC Alternative 3 Site Looking South From Navstar..... C-6

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Photo 1 Proposed SIDC Site Looking East

Photo 2 Proposed SIDC Site Looking North Along Enoch Road

Photo 3 Proposed SIDC Site Looking West From Irwin Ave To West Gate

Photo 4 Proposed Antenna Site Looking Southwest from Irwin and Enoch

Photo 5 Proposed Antenna Site Looking West Along Irwin Avenue

Photo 6 SIDC Alternative 3 Site Looking East from Navstar

Photo 7 SIDC **Alternative 3 Site Looking North along Navstar**

Photo 8 SIDC **Alternative 3 Site Looking South along Navstar**

APPENDIX D

AF FORM 813

APPENDIX D – AIR FORCE IMT 813

This appendix provides a copy of the AF IMT 813, dated December 3, 2003 for the Space Innovation and Development Center (formerly referred to as the Space Test and Evaluation Facility [STEF] and the Space Warfare Center [SWC]).

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REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

Report Control Symbol RCS:

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 numbers(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function*	2. FROM: *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
50 CEV	50 CES/CECC	7-5073

3. TITLE OF PROPOSED ACTION
Construct 100,000 sq ft (Space Warfare Center) SWC facility.

4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*
Mission requirements at the JNIC are requiring relocation of SWC.

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*
Three sites for the facility are being considered. Facility board has selected the location North of the West portal. See attached map for locations.

6. PROPONENT APPROVAL (Name and Grade)	6a. SIGNATURE	6b. DATE
Craig S. Highsmith, GS 12	Craig S. Highsmith	21 Nov 2003

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.)*			X	
9. WATER RESOURCES *(Quality, quantity, source. etc.)*			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.)*		X		
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains. flora, fauna, etc.)*				X
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, 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.)* i.e., Environmental Justice		X		

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

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

18. REMARKS:

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION (Name and Grade)	19a. SIGNATURE	19b. DATE
ALBERT FERNANDEZ, GS12	Albert Fernandez	03 Dec 2003

AF FORM 813 CONTINUATION SHEET

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA)*

ALTERNATIVE NO. 1:
No Action Alternative. Do not construct a new facility for the Space Warfare Center (SWC) operations support functions. This alternative would mean that existing facilities at Schriever AFB would be used to support current SWC operations. No new facilities would be built. Current mission is performed by 450 personnel in 75,000 square feet of the Joint National Integration Center (JNIC) facility on Schriever AFB. SWC pays over $1M annually for rent and facility upkeep to the JNIC. However, JNIC mission changes are requiring the use of additional space, which is occupied by SWC, and have officially notified SWC to vacate. Existing facilities on Schriever AFB and Peterson AFB, located approximately 15 miles to the west, cannot support SWC requirements. The No Action Alternative is not an acceptable option.

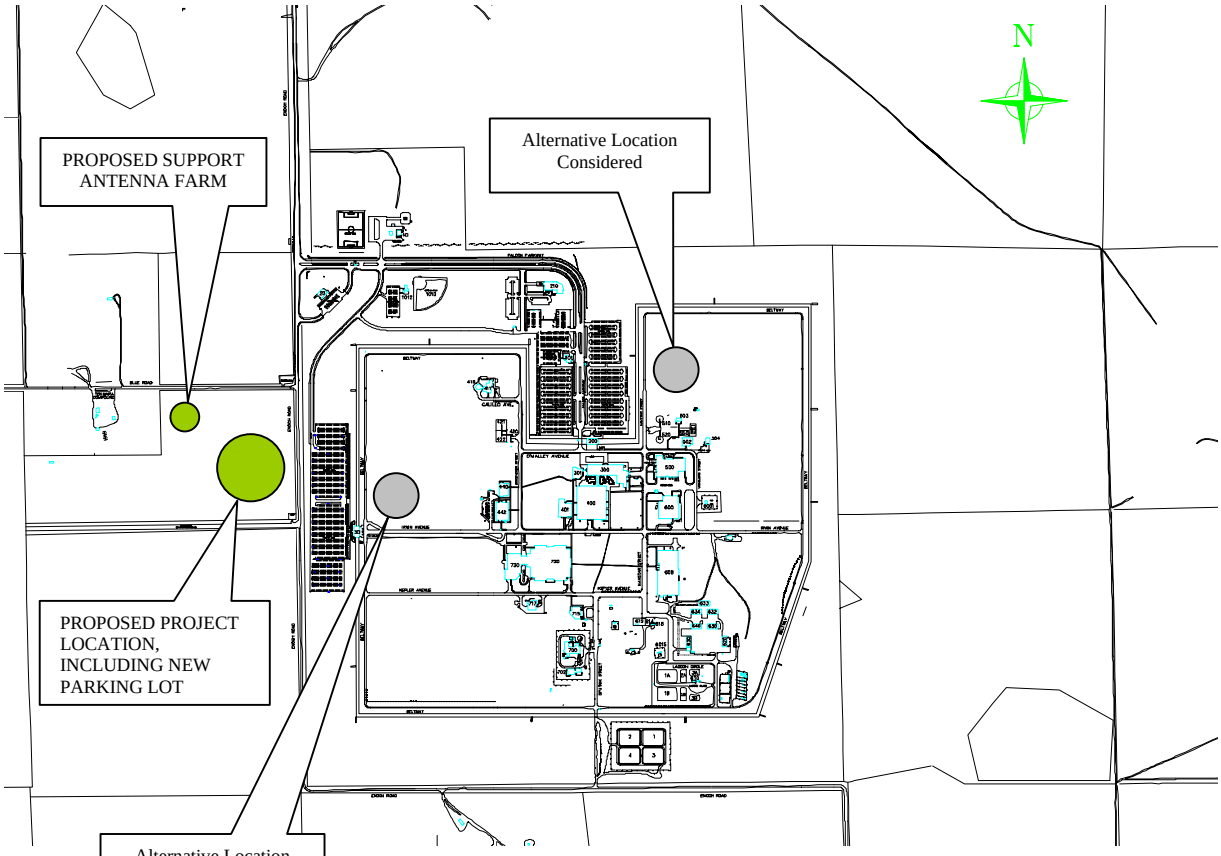
ALTERNATIVE NO. 2:
Proposed Action. Construct a new 140,000 square-foot two-story facility (increased from earlier estimate of 100,000 square feet) for the Space Warfare Center (SWC) operations support functions at the proposed location on the northwest corner of Enoch Road and Irwin Avenue. This location is outside of the restricted area of Schriever AFB. Also construct a new parking lot adjacent to the new SWC building to accommodate 450 personnel. Also construct a new 3,000 square-foot antenna farm within close proximity to the new SWC building, allowing for necessary safety and operational clearances and distance criteria from the new SWC and other adjacent facilities. The new antenna farm will be required to support the SWC mission operations. New utility lines would be required to be hooked up towards the north side of the proposed new SWC facility location.

ALTERNATIVE NO. 3:
Construct a new facility for the Space Warfare Center (SWC) operations support functions at an alternative location on the northeast corner of the Beltway and Irwin Avenue. This location is inside the restricted area of Schriever AFB, just across from the West Portal of the restricted area. A new antenna farm will likely also be required to support the SWC mission operations. The existing West Parking Lot would be used. However, expansion of the parking lot may be necessary. Current mission requires support facilities for 450 personnel. The same requirements in Alternative 2 (Proposed Action) apply for this alternative to fully support the SWC mission.

ALTERNATIVE NO. 4:
Construct a new facility for the Space Warfare Center (SWC) operations support functions at an alternative location on the northeast corner of Navstar Street and the Beltway. This location is inside the restricted area of Schriever AFB, just across from and east of the North Parking Lot. A new antenna farm will likely also be required to support the SWC mission operations. The existing West Parking Lot would be used. However, expansion of the parking lot may be necessary. Current mission requires support facilities for 450 personnel. The same requirements in Alternative 2 (Proposed Action) apply for this alternative to fully support the SWC mission.

SPACE WARFARE CENTER OPERATIONS SUPPORT BUILDING
SCHRIEVER AIR FORCE BASE, COLORADO
PROJECT NUMBER GLEN063002
FY 2006 MILITARY CONSTRUCTION PROGRAM

LOCATION PLAN



SCHRIEVER AFB

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