

FINDING OF NO SIGNIFICANT IMPACT
PERIMETER FENCING
AT KIRTLAND AIR FORCE BASE, NEW MEXICO

The 377th Air Base Wing (377 ABW) of Air Force Materiel Command prepared the attached Environmental Assessment (EA) to evaluate the environmental consequences of a proposed action at Kirtland Air Force Base (AFB). The action consists of constructing a perimeter security fence along the eastern boundary of the Withdrawal Area of Kirtland AFB.

This Finding of No Significant Impact (FONSI) has been drafted in accordance with the National Environmental Policy Act (NEPA) and the regulations implementing NEPA promulgated by the President's Council on Environmental Quality (CEQ), specifically Title 40 Code of Federal Regulations, Part 1508.13, Finding of No Significant Impact. Accordingly, this FONSI includes an EA and incorporates it by reference (see attached).

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The 377 ABW proposes to construct a new eastern perimeter security fence and firebreak roughly parallel to the eastern boundary of the Withdrawal Area, but approximately ½ mile inside (west) of the property boundary. Through a Public Land Order and withdrawal process, the Withdrawal Area was established initially in 1943 for the purposes of tactical training, research and development by Department of Defense and Department of Energy. The fence would extend on a predominantly north-south alignment for approximately 5 miles. In forested areas, a cleared space 10 feet wide would be created on each side of the proposed fence line in accordance with United States Forest Service (USFS) directives for firebreaks. Where terrain permits, a patrol road would be established within the firebreak on the Kirtland AFB (west) side of the fence. No additional clearing outside the firebreak would be required for the patrol road. On the east side of the fence, stumps of trees cleared from the firebreak would be left 18 inches high to discourage use of unauthorized motorized vehicles along the outside of the fence.

Geographic conditions exist in certain areas along the eastern boundary of the Withdrawal Area that make the area inaccessible by any means of ground transportation. In those areas, neither a firebreak nor a patrol road would be cleared and no fence would be constructed. This would be in accordance with Air Force Instruction 31-101, *The Air Force Installation Security Program* that allows the use of certain terrain features in lieu of fencing.

The new fence would leave all of Otero Canyon and most of Bonito Canyon (a total of approximately 1,500 acres) outside the fenced area of Kirtland AFB. Although this area

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE JUL 2004		2. REPORT TYPE		3. DATES COVERED 00-00-2004 to 00-00-2004	
4. TITLE AND SUBTITLE Environmental Assessment for Kirtland Air Force Base Perimeter Fencing				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) LopezGarcia Group,7011 Campus Drive, Suite 210,Colorado Springs,CO,80920				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

would be outside the perimeter fence, it would remain off limits to public use. Warning signs have been posted and will be maintained and the area will be patrolled.

Alternative 1: Exclusion of Otero Canyon

Alternative 1 (see section 2.3.1 of the attached EA) would be similar to the Proposed Action, except that it would only leave Otero Canyon outside the fenced area. Following the fence line of the Proposed Action south from the northeast corner, the fence would extend along the west side of Otero Canyon for approximately 1½ miles and then east to the eastern boundary of the Withdrawal Area. At the intersection with the Withdrawal Area boundary, the fence would continue south along the boundary to near the southeast corner of the Withdrawal Area.

The new fence would exclude Otero Canyon (a total of approximately 400 acres) from the fenced area of Kirtland AFB. Although this area would be outside the perimeter fence, it would remain off limits to public use. Warning signs have been posted and will be maintained and the area will be patrolled.

Alternative 2: Eastern Boundary Fence

A second alternative (see section 2.3.2 of the attached EA) to the Proposed Action is the construction of the security fence along the eastern boundary of the Withdrawal Area as originally proposed in the Draft EA for this action. The public would then be excluded from all portions of the Withdrawal Area for the foreseeable future. Construction would occur as described for the Proposed Action, but would follow the eastern boundary of the Withdrawal Area as closely as possible. Warning signs have been posted and will be maintained and the area will be patrolled.

No-Action Alternative

Selection of the No-Action Alternative (see section 2.3.3 of the attached EA) would result in continued use of the existing fence. Although the Withdrawal Area would not be fenced under this alternative, it would remain off limits to public use. Warning signs have been posted and will be maintained and the area will be patrolled.

SUMMARY OF ANTICIPATED ENVIRONMENTAL EFFECTS

Implementation of the Proposed Action, Alternative 1 or Alternative 2 could result in minor short-term negative impacts to transportation, wildlife, air quality, noise, and soils from construction-related activities. Minor long-term negative impacts to soils, visual resources and vegetation would occur from maintenance of the firebreaks and use of the patrol road. Beneficial impacts are expected to human health and safety. Minor negative impacts are expected to occur in the areas of land use and recreation. No impacts are anticipated to occur to water resources, floodplains, wetlands, minority and low-income populations, cultural resources, or environmental management.

Under the No Action alternative, Kirtland AFB, would not construct the proposed new fencing on the eastern boundary. Therefore, there would be no change to any environmental resources or socioeconomic/environmental justice issues as a result to this alternative. However, there would be minor negative impacts to land use and recreation.

Human Health and Safety. Implementation of the Proposed Action, Alternative 1, or Alternative 2 would result in beneficial impacts to human health and safety because the new fence would prevent unauthorized access to the base. There are a number of hazardous operations that occur on various portions of the installation including military testing and training and use of live fire ranges and restricting access to the base would help to prevent possible injury to people who inadvertently intrude across base boundaries. The safety of base personnel would also be augmented by a perimeter fence that would deter unauthorized access to the installation. For the protection of the fence construction crew and future security patrols, a survey and clearance for unexploded ordnance in the area of the historic range will be performed prior to starting construction.

With implementation of the No-Action Alternative, base security would continue to be inadequate along the eastern boundary.

Air Quality. Implementation of the Proposed Action, Alternative 1 or Alternative 2 could result in relatively short-term negative impacts to air quality from construction-related activities. Construction activities that would use vehicles producing carbon monoxide, an emission that is monitored in the Albuquerque air basin, would not result in violations of the de minimis levels set for the area. Where applicable, best management practices to reduce erosion by wind and construction traffic would be used to reduce particulate impacts from soil disturbance.

Noise. Implementation of the Proposed Action, Alternative 1 or Alternative 2 could result in short-term, minor impacts to noise from construction-related activities. However, for the eastern fence, those activities would occur in remote locations of the base and would not affect any noise-sensitive receptors either on or off base.

Land Use/Recreation. If the Proposed Action, Alternative 1 or Alternative 2 were implemented, there would be a slight negative impact to recreation because current users of the Withdrawal Area would no longer be able to use the area. Although there has been use of the Withdrawal Area by non-Governmental entities, this use has been unauthorized. Since recreational use of the Withdrawal Area has never been authorized, limiting recreational use is not considered a significant impact and will, in fact, be a benefit to human health and safety.

With implementation of the No-Action Alternative, denying access to the Withdrawal Area would have minor long term negative impacts on recreation since the area has been used for that purpose by many different groups. However, the area from which the public would be excluded represents a small percentage of the total area available for similar types of recreation in the vicinity of Albuquerque.

Geological Resources. Implementation of the Proposed Action, Alternative 1 or Alternative 2 could result in minor short-term negative impacts to soils from construction-related activities. Where applicable, impacts would be minimized by using best management practices, such as silt fencing and straw bales, to reduce erosion by wind and water.

Water Resources. Implementation of the Proposed Action, Alternative 1 or Alternative 2 would not result in any impacts to water resources. No surface waters exist in the area of construction and best management practices, such as silt fences and straw bales, would be followed to prevent erosion and runoff from occurring.

Biological Resources. Implementation of the Proposed Action, Alternative 1 or Alternative 2 would not result in any significant impacts to sensitive species, vegetation, wildlife, wetlands, or listed species. To avoid harassment of wildlife from unauthorized use of the firebreaks by off-road vehicles, tree stumps on the eastern side of the fence would be left 18 inches high following USFS guidelines. To assist in large mammal movements, two wildlife passes would be installed at locations to be determined in consultation with New Mexico Department of Game and Fish and the USFS. Merchantable wood cleared for the proposed fence would be made available to the public at a location identified by USFS. To prevent forest fires, remaining slash would be chipped and broadcast as required by USFS guidelines. Kirtland AFB, in consultation with the USFS, will leave meadow areas undisturbed on the outside of the fence. To ensure the Mexican spotted owl does not inhabit the area, all habitat located within a half mile of the Proposed Action will be surveyed in accordance with the US Fish and Wildlife Service procedures prior to any construction.

Transportation and Circulation. Implementation of the Proposed Action, Alternative 1 or Alternative 2 would not result in impacts to transportation either on or off base because of the remote location of the fencing projects. No long-term effects to traffic are expected because the Proposed Action would not result in any increase in traffic on base.

Visual Resources. The visual environment on base would not be significantly affected by the construction of the new fencing. Fences and firebreaks are common sights in the area, especially in the immediate vicinity of a military installation. The area of the fence is relatively remote and the fence would not be visible to many viewers.

Cultural Resources. An evaluation of the area of ground disturbance for the Proposed Action, Alternative 1 or Alternative 2 indicates that no known significant resources would be directly affected. The fence line would be located to avoid any known areas of cultural resource occurrence. As a result, no impacts to cultural resources are anticipated from the Proposed Action.

Socioeconomics/Environmental Justice. Beneficial effects to socioeconomics from implementation of the Proposed Action, Alternative 1 or Alternative 2 would be short-term in nature and would result from the purchase of construction materials, salaries paid to construction workers, and contracts for construction equipment from the surrounding

community. No negative impacts are expected to minority and low-income populations from the Proposed Action, Alternative 1 or Alternative 2 because the action would not change conditions for these populations in the area.

Environmental Management. All equipment would be maintained in accordance with applicable regulations and hazardous materials and wastes would be handled, recycled or disposed of in accordance with applicable regulations. Non-hazardous construction debris would be taken to a suitable landfill or recycled. There is sufficient capacity in numerous local landfills to handle the anticipated debris. As a result, no significant impacts are anticipated to occur to environmental management as a result of the Proposed Action.

CONCLUSION

After careful review of the EA, I have concluded that the Proposed Action and alternatives would not have a significant impact on the quality of the natural or human environment. Therefore, issuance of a FONSI is warranted, and an Environmental Impact Statement is not required. This analysis fulfills the requirements of the NEPA and the implementing regulations promulgated by the CEQ.

Approved By: Henry L. Andrews, Jr. Date: JUL 30 2004
HENRY L. ANDREWS, JR., Colonel, USAF
Commander
Kirtland Air Force Base

F I N A L

**ENVIRONMENTAL ASSESSMENT
FOR
KIRTLAND AIR FORCE BASE
PERIMETER FENCING**



July 2004

**Prepared for
377th Air Base Wing Air Force Materiel Command**

ACRONYMS AND ABBREVIATIONS

ABW	Air Base Wing	NAAQS	National Ambient Air Quality Standards
ADT	Average Daily Traffic	NEPA	National Environmental Policy Act
AFB	Air Force Base	NHPA	National Historic Preservation Act
AFI	Air Force Instruction	NHRC	National Historic Resources Commission
AFMC	Air Force Materiel Command	NMAAQS	New Mexico Ambient Air Quality Standards
AQCR	Air Quality Control Region	NMDG&F	New Mexico Department of Game and Fish
CAA	Clean Air Act	NMEMNRD	New Mexico Energy, Minerals, and Natural Resources Department
CEQ	Council on Environmental Quality	NO ₂	Nitrogen Dioxide
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	NPDES	National Pollutant Discharge Elimination System
CFR	Code of Federal Regulations	NRHP	National Register of Historic Places
CO	Carbon Monoxide	O ₃	Ozone
CWA	Clean Water Act	PLO	Public Land Order
dB	Decibels	Pb	Lead
dBA	A-weighted decibel scale	PM ₁₀	particulate matter equal to or less than 10 microns in diameter
DoD	Department of Defense	ROI	Region of Influence
DOE	Department of Energy	RPZ	Runway Protection Zone
EA	Environmental Assessment	SHPO	State Historic Preservation Officer
EIAP	Environmental Impact Assessment Process	SIP	State Implementation Plan
EO	Executive Order	SO ₂	Sulfur Dioxide
EOD	Explosive Ordnance Disposal	tpy	tons-per-year
EPA	US Environmental Protection Agency	USACE	US Army Corps of Engineers
FONSI	Finding of No Significant Impact	USAF	US Air Force
FR	Forest Road	USDA	US Department of Agriculture
FT	Forest Trail	USFS	US Forest Service
FY	Fiscal Year	USFWS	US Fish and Wildlife Service
HAP	Hazardous Air Pollutants	UXO	Unexploded Ordnance
IRP	Installation Restoration Program	V/C	Volume-to-Capacity
LOS	Level of Service		
MSA	Metropolitan Statistical Area		

FINAL

**PERIMETER FENCE
AT KIRTLAND AIR FORCE BASE
ABLUQUERQUE, NEW MEXICO**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
SECTION 1 PURPOSE AND NEED FOR THE PROPOSED ACTION	1-1
1.1 BACKGROUND	1-1
1.2 COMMUNITY CHARACTERISTICS.....	1-4
1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION.....	1-4
1.3.1 Purpose of the Proposed Action.....	1-4
1.3.2 Need for the Proposed Action.....	1-4
1.4 DECISION TO BE MADE AND DECISION-MAKER.....	1-5
1.5 REGULATORY COMPLIANCE	1-5
1.5.1 National Environmental Policy Act.....	1-5
1.5.2 Air Quality	1-5
1.5.3 Water Quality.....	1-6
1.5.4 Biological Resources.....	1-6
1.5.5 Cultural Resources	1-6
1.5.6 Land Use	1-7
1.5.7 Environmental Justice and Safety Risks to Children.....	1-7
1.5.8 Public Involvement	1-8
SECTION 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 BACKGROUND	2-1
2.2 DESCRIPTION OF THE PROPOSED ACTION	2-3
2.2.1 Fence Construction	2-4
2.2.2 Firebreak Clearing.....	2-9
2.2.3 Patrol Road Clearing.....	2-9
2.2.4 Operational Activities	2-9
2.2.5 Permitting, Licensing, and Consultation.....	2-9
2.3 ALTERNATIVES TO THE PROPOSED ACTION	2-10
2.3.1 Alternative 1: Exclusion of Otero Canyon from the Fenced Area.....	2-10
2.3.2 Alternative 2: Eastern Boundary Fence	2-11
2.3.3 No-Action Alternative.....	2-11
2.3.4 Alternatives Considered, But Not Carried Forward.....	2-11
2.4 OTHER FUTURE ACTIONS	2-13
SECTION 3 AFFECTED ENVIRONMENT	3-1
3.1 HUMAN HEALTH AND SAFETY.....	3-1
3.1.1 Definition of Resource	3-1
3.1.2 Existing Conditions.....	3-1
3.1.2.1 Safety Preparedness.....	3-1

3.1.2.2	Human Health.....	3-2
3.1.2.3	Industrial Hygiene	3-2
3.1.2.4	Operational Training Areas	3-2
3.1.2.5	Historic Ranges	3-2
3.2	AIR QUALITY.....	3-5
3.2.1	Definition of Resource	3-5
3.2.2	Existing Conditions.....	3-5
3.2.2.1	Climate and Air Quality in Project Area	3-5
3.3	NOISE	3-8
3.3.1	Definition of Resource	3-8
3.3.2	Existing Conditions.....	3-9
3.4	LAND USE.....	3-11
3.4.1	Definition of Resource	3-11
3.4.2	Existing Conditions.....	3-11
3.4.2.1	Land Use In and Around Project Area	3-11
3.5	GEOLOGICAL RESOURCES.....	3-13
3.5.1	Definition of Resource	3-13
3.5.2	Existing Conditions.....	3-15
3.5.2.1	Geology	3-15
3.5.2.2	Soils	3-15
3.5.2.3	Proposed Action	3-15
3.6	WATER RESOURCES.....	3-16
3.6.1	Definition of Resource	3-16
3.6.2	Existing Conditions.....	3-16
3.6.2.1	Surface Water	3-16
3.6.2.2	Floodplains	3-18
3.6.2.3	Groundwater	3-18
3.7	BIOLOGICAL RESOURCES.....	3-18
3.7.1	Definition of Resource	3-18
3.7.2	Existing Conditions.....	3-19
3.7.2.1	Vegetation.....	3-19
3.7.2.2	Wetlands	3-21
3.7.2.3	Wildlife.....	3-21
3.7.2.4	Threatened and Endangered Species	3-22
3.8	TRANSPORTATION AND CIRCULATION.....	3-25
3.8.1	Definition of Resource	3-25
3.8.2	Existing Conditions.....	3-26
3.8.2.1	Circulation at Kirtland AFB and Access Gates.....	3-26
3.9	VISUAL RESOURCES	3-26
3.9.1	Definition of Resource	3-26
3.9.2	Existing Conditions.....	3-29
3.10	CULTURAL RESOURCES	3-29
3.10.1	Definition of Resource	3-29
3.10.2	Existing Conditions.....	3-29
3.11	SOCIOECONOMICS.....	3-30
3.11.1	Definition of Resource	3-30
3.11.2	Existing Conditions.....	3-30

3.11.2.1	Population (including minorities).....	3-31
3.11.2.2	Economy within ROI.....	3-31
3.11.2.3	Housing.....	3-31
3.11.2.4	Kirtland AFB.....	3-32
3.11.2.5	Tijeras.....	3-33
3.11.2.6	Recreation/Tourism.....	3-33
3.11.3	Environmental Justice Considerations.....	3-34
3.11.3.1	Low-Income Population.....	3-34
3.12	ENVIRONMENTAL MANAGEMENT.....	3-34
3.12.1	Definition of Activity.....	3-34
3.12.2	Existing Conditions.....	3-35
3.12.2.1	Solid Waste.....	3-35
3.12.2.2	Wastewater.....	3-36
3.12.2.3	Hazardous Wastes.....	3-36
SECTION 4	ENVIRONMENTAL CONSEQUENCES.....	4-1
4.1	HUMAN HEALTH AND SAFETY.....	4-1
4.1.1	Significance Criteria.....	4-1
4.1.2	Impacts.....	4-1
4.1.2.1	Proposed Action.....	4-1
4.1.2.2	Alternative 1.....	4-2
4.1.2.3	Alternative 2.....	4-2
4.1.2.4	No-Action Alternative.....	4-2
4.2	AIR QUALITY.....	4-2
4.2.1	Significance Criteria.....	4-2
4.2.2	Impacts.....	4-3
4.2.2.1	Proposed Action.....	4-3
4.2.2.2	Alternative 1.....	4-3
4.2.2.3	Alternative 2.....	4-3
4.2.2.4	No-Action Alternative.....	4-4
4.3	NOISE.....	4-4
4.3.1	Significance Criteria.....	4-4
4.3.2	Impacts.....	4-5
4.3.2.1	Proposed Action.....	4-5
4.3.2.2	Alternative 1.....	4-5
4.3.2.3	Alternative 2.....	4-5
4.3.2.4	No-Action Alternative.....	4-5
4.4	LAND USE.....	4-6
4.4.1	Significance Criteria.....	4-6
4.4.2	Impacts.....	4-6
4.4.2.1	Proposed Action.....	4-6
4.4.2.2	Alternative 1.....	4-6
4.4.2.3	Alternative 2.....	4-7
4.4.2.4	No-Action Alternative.....	4-7
4.5	GEOLOGICAL RESOURCES.....	4-7
4.5.1	Significance Criteria.....	4-7
4.5.2	Impacts.....	4-7

4.5.2.1	Proposed Action	4-7
4.5.2.2	Alternative 1	4-8
4.5.2.3	Alternative 2	4-8
4.5.2.3	No-Action Alternative	4-8
4.6	WATER RESOURCES.....	4-9
4.6.1	Significance Criteria	4-9
4.6.2	Impacts	4-9
4.6.2.1	Proposed Action	4-9
4.6.2.2	Alternative 1	4-10
4.6.2.3	Alternative 2	4-10
4.6.2.4	No-Action Alternative	4-10
4.7	BIOLOGICAL RESOURCES.....	4-10
4.7.1	Significance Criteria	4-10
4.7.2	Impacts	4-11
4.7.2.1	Proposed Action	4-11
4.7.2.2	Alternative 1	4-13
4.7.2.3	Alternative 2	4-13
4.7.2.4	No-Action Alternative	4-13
4.8	TRANSPORTATION AND CIRCULATION	4-13
4.8.1	Significance Criteria	4-13
4.8.2	Impacts	4-14
4.8.2.1	Proposed Action	4-14
4.8.2.2	Alternative 1	4-14
4.8.2.3	Alternative 2	4-15
4.8.2.4	No-Action Alternative	4-15
4.9	VISUAL RESOURCES	4-15
4.9.1	Significance Criteria	4-15
4.9.2	Impacts	4-15
4.9.2.1	Proposed Action	4-15
4.9.2.2	Alternative 1	4-15
4.9.2.3	Alternative 2	4-16
4.9.2.4	No-Action Alternative	4-16
4.10	CULTURAL RESOURCES	4-16
4.10.1	Significance Criteria.....	4-16
4.10.2	Impacts	4-16
4.10.2.1	Proposed Action.....	4-16
4.10.2.2	Alternative 1	4-17
4.10.2.3	Alternative 2	4-17
4.10.2.4	No-Action Alternative	4-17
4.10.2.5	State Historic Preservation Office and Native American Consultation	4-17
4.11	SOCIOECONOMICS.....	4-17
4.11.1	Significance Criteria.....	4-17
4.11.2	Impacts	4-18
4.11.2.1	Proposed Action	4-18
4.11.2.2	Alternative 1	4-19
4.11.2.3	Alternative 2	4-19
4.11.2.4	No-Action Alternative	4-19

4.12 ENVIRONMENTAL MANAGEMENT	4-19
4.12.1 Significance Criteria.....	4-19
4.12.2 Impacts	4-20
4.12.2.1 Proposed Action	4-20
4.12.2.2 Alternative 1	4-20
4.12.2.3 Alternative 2	4-21
4.12.2.4 No-Action Alternative	4-21
SECTION 5 PERSONS AND AGENCIES CONTACTED	5-1
SECTION 6 LIST OF PREPARERS	6-1
SECTION 7 REFERENCES AND BIBLIOGRAPHY	7-1
APPENDIX A INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING CORRESPONDENCE	A-1

FIGURES

<u>Section</u>	<u>Page</u>
Figure 1-1. Kirtland Air Force Base and Proposed Action Location	1-2
Figure 2-1. Location of the Proposed Action and Alternatives, Kirtland Air Force Base	2-2
Figure 2-2. Construction Details of New Eastern Perimeter Fence.....	2-5
Figure 2-3. Construction Details of New Eastern Perimeter Fence Swale Crossing.....	2-6
Figure 2-4. Construction of Wildlife Pass Detail on Kirtland Air Force Base.....	2-7
Figure 2-5. Alternatives Considered, But Not Carried Forward, Kirtland Air Force Base	2-12
Figure 3-1. Operational Training Areas, Kirtland Air Force Base	3-3
Figure 3-2. Historic Ranges, Kirtland Air Force Base	3-4
Figure 3-3. Land Use	3-12
Figure 3-4. Kirtland air Force Base Land Agreements.....	3-14
Figure 3-5. 100-Year Floodplain on Kirtland Air Force Base.....	3-17
Figure 3-6. Native Vegetation and Wetland Locations on Kirtland Air Force Base.....	3-20
Figure 3-7. Existing Roadways in the Withdrawal Area at Kirtland Air Force Base	3-27
Figure 3-8. 2001 Traffic Flows in Rural Bernalillo County Near Proposed Fence Line	3-28

TABLES

<u>Section</u>	<u>Page</u>
Table 3-1. National and New Mexico Ambient Air Quality Standards	3-6
Table 3-2. CO Emissions Inventory of Bernalillo County (1996).....	3-7
Table 3-3. Summary of Calendar Year 2001 Air Emissions for Non-exempt Sources at Kirtland AFB	3-7
Table 3-4. Typical A-Weighted Sound Levels	3-9
Table 3-5. Construction-Equipment Noise Ranges	3-10
Table 3-6. Special Status Species, Bernalillo County	3-23
Table 3-7. Nonagricultural Employment in the United States, New Mexico, and the Albuquerque MSA, 2001	3-32
Table 3-8. Local Economic Impact, Kirtland AFB, 2002	3-33
Table 3-9. Average per person expenditures within 50 miles of recreation site for wilderness visitors to Cibola National Forest	3-34
Table 3-10. Estimates of Solid Waste Generated by Kirtland AFB (in tons).....	3-36
Table 4-1. CO Emissions Generated by the Proposed Action.....	4-4

SECTION 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

This section of the Environmental Assessment (EA) describes the purpose and need for the proposed construction of: a new perimeter fence along the eastern boundary of the Withdrawal Area of Kirtland Air Force Base (AFB) in Albuquerque, New Mexico. The existing perimeter fence along the eastern boundary does not meet Air Force requirements and is in need of replacement.

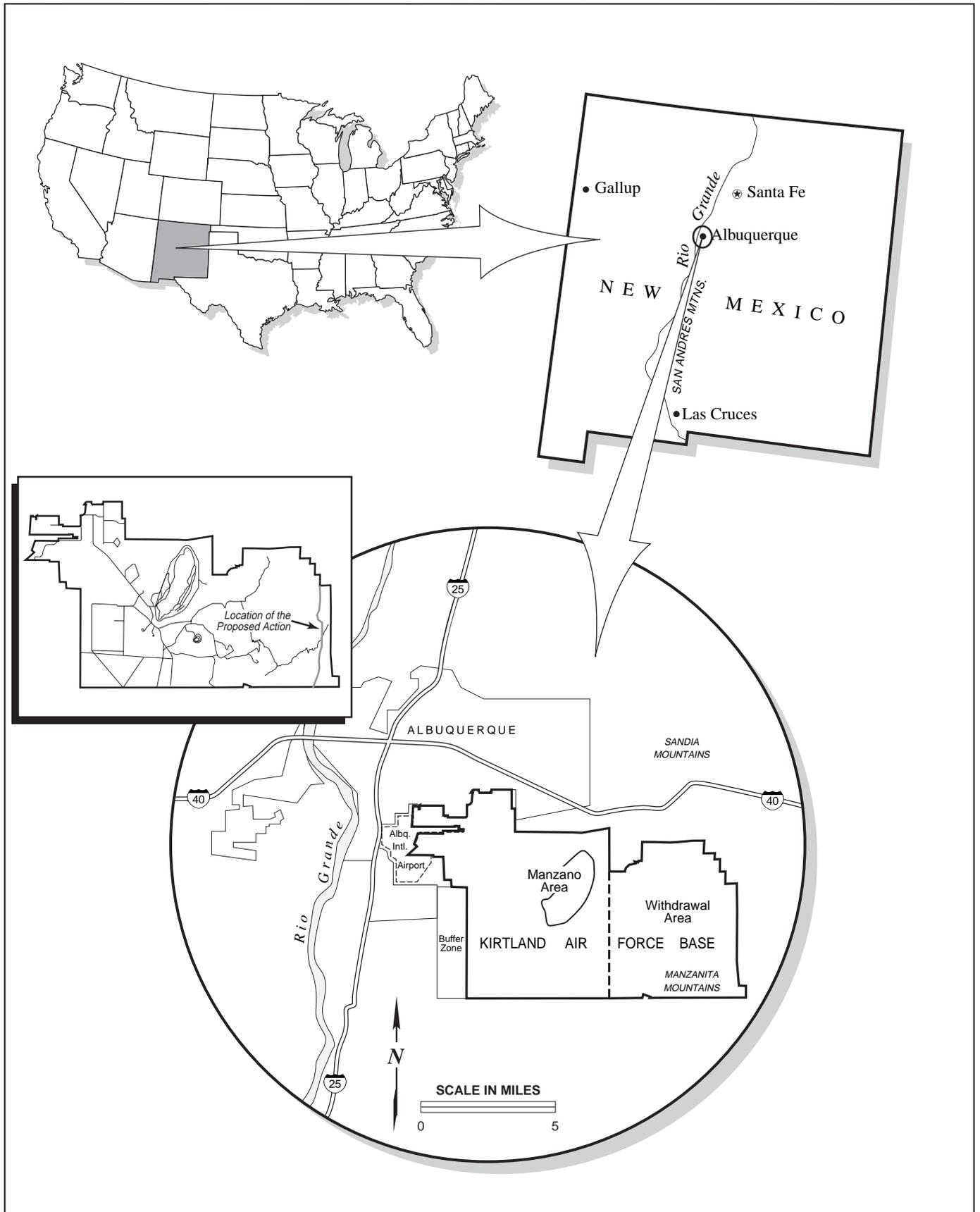
The south end of the proposed new eastern fence would begin at the bottom of Bonito Canyon approximately 1½ miles west of the southeast corner of the US Forest Service (USFS) Withdrawal Area boundary. It would run north roughly parallel to the Withdrawal Area boundary, to a point approximately ½ mile west of the northeast corner of the Withdrawal Area boundary (see detail in Figure 1-1). A cleared space 10 feet wide would be created in forested areas on each side of the proposed fence line in accordance with USFS directives for firebreaks. Where terrain permits, a patrol road would be established within the firebreak on the Kirtland AFB (west) side of the fence. No additional clearing outside the firebreak would be required for the patrol road. On the east side of the fence, stumps of trees cleared from the firebreak would be left 18 inches high to discourage use of motorized vehicles along the outside of the fence.

Section 2 of this EA describes the Proposed Action in detail, as well as alternatives to the Proposed Action, including the No-Action Alternative and alternatives considered, but eliminated. This EA is being prepared in compliance with Title 32 National Defense, Chapter VII Department of the Air Force, Code of Federal Regulations (CFR) Part 989 *Environmental Impact Analysis Process* (EIAP), which implements the National Environmental Policy Act (NEPA); and the regulations implementing NEPA promulgated by the President's Council on Environmental Quality (CEQ) as Title 40 of the CFR Parts 1500-1508.

1.1 BACKGROUND

Kirtland AFB, located just southeast of Albuquerque, New Mexico, is now operated by the 377th Air Base Wing (377 ABW) of Air Force Materiel Command (AFMC), the proponent of the action analyzed in this document. The 377 ABW's prime mission, as the host unit at Kirtland AFB, includes munitions maintenance and storage, readiness and training, and base operating support for approximately 200 associate organizations with personnel, resources, equipment, and facilities. The 377 ABW also provides fire protection and crash and rescue services for Albuquerque International Sunport.

The US Air Force (USAF) owns most of the land at Kirtland AFB, but several other ownerships and leases apply to many areas of the base both large and small. The eastern portion of Kirtland AFB is primarily Cibola National Forest land which was withdrawn from public use in 1943 (Figure 1-1).



JULY 2004

FIGURE

EA

Kirtland Air Force Base and Proposed Action Location

1-1

In 1996 the USFS prepared an Environmental Analysis of their Ecosystem Management Plan for National Forest Lands in and adjacent to the Military Withdrawal, Sandia Ranger District, Cibola National Forest and Bernalillo County, NM. On Page 2 under Existing Condition, that document describes the Public Land Order (PLOs) and withdrawal process as follows:

“The 1985 Cibola National Forest Land and Resource Management Plan, as amended in 1987 and 1991, acknowledged the closure of 20,486 acres of the Sandia Ranger District to public entry for security and safety purposes. PLO 133 first withdrew 4,667 acres of National Forest land in 1943 for use in connection with the prosecution of the war. In 1949, PLO 595 withdrew an additional 13,948 acres for experimental purposes to be used by the Department of Navy. In 1954, the Navy determined that it no longer had use for the withdrawn land. PLO’s 133 and 595 were turned over to the Department of Army for use with Sandia Base and were reissued as PLO 995. In 1980, a 2,400 acre portion of PLO 995 (encompassing David Canyon) was revoked and returned to public entry. PLO 995 is now with the Department of Defense (DoD). In 1969, PLO 4569 withdrew a 4,595 acre tract north of PLO 995 for research and development by the Atomic Energy Commission. PLO 4569 is with the Department of Energy (DOE).”

“The existing withdrawn lands are established for purposes of tactical training, research, and military developments by both agencies [DoD and DOE] and their contractors. The Cibola National Forest Plan identifies the withdrawn lands as Management Area 17 which specifies that management will remain under the joint control of the USFS, US Air Force (USAF), and DOE. All public use of the area will be restricted and enforced by personnel of the DoD and DOE.”

The Withdrawal Area was fenced with barbed wire during the 1940s and signs were posted warning the public not to enter the area. The fencing is now deteriorated or missing in many places along the eastern boundary and the signs have been torn down or fallen down with age. New signs have been erected at different times during the last two decades and most were torn down again. The US Department of Agriculture (USDA) EA described above states that “vandalism of capital investments on the Withdrawal... occurs” and later adds “Fencing and signage of the Withdrawal boundaries is difficult to maintain. Fences and signs are frequently torn down by vandals, sometimes within hours of being installed...” The EA also states that “Patrols of the boundaries don’t occur frequently enough to prevent this type of vandalism.” In an attempt to address these problems, new signs are being erected around the Withdrawal Area and it will be patrolled frequently.

1.2 COMMUNITY CHARACTERISTICS

Areas surrounding Kirtland AFB range from urban to unpopulated wilderness. Albuquerque, the largest city in the State of New Mexico, is adjacent to the base on the northwest. The population for the Region of Influence (ROI) for the project area is approximately 570,000 people (US Census Bureau 2003a). Kirtland AFB's host and associate units comprise the largest single employer in New Mexico and have a major economic impact on the surrounding communities: organizations at Kirtland AFB currently employ over 24,000 people and the base's estimated annual economic contribution to the ROI exceeds \$3.9 billion (USAF 2002).

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The 377 ABW at Kirtland AFB proposes to construct a new eastern perimeter fence for the following reasons:

- Air Force regulations require that installation perimeters be fenced unless the installation commander waives the requirements.
- The new fencing is necessary to meet anti-terrorism force protection requirements. The fencing along the eastern boundary of the Withdrawal Area does not meet current Air Force requirements.
- The boundary is so indistinct that individuals recreating in the area unknowingly enter Kirtland AFB. Uncontested access by unauthorized personnel could jeopardize missions on base and/or endanger civilians who cross base boundaries.

1.3.1 Purpose of the Proposed Action

The Proposed Action would increase safety and security at Kirtland AFB by reducing access to the base by unauthorized personnel and would assist in meeting anti-terrorism force protection requirements. While the fence would not make it impossible for intruders to access the base, it would make trespassing more difficult and it would make it easier for security forces personnel to identify deliberate intruders.

1.3.2 Need for the Proposed Action

Air Force Instruction (AFI) 31-101, *The Air Force Installation Security Program*, paragraph 11.4, requires that installation perimeters be fenced, unless the installation commander specifically waives the requirement after carefully weighing all of the factors set forth in paragraph 11.4. Current installation fencing along the eastern boundary of the Withdrawal Area does not meet Air Force requirements or is missing entirely. As a result, access by unauthorized personnel occurs frequently, and Kirtland AFB mission security and civilian safety are jeopardized. Military testing and training occur regularly in the Withdrawal Area and include the use of live fire ranges, explosive testing, helicopter landings, and troop maneuvers. These activities are hazardous to unauthorized personnel and are the reasons the area was withdrawn from public use. In addition,

Kirtland AFB is required to meet the new anti-terrorism force protection requirements of the DoD.

1.4 DECISION TO BE MADE AND DECISION-MAKER

The installation commander will make a decision regarding the best alternative to support AFMC, the DOE and Kirtland AFB.

1.5 REGULATORY COMPLIANCE

The following section provides a brief summary of the laws, regulations, Executive Orders (EO), and other requirements that are routinely considered in an environmental analysis for this type of proposed action.

1.5.1 National Environmental Policy Act

NEPA requires federal agencies to consider the potential environmental consequences of proposed actions in their decision-making process. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ was established under NEPA to implement and oversee federal policy in this process. In 1979, the CEQ issued the Regulations for Implementing the Procedural Provisions of NEPA. The CEQ regulations encourage federal agencies to develop and implement procedures that address the NEPA process in order to avoid or minimize adverse effects on the environment.

32 CFR 989 establishes the EIAP and the specific procedural requirements for the implementation of NEPA on USAF projects. EO 11514, *Protection and Enhancement of Environmental Quality*, as amended by EO 11991, *Relating to Protection and Enhancement of Environmental Quality*, set policy for directing the federal government in providing leadership in protecting and enhancing the quality of the nation's environment.

1.5.2 Air Quality

The Clean Air Act (CAA) (42 US Code, Sections 7401-7671, et seq., as amended) establishes federal policy to protect and enhance the quality of the nation's air resources to protect human health and the environment. The CAA requires that adequate steps be taken to control the release of air pollutants and prevent significant deterioration in air quality. The 1990 amendments to the CAA require federal agencies to determine the conformity of proposed actions with respect to State Implementation Plans (SIPs) for attainment of air quality goals. The US Environmental Protection Agency (EPA) has set forth regulations in 40 CFR 51, Subpart W, that require the proponent of an action potentially affecting air quality to perform an analysis to determine if implementation of the action would conform with the SIP.

The State of New Mexico has also adopted the New Mexico Ambient Air Quality Standards (NMAAQS), which apply a more stringent standard for carbon monoxide (CO), sulfur dioxide (SO₂), and for the 24-hour standard for nitrogen dioxide (NO₂).

1.5.3 Water Quality

The Clean Water Act (CWA) of 1977 and the Water Quality Act of 1987 (33 US Code 1251, et seq., as amended) establish federal policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and, where attainable, to achieve a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water.

1.5.4 Biological Resources

The Endangered Species Act (16 US Code 1531 et. Seq., as amended) requires federal agencies that fund, authorize, or implement actions to avoid jeopardizing the continued existence of federally listed threatened or endangered species, and to avoid destroying or adversely affecting their critical habitat. Federal agencies must evaluate the effects of their actions through a set of defined procedures, which can include preparation of a biological assessment and formal consultation with the US Fish and Wildlife Service (USFWS).

Section 404 of the CWA regulates development in streams and wetlands and requires a permit from the US Army Corps of Engineers (USACE) for dredging and filling in waters of the US.

EO 11990, *Protection of Wetlands*, requires that federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

1.5.5 Cultural Resources

AFI 32-7065, *Cultural Resources Management*, implements Air Force Policy Directive 32-70, *Environmental Quality*, and DoD Directive 4710.1, *Archeological and Historic Resources Management*. It sets guidelines for the protection and management of cultural resources, and requires compliance and coordination with NEPA, the National Historic Preservation Act (NHPA) of 1966, as amended, and related federal standards and authorities.

NEPA directs agencies to administer federal programs and resources to foster environmental quality and preservation; establishes federal policies to preserve important historic and cultural aspects of our national heritage; and requires consideration of environmental concerns during project planning and execution. Compliance with NEPA may be done in coordination with compliance with the NHPA under the regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800. Section 106 of the NHPA requires that every federal agency "take into account" how each of its

undertakings could affect historic properties. An agency must afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the agency's project.

The NHPA establishes policies that support and encourage the preservation of historic and prehistoric resources for present and future generations. The NHPA directs federal agencies to assume responsibility for considering historic properties (i.e. significant cultural resources) in their activities.

The Archaeological and Historic Data Preservation Act of 1974 directs federal agencies to notify the Secretary of the Interior of historic and archaeological data that could be lost as a result of federal construction or other federally licensed or assisted activities. When undertakings may cause irreparable damage to historic or archaeological resources, the agency must notify the Secretary, in writing, of the situation. The agency may undertake recovery, protection, and preservation of data with their own project funds, or they may request the Secretary to undertake preservation measures.

The Archaeological Resources Protection Act of 1979 requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands. Excavations must be undertaken for the purpose of furthering archaeological knowledge in the public interest, and resources removed remain the property of the US. The act provides both civil and criminal penalties for violation of the permit requirements.

1.5.6 Land Use

EO 11988, *Floodplain Management*, requires each federal agency to take actions to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Where information is unavailable, agencies are encouraged to delineate the areal extent of floodplains at their site.

1.5.7 Environmental Justice and Safety Risks to Children

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs federal agencies to assess the effects of their actions on these populations within their ROI. Agencies are encouraged to include demographic information related to race and income in their analysis of environmental and economic effects associated with their actions and to identify any potential impacts that could disproportionately affect minority or low-income communities.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, directs federal agencies to assess the effects of their actions on children within the agencies' purview. Therefore, to the extent appropriate, permitted by law, and consistent with the agency's mission, federal agencies shall:

- Make it a high priority to identify and assess environmental health risks and safety risks that could disproportionately affect children, and

- Ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

1.5.8 Public Involvement

Section 1.6.8 of EO 12372, *Intergovernmental Review of Federal Programs*, directs federal agencies to consult with and solicit comments from state and local government officials whose jurisdictions would be affected by federal actions. In addition, NEPA procedures and USAF policy are intended to ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. In order to comply with these requirements, the Draft EA for this action was released for public review prior to completion of the decision-making process. A 60-day public comment period resulted in over 500 comments. During the comment period, a public information meeting was held on June 23, 2003 that was attended by an estimated 300 - 400 people. As a result of the comments received during and after the public meeting, the EA was significantly revised and published for a second review period.

SECTION 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The 377 ABW of AFMC proposes to construct a new eastern perimeter fence along or near the eastern boundary of the Withdrawal Area of Kirtland AFB in Albuquerque, New Mexico.

The following section describes the Proposed Action, alternatives to this action, and other actions at Kirtland AFB that could have cumulative effects on environmental and/or human resources at the base when considered with the Proposed Action addressed in this EA.

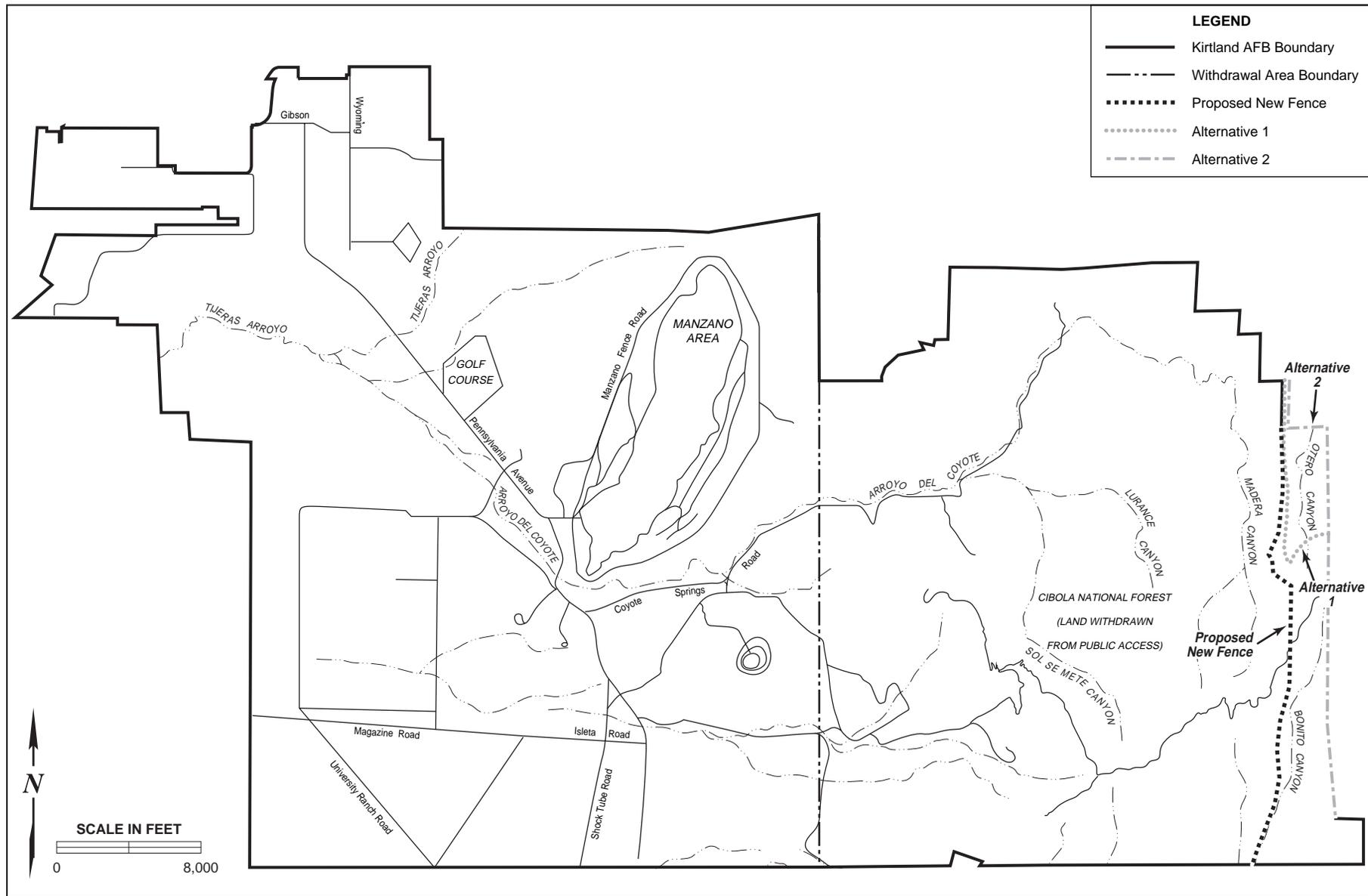
Under the Proposed Action and each of the alternatives described below, the Withdrawal Area would remain off limits to the public. New warning signs are being erected and the area will be patrolled.

2.1 BACKGROUND

A group of personnel representing the USFS, the DOE, Kirtland AFB and several major tenant units on base met multiple times to determine the best location for an eastern perimeter fence to enhance base security following the terrorist attacks of September 11, 2001. Initial discussions of the locations for the fence revolved primarily around the locations of existing boundaries and roads inside the Withdrawal Area. For operational reasons, these locations were not suitable for the fence and were dismissed from consideration (see Section 2.3.4 below). Later discussions assumed that the fence should be along the exact boundary of the Withdrawal Area and the Draft EA (May 2003) had that eastern boundary as the location of the Proposed Action.

Following a 60-day public comment period on the Draft EA, the Proposed Action was revised and a previously excluded alternative was added to the list of reasonable alternatives. This occurred only after consultation with: base tenants that use the Withdrawal Area for testing and training; safety officers; construction contractors; environmental civil engineering and remediation personnel; and base contractors who are currently surveying the Withdrawal Area. As a result of these consultations, it was confirmed that the area encompassed by Otero and Bonito Canyons was no longer used for testing or training activities and did not need to be enclosed within the fence to protect military missions. The rest of the Withdrawal Area is needed for a variety of test and training activities that are inherently hazardous to the public. These activities include the use of live fire ranges, helicopter landing zones, explosive demolition areas and troop maneuver and training areas. The Withdrawal Area is used for these activities regularly, often daily, when weather permits.

Once acceptable fence line alternatives were proposed, a survey was done to determine the exact location that would be best from a constructability stand point. That resulted in further changes to the Proposed Action's location and became the Proposed Action for this EA (shown in Figure 2-1).



JULY 2004

FIGURE

EA

Location of the Proposed Action and Alternatives,
Kirtland Air Force Base

2-1

In addition to the change described above, an alternative was developed that is similar to the USFS 1996 proposal discussed in the Cibola National Forest Land and Resource Management Plan (see Section 2.3.1 below). This alternative includes Bonito Canyon in the fenced area, but excludes Otero Canyon. The USFS 1996 EA states that they received input from “various public and government interests who felt the value of maintaining Bonito Canyon as a relatively undisturbed meadow habitat far outweighed the potential recreational value of the canyon.”

This alternative was selected for analysis because of the differences in natural resource impacts between the alternative and the Proposed Action. However, since all portions of the Withdrawal Area would remain closed to the public regardless of which alternative is selected, the differences between alternatives are primarily related to constructability.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The 377 ABW proposes to construct a new eastern perimeter security fence parallel to the eastern boundary of the Withdrawal Area, but approximately ½ mile inside (west) of the property boundary (refer to Figure 2-1). The proposed fence would be constructed from a point approximately 1½ miles west of the southeastern corner of the Withdrawal Area boundary, north along Bonito Canyon. The fence would continue north roughly parallel to the Withdrawal Area boundary along the ridge line between Madera Canyon and Otero Canyon, to a point approximately ½ mile northwest of the northeast corner of the Withdrawal Area boundary. The fence would extend for approximately 5 miles with the northern end meeting along the eastern edge of the portion of the Withdrawal Area controlled by the DOE. This location was selected following a survey of the proposed fence locations and represents the best location for ease of construction. Much of the eastern portion of the Withdrawal Area is rocky and would require extensive drilling in order to emplace fence posts. The Proposed Action is along a line that would require a minimum of such activities in order to erect the fence. Where possible, the fence line follows a ridge so that patrolling security personnel have good views of the surrounding areas. This is true of the northern three miles of the fence, although the southern mile and a half to two miles of the fence would follow the bottom of Bonito Canyon where views are more limited.

A cleared space 10 feet wide would be created in forested areas on each side of the proposed fence line in accordance with USFS directives for firebreaks. Where terrain permits, a patrol road would be established within the firebreak on the Kirtland AFB (west) side of the fence. No additional clearing outside the firebreak would be required for the patrol road. On the east side of the fence, stumps of trees cleared from the firebreak would be left 18 inches high to discourage use of motorized vehicles along the outside of the fence.

Geographic conditions exist in certain areas along the eastern boundary of the Withdrawal Area that make the area inaccessible by any means of ground transportation. In those areas, neither a firebreak nor a patrol road would be cleared and no fence would be constructed. This would be in accordance with AFI 31-101, *The Air Force*

Installation Security Program that allows the use of certain terrain features in lieu of fence.

The new fence would leave all of Otero Canyon and most of Bonito Canyon (approximately 1,500 acres) outside the fenced area of Kirtland AFB. Although this portion of the Withdrawal Area would be outside the perimeter fence, it would remain off limits to public use. New warning signs have been posted and the area will be patrolled.

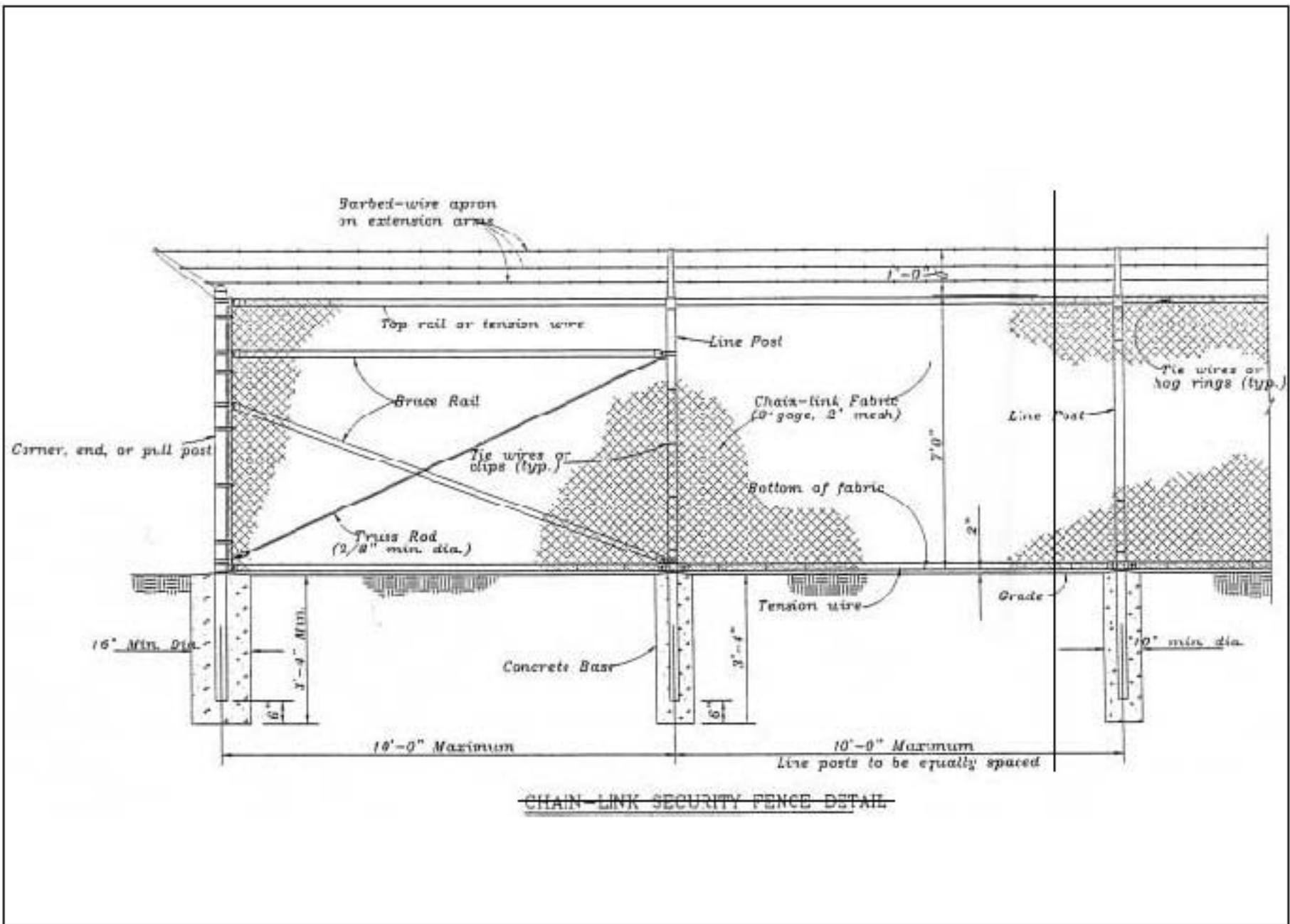
2.2.1 Fence Construction

The Proposed Action includes the construction of approximately 5 miles of fencing as described in Section 2.2 above. Construction details of the fence are shown in Figure 2-2. Where the fence crossed an arroyo or stream channel, a bollard would be constructed as shown in Figure 2-3. All work would be in accordance with AFI 31-101 and Air Force Handbook 32-1084, *Facility Requirements*. Two wildlife passes would be constructed in the fence to allow wildlife to move freely in and out of the Withdrawal Area. The location of these passes would be determined through consultation with the New Mexico Department of Game and Fish (NMDG&F) and the USFS. The passes would be constructed of three-strands of wire with barbs on only the center wire (refer to Figure 2-4), would be twelve feet wide with the top strand of wire approximately 3 feet high, in accordance with specifications set forth by the NMDG&F. These passes would be located in areas used by wildlife to transit the area where the fence is proposed to be constructed.

Construction access would be via existing gravel and dirt roads or two-track jeep trails where they exist. As the 20-foot wide firebreak is established, construction activities would be confined to the cleared area. Any construction staging areas would be located in areas to be designated by Kirtland AFB and USFS personnel. Construction would take no more than one year and would require trucks, augers, concrete mixers and hand tools.

Sufficient amounts of the fuels, hydraulic fluids, oils and lubricants required to support contractor vehicles and machinery would be properly stored on site during the project. No other hazardous materials or solvents would be stored on site during construction.

As many as ten workers per day would access the east fence construction site from east of the installation via Highway 337, Raven Road and Mars Court to USFS Road 530 that leads to the East Gate on the Withdrawal Area. It is estimated that as many as 22 vehicle trips per day may be required to transport workers and construction materials to the construction site. Water would be used for dust suppression as required on the dirt roads east of Highway 337.



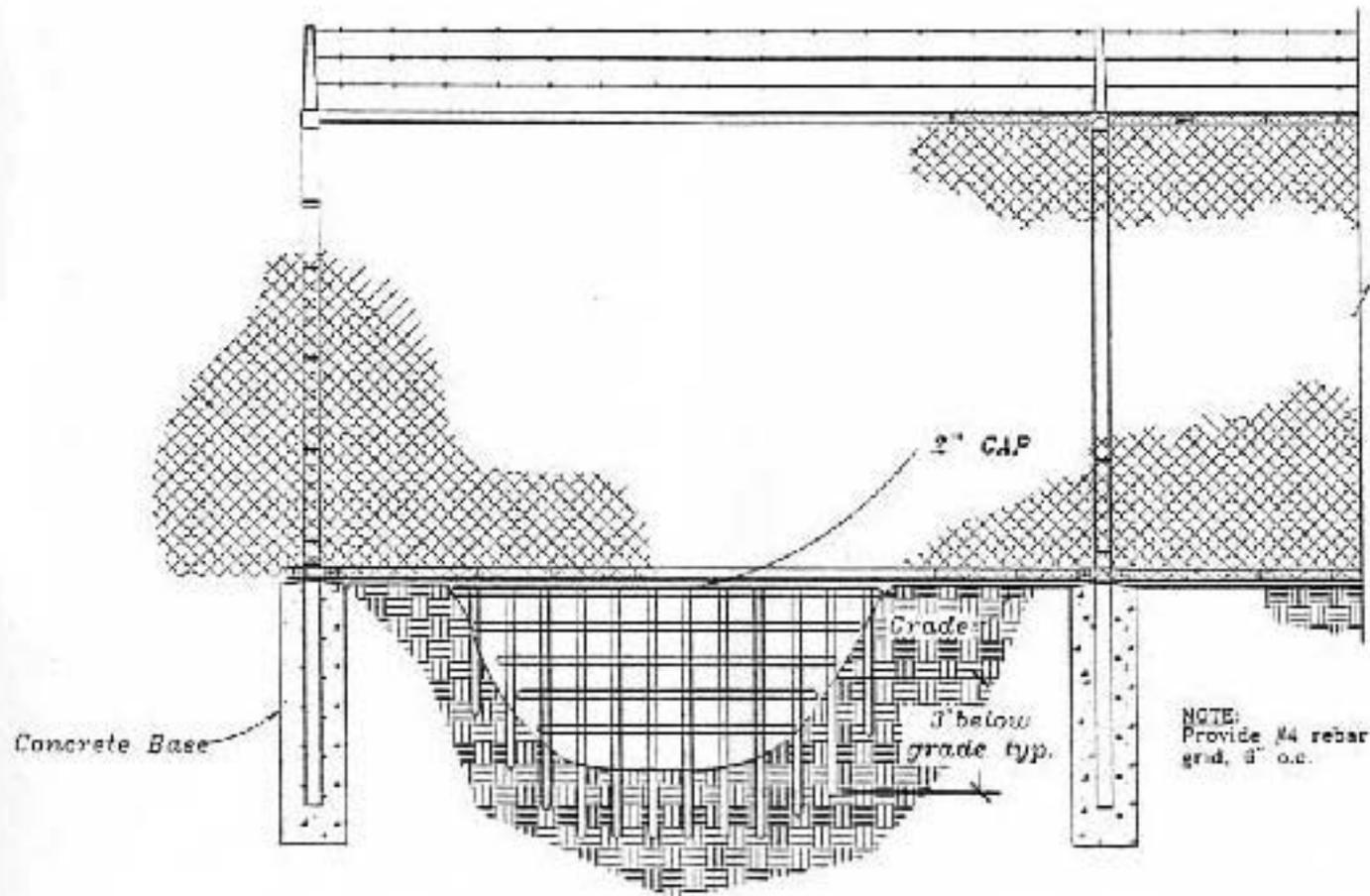
JULY 2004

Construction Details of New Eastern Perimeter Fence

FIGURE

2-2

EA



SECURE SWALE CROSSING WITH GROUND STAKES

NO SCALE

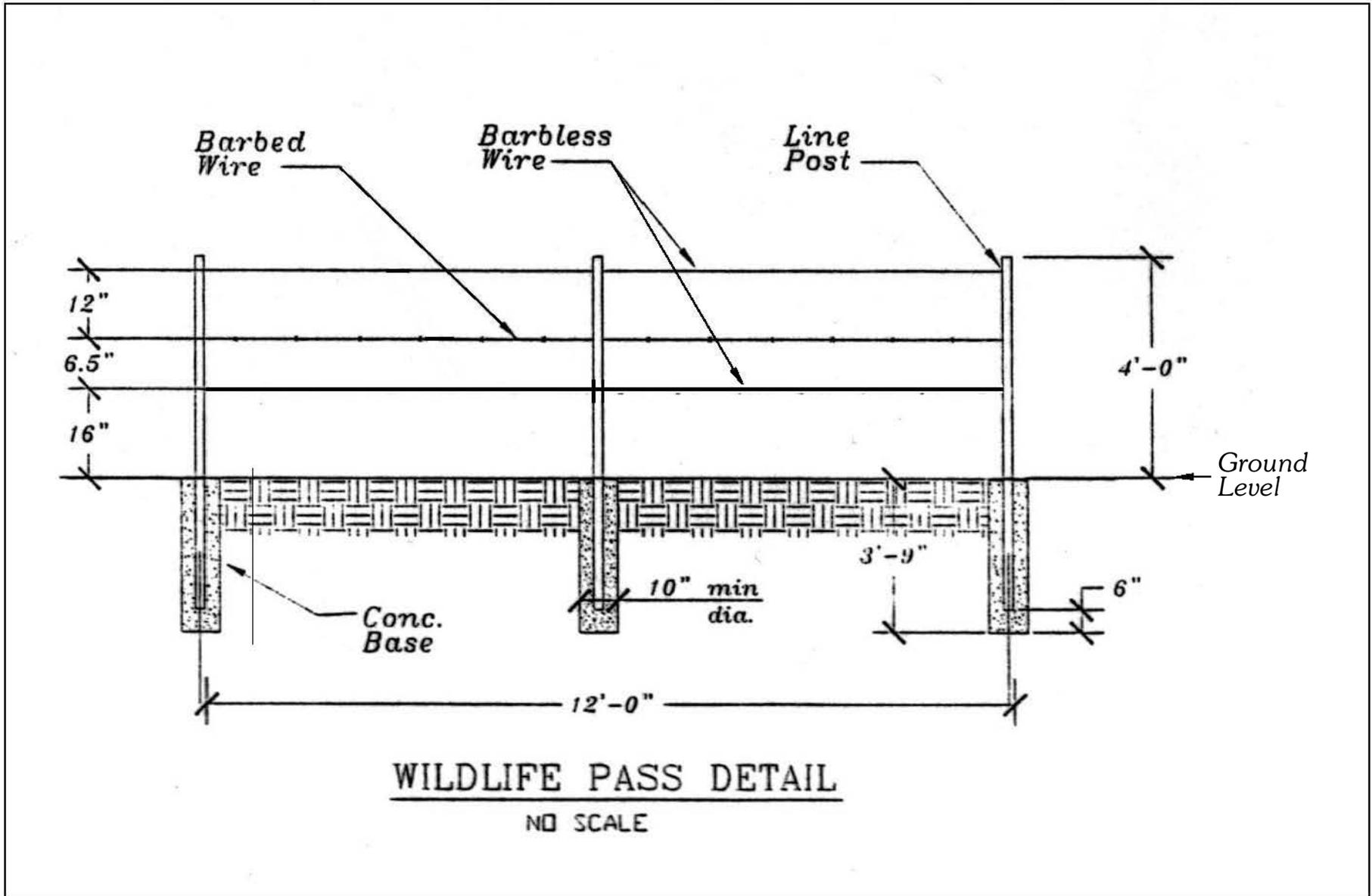
JULY 2004

Construction Details of New Eastern Perimeter Fence Swale Crossing

FIGURE

EA

2-3



JULY 2004

FIGURE

EA

Construction of Wildlife Pass Detail on
Kirtland Air Force Base

2-4

Work would occur from 7 AM to 6 PM, Monday through Friday for the duration of the project. The work would consist of the following steps:

- Trees would be cut down, trimmed, cut to log size and removed. All slash (limbs cut from the trees) would be shredded or chipped and spread nearby in accordance with USFS directives. Merchantable wood resulting from clearing of the firebreak would be made available to the public at locations determined by the USFS.
- A bulldozer would follow the tree cutting crew to create the firebreak and patrol road and make access to the construction site possible for worker vehicles, wood hauling trucks and construction material delivery vehicles.

The fence crew would follow the bulldozer as clearing progresses. Holes would be drilled by truck or tractor-mounted augers and post holes would be filled with concrete once the posts are in place. Chain link fencing material would be secured to the fence and strands of barbed wire added at the top as the final step in the process. Two wildlife passes would be added to the fence in areas to be determined by consultation with the USFS and NMDG&F. Routes used for animal travel such as low lying areas, and areas of rough terrain would be primary locations considered for the animal passes. A vehicle access gate or gates would be built at a point to be determined following consultation with the USFS, probably at the intersection of Forest Road (FR) 530 and the new fence line.

Adequate parking would be available for vehicles at locations at or near the construction sites. All contractors working on base would obtain vehicle and personnel passes from Kirtland AFB Security Police. Potable water for workers would be available in coolers furnished by either the general contractor or individual crews. Restroom facilities would consist of portable chemical toilets at the construction site. No additional potable water or disposition of wastewater would be required. Hazardous materials (e.g. waste oil, lubricants) would be handled, recycled or disposed of in accordance with the Kirtland AFB Hazardous Waste Management Plan (USAF 1998a).

Non-hazardous construction debris would be transported to the Kirtland AFB landfill or a suitable off-base landfill for disposal. In an effort to meet USAF waste diversion standards, Kirtland AFB receives monthly reports by item description and weight of any materials removed for recycling or reuse by contractors. In accordance with DoD Instruction 4715.4, *Pollution Prevention*, paragraph F.2.c(3)(f), salvageable metal debris resulting from construction activities would be removed and managed appropriately for recycling. If a dust nuisance or hazard occurs during firebreak clearing or fence construction activities, water, supplied by Kirtland AFB, would be used for dust control.

Off-site vendors would supply all material needs (e.g. fencing, posts and concrete). No electricity, natural gas or steam would be required during construction.

2.2.2 Firebreak Clearing

In forested areas, a 10-foot wide swath would be cleared on both sides of the fence line and tree stumps on the east side of the fence would be left 18 inches high to prevent motorized vehicles from using the firebreak as a roadway. This would result in a 20-foot total width firebreak in accordance with USFS comments on the Draft EA. As vegetation is removed from the firebreak, tree trunks and large limbs would be made available to the public as firewood at a location to be determined by consultation with the USFS. The firebreaks would be maintained by the USAF. In meadow areas (Bonito Canyon), no firebreak would be cleared on the outside (east) of the fence. The 10-foot firebreak on the west would be adequate to stop a grass fire and reducing the size of the firebreak would reduce impacts on sensitive meadow habitat. A gate would be constructed at the intersection of the fence and FR 530 to allow USFS personnel access to the base.

2.2.3 Patrol Road Clearing

The patrol road on the Kirtland AFB (west) side of the fence would be utilized by four-wheel drive vehicles and would be maintained in a sufficient condition to allow operation of those vehicles. It would be within the area cleared for the firebreak and would not disturb any additional ground.

2.2.4 Operational Activities

Operational activities would include patrolling the fence line to maintain base security as well as monitor for and respond to wildfires in the area.

2.2.5 Permitting, Licensing, and Consultation

The following permitting, licensing, and consultation would be required for the new perimeter fencing construction and operation:

- The construction contractor would be required to obtain the appropriate utilities clearance and excavation permits.
- Survey for and removal of unexploded ordnance (UXO) in the area of the firebreak clearing and fence construction would be required prior to any construction activities.

Individual construction sites (or common sites of development) that would result in disturbance of one (1) to five (5) (Small Construction) acres of total land area or greater than five (5) acres (Large Construction) are required to be permitted under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges From Construction Activities (Federal Register/Vol. 68, No. 126/Tuesday, July 1, 2003/Notices). These construction activities required the preparation of a Storm Water Pollution Prevention Plan and a Notice of Intent to discharge in accordance with the General Construction Permit language. The permitting of these construction activities would be coordinated through the Kirtland AFB Environmental Management Branch, Compliance Section.

If a dust nuisance or hazard occurs during road clearing or fence construction activities, water, supplied by Kirtland AFB, would be used for dust control.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 Alternative 1: Exclusion of Otero Canyon from the Fenced Area

Alternative 1 (refer to Figure 2-1) is similar to but involves less area than the Preferred Alternative in the December 20, 1996 USFS Decision Notice/Finding of No Significant Impact (FONSI) for their Ecosystem Management Plan for National Forest Lands in and Adjacent to the Military Withdrawal. In that document, the USFS proposed as their preferred alternative that the DOE return 199 acres of their withdrawn lands and that the DoD return 897 acres of the withdrawn lands to the USFS to be used for public recreation. That alternative was selected by the USFS for implementation, but implementation could not occur until the UXO on the property was cleaned up. The Forest Service FONSI states “Hazards that may exist on that portion of the Withdrawal proposed for return to public access, would be cleaned up before the public is allowed to use the lands.” Because funding was not available for survey and clean-up of the UXO, implementation of that proposal has never occurred.

Alternative 1 in this EA differs from the USFS Preferred Alternative in these ways; no DOE lands would be left outside the fence; and the DoD portion left outside the fence would be approximately 400 acres instead of 897.

Alternative 1 in this document would be similar to the Proposed Action described in Section 2.2, except at the southeast portion of the Withdrawal Area (refer to Figure 2-1). Following the fence line of the Proposed Action south from the northeast corner, the fence would extend south along the west side of Otero Canyon for approximately 1½ miles and then east to the eastern boundary of the Withdrawal Area. At the intersection with the Withdrawal Area boundary, the fence would continue south to near the southeast corner of the Withdrawal Area. Areas of severe terrain near the southeast and northeast corners of the Withdrawal Area would not be fenced.

This option would utilize the same fencing construction as the Proposed Action, including the installation of arroyo bollards, gates and wildlife passes where needed. Areas near the northern and southern ends of the fence where geographic features (cliffs, steep inclines etc) make the construction of fencing extremely difficult and are deemed to be relatively impassable to humans would not be fenced.

A patrol road would be established within the firebreak on the west side of the eastern fence within the Withdrawal Area. The patrol road would not be established in areas along the course of the fence where geographic features exist that make the area inaccessible by any means of ground transportation.

Alternative 1 was included in the 2003 Draft EA as one of the alternatives considered but not carried forward for detailed analysis. In response to public comment and after

extensive consultation with numerous base organizations, it was determined that this alternative does not conflict with current military activities.

If this alternative were selected, the portion of Otero Canyon that would remain outside the fence (approximately 400 acres) would remain off limits to public use. New warning signs have been posted and the area will be patrolled.

2.3.2 Alternative 2: Eastern Boundary Fence

A second alternative to the Proposed Action is the construction of the security fence along the eastern boundary of the Withdrawal Area as originally proposed in the Draft EA for this action (refer to Figure 2-1). The public would continue to be excluded from all portions of the Withdrawal Area for the foreseeable future. Construction would occur as described for the Proposed Action, but would follow the eastern boundary of the Withdrawal Area as closely as possible.

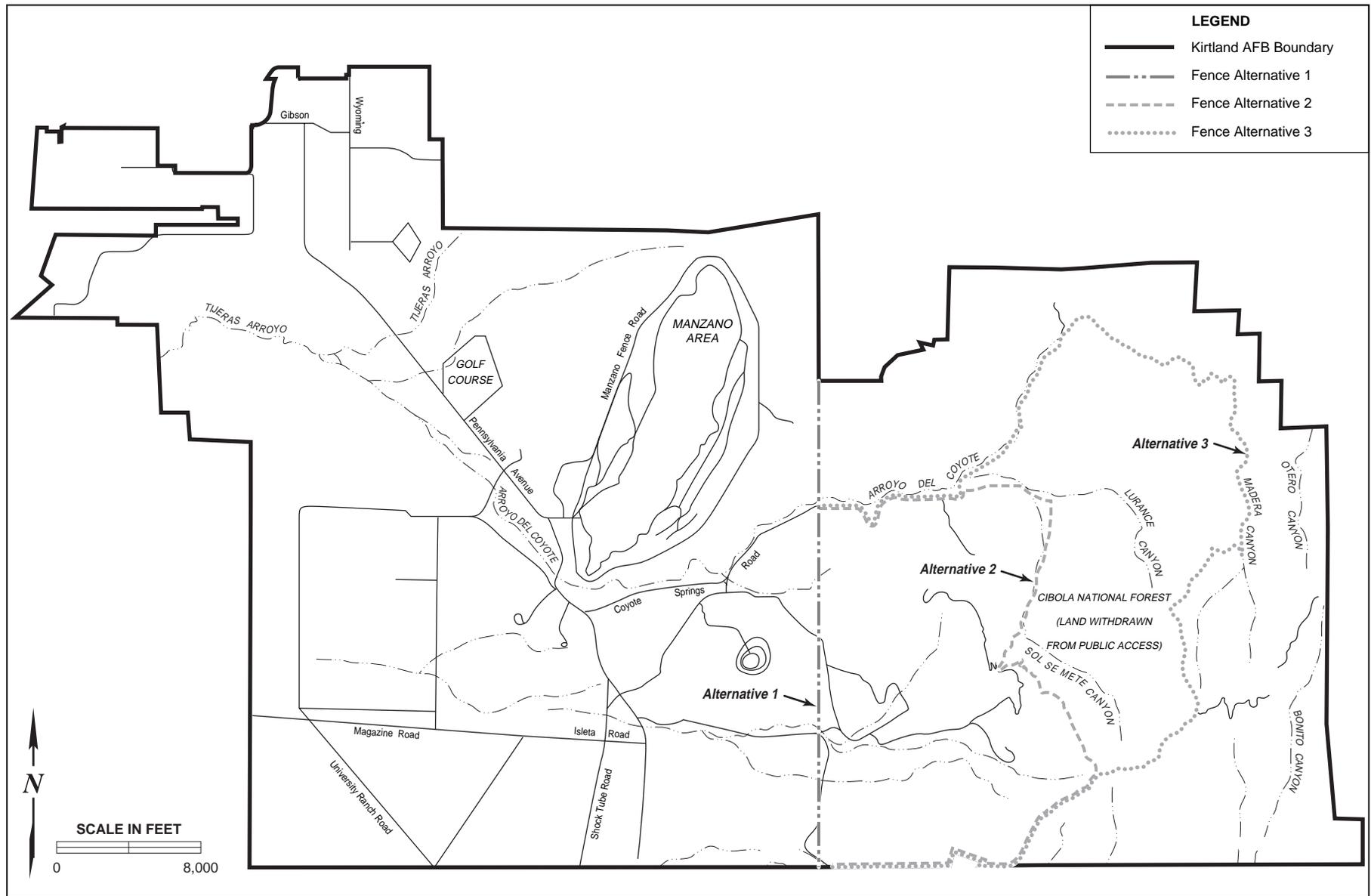
2.3.3 No-Action Alternative

Selection of the No-Action Alternative would result in continued use of the existing fence. The existing fence does not meet current DoD or USAF requirements for perimeter fences, and this alternative is therefore not considered acceptable. However, because CEQ regulations stipulate that the No-Action Alternative be analyzed to assess any environmental consequences that could occur if the Proposed Action is not implemented, this alternative is carried forward for analysis in this EA.

If this alternative were selected, the fence would not be constructed. However, the entire Withdrawal Area would remain off limits to public use. New warning signs have been posted and the area will be patrolled.

2.3.4 Alternatives Considered, But Not Carried Forward

A series of three initial fence line alternatives were considered which ranged from complete exclusion of the Withdrawal Area to inclusion of different sized portions of the Withdrawal Area within the fence (Figure 2-5). These alternatives involved placing the fence well inside the base boundary and were selected based primarily on locations of existing roads or the boundary between Kirtland AFB proper and the Withdrawal Area. These alternatives were determined to be unreasonable primarily because they would have denied military access to areas used for testing and training and would have allowed the public continued access to base property that is currently withdrawn from public access for mission security and public safety reasons.



JULY 2004

FIGURE

EA

**Alternatives Considered, But Not Carried Forward,
Kirtland Air Force Base**

2-5

An additional alternative was proposed by a group of interested citizens following the public hearing on the Draft EA. It also was based on the location of an existing road (Madera Canyon Road, similar to the north-south leg of Alternative 3, Figure 2-5), but also did not take ongoing military testing and training requirements into consideration.

These four alternatives were eliminated from further consideration for the following reasons:

- They allowed public access to areas currently used for DoD and DOE training and classified testing. Activities in these areas include live weapons firing, helicopter landings, explosives testing and troop maneuvers. These activities occur on a regular, sometimes daily, basis in the Withdrawal Area when weather permits.
- The fence lines associated with these four alternatives would have required that DoD and DOE personnel who work at facilities, training areas and/or test sites in the Withdrawal Area would have had to transit back and forth through the fence multiple times per day. Multiple gates would have been required, as well as guards to man the gates, substantially increasing the cost of these alternatives.

2.4 OTHER FUTURE ACTIONS

Albuquerque and Bernalillo County Open Space has proposed the addition of 25.8 miles of new trails in the Albuquerque area in their current management plan. This proposal was considered with the impacts of the Proposed Action to determine any cumulative effects.

SECTION 3 AFFECTED ENVIRONMENT

3.1 HUMAN HEALTH AND SAFETY

3.1.1 Definition of Resource

Health and safety issues are defined as those that directly affect the continued ability to protect and preserve life and property. Health and safety issues pertain to hazards that arise from physical conditions in the workplace and the actions of people working. The field of safety is focused on prevention of accidents and mitigation of damages resulting from accidents. An accident is an undesirable, unplanned event resulting in physical harm to people, damage to property, or interruption of business. An accident may be the result of an unsafe act or unsafe condition. Each worker must make a conscious effort to work safely, despite any adverse conditions of the work environment. A high degree of safety awareness must be maintained so that safety factors involved in a task become an integral part of that task.

Safety issues typically associated with and specific to military airfields include the potential for mid-air aircraft mishaps, aircraft collisions with objects on the ground (e.g. towers, buildings, or mountains), weather-related accidents, and bird-aircraft collisions. However, since the Proposed Action analyzed in this EA is not in the vicinity of the Albuquerque International Sunport and no changes in aircraft activity are proposed, only ground-based health and safety issues in and around the proposed project site are addressed in this document.

Because children may suffer disproportionately from environmental health and safety risks, EO 13045, *Protection of Children From Environmental Health and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children and to ensure that federal agencies' policies, programs, activities, and standards address environmental health and safety risks to children.

3.1.2 Existing Conditions

3.1.2.1 Safety Preparedness

Kirtland AFB has a general safety policy relating to the performance of all activities on the base. Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts. Safety awareness and strict compliance with established safety standards are expected. In the event of a mishap, incidents are investigated, lessons learned are documented, and corrective action is taken. Safety is an integral part of mission performance at Kirtland AFB, and supervisors and managers are strongly encouraged to prevent mishaps. In addition, the Kirtland AFB Disaster Preparedness Operation Plan (Kirtland AFB 1993) establishes procedures to respond to and recover from any disasters or accidents affecting organizations at Kirtland AFB or the

surrounding area. This plan includes procedures for responding to hazardous material spills and severe weather.

3.1.2.2 Human Health

Contractor personnel for the Proposed Action at Kirtland AFB would be responsible for ensuring ground safety and compliance with all applicable occupational health and safety regulations, and worker compensation programs. Contractors also would be required to conduct construction activities in a manner that would not pose any risks to personnel in the project vicinity.

3.1.2.3 Industrial Hygiene

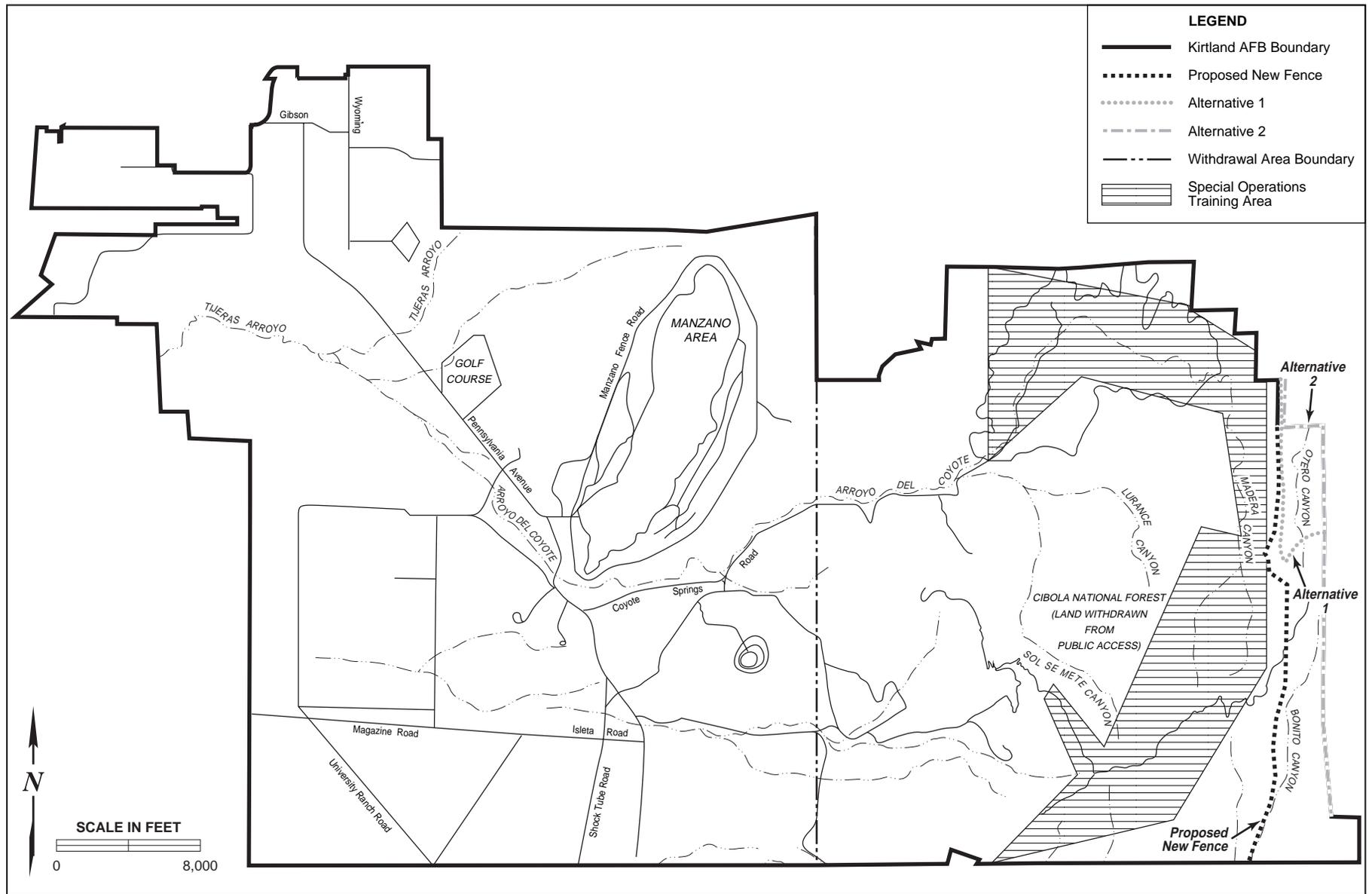
Exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets are managed under industrial hygiene programs. Industrial hygiene is the joint responsibility of bioenvironmental engineering and contractor safety departments, as applicable. These responsibilities include: reviewing all potentially hazardous workplace operations; monitoring exposure to workplace chemicals (e.g. asbestos, lead [Pb], and hazardous materials), physical (e.g. noise and radiation), and biological agents (e.g. infectious waste); recommending and evaluating controls to ensure personnel are properly protected (e.g. ventilators and respirators); and ensuring a medical surveillance program is in place to perform occupational health physicals for those workers subject to exposure to workplace hazards.

3.1.2.4 Operational Training Areas

The Special Operations Training Area is the only active operational training area located within the Withdrawal Area near the area that the proposed eastern perimeter fence would pass through (Figure 3-1). The Special Operations Training Area extends from the northern boundary to the southern boundary of the Withdrawal Area on Kirtland AFB and lies predominantly along the eastern boundary of the Withdrawal Area. The proposed eastern perimeter fence would pass along the eastern edge of this training area (Figure 3-1).

3.1.2.5 Historic Ranges

A preliminary assessment consisting of a file search and on-site personnel interviews was conducted in the fall of 2001 to identify historical ranges on Kirtland AFB. Several historical ranges were identified within Kirtland AFB and the Withdrawal Area (Figure 3-2). The largest site, referred to as the Proximity Fuse Range, encompasses approximately 7,000 acres, much of which lies within the Withdrawal Area and extends to the eastern boundary. UXO has been observed in several portions of the Proximity Fuse Range. Kirtland AFB is awaiting funding to investigate the ranges for the presence of UXO and possible soil and groundwater contamination. Funding would then be sought for any necessary remediation activities.



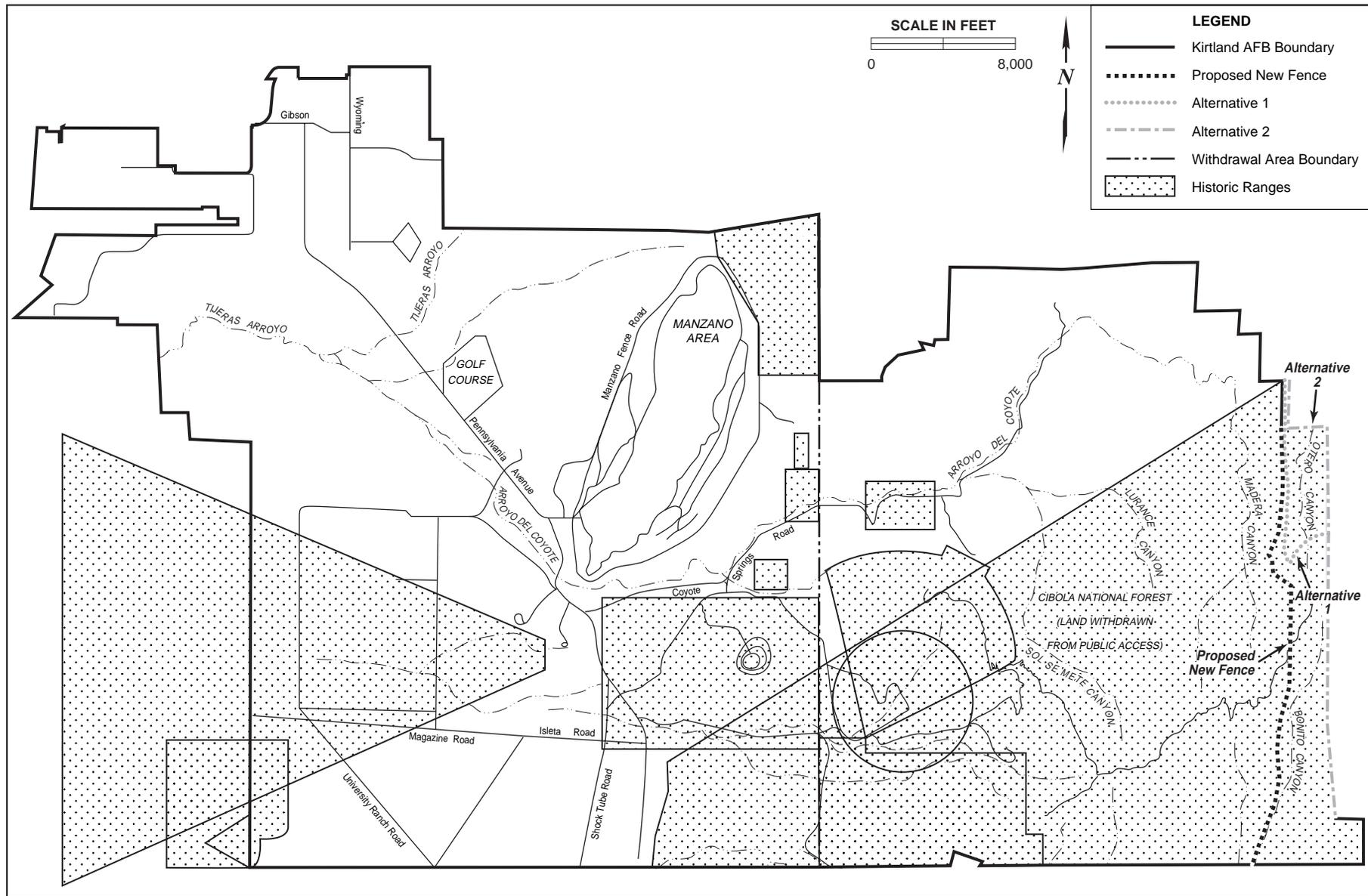
JULY 2004

EA

**Operational Training Areas,
Kirtland Air Force Base**

FIGURE

3-1



JULY 2004

FIGURE

EA

**Historic Ranges,
Kirtland Air Force Base**

3-2

3.2 AIR QUALITY

3.2.1 Definition of Resource

Outdoor air quality in a given location is described by the concentration of various pollutants in the atmosphere. Air quality at a given location is a function of several factors, including the quantity and dispersion rates of pollutants in the region, temperature, the presence or absence of inversions, and topographic and geographic features of the region. For the purposes of this EA, Bernalillo County forms the region of concern for air quality.

The EPA has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants, including ozone (O₃), CO, NO₂, SO₂, particulate matter equal to or less than ten microns in diameter (PM₁₀), and Pb. Under the 1990 CAA Amendments, all states must attain compliance through adherence to the NAAQS, as demonstrated by the comparison of measured pollutant concentrations and the NAAQS. Fugitive dust is also a contributor to air pollution within the region because of New Mexico's dry climate. Windblown dust from local fields, streets, roads, and construction zones contributes particulate matter to the local airshed.

The NAAQS represent the maximum levels of background pollution that are considered acceptable, with an adequate margin of safety to protect public health and welfare. The State of New Mexico has adopted additional standards for air quality, the NMAAQs, which apply a more stringent standard for CO, SO₂, and for the 24-hour standard for NO₂. See Title 40, Part 50 of the CFR for the NAAQS. Both the NAAQS and NMAAQs are depicted in Table 3-1.

3.2.2 Existing Conditions

3.2.2.1 Climate and Air Quality in Project Area

The climate in the Albuquerque area is mild, sunny, and dry. Air quality in and around the project area is a function of normal climatic conditions in the region, combined with airborne pollutants from a variety of sources. Gusts up to 50 miles per hour can occur in Tijeras Canyon from the release of heavy cold air held back by the Sandia and Manzanita Mountains. The Albuquerque metropolitan area and Kirtland AFB are within New Mexico's Air Quality Control Region (AQCR) No. 2, which is one of 8 AQCRs in the state. Region No. 2 includes all of northwestern New Mexico. The Albuquerque Environmental Health Department performs air quality functions in Albuquerque, and the Albuquerque-Bernalillo County Air Quality Control Board governs them.

Table 3-1. National and New Mexico Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS ^a (Primary) ^b	NMAAQS ^c
O ₃	1-hour	0.12 ppm (235 µg/m ³)	0.12 ppm (235 µg/m ³)
	8-hour	0.08 ppm (157 µg/m ³)	0.08 ppm (157 µg/m ³)
CO	8- hour	9 ppm (10 mg/m ³)	8.7 ppm (9,900 µg/m ³)
	1 hour	35 ppm (40 mg/m ³)	13.1 ppm (14,900 µg/m ³)
NO ₂	Annual	0.053 ppm (100 µg/m ³)	0.053 ppm (100 µg/m ³)
	24-hour	None	0.10 ppm (200 µg/m ³)
SO ₂	Annual	0.03 ppm (80 µg/m ³)	0.02 ppm (52 µg/m ³)
	24-hour	0.14 ppm (365 µg/m ³)	0.10 ppm (260 µg/m ³)
	3-hour	0.50 ppm (1300 µg/m ³)	0.50 ppm (1300 µg/m ³)
PM ₁₀	Annual	50 µg/m ³	60 µg/m ³
	24-hour	150 µg/m ³	150 µg/m ³
Particulate Matter Equal to or less than 2.5 microns in diameter	Annual	15 µg/m ³	15 µg/m ³
	24-hour	65 µg/m ³	65 µg/m ³
Pb	Quarter	1.5 µg/m ³	1.5 µg/m ³

Source: EPA 2002. Title 40, Part 50 of the CFR.

Notes: ^a National standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.

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

^c Standards are presented for pollutant data reported in the State of New Mexico Air Quality Bureau annual report summaries.

An inventory was completed at Kirtland AFB in which a list of facilities with air emissions (both criteria pollutants and hazardous pollutants) was developed. All of the pollutants were then quantified for facilities on the list. There are a number of facilities located on the installation that generate periodic emissions. The inventory calculated the total potential air emissions using the quantities of hazardous and toxic pollutants maintained at each facility. Based upon the results of the emissions study, Kirtland AFB is subject to Title III and Title V permitting requirements of the CAA, respectively. Kirtland AFB is currently a minor source of Hazardous Air Pollutants (HAPs) under Title III of the CAA. Hazardous pollutant emissions come from aircraft engine testing, fire

training, fuel dispensing, fuel loading, open burning, above ground storage tanks, underground storage tanks, and external floating roof storage tanks. These HAPs consist of Acetaldehyde, Acrolein, Benzene, Ethylbenzene, Formaldehyde, Xylene, m-Xylene, p-Xylene, Naphthalene, o-Xylene, Styrene, Toluene, Methyl ethyl ketone, 1,3-Butadiene, Phenol, Propionaldehyde, n-Hexane, Chlorobenzene, Cumene, 1,1,2-Trichloroethane, 2,2,4-Trimethylpentane, and Arsenic, Cadmium, Chromium, Lead, Nickel, and Selenium Compounds. Emissions vary for action and pollutant.

A Title V permit application was submitted in December 1995 to the Albuquerque-Bernalillo County Air Pollution Control District and deemed complete in June 1996. Table 3-2 summarizes the CO emissions inventory for Bernalillo County. Table 3-3 summarizes the air emissions inventory for Kirtland AFB.

Table 3-2. CO Emissions Inventory of Bernalillo County (1996)

Source Category	CO Emissions (tons per year)
On Road Sources ^a	97,450.99
Agricultural Equipment	NA
Off Road Motorcycles	1,643
Lawn and Garden Equipment	NA
Recreation (boats, snowmobiles, etc.)	NA
Aircraft	3,104.14
Construction Equipment	8,456.50
Industrial Equipment	6,985.55
Railroads	28.84
Area Sources ^b	24,524.17
Major Stationary Sources	1,432.26
TOTAL	141,984.09

Source: Albuquerque Environmental Health Department 2003.

Notes: ^a On Road Sources include Light and Heavy Duty Gasoline and Diesel Vehicles and Trucks and Motorcycles.

^b Area Sources include residential woodburning, agricultural burning, open burning cigarette smoking, fires, natural gas combustion and propane combustion as well as small stationary point sources.

Table 3-3. Summary of Calendar Year 2001 Air Emissions for Non-exempt Sources at Kirtland AFB

Pollutant	Emissions	
	Actual ^b (tons per year)	Allowable ^b (tons per year)
CRITERIA POLLUTANTS AND PRECURSORS		
CO	33.7	171.9
NO _x	57.2	176.4
PM	12.7	48.4
PM ₁₀ ^a	12.5	47.8
SO _x	5.4	23.0
VOC	95.2	166.5
Total HAPs	6.9	12.0

Notes: ^a Particulate matter ≤ 10 μm is a subset of particulate matter.

^b These cumulative totals include emissions from 20 New Mexico Administration Code Title, Section 11.41 Authority to Construct permitted sources and Title V sources.

3.3 NOISE

3.3.1 Definition of Resource

Noise is defined as unwanted sound or, more specifically, as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise 1992). The Noise Control Act of 1972 promoted an environment for all Americans free from noise that jeopardizes their health or welfare. Human response to noise varies according to the type and characteristics of the noise, distance between the noise source and the receptor, sensitivity of the receptor and time of day.

Due to wide variations in sound levels, sound is measured in decibels (dB), which is a unit of measure based on a logarithmic scale (e.g., 10-dB increase corresponds to a 100 percent increase in perceived sound). According to the EPA Office of Noise and Abatement (1972-1982), under most conditions, a 5-dB change is necessary for noise increases to be noticeable to humans. Sound measurement is further refined by using an A-weighted decibel scale (dBA) that emphasizes the range of sound frequencies that are most audible to the human ear (between 1,000 and 8,000 cycles per second).

A Day-Night Average A-Weighted Sound Level is a noise metric that averages A-weighted sound levels over a 24-hour period, with an additional 10-dB penalty added to noise events occurring between 10:00 p.m. and 7:00 a.m.

Ambient background noise in urbanized areas typically varies from 60 to 70 dBA, but can be higher; suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dBA (EPA 1978). Remote, mountain terrain like the eastern boundary of the Withdrawal Area ranges from 35 to 45 dBA. Table 3-4 identifies noise levels associated with common indoor and outdoor activities and settings and identifies subjective human judgment of noise levels, specifically the perception of noise levels doubling or being halved.

A noise-sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals or certain wildlife species.

Table 3-4. Typical A-Weighted Sound Levels

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Evaluations
Lear Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a few feet away	110	Very Loud	16 times as loud
Chainsaws ¹	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Moderately Loud	
Pneumatic Drill; Vacuum Cleaner	80	Moderately Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	
Average Office	60	Moderate	½ times as loud
Suburban Street	55	Moderate	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ times as loud
Large Transformer	45	Quiet	
Average Residence Without Stereo Playing	40	Faint	⅛ times as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing

Source: LSA Associates, Inc. 2002.

¹ National Institute for Occupational Safety and Health 2003.

3.3.2 Existing Conditions

Localized sources of noise in the proposed project area, both on and off base, include military and civilian aircraft operations at Albuquerque International Sunport and a limited amount of vehicular traffic. The Proposed Action assessed in this EA would have no effect on aircraft noise, but aircraft noise is mentioned because commercial and military aircraft operations at Albuquerque International Sunport are the primary sources of noise in the area. The current noise abatement program prohibits flights over residential areas after 9:00 PM. Table 3-5 shows typical noise levels generated from various types of construction equipment.

Table 3-5. Construction-Equipment Noise Ranges

		Noise level at 50 ft, dBA						
		60	70	80	90	100	110	
Equipment powered by internal combustion engines	Earth-Moving	Compactors (rollers)		70	75			
		Front Loaders		70	85			
		Backhoes		70	95			
		Tractors		75	100			
		Scrapers, graders		80	95			
		Pavers				90	95	
		Trucks				90	100	
	Materials handling	Concrete mixers			80	95		
		Concrete pumps				85	90	
		Cranes, movable			80	95		
		Cranes, derrick				90	95	
	Stationary	Pumps		70	75			
		Generators			80	95		
Compressors				80	95			
Impact equipment	Pneumatic wrenches				85	90		
	Jackhammers and rock drills			80	95			
	Impact pile drivers, peaks					100	110	
Other	Vibrator		70	85				
	Saws			80	95			

Source: EPA 1972.

Notes: Based on limited available data samples

3.4 LAND USE

3.4.1 Definition of Resource

Land use is the classification of either natural or human-modified activities occurring at a given location. Natural land use includes rangeland and other open or undeveloped areas. Human-modified land use classifications include residential, commercial, industrial, communications and utilities, agricultural, institutional, recreational, and other developed areas. Land use is regulated by management plans, policies, regulations, and ordinances (e.g. zoning) that determine the type and extent of land use allowable in specific areas and protect specially designated or environmentally sensitive areas.

3.4.2 Existing Conditions

Bernalillo County encompasses approximately 477 square miles of land. In the vicinity of the Proposed Action, land use is predominantly rural with Cibola National Forest land to the northeast and east. Land to the north, northwest and west of the base is predominately urban (established and developing land). Land use adjacent to Kirtland AFB in the project area (northeast and east) is bordered on the east by the Cibola National Forest. South and southeast of the installation, the Isleta Pueblo lands are generally open space and forest or vacant land. These lands are utilized by Isleta Pueblo for a variety of highly sensitive cultural practices. Figure 3-3 shows the land use in the area.

In the last 100 years, the Albuquerque metropolitan statistical area (MSA), which includes Bernalillo County, has increased from 2,000 to 103,000 acres.

3.4.2.1 Land Use In and Around Project Area

Kirtland AFB is among the largest bases (land area) owned by the USAF with 52,678 acres of land (62 square miles). Kirtland AFB currently provides support for a variety of missions that include every primary mission traditionally fulfilled by the USAF, as well as many specialized activities less common to other USAF bases. In particular, Kirtland AFB is one of the nation's leading research, development, test, and evaluation facilities, with more than three-fourths of the base devoted to these activities.

Kirtland AFB manages a wide variety of land ownerships and land use agreements with multiple state and federal agencies (Figure 3-4). The land at Kirtland AFB is primarily owned by the USAF, but several other ownerships and leases apply. The eastern portion of Kirtland AFB is primarily Cibola National Forest land withdrawn from public use for security and safety purposes and are known as the Withdrawal Area. The DOE also uses some of the Withdrawal Area, and leases other areas from the USAF (USAF 2002). Some areas on the southern end of the installation are lands withdrawn from the Bureau of Land Management. The new eastern perimeter fence would be located approximately ½ miles west of the eastern boundary of the Withdrawal Area. The fence proposed for replacement is located along the northern boundary of the base just west of the Withdrawal Area.

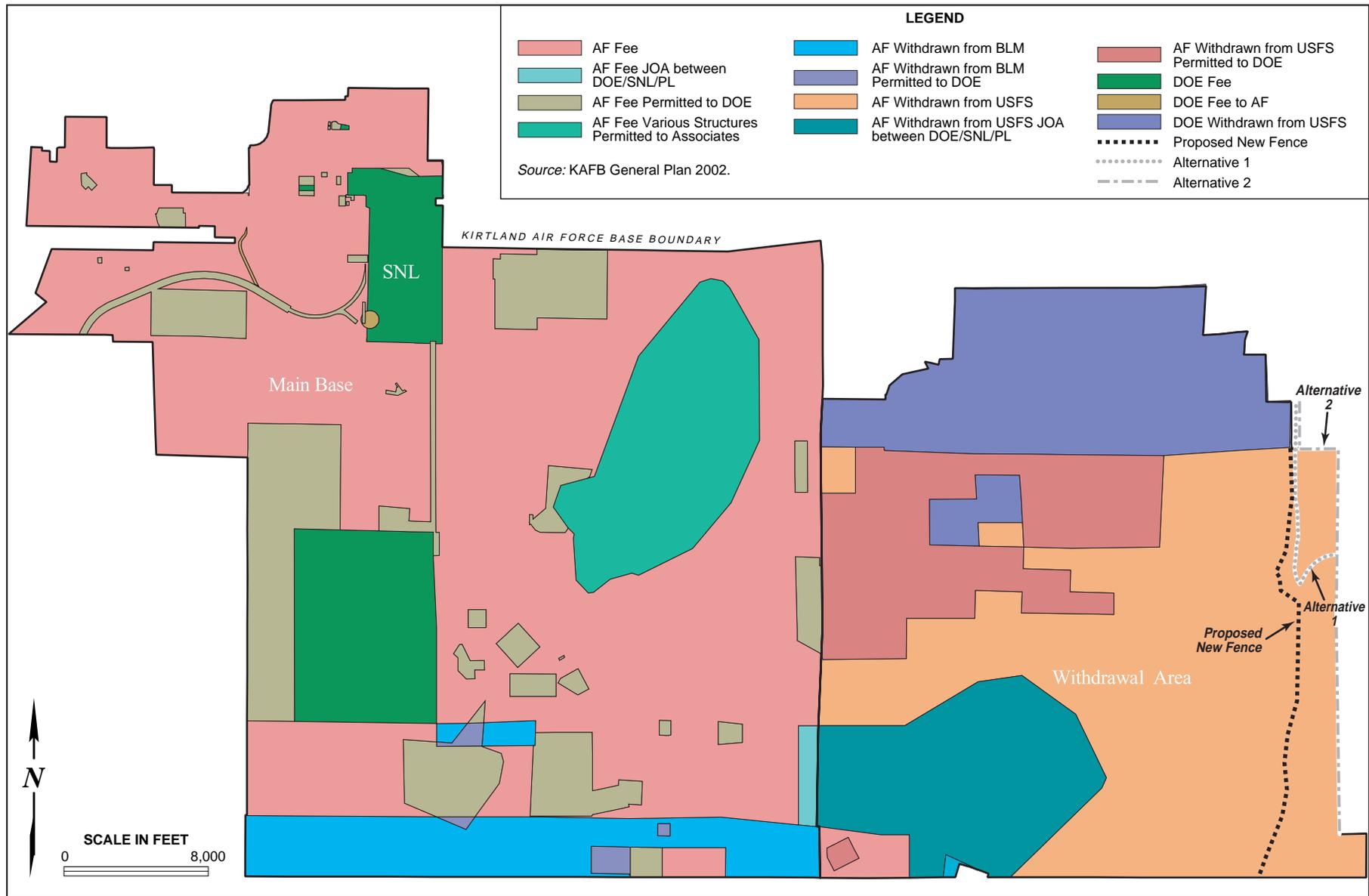
Lands in the Withdrawal Area are used for military training, DOE and DoD testing and research and the potential use of hazardous materials by agencies and contractors. Northeast and east of the Withdrawal Area is USFS land that includes picnicking, camping areas, and recreational activities. Trails that are in or enter the Withdrawal Area within the project area include Forest Trail (FT) 268, FT 268B, FT 236, FT 56, and FT 56A and additional trails and FRs. These trails either begin or are connected to trails and roads inside and outside of the project area and within the Withdrawal Area. Hiking, biking, and horseback riding are just a few of the popular recreational activities occurring in the area. Even though the Withdrawal Area is not open for public recreational use, the area is accessible and the public uses the area for recreation.

Lands east of the Withdrawal Area are in Management Area 2 of the Cibola National Forest. Future land use and proposals are referenced in the Cibola National Forest Land and Resource Management Plan (1985) and the USFS Environmental Analysis for the Ecosystem Management Plan for National Forest Lands in and Adjacent to the Military Withdrawal (1996).

3.5 GEOLOGICAL RESOURCES

3.5.1 Definition of Resource

The geological resources of an area consist of all soil and rock materials. For the purpose of this document, the terms “soil” and “rock” refer to unconsolidated and consolidated earth materials, respectively. The geology of an area includes mineral deposits, notable landforms, tectonic features, and fossil remains.



JULY 2004

FIGURE

EA

Kirtland Air Force Base Land Agreements

3-4

3.5.2 Existing Conditions

3.5.2.1 Geology

Kirtland AFB is situated in the eastern portion of the Albuquerque Basin, one of the largest of a series of north-trending basins measuring 90 miles long and 30 miles wide (Fenneman 1931). The basin extends from the gently sloping area near the Rio Grande River to the steep foothills and slopes of the Sandia and Manzanita Mountains. Different landforms within the basin include mesas, benches, stream terraces, low hills, ridges, and graded alluvial slopes (Lozinsky et al. 1991; Kelley 1977; Kelley and Northrup 1975). Elevations at Kirtland AFB range from 5,200 feet in the west to almost 8,000 feet in the Manzanita Mountains. Several canyons are found in the region. David, Otero, Bonito, and Madera Canyons are located near the proposed fenceline.

Most of the Albuquerque Basin consists of poorly consolidated sediments that eroded from the surrounding mountains following previous faulting and geologic activity. These sediments, known as the Santa Fe Group, are overlain in places by the 5.3 to 1.6-million-year-old Ortiz Gravel deposits. In certain places, the Rio Grande River and volcanic deposits are interspersed.

3.5.2.2 Soils

The dominant soils of Albuquerque Basin, in which Kirtland AFB is located, are well drained and loamy, with minor amounts of gravelly and stony soils along the mountains and arroyos. A variety of soil associations occur on Kirtland AFB including the: Bluepoint-Kokan association, Gila-Vinton-Brazito association, Madurez-Wink association, Tijeras-Embudo association, Seis-Orthids association, and Kolob-Rock outcrop association.

3.5.2.3 Proposed Action

The major soil types that occur in the general area of the Proposed Action are Silver and Witt soils, the Seis Complex, and the Seis-Silver Complex. These soils are deep and well drained, and are mildly to moderately alkaline with the Seis and Seis-Silver Complexes being strongly calcareous. Permeability is slow and available water capacity ranges from 11.5 to 12.5 inches for the Silver and Witt soils, while permeability is moderate and available water capacity ranges from 2.5 to 3 inches for the Seis-Silver Complex and Seis Complex. Run-off is medium to rapid and the hazard of water erosion and soil blowing ranges from moderate to severe.

3.6 WATER RESOURCES

3.6.1 Definition of Resource

Water resources include all surface and groundwater quality and their availability for human use located within the proposed project area and the watershed areas affected by existing and potential runoff, including an area's potential for flooding (100-year floodplains). Surface water resources comprise lakes, rivers and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health. Groundwater comprises the subsurface hydrologic resources of the physical environment and is an essential resource in many areas; groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition.

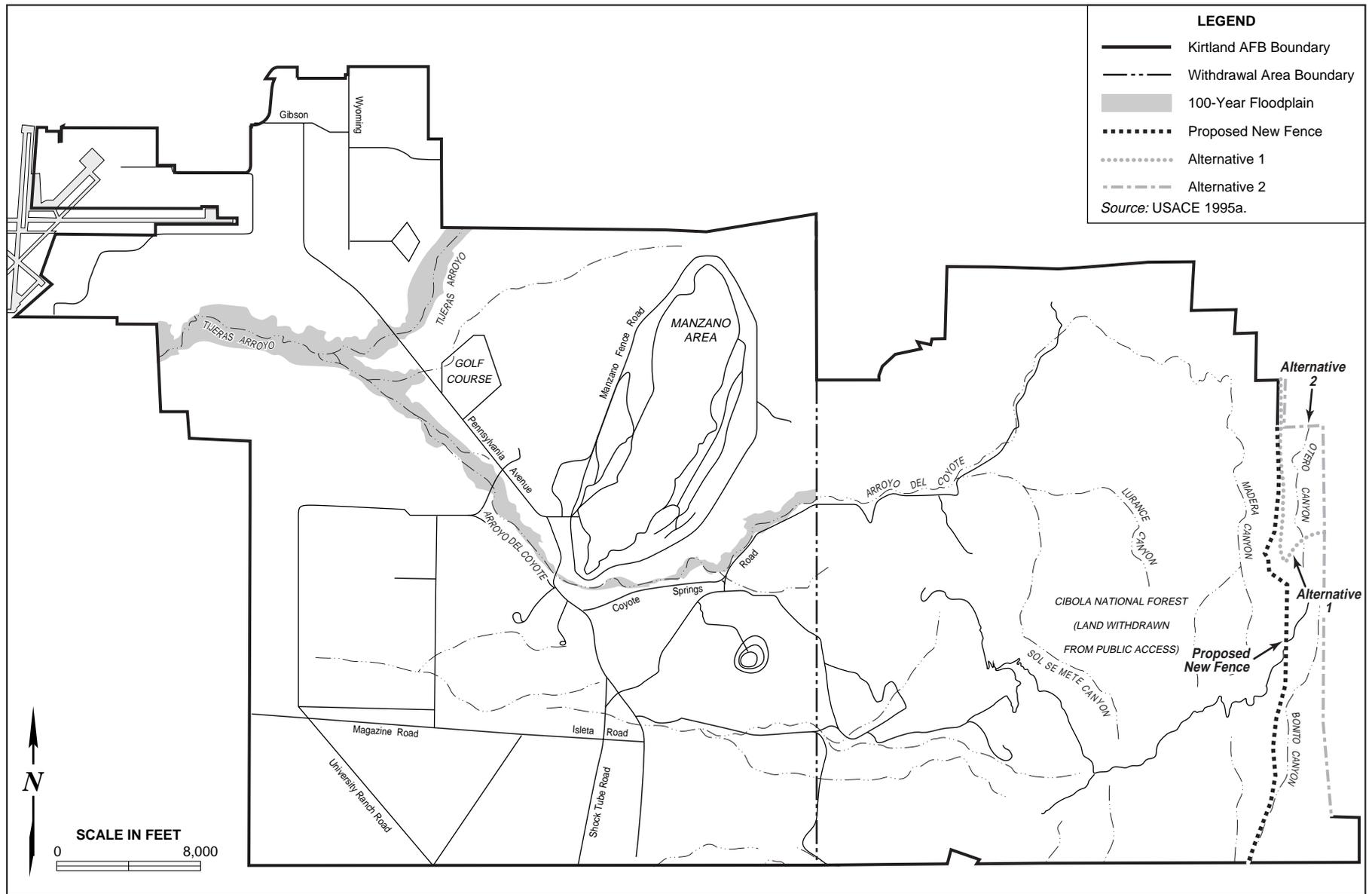
Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 100-year floodplains. Floodplains are often belts of low, level ground present on one or both sides of a stream channel and are subject to either periodic or infrequent inundation by floodwater. Inundation dangers associated with floodplains have prompted federal, state, and local legislation that limit development in these areas largely to recreation and preservation activities. The 100-year floodplain on Kirtland AFB is shown on Figure 3-5.

3.6.2 Existing Conditions

3.6.2.1 Surface Water

The Rio Grande River is the major surface hydrologic feature in central New Mexico, flowing north to south through Albuquerque approximately 5 miles west of Kirtland AFB. Minor surface water bodies exist on the East Mesa as small wetlands, such as Coyote Springs and Sol se Mete Spring or as small reservoirs such as the ponds located at Tijeras Arroyo Golf Course. Two small springs, Sol se Mete and Lurance Springs, are located more than 1 mile west of the Proposed Action.

East Mesa surface water occurs in the form of storm water sheet flows that drain into small gullies when it rains. The primary surface channels that drain runoff from Kirtland AFB to the Rio Grande River are the Tijeras Arroyo and Arroyo del Coyote. These arroyos are both water-carved channels that are dry for most of the year. Precipitation reaches these arroyos through a series of storm drains, flood canals, and unnamed smaller arroyos. Surface water enters Tijeras Arroyo where it crosses the northeast corner of Kirtland AFB and then flows south of Albuquerque International Sunport, draining eventually into the Rio Grande River (USAF 1991). Arroyo del Coyote drains into Tijeras Arroyo approximately 1 mile west of the Tijeras Arroyo Golf Course and receives surface water from the eastern portion of the base and from the Manzanita Mountains.



JULY 2004

EA

100-Year Floodplain on Kirtland Air Force Base

FIGURE

3-5

Both Arroyo del Coyote and Tijeras Arroyo flow intermittently during heavy thunderstorms and spring snowmelt (USACE 1979a). However, nearly 95 percent of the precipitation that flows through the Tijeras Arroyo evaporates before it reaches the Rio Grande River. The remaining 5 percent is equally divided between runoff and groundwater recharge (USAF 1991). The proposed eastern fence line crosses minor drainages but avoids larger waterways such as Otero Canyon.

3.6.2.2 Floodplains

Flooding on Kirtland AFB generally occurs between May and October during high-intensity thunderstorms (USACE 1979b). Tijeras Arroyo and Arroyo del Coyote floods are characterized by high peak flows, small volumes, and short duration. Although flooding occurs infrequently, vegetation can encroach into these arroyos' channels, obstructing the flow of water, leading to flooding. A 100-year floodplain encompasses these arroyos and follows their path. Floodplain studies for the Withdrawal Area have not been conducted. However, due to the relatively steep terrain in the area of the Proposed Action, floodplains are not expected to occur.

3.6.2.3 Groundwater

Kirtland AFB is located within the limits of the Rio Grande Underground Water Basin, which has been defined by the State of New Mexico as a natural resource area and has been designated as a "declared underground water basin." The state regulates it as a sole source of potable water. The average depth to groundwater beneath Kirtland AFB is 450 to 550 feet. The Rio Grande Basin's source of groundwater is the Santa Fe Aquifer, which Albuquerque relies on as its sole potable water source. The volume of recoverable fresh groundwater in the Rio Grande Basin is estimated at 2.3 billion-acre feet. Recharge of the Santa Fe Aquifer is most likely to occur east of the installation in the Manzanita Mountains where the sediment material favors rapid infiltration (USAF 1991).

3.7 BIOLOGICAL RESOURCES

3.7.1 Definition of Resource

Biological resources include native or naturalized plants and animals and the habitats in which they occur, and native or introduced species found in landscaped or disturbed areas. Protected species are defined as those listed as threatened, endangered, or proposed or candidate for listing by the: USFWS; New Mexico Energy, Minerals, and Natural Resources Department (NMEMNRD); and/or NMDG&F. Federal species of concern, formerly known as candidate category 2 species, are not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action. The New Mexico Natural Heritage Program also maintains a listing of threatened or endangered species. NMEMNRD holds the responsibility for identifying and listing sensitive plant species considered in this analysis. Animal species of special concern to the NMDG&F are also considered.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g. migration routes, breeding areas, crucial summer/winter habitats).

Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*. Wetlands are defined by the USACE (Federal Register 1982) and EPA (Federal Register 1980) as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3(b), 1984).

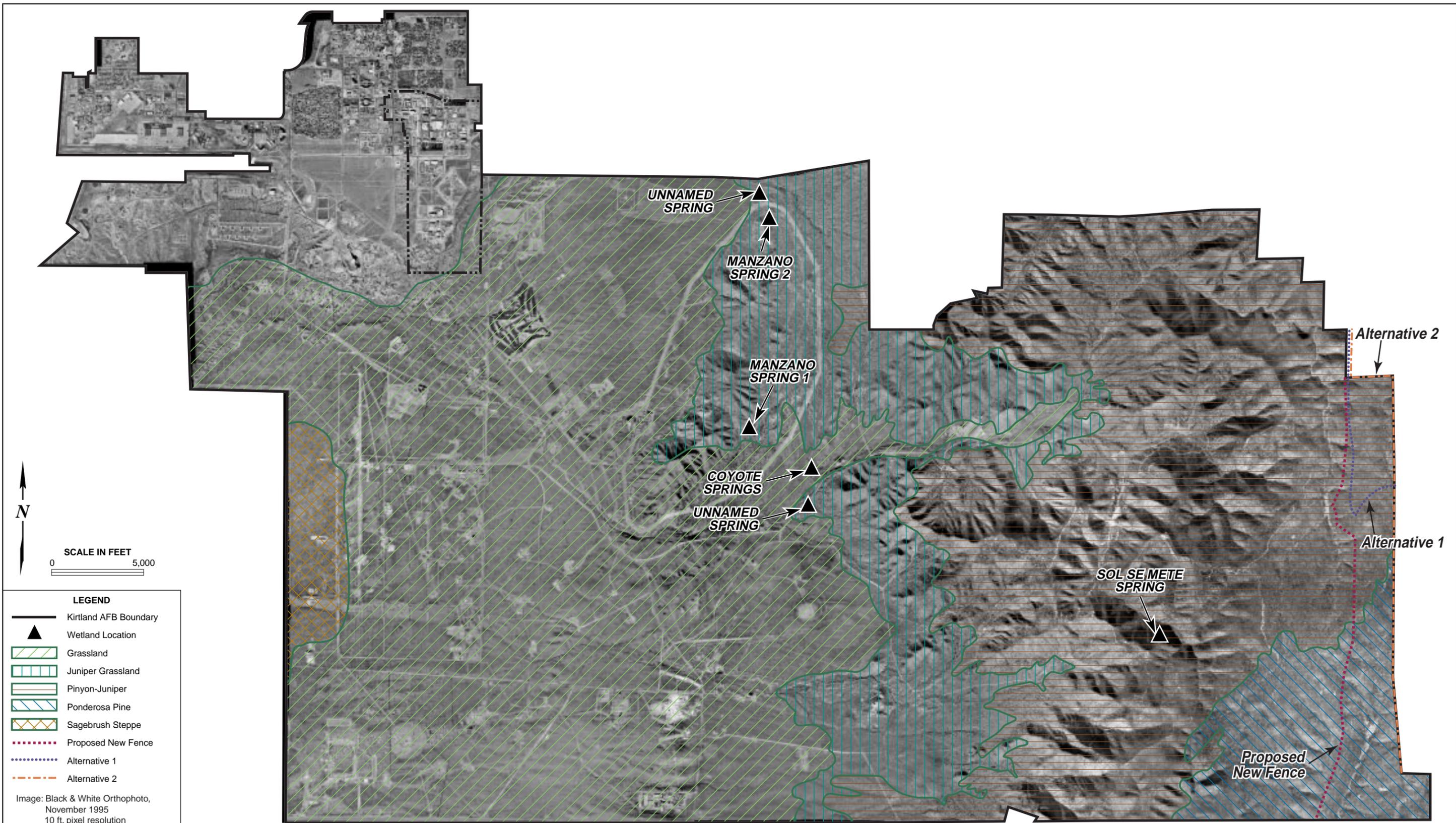
3.7.2 Existing Conditions

Kirtland AFB lies at the intersection of 4 major North American physiographic and biotic provinces: the Great Plains, Great Basin, Rocky Mountains, and Chihuahuan Desert. Vegetation and wildlife found within Kirtland AFB are influenced by each of these provinces, with the Great Basin being the most dominant.

3.7.2.1 Vegetation

The vegetation scheme at Kirtland AFB consists of six main plant communities: grassland, sagebrush steppe, juniper woodland, piñon-juniper, ponderosa, and riparian/wetland/arroyo. Transitional areas are found between these communities and contain a mixture of representative species from each bordering vegetation zone. The grassland and piñon-juniper are the dominant vegetative communities at Kirtland AFB. The riparian/wetland/arroyo community is confined to isolated areas inundated by surface water during at least some part of the year. Native vegetation communities are shown in Figure 3-6. Vegetation located east of the Withdrawal Area has not been delineated but is the same as that found in the area of the Proposed Action. Neither the sagebrush steppe nor the grassland ecosystems will be discussed since they occur well outside of the area of the Proposed Action.

The dominant plant community surrounding the Proposed Action is the piñon-juniper woodland community. The piñon-juniper community ranges in elevation from 6,300 to 7,700 feet. This dominant plant community is composed of Colorado piñon pine (*Pinus edulis*) and one-seeded juniper with an understory of grasses and shrubs including blue grama, side oats grama, banana yucca (*Yucca baccata*), alderleaf mountain mahogany (*Cercocarpus mantanus*), and squawberry (*Rhus trilobata*). Gambel oak (*Quercus gambelli*) is also found in the piñon-juniper woodland and in north-facing canyons it can become codominate with the piñon pine creating isolated communities of pine-oak woodlands. The piñon-juniper woodland contains tree densities of 40 to 70 square feet per acre while pine-oak woodlands have densities of 50 to 90 square feet per acre (USFS 1996). The majority of the proposed eastern fence would be built through this type of vegetation.



JULY 2004

EA

Native Vegetation and Wetland Locations on Kirtland Air Force Base

FIGURE

3-6

Ponderosa pine (*Pinus ponderosa*) forests occur in the upper elevations, usually above 7,700 feet. A portion of the proposed fence would be built through this ecosystem. However, some ponderosa stands may be found at lower elevations especially in north-facing canyons. This community contains much of the same flora found in piñon-juniper woodland. Additional plant species include creeping barberry (*Berberis repens*), snowberry (*Symphoricarpus rotundifolius*), and New Mexican locust (*Robinia newmexicana*), and Rocky Mountain juniper (*Juniperus scopulorum*). Tree density in the ponderosa pine community ranges from 90 to 120 square feet per acre (USFS 1996). The southern portion of the proposed east fence would dissect the ponderosa pine community.

The riparian/wetland/arroyo community consists of species that have a greater moisture requirement than species common to other communities. These plant associations are found along Tijeras Arroyo, Arroyo del Coyote, and the various springs found on Kirtland AFB, where sufficient moisture occurs during at least part of the year. Species associated with the riparian/wetland/arroyo community include salt-cedar (*Tamarix chinensis*), yerba mansa (*Anemopsis californica*), three-square bulrush (*Scirpus americanus*), and cattail (*Typha latifolia*).

Mountain meadow grasslands can be found in Bonito, David, and Madera Canyons as well as other isolated openings located near the Proposed Action. The proposed fence would not cross any of these important meadows.

Insects and disease are natural activities that degrade the forest health. Probably the most significant disease activity in the project area is that of dwarf mistletoe in the piñon pine and juniper species *Arceuthobium divaricatum* and *Phoradendron juniperinum*, respectively (USFS 1996). Bark beetles are becoming an increasing problem in the area due to the recent drought.

3.7.2.2 Wetlands

The USACE Albuquerque District has prepared a map of Kirtland AFB showing known wetland locations, a description of waters of the US regulated pursuant to Section 404 of the CWA, and a restatement of the location of the 100-year floodplain determined in a 1979 study (USACE 1995). (Floodplains are discussed in Section 3.6, Water Resources).

3.7.2.3 Wildlife

Wildlife communities potentially affected by the proposed fencing are typical of woodland habitats within the central New Mexico region. Common bird species found in the juniper woodland association include the Mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), curved billed thrasher (*Toxostoma curvirostre*), brown-head cowbird (*Molothrus ater*), black-throated sparrow (*Amphispiza bilineata*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and the great horned owl (*Bubo virginianus*). Mammals include the coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), silky pocket mouse (*Perognathus flavus*), desert cottontail (*Sylvilagus audubonii*), black-tailed

jackrabbit (*Lepus californicus*), and the striped skunk (*Mephitis mephitis*). Amphibians and reptiles found in the juniper woodlands include New Mexico spadefoot toads (*Spea multiplicata*), whiptail lizards (*Cnemidophorus* spp.), coachwhip snake (*Masticophis flagellum*), and the western rattlesnake (*Crotalus viridis*).

Much of the wildlife found in the juniper woodlands also occur in the piñon-juniper woodland association. Additional bird species consist of the scrub jay (*Aphelocoma coerulescens*), white-breasted nuthatch (*Sitta carolinensis*), Downy woodpecker (*Picoides pubescens*), and sharp-shinned hawk (*Accipiter striatus*). Mammals known to inhabit the piñon-juniper community include the common porcupine (*Erethizon dorsatum*), black bear (*Ursus americanus*), rock squirrel (*Spermophilus variegatus*), and mountain lion (*Felis concolor*). Additional reptiles include the mountain patchnosed snake (*Salvadora grahamiae*) and the tree lizard (*Urosaurus ornatus*).

Animals found in the ponderosa pine forest are generally the same as those found in the piñon-juniper community. However, fewer reptile and amphibian species are found here. Cavity nesting birds such as the hairy woodpecker (*Picoides villosus*) may be more numerous.

The arroyo/wetland/riparian community at Kirtland AFB is generally inhabited by the same species found in the surrounding habitat, due to their relatively small size. Wetlands/arroyos that contain permanent or temporary pools provide breeding areas for the tiger salamander (*Ambystoma tigrinum*), red-spotted toad (*Bufo punctatus*), and woodhouse toad (*Bufo woodhousii*).

A locally important foraging and fawning area for mule deer is located in the Manzano Base area and extends into the north and west portions of the Withdrawal Area (Gustin 2003). Mule deer migrate through and inhabit this area for much of the year.

3.7.2.4 Threatened and Endangered Species

Thirty-two state and federally listed species could occur in Bernalillo County. Several state and federally listed species have the potential to occur on Kirtland AFB or within the Withdrawal Area. Federally threatened and endangered species are legally protected under the Endangered Species Act. In New Mexico, threatened and endangered animal species are protected by the New Mexico Wildlife Act. The NMEMNRD maintains listings of state threatened and endangered plants, which are protected under the New Mexico Endangered Plant Species Act. Table 3-6 lists special status species found in Bernalillo County and their potential for occurring on base or in the Withdrawal Area.

Table 3-6. Special Status Species, Bernalillo County

Common Name	Scientific Name	Status	Occurrence on Kirtland AFB proper	Occurrence Within Withdrawal Area	Habitat	Season	Behavior
FISH							
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	FE, SE, PCH	No	No	AQ	AY	Breeds
REPTILES							
Texas horned lizard	<i>Phrynosoma cornutum</i>	FSC	Potential	Potential	G, PJ	AY	Breeds
BIRDS							
Neotrophic cormorant	<i>Phalacrocorax brasilianus</i>	ST	No	No	R, AQ	SP, SM	Breeds
White-faced ibis	<i>Plegadis chihi</i>	FSC	No	No			
Bald eagle	<i>Haliaeetus leucocephalus</i>	FT, ST	Potential	Potential	G, PJ, P	SP, F	Transient
Northern goshawk	<i>Accipiter gentilis</i>	FSC	No	Potential	PJ, P	SP, SM, F	Transient, breeds in summer
Common black-hawk	<i>Buteogallus anthracinus</i>	ST	No	No	R	SM	Breeds
Ferruginous hawk	<i>Buteo regalis</i>	FSC	Potential	Potential	G, PJ, P		
Whooping crane	<i>Grus americana</i>	FE, SE	No	No	G, R, AQ	W	Transient
Black tern	<i>Chlidonias niger surinamensis</i>	FSC	No	No			
Western burrowing owl	<i>Athene cucularia hypugaea</i>	FSC	Yes	Yes	G, PJ	SP, SM, F	Transient, nest in summer
Mexican spotted owl	<i>Strix occidentalis lucida</i>	FT, CH	Potential	Potential	PJ, P	AY	Transient, breeds in summer
White-eared hummingbird	<i>Hylocharis leucotis borealis</i>	ST	No	Potential	P	SM	Transient
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE, SE, CH	No	No	R	SP, SM, F	Breeds
Loggerhead shrike	<i>Lanius ludovicianus</i>	FSC	Yes	Yes	G, PJ, R	AY	Transient, nests in summer, winter resident
American peregrine falcon	<i>Falco peregrinus anatum</i>	ST	Potential	Potential	G, PJ, P	SP, SM, F	Transient
Bell's vireo	<i>Vireo bellii</i>	ST	No	No	R	SM	Breeds
Gray vireo	<i>Vireo vicinior</i>	ST	Potential	Yes	PJ	SP, SM	Transient, breeds in summer
Baird's sparrow	<i>Ammodramus bairdii</i>	ST	Potential	No	G, PJ	F	Transient

Table 3-6. Special Status Species, Bernalillo County (continued)

Common Name	Scientific Name	Status	Occurrence on Kirtland proper	Occurrence Within Withdrawal Area	Habitat	Season	Behavior
MAMMALS							
Black-footed ferret	<i>Mustela nigripes</i>	FE	No	No	G, PJ	AY	Breeds
Spotted bat	<i>Euderma maculatum</i>	ST	No	Potential	R, PJ, P	SM	Transient
Western small-footed myotis bat	<i>Myotis ciliolabrum melanorhinus</i>	FSC	No	No	R	SM	Breeds
Yuma myotis bat	<i>Myotis yumanensis yumanensis</i>	FSC	No	No			
Occult little brown myotis bat	<i>Myotis lucifugus occultus</i>	FSC	No	No			
Long-legged myotis bat	<i>Myotis volans interior</i>	FSC	No	Potential	PJ, P	SM	Breeds
Fringed myotis bat	<i>Myotis thysanodes</i>	FSC	No	No			
Pale Townsend's big-eared bat	<i>Plecoyus townsendii pallescens</i>	FSC	No	No			
Big free-tailed bat	<i>Nyctinomops macrotis</i>	FSC	No	No			
Arizona black-tailed prairie dog	<i>Cynomys ludoficianus arizonicus</i>	C	No	No	G, PJ		
Pecos River muskrat	<i>Ondatra zibethicus ripensis</i>	FSC	No	No			
New Mexican jumping mouse	<i>Zapus hudsonius luteus</i>	ST	Potential	No	R	AY	Breeds
PLANTS							
Great Plains ladies'-tresses orchid	<i>Spiranthes magnicamporum</i>	SE	No	Potential	R, PJ	AY	Grows

Sources: NMDG&F 1999; 2002, New Mexico Natural Heritage Program 2002, USFWS 2003.

Notes: FE = Federal Endangered ST = State Threatened G = Grassland AQ = Aquatic
 FT = Federal Threatened FSC = Federal Species of Concern PJ = piñon/Juniper SP = Spring
 C = Federal Candidate PCH = Proposed Critical Habitat P = Ponderosa SM = Summer
 SE = State Endangered CH = Critical Habitat R = Riparian F = Fall
 AY = All Year

Of the seventeen species listed as threatened or endangered for Bernalillo County, seven of these species could not occur on Kirtland AFB or in the Withdrawal Area due to habitat restrictions. The federally endangered Rio Grande silvery minnow is found only within its critical habitat in the Rio Grande River. The state threatened neotrophic cormorant is attracted to large water bodies, such as Elephant Butte Reservoir in Sierra County, well south of Kirtland AFB (NMDG&F 2001). Farther to the north, the neotrophic cormorant is only found along the Rio Grande River. No large water bodies that could attract neotrophic cormorants are located near the Proposed Action. The state threatened common black-hawk occupies dense, well-developed riparian corridors along permanent streams and rivers (NMDG&F 2001). These habitats contain the necessary prey base to support this bird species. Surface drainages in the vicinity of the Proposed Action are sporadic and do not contain water year round; therefore, well-developed riparian areas do not occur in the proposed project areas. The Bell's vireo, a state

threatened bird, prefers riparian habitats similar to that of the common black-hawk. This species prefers dense riparian corridors along permanent grassland streams (NMDG&F 2001). Permanent streams are not present within the grasslands at Kirtland AFB. Lack of adequate riparian habitat also prevents the federally endangered southwestern willow flycatcher from using the area. During a survey for southwestern willow flycatchers conducted in 1994 to 1996, this species was discovered in riparian habitat along the Rio Grande River near Albuquerque, but not at Kirtland AFB (USAF 1998b).

The remaining two of the seven species that could not occur on Kirtland AFB due to habitat restrictions are the whooping crane and the black-footed ferret. The federally endangered whooping crane is only known in New Mexico from three experimental populations. The populations that migrate through New Mexico primarily travel to the shores of the Gulf of Mexico (NMDG&F 2001). These birds are known to frequent riparian and aquatic habitats along the Rio Grande River, but are not known to occur in the Manzanita Mountains. The federally endangered black-footed ferret could occur within a 50-mile radius of Kirtland AFB, but it has never been reported in the area (USAF 1991). This species is presumed to be extirpated from Bernalillo County (NMDG&F 2001).

Two federal species of concern are known to occur on Kirtland AFB and the Withdrawal Area. The western burrowing owl inhabits the disturbed grasslands at Kirtland AFB and is typically associated with Gunnison's prairie dog towns, however, burrowing owl habitat does not occur near the Proposed Action. The loggerhead shrike, another federal species of concern, is also commonly observed throughout Kirtland AFB grasslands and may be found occasionally in the juniper woodland association. It is a year-round resident and has been known to nest in the Withdrawal Area although not in the area of the Proposed Action (USFS 1996).

Nine of the threatened or endangered species listed for Bernalillo County occur, or have the potential to occur, at Kirtland AFB or in the Withdrawal Area. These species are: the bald eagle, Mexican spotted owl, American peregrine falcon, white-eared hummingbird, gray vireo, Baird's sparrow, spotted bat, New Mexican jumping mouse, and the Great Plains ladies'-tresses orchid. Much of the Withdrawal Area is being proposed as critical habitat for the Mexican spotted owl (USFWS 2003). See Table 3-6 for habitat as well as season and type of use for each of the species.

3.8 TRANSPORTATION AND CIRCULATION

3.8.1 Definition of Resource

Transportation and circulation refer to the movement of vehicles throughout a roadway network. Roadway operating conditions and the capacity of the system to accommodate vehicles can be described in terms of volume-to-capacity (V/C) ratio, which is a comparison of average daily traffic (ADT) volume to roadway capacity and the V/C ratio corresponds to a Level of Service (LOS) rating. Because of the location of the Proposed Action, V/C, and LOS ratings are not discussed.

3.8.2 Existing Conditions

The Proposed Action would occur ½ mile west of the eastern boundary of the Withdrawal Area, and at the northeast corner of Kirtland AFB and there are few roads in these areas (Figure 3-7). Patrol roads on Kirtland AFB would be used to access the northern fence boundary. FR 530 is the only road that crosses the eastern boundary of the installation. The existing East Gate is located approximately ¼ mile directly west of the installation boundary, about ½ mile by road. This gate is only used for security patrols and USFS access for fire fighting when needed. No other vehicle traffic is allowed through the gate, so there is very little traffic in the vicinity. Construction vehicles including trucks may use Highway 337 to get to the base's East Gate. ADT (weekday) volumes in the project area include roads on base and roads/highways adjacent to the base in rural Bernalillo County. The major roads or highways include Interstate 40 and Highway 337. Because roads are seldom used in the Withdrawal Area, ADT volumes are not calculated. ADT volumes range from 44,800 on Interstate 40 to 6,900 on Highway 337. This would not result in additional traffic or congestion problems. Figure 3-8 for 2001 shows traffic flows in the area of the Proposed Action.

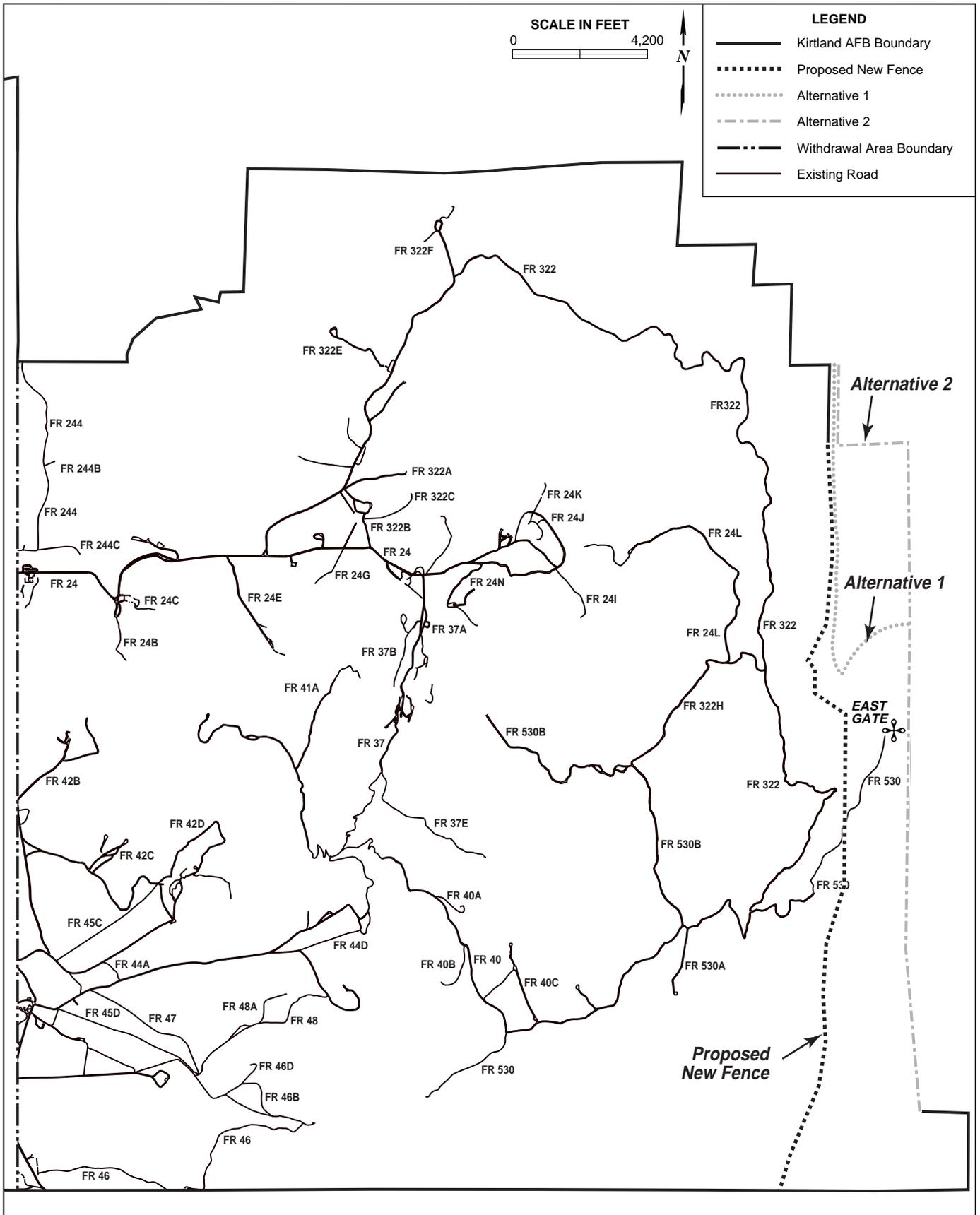
3.8.2.1 Circulation at Kirtland AFB and Access Gates

Traffic in the vicinity of the East Gate is confined to occasional security or fire patrols. The East Gate may be used for access for construction equipment.

3.9 VISUAL RESOURCES

3.9.1 Definition of Resource

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 (i.e. its landscape character). An area's susceptibility to visual impacts is related to visual sensitivity. Highly sensitive resources include national parks, recreation areas, historic sites, wild and scenic rivers, designated scenic roads and other areas specifically noted for aesthetic qualities.



JULY 2004

FIGURE

EA

Existing Roadways in the Withdrawal Area at Kirtland Air Force Base

3-7

3.9.2 Existing Conditions

The visual environment at Kirtland AFB is characteristic of military and civilian airfields. Structures include hangars, maintenance and support facilities and navigational equipment. The base contains both highly developed areas and large areas of minimally developed open space. The area surrounding the installation varies from urban to rural and open rangeland. The areas to the northeast and east of Kirtland AFB are mostly rural and Cibola National Forest lands that include recreational areas and open space. South of the installation, the Isleta Pueblo lands are generally open space, forests or vacant land. The proposed project sites along the eastern perimeters are rural, open space, mountainous and forested with small openings along some valleys or on top of mesas and buttes. According to the Forest Service's Visual Management System, most of the area along the eastern project site is classified as the highest sensitivity area and there is a concern for scenic quality.

Legislation pertaining to visual resources includes the Federal Highway Beautification Act of 1965, the Wilderness Act of 1964, the Wild and Scenic Rivers Act of 1968, the National Trails System Act of 1968, and the Surface Mining Control and Reclamation Act of 1977.

3.10 CULTURAL RESOURCES

3.10.1 Definition of Resource

Historic properties (i.e. significant cultural resources) are defined and described under the Native American Graves Protection and Repatriation Act, NHPA of 1966, as amended, Archaeological Resource Protection Act, American Indian Religious Freedom Act, NEPA, EO 13084, *Consultation and Coordination with Indian Tribal Governments*, EO 13287, *Preserve America*, EO 12898, *Environmental Justice*, EO 13007, *Indian Sacred Sites*, and "Executive Memorandum: government to Government Relations with Native American Tribal Governments," dated 29 April 1994.

The criteria for establishing significance are set forth in Title 36 CFR Part 60.4. Procedures for the application of the National Register criteria for evaluation are found in various National Park Service bulletins. These bulletins provide guidelines so that decisions concerning significance, integrity, and treatment can be reliably made.

3.10.2 Existing Conditions

Records available through the New Mexico Cultural Resources Inventory System administered by the Archaeological Resources Management Section were queried for current information regarding previous studies and known cultural resources within the Withdrawal Area. Also, a review of the records available at the Cibola National Forest offices in Albuquerque was completed to identify studies and resources within or near the Proposed Action and the Alternatives.

Under Section 106 of the NHPA of 1966, as amended, the USAF is required to access the effects of undertakings prior to their initiation to ensure that there would be no adverse effects on historic properties (36 CFR 800). Section 110 of the NHPA requires the USAF to complete an inventory of historic properties located on its land (36 CFR 60, 63, 78, 79, and 800).

Gallison et al. (2003) completed a survey in accordance with USFS protocol along the boundary of the Withdrawal Area that extended approximately 2 miles west of the boundary. The results of this survey found 44 archaeological sites within 1 mile of the Proposed Action. Of the 44 sites, 37 have been recommended to the National Register of Historic Places, 5 are recommended not eligible and 2 are recommended eligible.

3.11 SOCIOECONOMICS

3.11.1 Definition of Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment. A ROI is defined as the geographic area or region, wherein the project-induced changes to the socioeconomic environment would occur (Canter 1996). The ROI for the Proposed Action is Bernalillo County. Socioeconomic activity can encompass many areas such as population trends, economic history, employment, income levels, land-use patterns, land values, tax levels, housing characteristics, public services (i.e. law enforcement, utilities, fire protection), educational resources, transportation systems, community attitudes and lifestyles, recreation and tourism, and areas of unique significance. Only those socioeconomic components that would experience site specific environmental changes are included in this section.

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. The Presidential Memorandum that accompanied EO 12898 states that federal agencies “shall analyze the environmental effects, including human health, economic and social effects of federal actions including effects on minority and low-income populations.” To provide a thorough environmental justice evaluation, particular attention is given to the distribution of race and poverty status in areas potentially affected by implementation of the Proposed Action.

3.11.2 Existing Conditions

New Mexico and the ROI represent a diverse economy. Nonagricultural employment and the transportation and services industries represent the largest growth sector in New Mexico and in the ROI. Also, tourism has become one of New Mexico’s largest industries. According to the Tourism Association of New Mexico, tourism is a \$3.9

billion industry. Major employers within the ROI include the state's largest university, as well as medical and government facilities.

3.11.2.1 Population (including minorities)

The ROI had an estimated population of 570,000 in 2002 (US Census Bureau 2003a). This was a 1 percent increase from 2001.

According to the US Census Bureau's 2002 American Community Survey Profile, the Hispanic or Latino (of any race) population accounted for 43 percent of the population, the non-Hispanic white population accounted for 47 percent of the population. The Black or African American population accounted for 2 percent of the total population, the American Indian or Alaskan Native population accounted for 4 percent of the total population, the Asian population accounted for 2 percent, native Hawaiian and other Pacific Islanders .08 percent, some other race accounted for .01 percent and the population consisting of two or more races accounted for 2 percent (US Census Bureau 2003b).

3.11.2.2 Economy within ROI

Kirtland AFB plays an important role in the economy of the Albuquerque metropolitan area and the entire ROI, being the largest employer in New Mexico. Kirtland AFB had approximately 24,000 employees in fiscal year (FY) 2002 (USAF 2002). The goods and services purchased by base employees in the local area create secondary jobs and wages, further adding to its total economic importance to the local area. The economic contribution of Kirtland AFB to the Albuquerque area in FY 2002 was estimated at \$3.9 billion (USAF 2002).

The State of New Mexico ranks 48th among the states in terms of per capita income. In 2001, New Mexico's per capita income was \$23,155 and in 2000 it was \$21,827. In Bernalillo County the personal per capita income was \$27,253 (New Mexico Department of Labor 2003). Annual average unemployment rates in 2000 and 2001 within the ROI were at 3 percent, and 3.4 percent. Table 3-7 shows nonagricultural employment within the US, New Mexico, and the Albuquerque MSA (including Bernalillo County).

3.11.2.3 Housing

The ROI housing units in 2002 consisted of 248,663 housing units with 227,536 occupied units and 21,127 vacant units (US Census Bureau 2003b). The home ownership rate in the ROI in 2000 was 64 percent, (US Census Bureau 2003c).

Table 3-7. Nonagricultural Employment in the United States, New Mexico, and the Albuquerque MSA, 2001

Industry	United States		New Mexico		Albuquerque MSA	
	2001 Annual Average*	Percent of Total	2001 Annual Average	Percent of Total	2001 Annual Average	Percent of Total
Total Nonagricultural Employment	132,212	100.0	756,800	100.0	359,200	100.0
Manufacturing	17,698	13.4	43,100	5.7	24,200	6.7
Mining	563	0.4	16,200	2.1	100	0.0
Construction	6,861	5.2	45,900	6.1	28,300	7.9
Transportation & Public Utilities	7,070	5.3	37,300	4.9	19,900	5.5
Wholesale & Retail Trade	30,502	23.1	173,700	23.0	83,600	23.3
Finance Insurance and Real Estate	7,623	5.8	32,600	4.3	19,500	5.4
Services & Miscellaneous	41,023	31.0	222,200	29.4	114,900	32.0
Government	20,873	15.8	185,800	24.6	68,800	19.2

Source: New Mexico Department of Labor 2003.

Note: 2001 preliminary figures. Due to rounding, detail may not sum to total.

3.11.2.4 Kirtland AFB

Kirtland AFB expenditures in FY 2001, including payroll, totaled over \$3.0 billion. Total economic impact from the annual operating expenditures from Kirtland AFB was estimated to be over \$3.9 billion. Table 3-8 provides additional information relating to the economic impact of Kirtland AFB activities on the local community (USAF 2002).

Employment at Kirtland AFB totaled 24,000 at the end of FY 2002. The DoD work force reached 5,500, of which 4,500 employees were active duty military, 1,060 reserve, and Air National Guard personnel. Federal civilian employees including contract civilians included 14,700 by the end of FY 2002.

Table 3-8. Local Economic Impact, Kirtland AFB, 2002

Category	Amount
PAYROLL	
Military payroll	\$235,463,012
Appropriated Fund Civilian payroll	\$265,427,932
Other Civilian/contractor payroll	<u>1,546,376,431</u>
TOTAL ANNUAL PAYROLL	\$2,047,267,375
ANNUAL EXPENDITURES IN THE LOCAL COMMUNITY	
Construction projects	\$183,405,714
Service contracts	\$357,840,861
Local Purchases	<u>\$507,617,204</u>
TOTAL NON-PAY	\$1,048,863,779
TOTAL EXPENDITURES	\$3,096,131,154
TOTAL ESTIMATED ANNUAL DOLLAR VALUE OF JOBS CREATED	\$894,030,676
TOTAL ANNUAL ECONOMIC IMPACT ESTIMATE	\$3,990,161,830

Source: United States Air Force 2002

By the end of FY 2002, an estimated 811 military personnel (both active duty and guard/reserve) were living in family housing at Kirtland AFB, and approximately 4,700 military personnel were living off base.

3.11.2.5 Tijeras

The Village of Tijeras has a population of 474 residents (US Census Bureau 2000). Tijeras, NM (Bernalillo County) encompasses a land area of .8 square miles. The nearest city with a population of 50,000 plus is Albuquerque, NM which is 16.1 miles to the east of the Village of Tijeras. The Sandia National Forest Ranger Station is located in the heart of Tijeras.

3.11.2.6 Recreation/Tourism

According to the Forest Service's National Visitor Use Results Survey, approximately 54 percent of visitors on the Cibola National Forest used designated areas to hike, bike, or use horseback trails in the forest. Some activities that have a high percentage of visitors include camping (38 percent), viewing of wildlife (56 percent), viewing of natural features/scenery (62 percent), and hiking or walking (52 percent). Businesses in the area include restaurants, gas stations, retail stores, and general stores along Highways 14 and 66. Cibola National Forest is a popular tourist destination. In 2000, there were an estimated 2.88 million (18.75 error rate) national forest visits, 3.17 million (17.90 error rate) site visits, and 707,858 (37.43 error rate) wilderness visits to Cibola National Forest (USDA Forest Service 2001). According to the 2001 Forest Service Study, wilderness visitors to Cibola National Forest spent an average of \$14 each within 50 miles of the wilderness and spent an average of \$828 annually on all outdoor recreation related expenditures. Cibola National Forest Expenditures within 50 miles of recreation sites are shown in Table 3-9.

Table 3-9. Average per person expenditures within 50 miles of recreation site for wilderness visitors to Cibola National Forest

Type of Expenditures	Average expenditure (\$)
Government owned lodging	0.43
Privately owned lodging	2.17
Food/drink at restaurants and bars	4.26
Other food and beverages	1.45
Gasoline and oil	2.47
Other transportation (plane, bus, etc.)	2.07
Activities (including guide fees and equipment rental)	0.00
Entry, parking, or recreation use fees	1.16
Souvenirs/clothing	0.69
Other expenses	0.00

Source: USDA Forest Service 2001.

3.11.3 Environmental Justice Considerations

According to the Federal Interagency Working Group on Environmental Justice, “adverse environmental impacts are defined as having a negative impact or effect on human health or the environment that is significant, unacceptable or above generally accepted norms. Adverse environmental effects may include ecological, cultural, human health, economic, or social impacts when interrelated to impacts on the natural or physical environment.”

This section provides information on minority and low-income populations throughout the ROI. An environmental justice analysis would need to be conducted if there is an adverse environmental impact as a result of the Proposed Action.

3.11.3.1 Low-Income Population

In 2000, persons with low incomes were not nearly as prevalent throughout the ROI as were minority persons. Poverty levels for the ROI in 2000 were at 10.2 percent (families) and 13.7 percent (individuals). The most notable socioeconomic characteristic of the Indian communities is the large number of low-income persons. For comparison, the Isleta Pueblo within the ROI had 36.2 percent of its family population at poverty level and 38.5 percent of individuals at or below poverty level.

3.12 ENVIRONMENTAL MANAGEMENT

3.12.1 Definition of Activity

Environmental management activities at Kirtland AFB include the treatment and/or disposal of sanitary sewage, municipal solid waste, and industrial waste, including hazardous waste. In addition to the activities related to currently generated waste, the Installation Restoration Program (IRP) is intended to identify, confirm, quantify, and remediate problems caused by past management of hazardous wastes at USAF facilities.

Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes, that pose a substantial present, or potential, hazard to human health or the environment.

To protect people and habitats from inadvertent and potentially harmful releases of hazardous substances, DoD has dictated that all facilities develop and implement Hazardous Waste Management Plans and/or Spill Prevention, Control, and Countermeasure Plans. Also, DoD has developed the IRP, intended to facilitate thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g. the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] of 1980) are intended to protect human health and the ecosystems on which living organisms depend.

3.12.2 Existing Conditions

A preliminary assessment consisting of a file search and on-site personnel interviews was conducted in the fall of 2001 to identify historical ranges. Several historical ranges were identified within the Withdrawal Area (refer to Figure 3-2). The largest site identified, referred to as the Proximity Fuse Range, encompasses approximately 7,000 acres, much of which lies within the Withdrawal Area and extends to the eastern boundary. UXO has been observed in several portions of the Proximity Fuse Range. Kirtland AFB is awaiting funding to investigate the ranges for the presence of UXO and possible soil and groundwater contamination. Kirtland AFB would then seek funding for any needed remediation activities. The construction contractor would be required to do a survey for UXO prior to any ground disturbing activities in the areas where the proposed fence is to be constructed.

3.12.2.1 Solid Waste

Solid municipal waste generated by commercial activities and housing on base is sent to Waste Management of New Mexico sites off base. These sites include Rio Rancho and Torrance County facilities. Waste generated by construction and demolition activities are taken to the Kirtland AFB Landfill. The estimated rate of landfill waste generated on Kirtland AFB is shown in Table 3-10. All solid wastes are disposed of in accordance with USAF, Kirtland AFB, and applicable federal, state, and local regulations.

Table 3-10. Estimates of Solid Waste Generated by Kirtland AFB (in tons)

Year	Waste Generated by Commercial Activities ^a	Waste Generated by Housing on Base ^b	Waste Generated by Construction and Demolition ^c
1996	3,583	1,677	90,729
1997	4,362	2,318	40,848
1998	4,213	2,180	43,650
1999	3,783	1,863	36,699
2000	4,087	1,644	46,298
2001	3,766	1,403	53,075
2002	3,638	1,177	3,190

Source: Kitt 2003.

Notes: ^a sent to Waste Management facilities at Rio Rancho and Tarrant County.

^b sent to Rio Rancho Waste Management facility

^c waste sent to Kirtland AFB landfill

3.12.2.2 Wastewater

Kirtland AFB does not have separate industrial and municipal wastewater systems. The City of Albuquerque treats all of the sanitary sewage produced by Kirtland AFB. By the end of 2001, the base contributed 2.5 million gallons-per-day of wastewater to the city facility (USAF 2002). An industrial pretreatment program administered by the City of Albuquerque regulates industrial discharges from the base to sewer lines. A City of Albuquerque Wastewater Permit was reissued to Kirtland AFB in 2001 under the Sewer Usage and Wastewater Control Ordinance, bringing the base's total number of wastewater permits issued by the city to four. Kirtland AFB's permits are issued by the City of Albuquerque's publicly owned treatment works, which is currently regulated by a NPDES Permit. Four manholes located on the base are used for monitoring the discharged water quality (USAF 1990). Kirtland AFB does not have an NPDES industrial discharge permit.

3.12.2.3 Hazardous Wastes

A number of potentially hazardous wastes are used and stored at Kirtland AFB. An annually updated management plan is followed for the collection, storage, and disposal of hazardous waste in accordance with applicable federal, state, and local standards. Special guidance documents are followed for the disposal of asbestos, hydrazine, and radioactive materials, and for the prevention of spills (USAF 1990).

Hazardous wastes generated at Kirtland AFB are associated with operation of industrial shops and research and development laboratories, pesticide and herbicide application, radiological testing, fire control training, and fuel management. Wastes generated by these activities vary from year to year, depending on research activities and mission assignments. Hazardous wastes generated at the base include petroleum, oil and lubricants, acids and bases, non-halogenated and halogenated solvents, and organic compounds. Hazardous wastes that are recycled include surplus chemicals such as halogenated solvents and silver-bearing photographic materials.

Kirtland AFB operates as a large-quantity generator of hazardous waste and as a treatment, storage, and disposal facility. A Resource Conservation and Recovery Act Part B Permit issued by the State of New Mexico to Kirtland AFB, regulates the collection and storage of hazardous waste. Hazardous waste collection and storage sites are operated by the Defense Reutilization and Marketing Office, which arranges off-site disposal of the waste. Some wastes are collected by outside contractors at designated collection points. Photographic laboratory wastes are discharged to sanitary sewers following silver recovery and neutralization. Asbestos and asbestos-containing materials found in numerous buildings at the base are handled in accordance with the Kirtland AFB Asbestos Management Plan (USAF undated).

The IRP at Kirtland AFB forms the basis for assessment and response action under the provisions of CERCLA. As of March 2002, 77 IRP sites and 15 Areas of Concern had been identified at the base (Sillerud 2002). The only sites that are of concern to the Proposed Action examined in this document consist of individual UXO from the Proximity Fuse Range testing that occurred during World War II. Kirtland AFB is awaiting funding to investigate the ranges for the presence of UXO and possible soil and groundwater contamination and to determine any needed remediation activities. In the interim, the construction contractor would be required to do a survey for UXO prior to any ground disturbing activities in the area where the proposed fence would be constructed.

SECTION 4 ENVIRONMENTAL CONSEQUENCES

4.1 HUMAN HEALTH AND SAFETY

4.1.1 Significance Criteria

An impact to safety would be considered significant if implementation of the proposed action would substantially increase risks associated with mishap potential or safety relevant to the public or the environment. For example, if implementation of a proposed action would render existing base facilities incompatible with safety criteria (e.g., runway protection zones [RPZs] or explosive safety zones), safety impacts would be considered significant.

An impact to children from environmental health risks and safety risks would be considered significant if a proposed action would result in a disproportionate adverse impact to the health or safety of children.

4.1.2 Impacts

Changes in safety resulting from the Proposed Action were quantified by examining the project site in relation to the RPZs and explosive safety zones present on the base. Encroachment on these zones was assessed compared with the risk of the action involved. Changes in the safety and security of personnel working on base that would result from the Proposed Action and Alternatives were also assessed as a part of this analysis.

Analysis of potential impacts to children included: 1) identification and description of hazards that could potentially affect children; 2) examination of the Proposed Action and Alternatives and the potential effect these proposals could have on children; and 3) assessment of the significance of potential impacts.

4.1.2.1 Proposed Action

Implementation of the Proposed Action would have a minor beneficial impact on the current health and safety environment at Kirtland AFB due to the increase in security on the base and the exclusion of unauthorized personnel from areas of the base where testing and training occur. New signs are being posted and the Withdrawal Area will be patrolled to prevent unauthorized trespass.

Contractor personnel would be responsible for complying with all applicable occupational health and safety regulations and would be required to conduct construction activities in a manner that would not pose any risks to personnel at or near the construction site. To insure the safety of contractor personnel, an Explosive Ordnance Disposal (EOD) survey and clearance would be conducted to remove any UXO from the specific area of the proposed eastern fence line construction.

The Proposed Action does not encroach upon explosive safety zones or any RPZ so these areas would not be affected by the Proposed Action.

There would be no disproportionate increase in environmental health and safety risks to children from the Proposed Action, because children would not be present in the construction area. The increased security resulting from the fence would benefit children on base. The fence would prevent children from entering the base from the eastern border and encountering hazards inherent in the testing and training activities that occur in the area. Therefore, possible disproportionate negative impacts to children identified in EO 13045, *Protection of Children from Environmental Health and Safety Risks*, would not occur.

4.1.2.2 Alternative 1

Implementation of Alternative 1 would have the same minor beneficial impacts on human health and safety at Kirtland AFB as those stated for the Proposed Action. There would be an increase in security and safety on the base from fencing the boundary of the base that is hazardous. Signs would be put up to warn the public that the portion of the Withdrawal Area east of the fence would remain off limits to unauthorized personnel. As with the Proposed Action, there would be no disproportionate increase in environmental health or safety risks to children. There would be a beneficial impact to human health and safety because of the increased safety and security and the prevention of unauthorized entry to the base from the east side.

4.1.2.3 Alternative 2

Implementation of Alternative 2 would have the same minor beneficial impacts on human health and safety at Kirtland AFB as those stated for the Proposed Action due to the increase in security on the base. The security fencing would restrict unauthorized access to active test and training ranges. As with the Proposed Action, there would be no disproportionate increase in environmental health or safety risks to children and there would actually be a benefit because of the increased safety.

4.1.2.4 No-Action Alternative

Selection of the No-Action Alternative would result in no changes to current conditions of safety or risks to children on base.

4.2 AIR QUALITY

4.2.1 Significance Criteria

The 1990 amendments to the CAA require federal agencies to conform to the affected SIP with respect to achieving and maintaining attainment of NAAQS and addressing air quality impacts. An air quality impact resulting from a proposed action would be significant if it would: (1) increase concentrations of ambient criteria pollutants or O₃

precursors to levels exceeding NAAQS, (2) increase concentrations of pollutants already at nonattainment levels, (3) lead to establishment of a new nonattainment area by the governor of the state or the EPA, or (4) delay achievement of attainment in accordance with the SIP.

The CAA General Conformity Rule states that nonattainment and maintenance areas must conform to the applicable SIP. Kirtland AFB is covered by a CO maintenance plan, and the applicable de minimis level for CO is 100 tons per year (tpy). Furthermore, total CO emissions in the Albuquerque-Bernalillo County air basin are estimated to be 141,984 tpy. Therefore, CO emissions from mobile, area, and stationary, as well as construction phase emissions associated with a project at Kirtland AFB would not be considered regionally significant unless they were in excess of 14,198 tpy (10 percent of 141,984). The CAA conformity rule states that only net emissions must be considered.

4.2.2 Impacts

4.2.2.1 Proposed Action

The greater Albuquerque area, including Kirtland AFB, is in attainment for all NAAQS, although the area was reclassified from nonattainment to maintenance status for CO in 1996. As a result, CO emissions are still being tracked. As described above, the EPA defines an action as regionally significant only when that action contributes at least 10 percent of a nonattainment area's total emissions for any criteria pollutant.

The Proposed Action would have a minor, short-term impact on air quality from increased air emissions during ground disturbance and site preparation activities, emissions from vehicles and heavy equipment, and fugitive dust emissions from vehicles traveling on unpaved roadways used during construction of new fencing. Mitigation measures may include controlling dust by application of water to unpaved roads used to access the construction site. Table 4-1 lists the potential CO emissions for construction equipment under the Proposed Action. Emissions generated by contractor vehicles and construction equipment would be minor, temporary and short-term.

4.2.2.2 Alternative 1

Implementation of Alternative 1 would have similar minor, short-term impacts on air quality at Kirtland AFB as those described for the Proposed Action.

4.2.2.3 Alternative 2

Implementation of Alternative 2 would have similar minor, short-term impacts on air quality at Kirtland AFB as those stated for the Proposed Action and Alternative 1.

Table 4-1. CO Emissions Generated by the Proposed Action

Categories	CO Emission Factors ^a	Total CO Emissions
	Lb/hr	Lb/yr
Contractor-Owned Vehicles ^b	2.19	14,300
Off-Highway Trucks	3.68	2,392
Excavator	5.20	3,380
Compressor	1.07	696
Crane	1.63	1,060
Tractor/Loader/Backhoe	2.91	1,892
Dumpers/Tenders	3.68	2,392
Grader	1.12	728
Rubber-tired dozers	1.99	1,294
Chainsaw (gas powered)	11.00	7,150
Shredder (gas powered)	5.37	3,491
Cement/Mortar mixer	0.10	65
Rough terrain forklifts	1.86	1,209
Other Construction Equipment	1.97	1,281
Project Totals^c	43.77	41,330
Albuquerque/Bernalillo County Standard^d		200,000
EPA Standard^e		200,000

Notes: ^a Emission Factors for heavy-duty, diesel-powered construction equipment were obtained from the Nonroad Engine and Vehicle Emission Study-Report, Office of Air And Radiation, US Environmental Protection Agency, November 1991.

^b Calculation of the Contractor Owned Vehicles Category was calculated using the US Air Force Air conformity Applicability Model for 22 contractor-owned vehicles commuting to the base using a 30-mile round trip.

^c The total emissions were calculated by multiplying the emissions per hour for each type of equipment by 10 hours per day, 5 days per week, and 13 weeks per year. The entire project would last one year and each piece of equipment would be used for only a portion of that time.

^d New Mexico Air Quality Bureau Ambient Air Quality Standards, October 2002

^e 40 CFR 93.153(B)(1) - Carbon Monoxide Standard for Non-Attainment Areas.

4.2.2.4 No-Action Alternative

No changes to air quality would result from selection of the No-Action Alternative because no construction activities would occur.

4.3 NOISE

4.3.1 Significance Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e. if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e. if the number of sensitive receptors exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e. if they result in increased exposure of sensitive receptors to unacceptable noise levels). Noise impacts would be considered significant if health and safety standards for noise are violated, if sensitive receptors are disproportionately affected, or if damage results to personal property from noise or associated vibration.

4.3.2 Impacts

Land use guidelines established by the US Department of Housing and Urban Development and based on findings of the Federal Interagency Committee on Noise recommend acceptable levels of noise exposure for various types of land uses. Projected noise impacts from the Proposed Action and Alternatives were evaluated quantitatively against these acceptable noise levels.

4.3.2.1 Proposed Action

The Proposed Action would generate noise from construction equipment and construction vehicles, but the construction would occur in relatively remote areas and would be of short duration. Construction activities would cause minor, temporary increases in noise near the perimeter fencing sites. Noise generation would last only for the duration of construction activities, and would be reduced through the use of equipment exhaust mufflers and restriction of construction activity to normal working hours (i.e. between 7 a.m. and 6 p.m.). Because of the remote location of the east fence, sensitive receptors would not be affected on or off base. In addition, the noise environment on base is dominated by commercial and military aircraft overflight. A vehicle mounted auger, one or two support vehicles and other construction vehicles and equipment (see Table 4-1) would be used in construction of the east fence including those used for road clearing and construction material delivery. Chain saws would be used in construction of the firebreak. Noise associated with construction activities would be minor and short-term in duration compared to aircraft activity in the area.

4.3.2.2 Alternative 1

Alternative 1 would have similar minor, short-term impacts as those described for the Proposed Action. As stated in the Proposed Action, noise associated with construction activities would be minor and short-term, especially when compared to aircraft activity in the area.

4.3.2.3 Alternative 2

Implementation of Alternative 2 would have similar minor, short-term impacts on the noise environment at Kirtland AFB as those stated for the Proposed Action and Alternative 1. As in the Proposed Action and Alternative 1, noise associated with construction activities would be minor and short-term, especially when compared to aircraft activity in the area.

4.3.2.4 No-Action Alternative

No changes to the noise environment would result from selection of the No-Action Alternative because replacement of the perimeter fencing would not occur.

4.4 LAND USE

4.4.1 Significance Criteria

Potential impacts to land use are evaluated by determining if an action is compatible with existing land use and in compliance with adopted land use plans and policies. In general, land use impacts would be considered significant if they would: (1) be inconsistent or noncompliant with applicable land use plans and policies, (2) prevent continued use or occupation of an area, or (3) be incompatible with adjacent or nearby land use to the extent that public health or safety is threatened.

4.4.2 Impacts

Potential land use impacts were analyzed by: (1) identifying and describing land uses that could affect or be affected by the project, (2) examining the effect the action may have on the resource, (3) assessing the significance of potential impacts, and (4) providing measures to mitigate potentially significant impacts.

4.4.2.1 Proposed Action

Under the Proposed Action, approximately 1,500 acres of DoD withdrawn lands would remain outside of the fenced portion of the base. However, no changes in land use are anticipated at this time. The new fence would be compatible with the surrounding area, as well as existing and projected land use. Land use within the project area would conform to the Albuquerque/Bernalillo County Comprehensive Plan.

Recreation. There would be minor long-term negative impacts to recreation under the Proposed Action since the public would continue to be denied access to the entire Withdrawal Area. However, there are currently a total of over 220 miles of officially recognized unpaved trails in the Albuquerque area (based on digitization from aerial photography). In addition, Albuquerque and Bernalillo County Open Space propose an additional 26 miles of new trails in their current management plans. The trails on the Withdrawal Area represent a small percentage of the total miles of trail available to the public.

4.4.2.2 Alternative 1

Under Alternative 1, the impacts to current land use would be similar to those stated for the Proposed Action.

Recreation. There would be minor long-term negative impacts to recreation under Alternative 1 because the public would continue to be denied access to the entire Withdrawal Area.

4.4.2.3 Alternative 2

Implementation of Alternative 2 would not change land use as it is currently designated. The fence would be constructed along the existing installation boundary of the Withdrawal Area.

Recreation. Recreation would be negatively impacted because the fence would prohibit the public from entering the Withdrawal Area.

4.4.2.4 No-Action Alternative

The No-Action Alternative would result in no changes to land use at Kirtland AFB.

4.5 GEOLOGICAL RESOURCES

4.5.1 Significance Criteria

An impact to geological resources would be considered significant if implementation of the proposed action would violate a federal, state, or local law or regulation protecting geological resources (e.g. impacted unique landforms or rock formations), or result in uncontrolled erosion over a larger area than that allowed by regulations protecting soil resources.

4.5.2 Impacts

Protection of unique geologic features and minimization of soil erosion are considered when evaluating impacts of a proposed action on geological resources. Generally, such impacts are not considered significant if proper construction techniques and erosion control measures can be implemented to minimize short- and long-term disturbance to soils and overcome limitations imposed by earth resources.

4.5.2.1 Proposed Action

Under the Proposed Action, no significant impacts to regional geological resources would occur nor would the region's infrequent seismic activity create a significant threat to construction workers given the use of standard construction procedures.

The Proposed Action would occur in several of the soil associations present in the Withdrawal Area and Kirtland AFB. These soils are prone to slight to severe erosion. The small surface area to be disturbed from the installation of the fencing, wildlife passes, gate poles, and bollards makes the risk of erosion from these activities minimal and easy to control with standard construction practices.

Construction of the firebreak and the security road would remove all vegetation within 10 feet of both sides of the fence leaving only exposed soil. Maintaining the firebreak and the dirt security road would result in soil erosion. The degree to which erosion would

occur is largely dependent on the slope of the local terrain. Most of the terrain that would be traversed by the eastern fence has slopes on average of 8 percent or less. Soil erosion in these areas is not expected to be significant. Some isolated regions of steep terrain (i.e. greater than 10 percent) would be fenced. In order to prevent significant soil erosion in areas of steep terrain, Kirtland AFB would implement USFS approved soil erosion control measures.

Existing gravel, dirt and two-track jeep trails would be utilized during the construction of the perimeter fence whenever possible. Short-term use of existing roads during the construction of the fence is not expected to significantly increase the road erosion potential. In areas where no roads exist, an access path would be cleared. The size of the path would be determined by the means of transportation (i.e. four wheeled vehicle, all-terrain vehicles, two wheeled vehicles or foot). Since access paths would be limited to areas of relatively flat to moderately sloping terrain, effects on the soil from construction of the perimeter fence and access paths are expected to be localized and insignificant. Best management practices would adequately address any potential erosion issues.

Once the perimeter fence is installed, localized flooding may occur on the upstream side of any small arroyos that the fence crosses. This erosion would occur due to the accumulation of debris (e.g. dead plant matter and trash) up against the bollards, thus impeding water flow. Minor erosion could result around the blockage, but it would be localized and not significant.

4.5.2.2 Alternative 1

Impacts to geological resources from Alternative 1 would be similar to those discussed for the Proposed Action since similar terrain and soils would be affected. No significant impacts are expected to occur.

4.5.2.3 Alternative 2

Impacts to soil erosion under this alternative would be greater than under the Proposed Action since Otero Canyon would be fenced and Otero Canyon is relatively steep compared to the other terrain proposed for fencing. Risk of serious erosion becomes greater as the steepness of the terrain increases. Impacts to other geological resources are expected to be similar to those outlined for the Proposed Action.

4.5.2.3 No-Action Alternative

Selection of the No-Action Alternative would result in no change to current conditions of geological resources at Kirtland AFB.

4.6 WATER RESOURCES

4.6.1 Significance Criteria

Criteria for determining the significance of impacts to water resources are based on water availability, quality, and use; existence of floodplains and wetlands; and applicable regulations. An impact to water resources would be considered significant if it would: (1) reduce or interfere with water availability to existing users, (2) create or contribute to overdraft of groundwater basins, (3) exceed safe annual yields of water supply sources, (4) adversely affect water quality or otherwise endanger public health, (5) threaten or damage unique hydrologic characteristics, or (6) violate established laws or regulations that have been adopted to protect or manage water resources. Impacts to floodplains would be considered significant if a proposed action would alter flow within a floodplain.

4.6.2 Impacts

Potential impacts to water resources are typically analyzed by: (1) identifying and describing the effect the action could have on the resource, (2) examining the effect the action could have on the resource, (3) assessing the significance of potential impacts, and (4) providing measures to mitigate potentially significant impacts.

4.6.2.1 Proposed Action

Under the Proposed Action, the east perimeter security fence would be built along a ridgeline in the northern part of the Withdrawal Area and along the bottom of Bonito Canyon in the southern part of the Withdrawal Area. However, no arroyos or other water features would be affected by the Proposed Action because the fence would not be built in the dry creek bed that runs along parts of the canyon bottom. Since few, if any, watercourses would be crossed by the fence, localized flooding during storm events would not occur. A Section 404 permit would need to be obtained from the USACE, Albuquerque District office as required under the 1977 CWA. Activities requiring a Section 404 permit include the auguring of post holes, fill of wet concrete into the post holes, the installation of arroyo bollards, and other possible dredge and fill construction practices that would take place in an arroyo.

Water quality is not expected to be significantly impacted by the Proposed Action. Erosion caused by the construction of the firebreak and security road would be reduced by following the erosion control measures outlined in the Geological Resources section. This would reduce the amount of sediment resulting from the Proposed Action from entering the various drainages. Sediment laden flows from these drainages rarely reach the Rio Grande River, as approximately 95 percent is either absorbed into the ground or evaporated. Therefore, water quality in the Rio Grande River would not be significantly impacted by the Proposed Action.

Impacts to groundwater are not expected, as intrusive construction would be shallow (less than 2 meters) and changes to water consumption from the construction of the perimeter fence would not occur.

4.6.2.2 Alternative 1

Under Alternative 1, the east perimeter fence would transect the upper portion of Otero Canyon as well as other small arroyos. However, impacts from the construction of the east perimeter fence, security road and firebreak are not expected to be significant since erosion control measures would be implemented as discussed in Section 4.5.2.1. A Section 404 permit would need to be obtained from the USACE, Albuquerque District office as required under the 1977 CWA. Activities requiring a Section 404 permit include the auguring of post holes, fill of wet concrete into the post holes, the installation of arroyo bollards, and other possible dredge and fill construction practices that would take place in an arroyo.

Localized flooding may occur, whenever the fence crosses an arroyo (e.g. Otero Canyon). This is due to debris (e.g. dead plant matter and trash) accumulating along the upstream side of the fence, and impeding water flow. Since no buildings occur in these areas, impacts to man-made structures would not occur. Isolated flooding events may cause localized erosion, thus contributing to the total soil load during runoff events. However, impacts from erosion are expected to be localized and not significant.

Implementation of Alternative 1 would have similar impacts on groundwater and water quality at Kirtland AFB to those stated for the Proposed Action.

4.6.2.3 Alternative 2

Implementation of Alternative 2 would have similar impacts on water resources as those discussed for Alternative 1. However, localized flooding in Otero Canyon may be slightly greater under Alternative 2. The placement of the fence under Alternative 2 is further downstream, thus involving larger volumes of water during runoff events.

4.6.2.4 No-Action Alternative

Selection of the No-Action Alternative would result in no change to current conditions of water resources at Kirtland AFB because no construction or other disturbances would occur.

4.7 BIOLOGICAL RESOURCES

4.7.1 Significance Criteria

Determination of the significance of impacts to biological resources is based on: (1) the importance (legal, commercial, recreational, ecological, or scientific) of the resource; (2) the proportion of the resource that would be affected relative to its occurrence in the

region; (3) the sensitivity of the resource to proposed activities; and (4) the duration of ecological ramifications. Impacts to biological resources are considered significant if species or habitats of high concern are adversely affected over relatively large areas, or disturbances cause reductions in population size or distribution of a species of special concern.

Determination of the significance of wetland impacts is based on: (1) the function and value of the wetland, (2) the proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (3) the sensitivity of the wetland to proposed activities, and (4) the duration of ecological ramifications. Impacts to wetlands resources are considered significant if high value wetlands would be adversely affected.

4.7.2 Impacts

Biologists familiar with the resources on the base were contacted to identify those species or habitats in the vicinity of the project site. Potential impacts to biological resources, such as habitat loss and noise, resulting from implementation of the Proposed Action were evaluated.

4.7.2.1 Proposed Action

The majority of the proposed perimeter fence would be constructed within the piñon-juniper woodland and the ponderosa pine communities. Vehicles used for the construction of the fence would use existing roads to access the area. Vegetation located within 10 feet of either side of the proposed fence line would be removed so that an access road and a firebreak could be constructed. Approximately 2.2 acres of vegetation would be removed per mile of fencing. Merchantable wood cleared for the proposed fence would be made available to the public at a location identified by the USFS. To prevent forest fires, remaining slash would be chipped and broadcast as required by USFS guidelines. Although 12-15 acres of vegetation would be removed during the implementation of the Proposed Action, it would not result in a significant impact, since the type of vegetation being cleared is common to the area and not unique. Additionally, the amount being removed is minor when compared to the thousands of acres of similar habitat surrounding the Proposed Action. USFS personnel would continue to have access to the Withdrawal Area to manage trees affected by insects and disease. Therefore, management of the forest health is not expected to change.

Significant impacts to wildlife from the construction of the east perimeter fence are not expected to occur. Once the perimeter fence is completed, short-term impacts to transient mammals may occur. Many medium to large mammals, such as foxes, coyotes, and mule deer, may find the east perimeter fence an initial barrier that prevents them from foraging or moving through an area until they become familiar with the wildlife passes. Medium sized mammals, such as coyotes are likely to burrow under the new east perimeter fence to negotiate the barrier. This behavior has been observed at Kirtland AFB along the northern perimeter fence. Larger mammals such as mule deer would be prevented from crossing the fence except at the wildlife passes, since the height of the fence (8 feet)

would discourage them from jumping over. Most of the mule deer present at Kirtland AFB occur along the eastern portion of the base and along the western portion of the Withdrawal Area, occupying both juniper and piñon-juniper woodland habitats.

To assist in large mammal movements, two wildlife passes would be installed at locations to be determined by consultation with the NMDG&F and the USFS in order to reduce impacts to wildlife movement. These passes are designed to allow large mammals such as mule deer to easily jump over the fence while allowing bears, coyotes and mountain lions to move under them. Small mammals (i.e. mice and voles) may avoid crossing the 20-foot wide firebreak but since they tend to have smaller home ranges and large tracts of suitable habitat are available on each side of the fence, no significant impacts are expected. To avoid harassment of wildlife from unauthorized use of the firebreaks by off-road vehicles, tree stumps on the western (off base) side of the fence would be left 18 inches high following USFS guidelines. Several small mountain meadows are found in the area of the proposed fence line. None of these meadows would be transected by the Proposed Action although the fence would run along the eastern edge of a meadow in the bottom of Bonito Canyon near the south end of the fence line. Large animals outside the fence (on the eastern side) that would use the meadow for foraging could pass around the southern end of the fence to access the meadow. Kirtland AFB representatives have agreed to leave the 10-foot wide firebreak outside the fence undisturbed in meadow areas. The 10-foot wide fire break inside the fence would be adequate protection against fire in an area with no trees or large stands of brush. USFS representatives have agreed that this would be adequate fire protection and would decrease the impact of constructing the fence in sensitive meadow areas. In formal consultation with the USFS regarding the Mexican spotted owl and the other federally listed species, the USFS would be involved in design of survey procedures. As a result, impacts to wildlife from the installation of the fence are not expected to be significant.

No wetland habitats exist near the Proposed Action; the closest wetland is located approximately 1 mile west from the proposed fence at Sol Se Mete Spring. The spring is separated from the proposed fence line by Madera Canyon and the ridge to the west of the canyon. Therefore, impacts to wetlands are not expected to occur.

One federally listed threatened bird species, the bald eagle, could fly over the project site, as could the state threatened American peregrine falcon. Impacts to these species are unlikely since very little change to the local environment would occur. Mexican spotted owls, a federally threatened species, have the potential to occur in the area. Impacts to this species are unlikely, as habitat in the Withdrawal Area is marginal and previous surveys have not revealed their presence. However, to insure that the Mexican spotted owl does not inhabit the area, all habitat located within a half mile of the Proposed Action would be surveyed in accordance with USFWS procedures prior to any construction. In the unlikely event that a Mexican spotted owl is present, the USFWS would be contacted for further instruction. Neither the state threatened white-eared hummingbird nor the spotted bat are expected to be affected since both species are considered rare transients in New Mexico. The Baird's sparrow and New Mexican jumping mouse are not found in

the Withdrawal Area and habitat for the Great Plains ladies'-tresses orchid does not exist in the area of the proposed fence.

The state threatened gray vireo has been observed in the juniper woodland community in the Withdrawal Area, but the Proposed Action would not transect any of this habitat. Therefore, no impacts to gray vireos are expected from construction of the proposed fence.

Only six federal species of concern potentially occur in the vicinity of the Proposed Action. The ferruginous hawk and the northern goshawk may forage over the site but, like the American peregrine falcon and the bald eagle, the actions involved with the construction of the proposed eastern perimeter fence are not expected to negatively affect these species. The long-legged myotis bat is unlikely to be affected since no potential roosting sites are known to occur in the area. The western burrowing owl, while present on base, is mainly found in disturbed areas in the developed area of the base. The rocky terrain associated with the northeast corner of Kirtland AFB does not provide adequate habitat for this species. The loggerhead shrike and Texas horned lizard are unlikely to be found in the area proposed for construction of the eastern boundary fence because of lack of suitable habitat.

4.7.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on biological resources at Kirtland AFB as those described for the Proposed Action since similar terrain and species occur in the area. Mitigation measures addressed under the Proposed Action would also be implemented under Alternative 1.

4.7.2.3 Alternative 2

Implementation of Alternative 2 would have similar impacts on biological resources at Kirtland AFB as those described for the Proposed Action since similar terrain and species occur in the area. Mitigation measures addressed under the Proposed Action would also be implemented under Alternative 2.

4.7.2.4 No-Action Alternative

Under the No-Action Alternative, existing conditions, as described in Section 3, would remain unchanged. Therefore, implementation of the No-Action Alternative would not affect biological resources.

4.8 TRANSPORTATION AND CIRCULATION

4.8.1 Significance Criteria

Impacts to transportation and circulation are assessed by determining an action's potential to change current transportation patterns, systems, service, and safety. Impacts

may arise from physical changes to circulation (e.g. closing, rerouting, or creating roads), construction activity (e.g. introduction of construction-related traffic on local roads), or changes in daily or peak-hour traffic volumes created by workforce and population changes related to installation activities. An impact on roadway capacities would be considered significant if a road with no history of capacity exceedances were forced to operate at or beyond its design capacity. An impact would also be considered significant if the action would increase traffic on roads already experiencing traffic problems.

4.8.2 Impacts

Potential impacts to transportation and circulation are typically analyzed by: (1) identifying and describing transportation and circulation that could affect or be affected by the project, (2) examining the effect this action may have on the resource, (3) assessing the significance of potential impacts, and (4) providing measures to mitigate potentially significant impacts.

4.8.2.1 Proposed Action

Construction of the eastern perimeter fence would increase transportation to and from the fence line area for the duration of construction. The construction traffic that would occur on the roadways along the eastern boundary of the Withdrawal Area would not have a significant impact on transportation on or off base.

An access road would need to be cleared to provide construction access to the east fence line. Construction staging areas would be located in areas to be designated by Kirtland AFB personnel. Transportation of heavy machinery and construction materials to the fence line site would produce a minor increase in traffic. This is not anticipated to create a significant impact to transportation in the project area.

Perimeter fence construction would result in increased construction worker and material-hauling vehicle trips to and from the project sites, but the sites would be in remote areas of the base. Vehicle traffic from construction worker trips and construction deliveries would be on Interstate 40 and Highway 337, Raven Road and Mars Court within the Eastern Mountain residential areas to access USFS Road 530 to get onto Kirtland AFB through the East Gate. This increase in traffic would be short-term and would not have a significant impact on transportation in the vicinity of the project area.

4.8.2.2 Alternative 1

Implementation of Alternative 1 would have similar minor, short-term impacts on transportation and circulation in the vicinity of the project area as those stated for the Proposed Action.

4.8.2.3 Alternative 2

Implementation of Alternative 2 would have similar minor, short-term impacts on transportation and circulation in the vicinity of the project area as those stated for the Proposed Action and Alternative 1.

4.8.2.4 No-Action Alternative

The No-Action Alternative would result in no change to current conditions of transportation and circulation at Kirtland AFB because no construction activities would occur.

4.9 VISUAL RESOURCES

4.9.1 Significance Criteria

Criteria for determining the significance of impacts to visual resources are based on the level of visual sensitivity in an area. Visual sensitivity is defined as the degree of public interest in visual resources and concern over adverse changes in the quality of that resource. In general, an impact on a visual resource would be considered significant if implementation of an action would substantially alter a sensitive visual setting.

4.9.2 Impacts

After assessing the visual character and relative sensitivity of the affected setting, changes to the landscape associated with the Proposed Action and Alternatives were analyzed in terms of their potential to noticeably alter existing viewsheds.

4.9.2.1 Proposed Action

New fence construction would impact portions of the eastern border of the Withdrawal Area. Where there is existing fence in the area, it is three-strand barbed wire. Although chain link fencing is visually different from the existing barbed wire fence, the remote location of the proposed chain link fence and the dense trees along most of the fenceline would reduce impacts on visual resources. The new boundary would create more distance between the base boundary and residential areas to the east, so the fence would not be easily viewed by residents of this area. The construction of the firebreaks and access roads would impact visual resources, but would be similar to FRs and firebreaks common throughout the area. The new fence would not have a significant impact on visual resources in the eastern boundary areas.

4.9.2.2 Alternative 1

Implementation of Alternative 1 would have a greater impact on visual resources at Kirtland AFB than those stated for the Proposed Action, since the southern portion of the

fence may be visible to residents and residential areas adjacent to the Withdrawal Area, and would be visible to the public recreating in the immediate area of the boundary.

4.9.2.3 Alternative 2

Implementation of Alternative 2 would have greater impacts on visual resources at Kirtland AFB than those described for the Proposed Action and Alternative 1. Since the fence would be built on the existing eastern boundary, portions of the fence would be visible from residential areas adjacent to the Withdrawal Area. However, many portions of the fence would be blocked from view by terrain features. The fence also would be visible to the public recreating in the immediate area of the boundary.

4.9.2.4 No-Action Alternative

The No-Action Alternative would result in no change to current visual conditions at Kirtland AFB or the region.

4.10 CULTURAL RESOURCES

4.10.1 Significance Criteria

The National Historic Preservation Act of 1966, as amended, establishes the National Register of Historic Places (NRHP). Title 36 CFR Section 60.4 defines the criteria used to establish significance and eligibility to the National Register.

4.10.2 Impacts

Analysis of potential impacts to significant cultural resources considers both direct and indirect impacts. Impacts may occur by:

1. Physically altering, damaging, or destroying all or part of a resource;
2. Altering the characteristics of the surrounding environment that contribute to resource significance;
3. Introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or
4. Neglecting the resource to the extent that it is deteriorating or destroyed.

4.10.2.1 Proposed Action

The Proposed Action includes construction of approximately five miles of fencing near the existing eastern boundary of the Withdrawal Area boundary. According to the current archaeological survey seven archaeological sites are known to exist along or near the proposed fence line corridor. These sites have been recommended to the NRHP for inclusion on the National Register. The fence would go around these sites to avoid the cultural resources. Therefore, no cultural resources would be affected by this action.

4.10.2.2 Alternative 1

Alternative 1 includes the construction of approximately 5 miles of fencing along or near the existing eastern boundary of the Withdrawal Area, with the exception of fencing out 1.5 miles of Otero Canyon. According to the current archaeological survey, nine archaeological sites are known to exist along or near the proposed fence line corridor. These sites have been recommended to the NRHP for inclusion on the National Register. The fence would go around these sites to avoid the cultural resources. Therefore, no cultural resources would be affected by this action.

4.10.2.3 Alternative 2

Alternative 2 includes the construction of approximately 5 miles of fencing along or near the existing eastern boundary of the Withdrawal Area. According to the current archaeological survey, five archaeology sites are known to exist near the proposed fence line corridor along the eastern boundary of the Withdrawal Area. These sites have been recommended to the NRHP for inclusion on the National Register. The fence would go around these sites to avoid the cultural resources. Therefore, no cultural resources would be affected by this action.

4.10.2.4 No-Action Alternative

Implementation of the No-Action Alternative would result in no change to existing conditions of cultural resources and therefore would have no impact to those resources.

4.10.2.5 State Historic Preservation Office and Native American Consultation

The Draft EA has been reviewed by the State Historic Preservation Office (SHPO) and they have determined no adverse effects as long as the “proposed undertaking would ‘avoid’ these sites” (see SHPO letter, Appendix A). All of the actions proposed would avoid all cultural resources. Therefore, no cultural resources would be affected by this action.

The USFS included the installation of a fence in the Withdrawal Area in their consultation with Native American Tribes. No Tribes have pursued consultation regarding this action.

4.11 SOCIOECONOMICS

4.11.1 Significance Criteria

Impacts to populations and economics are assessed by determining an action’s direct effect on the local economy and related effects on other socioeconomic resources (e.g. housing). A socioeconomic impact would be considered significant if implementation of an action would substantially shift population trends, or adversely affect regional spending patterns.

An impact to environmental justice would be considered significant if an action would result in a disproportionate adverse impact to minority or low-income populations in the project vicinity.

4.11.2 Impacts

Potential impacts to socioeconomic resources were analyzed by: (1) identifying and describing socioeconomic resources that could affect or be affected by the project, (2) examining the effects this action may have on the resource, (3) assessing the significance of potential impacts, and (4) providing measures to mitigate potentially significant impacts.

4.11.2.1 Proposed Action

Socioeconomic impacts within the ROI that were addressed and analyzed include land values, recreation, tourism, job creation or loss, and environmental justice within the project area. Other socioeconomic factors including land use, transportation and circulation, and visual resources are addressed as separate resource sections.

Land Values: Regardless of which alternative is selected, the public will be excluded from the Withdrawal Area. Signs are being erected and the area will be patrolled. This area has been off-limits to the public for decades, but has been used as and considered to be a public resource. The loss of areas in the Withdrawal Area that were formerly used for recreation may result in minor decreases in land values in properties immediately adjacent to the eastern edge of the Withdrawal Area. The trails lost to public use represent a very small percentage of the trails in the Cibola National Forest Sandia District and the Albuquerque area. For this reason, any potential negative impacts to land values are expected to be minor.

Recreation/Tourism: Recreation and tourism are going to continue in the project area in the national forest. There are numerous recreational facilities surrounding the project area (see Section 3.11). Visitors would continue to contribute to the economy of the area. The Proposed Action would have a minor negative impact on recreation and tourism in the area because of the loss of lands in the Withdrawal Area previously used for recreation and therefore would have a minor negative impact to the economy in the area. Even in a community the size of Tijeras, this impact is not expected to be significant.

Employment: Purchase of construction materials to install new fencing, and salaries paid to construction workers would constitute a minor, temporary, beneficial impact on the local economy. Contracts for construction equipment would also have a temporary, beneficial impact. In an area the size of the ROI, these impacts would be negligible.

Environmental Justice: Although the ROI has relatively high percentages of minority and low-income populations, these communities would not be disproportionately affected. Therefore, possible disproportionate impacts to populations identified in EO

12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, would not occur.

Overall, the Proposed Action would have a minor short-term beneficial impact on socioeconomics from salaries paid to construction workers and purchase of construction materials and equipment. It would have a minor long-term negative impact on socioeconomics due to the loss of the Withdrawal Area for recreational purposes.

4.11.2.2 Alternative 1

There would also be similar minor, short-term beneficial and long-term negative impacts on socioeconomics at Kirtland AFB and the surrounding areas as those stated for the Proposed Action.

4.11.2.3 Alternative 2

If Alternative 2 is implemented, there would be similar minor, short-term beneficial impacts and minor long-term negative impacts on socioeconomics at Kirtland AFB and the surrounding areas as those described for the Proposed Action and Alternative 1.

4.11.2.4 No-Action Alternative

Selection of the No-Action Alternative would not result in any changes to socioeconomics or to minority or low-income populations in the Albuquerque area.

4.12 ENVIRONMENTAL MANAGEMENT

4.12.1 Significance Criteria

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes. The primary purpose of these laws is to protect public health and the environment. The significance of potential impacts associated with hazardous wastes is based on toxicity, ignitability, reactivity, and corrosivity. Generally, impacts associated with hazardous materials and wastes would be considered significant if implementation of a proposed action would involve the storage, use, transportation, or disposal of hazardous substances that would substantially increase human health risks or environmental exposure. For example, if implementation of a proposed action would exacerbate conditions at an existing area of contamination associated with the Installation Restoration Program (IRP), impacts would be considered significant.

A reduction in the quantity of hazardous substances used and/or generated would be a beneficial impact; a substantial increase in the quantity and/or toxicity of hazardous substances used or generated could be potentially significant. Significant impacts would result if a substantial increase in human health risks and/or environmental exposure were

generated and such impacts could not be mitigated to acceptable local, state, and federal levels.

4.12.2 Impacts

Analysis of potential impacts to hazardous materials and wastes typically includes: (1) a comparative analysis of existing and proposed hazardous materials and waste management practices to evaluate potential changes resulting from implementation of a proposed action or alternatives, (2) assessment of the significance of potential impacts, and (3) provision of mitigation measures in the event that potentially significant impacts are identified.

Prior to commencement of the Proposed Action, the proposed fence line would be surveyed for UXO and any ordnance found would be removed or detonated in place. In addition, the construction contractor would meet with Kirtland AFB EOD personnel for training in the identification of UXO and the procedure for notifying EOD personnel for its proper disposal.

4.12.2.1 Proposed Action

As part of the construction process, a short-term increase in non-hazardous waste generation would occur. Non-hazardous construction wastes (e.g., concrete and metal fencing) would be disposed of at the Kirtland AFB landfill, which has adequate excess capacity to accommodate construction-related waste. Additional non-hazardous waste (e.g., plastics and paper) generated by increased worker activity under the proposed project would be collected on site and transported to the City of Albuquerque's Cerro Colorado Landfill. Recyclable wastes would be separated for pickup in accordance with the Kirtland AFB Qualified Recycling Program. No additional hazardous wastes would be generated by the construction of the proposed fencing.

The only IRP sites in the vicinity of the proposed fence line are potential occurrences of UXO from the Proximity Fuse Range. This range was used during World War II to test proximity fuses on 5 inch Navy rockets. It extends from the gun site, which was located near the intersection of Lovelace and Target Roads to the eastern boundary of the Withdrawal Area. Ordnance found on the range includes five inch shells, 75 mm ballistic shells, 105 and 155 mm dummy and high explosive rounds, 5 inch rocket-assisted projectiles and fuses, many of which may still be live. Under the proposed action, the entire Withdrawal Area would remain off-limits to the public. Signs are being posted and the area will be patrolled.

4.12.2.2 Alternative 1

The impacts of this alternative would be similar to those described for the Proposed Action, although the fence line would change as described in Section 2.2.1.

4.12.2.3 Alternative 2

Under Alternative 2, the east fence would be built along the Withdrawal Area boundary, keeping the public from entering all areas of the base. The risk to the public of encountering UXO would be reduced by excluding unauthorized users from all areas of the base that could contain UXO. All other impacts of this alternative would be similar to those described for the Proposed Action

4.12.2.4 No-Action Alternative

Selection of the No-Action Alternative would result in no change to current conditions of environmental management at Kirtland AFB.

**SECTION 5
PERSONS AND AGENCIES CONTACTED**

Cynthia L. Gooch
Chief, Environmental Quality
377 MSG/CEVQ
Kirtland AFB

Mr. Ralph Francis
Public Affairs
377 ABW/PA
Kirtland AFB

Susan Gregory
NEPA Program Manager
377 MSG/CEVQ
Kirtland AFB

Carl Lanz
Restoration Branch Chief
Restoration Program Branch
377 ABW/EM
Kirtland AFB

Teri Monaghan
377 MSG/CEVQ
Kirtland AFB

Joan E. Lotosky
USACE, Albuquerque District
CESPA-EC-EH
Albuquerque, NM

Valerie Butler
377 MSG/CEVQ
Cultural Resources Management
Kirtland AFB

Michael D. Smith
Albuquerque Environmental Health
Dept./Air Quality Division
City of Albuquerque
Albuquerque, NM

Mike Gustin
Habitat Specialist
State of New Mexico Department of
Game and Fish

Jim Shively
New Mexico Environment Department
Air Quality Bureau
Santa Fe, NM

Clifford J. Dils
District Ranger
United States Forest Service
Cibola National Forest

Joe Price
USFS Military Withdrawal Coordinator
United States Forest Service
Cibola National Forest

**SECTION 6
LIST OF PREPARERS**

This report was prepared for and under the direction of the 377th Air Base Wing Command of Kirtland Air Force Base by the LOPEZGARCIA GROUP. The members of the professional staff of the LOPEZGARCIA GROUP who participated in the development and technical review of this document are listed below.

<u>Preparers</u>	<u>Education</u>	<u>Environmental Experience</u>
Walter L. Moore Manager Colorado/ New Mexico Operations	<i>B.S., Zoology</i>	25 years
Kristine J. Andrews Environmental Scientist/ Noise Analyst	<i>B.A., Geography/ Environmental Studies and Energy Science</i>	6 years
Robert D. Frei Environmental Scientist/ Biologist	<i>B.S., Biology</i>	6 years
Rebecca L. Klundt Document Editor and Preparer	<i>Document Manager</i>	18 years
Deirdre Stites Technical Illustrator	<i>A.S., Geology</i>	23 years

SECTION 7 REFERENCES AND BIBLIOGRAPHY

- Advisory Council on Historic Preservation 2002. The National Historic Preservation Act of 1966, As Amended. Retrieved December 19, 2003, from <http://www.achp.gov/nhpa.html>
- Air Force Publications. Air Force e-publishing. Retrieved December 19, 2003, from <http://www.e-publishing.af.mil/pubs/majcom.asp?org=AF>.
- Albuquerque Environmental Health Department (AEHD) 2000. *Albuquerque 2000 Progress Report, Air Quality*. Albuquerque/Bernalillo County, New Mexico.
- AEHD 2003. *Personal communication with Michael Smith of the Air Quality Division 3/24/03*. Bernalillo County Emissions Inventory.
- Bureau of Land Management 2003. Table of Public Land Orders, 1942-2003 Retrieved December 19, 2003, from <http://www.blm.gov/nhp/what/plo/>
- Bureau of National Affairs, Inc., 1996. Noise Control Act of 1972. Retrieved December 19, 2003, from <http://hydra.gsa.gov/pbs/pt/call-in/nca.htm>
- Canter, L.W. 1996. *Environmental Impact Assessment* 2d ed. McGraw-Hill Inc.
- City of Albuquerque 2003a. Albuquerque International Sunport. Noise Abatement Program. <http://www.cabq.gov/airport/noise.htm>.
- City of Albuquerque 2003b. Double Eagle II Airport. <http://www.cabq.gov/airport/double.htm>.
- City of Albuquerque 2003c. Transit Department. <http://www.cabq.gov/transit/index.htm>.
- City of Albuquerque 2003d. Albuquerque 2000 Progress Report. Public Infrastructure, Albuquerque, NM. <http://www.cabq.gov/progress/PI11BIKE.html>.
- City of Albuquerque Water Conservation Office (CAWCO) 1997. *Albuquerque's Aquifer and How We Meet the Challenge*. CAWCO. (<http://www.cabq.gov/resources//insert.html>)
- Energy Research and Development Administration 1977. *Environmental Impact Statement (EIA/MA 77-1)*. Sandia National Laboratories, Albuquerque, New Mexico.

- Environmental Protection Agency (EPA) 1972. *Report to the President and Congress on Noise*. 92nd Congress, w2d Session, Doc. 92-63, Washington, D.C. February 1972.
- EPA 1978. Part 58 Appendix D: 40 Code of Federal Regulations. *Chapter One. Protective Noise Levels – Condensed Version of EPA Levels Document*.
- EPA 2002. National Ambient Air Quality Standards. Office of Air and Radiation. URL: <http://www.epa.gov/airs/criteria.html>. November 15, 2002.
- EPA 2003. Air and Radiation. The Clean Air Act. Retrieved December 19, 2003, from <http://www.epa.gov/oar/caa/contents.html>
- EPA 2003. Air Quality and Planning Standards. The Plain English Guide to the Clean Air Act. Retrieved December 19, 2003, from http://www.epa.gov/oar/oaqps/peg_caa/pegcaain.html
- EPA 2003. Laws and Regulations. Clean Water Act. Retrieved December 19, 2003, from <http://www.epa.gov/region5/water/cwa.htm>
- EPA 2003. Superfund. The Comprehensive Environmental Response, Compensation, and Liability Act CERCLA. Retrieved December 19, 2003, from <http://www.epa.gov/superfund/action/law/cercla.htm>
- Federal Interagency Committee on Noise 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues*.
- Federal Register 1980. “40 Code of Federal Regulations Part 230: Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.” Vol. 45, No. 249, pp. 85352-85353. US Government Printing Office. Washington, D.C.
- Federal Register 1982. “Title 33: Navigation and Navigable Waters; Chapter II, Regulatory Programs of the Corps of Engineers.” Vol. 47, No. 138, p. 31810. US Government Printing Office. Washington, D.C.
- Fenneman N. M. 1931. *Physiography of the United States*.
- Gallison, J., Wilcox, D., and Herrera, R. 2003. *Archaeology of the Manzanita Mountains: 2002 Survey of the Eastern Portion of Kirtland AFB and Department of Energy Lands Withdrawn from the US Forest Service, Bernalillo County New Mexico*. Submitted to Kirtland AFB.
- Gustin, M. 2003. Habitat Specialist. Personal communication with R. Frei, LGG, regarding mule deer migration and habits at Kirtland AFB. 9 January.

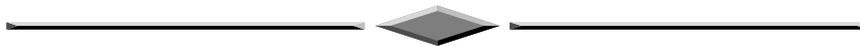
- Heritage Preservation Services 2003. Archaeological and Historic Preservation Act of 1974. Retrieved December 19, 2003, from <http://www2.cr.nps.gov/laws/archpreserv.htm>
- Heritage Preservation Services 2003b. Archaeological Resources Protection Act of 1979. Retrieved December 19, 2003, from <http://www2.cr.nps.gov/laws/archprotect.htm>.
- Kelley, V. C. 1977. "Geology of the Albuquerque Basin, New Mexico." *Memoir 33*. New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.
- Kelley, V. C., and S. A. Northrup 1975. "Geology of Sandia Mountains and Vicinity, New Mexico." *Memoir 29*. New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico.
- Kirtland Air Force Base (AFB) 1993. *Kirtland Disaster Preparedness Operation Plan* (OPLAN 355-1). Kirtland Air Force Base, Albuquerque, New Mexico.
- Kirtland AFB 1999. Clean Air Act Transportation Intermodel Study. Phase I Traffic Analysis Report. April 30, 1999. <http://www.kirtland.af.mil/EM/Comp/Transp/Study-desc.html>
- Kirtland AFB 2002. Work Plan for Surveying Mountain Plover and Gray Vireo Populations at Kirtland AFB. Albuquerque, NM.
- Kitt, S. 2003. 377 MSG/CEVC Hazardous Materials / Solid Waste Programs Manager. E-mail communication June 6, 2003. Kirtland AFB Annual Solid Waste Report to New Mexico Environmental Department.
- Lozinsky, R. P., J. W., Hawley, and D. W., Love 1991. "Geologic Overview and Pliocene-Quaternary History of the Albuquerque Basin, Central New Mexico," Bulletin 137: *Field Guide to Geologic Excursions in New Mexico and Adjacent Areas of Texas and Colorado*. New Mexico Bureau of Mines and Mineral Resources, Socorro, NM.
- LSA Associates, Inc. 2002. *NOISE*. Livermore General Plan Update Working Paper. Berkeley, California. July 23, 2002
- Military Traffic Management Command Transportation Engineering Agency 1993. *Traffic Engineering Study, Kirtland Air Force Base, New Mexico* (MTMCTEA Report SE 92-6a-40).
- National Academy of Sciences undated. *Highway Capacity Manual, Highway Research Board Special Report 209, Washington D.C.*

- National Archives and Records Administration Electronic Code of Federal Regulations 2003. Retrieved December 19, 2003, from <http://www.access.gpo.gov/ecfr>.
- National Center for Recreation & Conservation 2003. National Trails System. National Trails System Act of 1968. Retrieved December 19, 2003, from <http://www.nps.gov/ncrc/programs/nts/legislation.html>
- National Wild and Scenic Rivers System 2003. Wild and Scenic Rivers Act of 1968. Retrieved December 19, 2003, from <http://www.nps.gov/rivers/wsract.html>.
- New Mexico Department of Game and Fish (NMDG&F) 1999. New Mexico Wildlife of Concern - Bernalillo County. Conservation Services Division.
- NMDG&F 2001. Biota Information system of New Mexico (BISON-M) database. (<http://www.emnrd.state.nm.us/forestry/ENDPLN-LHTM>).
- NMDG&F 2002. *Threatened and Endangered Species of New Mexico Biennial Review and Recommendations* September 2000. New Mexico Department of Game and Fish Homepage, accessed 14 February 2002 <<http://www.gmfsh.nm.us>>
- New Mexico Department of Labor 2003. New Mexico Annual Social and Economic Indicators 2003 ed., Albuquerque, NM.
- New Mexico Energy, Minerals, and Natural Resources Department (NMEMNRD), Forestry Division, 1999. *Inventory of Rare and Endangered Plans of New Mexico. NMEMNRD*. (<http://www.emnrd.state.nm.us/forestry/ENDPLN-1.HTM>).
- New Mexico Natural Heritage Program (NMNHP) 1995. *Threatened and Endangered Species Survey of Kirtland AFB, New Mexico*. Albuquerque, New Mexico.
- NMNHP 2002. *NMNHP Species Information for Bernalillo County*. Updated 4 February 2002. http://nmnhp.unm.edu/query_bcd/query.html. Accessed 14 February 2002.
- Sillerud, J. 2002. 377 SPTG/CEVR electronic communication. April, 2002.
- US Air Force (USAF) undated. *Kirtland AFB Asbestos Management Plan*. Kirtland AFB, Albuquerque, New Mexico.
- USAF 1990. *Environmental Assessment of the Realignment of Units at Kirtland AFB, New Mexico*. Air Force Headquarters, Military Airlift Command, Scott Air Force Base, IL.
- USAF 1991. *Installation Restoration Program, Stage 2A, Work Plan, Draft 2, February 1991*. U.S. Geological Survey — Water Resources Division. Albuquerque, New Mexico.

- USAF 1995. *Integrated Natural Resources Management Plan*. Kirtland AFB, New Mexico.
- USAF 1998a. *Hazardous Waste Management Plan*, Kirtland AFB, New Mexico.
- USAF 1998b. *Biological Evaluation for Proposed Force Structure and Foreign Military Sales Actions at Cannon Air Force Base, New Mexico*. United States Air Force, Air Combat Command. July, 1998.
- USAF 2000. *Kirtland AFB Privatization of Military Housing Final EA*. 377th Air Base Wing, Air Force Materiel Command. March, 2000.
- USAF 2001. *Final 2000 Kirtland Air Force Base Emissions Inventory*. Kirtland AFB Environmental Management Division, 377 ABW, Albuquerque, New Mexico.
- USAF 2002. *Kirtland AFB Economic Impact Analysis for Fiscal Year 2001*. 377th Air Base Wing. <http://www.kirtland.af.mil/doc/TRIFOLD-EIA.ppt>.
- US Army Corps of Engineers (USACE) 1979a. *Albuquerque Greater Urban Area Water Supply Study*. Hydrologic Engineering Center, Albuquerque, New Mexico.
- USACE 1979b. *Special Flood Hazard Information Tijeras Arroyo and Arroyo del Coyote, Kirtland, New Mexico*. Albuquerque, New Mexico.
- USACE 1995. *Wetland Inventory Survey, Kirtland AFB*. Kirtland AFB, Albuquerque, New Mexico.
- US Census Bureau 2003a. *Census 2000, American Factfinder*. New Mexico American Indian Area. <http://factfinder.census.gov/bf/>.
- US Census Bureau 2003b. *American Community Survey Profile 2002, Bernalillo County, NM*.
<http://www.census.gov/acs>.
- US Census Bureau 2003c. *State and County Quick facts, Bernalillo County, NM*.
<http://quickfacts.census.gov/qfd/states/35/35001.html>.
- US Census Bureau 2003d. *State and County Quickfacts*. New Mexico.
<http://quickfacts.census.gov/qfd/states>.
- US Census Bureau 2003e. *Census 2000, American Factfinder*. Geographic Comparison Table, New Mexico, Race and Hispanic or Latino 2000.
<http://factfinder.census.gov?>

- USFS 1996. *Environmental Analysis: Ecosystem Management Plan for National Forest Lands in and Adjacent to the Military Withdrawal*. Sandia Ranger District, Cibola National Forest, Bernalillo County NM.
- USDA Forest Service 2001. *National Visitor Use Monitoring Results*. Cibola National Forest. Region 3. August 2001. Retrieved September 26, 2003, from http://www.fs.fed.us/recreation/prgorams/nvum/reports/year/R3_Cibola_final.htm
- US Department of Interior 2003. The Office of Surface Mining. Surface Mining Control and Reclamation Act of 1977. Retrieved December 19, 2003, from <http://www.osmre.gov/smcra.htm>
- US Department of Transportation 1998. Federal Highway Administration Summary of Environmental Legislation Affecting Transportation. Retrieved December 19, 2003, from http://www.fhwa.dot.gov/environment/env_sum.htm
- US Fish and Wildlife Service 2003. Division of Congressional and Legislative Affairs Resource Laws. Wilderness Act of 1964. Retrieved December 19, 2003, from <http://laws.fws.gov/lawsdigest/wildrns.html>.
- US Geological Survey (USGS) 1990a. Albuquerque East, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 1990b. Sedillo, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 1990c. Tijeras, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 1991a. Escabosa, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 1991b. Hubbell Spring, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 1991c. Mount Washington, NM Topographic Map. Scale 1:24,000. US Department of the Interior, Reston, Virginia.
- USGS 2000. *Urban Dynamics of the Middle Rio Grande Basin*.
- US National Archives and Records Administration Federal Register 2003. Executive Orders Disposition Tables. Retrieved December 19, 2003, from http://www.archives.gov/federal_register/executive_orders/disposition_tables.htm

Washington Headquarters Services 2003. Communications and Directives Directorate Directives and Records Division, Department of Defense DoD Issuances and OSD Administrative Instructions. Retrieved December 19, 2003, from <http://www.dtic.mil/whs/directives/>.



APPENDIX A

**INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR
ENVIRONMENTAL PLANNING CORRESPONDENCE**



APPENDIX A
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR
ENVIRONMENTAL PLANNING CORRESPONDENCE

New Mexico Department of Game &
Fish
Albuquerque Office

U.S. Forest Service
Sandia Ranger District
Cibola National Forest

U.S. Safety Office
Department of Defense

U.S. Security Forces
Department of Defense

U.S. Department of Energy

U.S. Directed Energy

U.S. Fish and Wildlife
Albuquerque Office

Senator Bingaman

Senator Domenici

Congresswoman Heather Wilson

State Historic Preservation Office