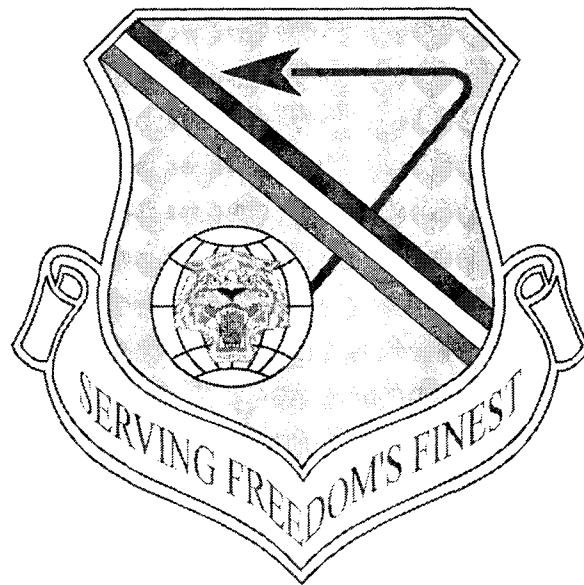


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F I N A L

**ENVIRONMENTAL ASSESSMENT
FOR
KIRTLAND AIR FORCE BASE
ARSENIC COMPLIANCE
SYSTEM**



September 2003

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

Report Documentation Page

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FINDING OF NO SIGNIFICANT IMPACT

CONSTRUCTION OF AN ARSENIC COMPLIANCE SYSTEM AT KIRTLAND AIR FORCE BASE

The 377th Air Base Wing (377th ABW) of the Air Force Materiel Command prepared the attached Environmental Assessment (EA) to assess the potential environmental consequences of a proposed action at Kirtland Air Force Base (AFB). The action proposed consists of the construction of an arsenic compliance system for drinking water at Kirtland AFB. The Department of the Air Force has independently evaluated this EA and adopts it herein.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action. The 377th ABW at Kirtland AFB proposes to construct an arsenic compliance system on base. The purpose of the Proposed Action is to meet new requirements issued by the US Environmental Protection Agency (EPA) as amendments to the Safe Drinking Water Act. These amendments reduce the maximum contaminant level (MCL) for arsenic in drinking water from 50 micrograms per liter ($\mu\text{g}/\text{l}$) to 10 $\mu\text{g}/\text{l}$. Naturally occurring concentrations of arsenic in Kirtland AFB Drinking Water Supply Wells #15 and #16 are above 10 $\mu\text{g}/\text{l}$.

The Proposed Action is to install an arsenic compliance system that would allow Drinking Water Supply Wells #15 and #16 to meet the more stringent arsenic MCL of 10 $\mu\text{g}/\text{l}$. The Proposed Action includes the construction of a 2-million gallon (MG) blending tank near the existing main pump station. The existing main pump station, where flows from Wells #1, #2, and #4 are presently being delivered, would be re-equipped with larger pumps making use of the existing suction and discharge piping.

The Proposed Action would also include the installation of a dedicated pipeline to deliver water from Wells #14, #15, and #16 to a point near the new 2-MG blending tank. Wells #14, #15, and #16 would be disconnected from their current points of connection to the existing main 24-inch transmission pipeline. The new transmission line from these wells would vary in diameter, using 14-, 18-, and 20-inch-diameter pipe. A new 10-inch transmission pipeline from Well #3 would join the flows from a new 16-inch transmission line from the City of Albuquerque connection near the Gibson Gate. An 18-

inch pipeline would deliver these combined flows to a point near the new 2-MG blending tank. The transmission line delivering flows from Wells #14, #15, and #16 would join the transmission line delivering flows from Well #3 and the city connection at a location approximately 900' west of the existing main pump station site. From this point, a 24-inch transmission line would deliver the combined flows to the new 2-MG blending tank. Disinfection would be provided with sodium hypochlorite injection at the new 2-MG blending tank.

Groundwater from Wells #1, #2, and #4 is presently routed to the existing main pump station storage reservoirs, and the pipelines would require the following modifications to allow delivery to the new 2-MG blending tank: a 14-inch transmission line would be included from Wells #2 and #4 to the new 2-MG blending tank; and a section of 18-inch transmission line would be installed to deliver the combined flows from Wells #1, #2, and #4 to the new 2-MG blending tank. The total proposed area of disturbance would be about 4.26 linear miles.

Alternative 1. Alternative 1, like the Proposed Action, would include the installation of a new 2-MG blending tank. Unlike the Proposed Action however, this blending tank would be located southwest of the intersection of San Pablo Street and Gibson Boulevard. The 2-MG blending tank, located at grade, would receive flows from wells #14, #15, and #16; from wells #1, #2, #3, and #4; and from the city connection at the Gibson Gate.

A new 14-, 18-, and 20-inch-diameter pipeline would be constructed to collect and convey groundwater from wells #14, #15, and #16 to the new 2-MG blending tank. A new 14-inch transmission pipeline would be constructed from the discharge of the existing main pump station to the 2-MG blending tank. This new transmission pipeline would be used to repump the groundwater from Wells #1, #2, and #4 to be blended with the other production wells. New transmission lines would be constructed for delivering the combined flows from the City of Albuquerque connection and Well #3 for delivery to the blending tank. This portion of the system would include a 10-inch transmission line from Well #3 to a point at which it would join a 14-inch transmission line from the city connection. An 18-inch transmission line would convey the combined flows from the 10-inch and 14-inch transmission lines to the blending tank. A backflow prevention device would be installed on the 14-inch city connection transmission line to prevent backflow of water from the Kirtland AFB system into the city system.

A booster pump station would be constructed at the blending tank, and the combined flows would be pumped into the existing 24-inch main transmission trunk line in the vicinity of Well #16. Disinfection would be provided with sodium hypochlorite injection at the new 2-MG blending tank.

The existing booster pump discharge at Well #3 is assumed to be adequate for delivering flows to the new 2-MG blending reservoir. Wells #14, #15, and #16 would be modified to pump with only the head pressure required to deliver flows to the new 2-MG blending reservoir. The existing main pump station would convey water directly to the new 2-MG blending tank from Wells #1, #2, and #4.

A new pump station would be required to deliver the blended water from the 2-MG blending tank to the distribution system through a new 24-inch transmission line. This new transmission line would connect to the existing 24-inch transmission trunk line at a location adjacent to Randolph Avenue, approximately 1,000 feet south of Well #16. The total area of disturbance would be about 4.46 linear miles.

No-Action Alternative

The No-Action Alternative would be to not install the arsenic compliance system described in the Proposed Action, which would allow existing conditions to prevail, resulting in non-compliance with EPA guidelines, the Federal Safe Drinking Water Act and Department of Defense and US Air Force directives.

SUMMARY OF ANTICIPATED ENVIRONMENTAL EFFECTS

Proposed Action

Implementation of the Proposed Action could result in minor short-term negative impacts to air quality, noise, soils, and transportation and circulation from construction activities. Beneficial impacts are expected to occur in the areas of human health and safety, socioeconomics, and water resources. No impacts are anticipated to occur to current land uses, floodplains, vegetation, wildlife, wetlands, minority and low-income populations, cultural resources, visual resources, or hazardous wastes from the Proposed Action.

Human Health and Safety. Beneficial impacts to human health and safety and the health and safety of children on base are expected to result from the Proposed Action. The Proposed Action would reduce the health risks associated with the ingestion of arsenic from the base groundwater wells. No negative impacts are expected to the health and safety of children on base because the proposed project does not occur in areas typically associated with children.

Air Quality. Implementation of the Proposed Action could result in relatively short-term negative impacts to air quality from construction activities. Construction activities that would use large 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, particulate impacts from soil disturbance would be minimized by using best management practices to reduce erosion by wind and construction traffic. Long-term impacts to air quality associated with the Proposed Action would not occur since there would not be an increase in vehicular traffic.

Noise. Implementation of the Proposed Action could result in short-term, minor impacts to noise from construction activities. However, those activities would be minor when compared to the noise generated on base by commercial and military aircraft overflight.

Land Use. No negative impacts are expected to current land uses from the Proposed Action because land uses would remain unchanged if the action were implemented.

Geological Resources. Implementation of the Proposed Action could result in short-term negative impacts to soils from construction activities. Where applicable, impacts would be minimized by implementation of a Storm Water Management Plan utilizing best management practices to reduce erosion by wind and water.

Water Resources. Beneficial impacts are expected from implementation of the arsenic compliance system as water quality will improve with the reduced arsenic levels, thus bringing the water quality into compliance with new EPA standards. No negative impacts are expected to water resources from the Proposed Action because impacts from soil disturbing activities that could contribute to erosion into local waterways would be minimized by implementation of a Storm Water Management Plan utilizing best management practices to reduce erosion by wind and water. No floodplains would be affected by the Proposed Action.

Biological Resources. Implementation of the Proposed Action would not result in any impacts to sensitive species, vegetation, wildlife, wetlands, or listed species because the action is occurring in areas that have a low incidence of wildlife or sensitive biological resources.

Transportation and Circulation. Implementation of the Proposed Action could result in short-term negative impacts to transportation on base from construction activities because of the trips required to deliver construction materials and personnel to the sites and to transport debris to the landfill. No long-term effects to traffic are expected because the Proposed Action would not result in increased traffic on base.

Visual Resources. No negative impacts are expected to occur to visual resources from the Proposed Action because the arsenic compliance system would either be below ground or be consistent with the current visual environment on base.

Cultural Resources. No significant cultural resources, historic or prehistoric, exist within the area to be disturbed by the proposed project, so no impacts to cultural resources are expected to occur.

Socioeconomics. Beneficial impacts to socioeconomics from the Proposed Action 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 because the action would not change conditions for these populations on or off base.

Environmental Management. Small amounts of hazardous waste would be generated by use of construction equipment requiring hydraulic fluids. All equipment would be maintained in accordance with applicable regulations and hazardous materials and wastes would be handled and disposed of safely. Nonhazardous construction debris would be taken to a suitable landfill or recycled. There is sufficient capacity in numerous local landfills to handle the anticipated construction debris.

Alternative 1

Implementation of Alternative 1 would result in similar short-term negative impacts to air quality, noise, soils, and transportation and circulation from construction-related activities as those in the Proposed Action. Beneficial impacts would also be the same as those expected from the Proposed Action. As in the Proposed Action, no impacts are anticipated to occur to current land uses, floodplains, vegetation, wildlife, wetlands, minority and low-income populations, cultural resources, visual resources, or hazardous wastes from the Proposed Action.

No-Action Alternative

Selection of the No-Action Alternative would result in the continued use of the existing water system supply system, which would allow existing conditions to prevail. No change to current conditions of human health and safety, air quality, noise, land use, geological resources, water resources, biological resources, transportation and circulation, visual resources, cultural resources, socioeconomics or environmental management would occur from the No-Action Alternative.

CONCLUSION

After careful review of the EA of this Proposed Action, I have concluded that the Proposed Action would not have a significant impact on the quality of the human environment and would not generate significant controversy. Therefore, issuance of a Finding of No Significant Impact is warranted, and an Environmental Impact Statement is not required. This analysis fulfills the requirements of the National Environmental Policy Act and the implementing regulations promulgated by the Council on Environmental Quality.

Accepted By: Henry L. Andrews, Jr. Date: MAR 9 2004
Henry L. Andrews, Jr. Colonel
USAF Commander, **377 ABW**

ACRONYMS AND ABBREVIATIONS

ABW	Air Base Wing	NEPA	National Environmental Policy Act
ADT	Average Daily Traffic	NHPA	National Historic Preservation Act
AFB	Air Force Base	NMAAQS	New Mexico Ambient Air Quality Standards
AFI	Air Force Instruction	NMDG&F	New Mexico Department of Game and Fish
AFMC	Air Force Materiel Command	NMEMNRD	New Mexico Energy, Minerals, and Natural Resources Department
ATV	All-Terrain Vehicle	NMNHP	New Mexico Natural Heritage Program
CAA	Clean Air Act	NO ₂	Nitrogen Dioxide
CAWCO	City of Albuquerque Water Conservation Office	NO _x	Oxides of Nitrogen
CEQ	Council on Environmental Quality	NPDES	National Pollutant Discharge Elimination System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	O ₃	Ozone
CFR	Code of Federal Regulations	Pb	Lead
CO	Carbon Monoxide	PM ₁₀	Particulate Matter Equal to or Less Than Ten Microns in Diameter
CWA	Clean Water Act	PSD	Prevention of Significant Deterioration
dB	Decibels	RPZ	Runway Protection Zone
dBA	A-weighted decibel scale	SHPO	State Historic Preservation Officer
DNL	Day-Night Average A-Weighted Sound Level	SIP	State Implementation Plan
DoD	Department of Defense	SO ₂	Sulfur Dioxide
DOE	Department of Energy	tpy	Tons-per-Year
EA	Environmental Assessment	USACE	US Army Corps of Engineers
EIAP	Environmental Impact Assessment Process	USAF	US Air Force
EO	Executive Order	USGS	US Geological Survey
EOD	Explosive Ordnance Disposal	USFS	US Forest Service
EPA	US Environmental Protection Agency	USFWS	US Fish and Wildlife Service
°F	Degrees Fahrenheit	UXO	Unexploded Ordnance
FY	Fiscal Year	V/C	Volume-to-Capacity
IRP	Installation Restoration Program		
LOS	Level of Service		
MSA	Metropolitan Statistical Area		
NAAQS	National Ambient Air Quality Standards		

EXECUTIVE SUMMARY

The potential environmental impacts associated with the construction of an arsenic compliance system for drinking water at Kirtland Air Force Base (AFB) were evaluated in this Environmental Assessment (EA) prepared for the 377th Air Base Wing (377th ABW) of Air Force Materiel Command (AFMC).

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to install an arsenic compliance system that would allow blending from water supply wells that are below arsenic compliance levels with water supply wells #15 and #16, which currently exhibit arsenic levels above the Environmental Protection Agency (EPA) compliance levels that drinking water systems are required to meet by January 2006.

The EPA has issued new regulations under the Safe Drinking Water Act, which reduce the maximum contaminant level for arsenic in drinking water from 50 micrograms per liter ($\mu\text{g/l}$) to 10 $\mu\text{g/l}$. Naturally occurring concentrations of arsenic in Kirtland AFB drinking water supply wells #15 and #16 are currently above 10 $\mu\text{g/l}$.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVE

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The 377th ABW at Kirtland AFB proposes to construct an arsenic compliance system on base. The purpose of the Proposed Action is to meet new requirements issued by the US Environmental Protection Agency (EPA) as amendments to the Safe Drinking Water Act. These amendments reduce the maximum contaminant level (MCL) for arsenic in drinking water from 50 micrograms per liter ($\mu\text{g/l}$) to 10 $\mu\text{g/l}$. Naturally occurring concentrations of arsenic in Kirtland AFB Drinking Water Supply Wells #15 and #16 are above 10 $\mu\text{g/l}$.

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Land Use. No negative impacts are expected to current land uses from the Proposed Action because land uses would remain unchanged if the action were implemented.

Geological Resources. Implementation of the Proposed Action could result in short-term negative impacts to soils from construction activities. Where applicable, impacts

would be minimized by implementation of a Storm Water Management Plan utilizing best management practices to reduce erosion by wind and water.

Water Resources. Beneficial impacts are expected from implementation of the arsenic compliance system as water quality will improve with the reduced arsenic levels, thus bringing the water quality into compliance with new EPA standards. No negative impacts are expected to water resources from the Proposed Action because impacts from soil disturbing activities that could contribute to erosion into local waterways would be minimized by implementation of a Storm Water Management Plan utilizing best management practices to reduce erosion by wind and water. No floodplains would be affected by the Proposed Action.

Biological Resources. Implementation of the Proposed Action would not result in any impacts to sensitive species, vegetation, wildlife, wetlands, or listed species because the action is occurring in areas that have a low incidence of wildlife or sensitive biological resources.

Transportation and Circulation. Implementation of the Proposed Action could result in short-term negative impacts to transportation on base from construction activities because of the trips required to deliver construction materials and personnel to the sites and to transport debris to the landfill. No long-term effects to traffic are expected because the Proposed Action would not result in increased traffic on base.

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Cultural Resources. No significant cultural resources, historic or prehistoric, exist within the area to be disturbed by the proposed project, so no impacts to cultural resources are expected to occur.

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populations from the Proposed Action because the action would not change conditions for these populations on or off base.

Environmental Management. Small amounts of hazardous waste would be generated by use of construction equipment requiring hydraulic fluids. All equipment would be maintained in accordance with applicable regulations and hazardous materials and wastes would be handled and disposed of safely. Nonhazardous construction debris would be taken to a suitable landfill or recycled. There is sufficient capacity in numerous local landfills to handle the anticipated construction debris.

Alternative 1

Implementation of Alternative 1 would result in similar short-term negative impacts to air quality, noise, soils, and transportation and circulation from construction-related activities as those in the Proposed Action. Beneficial impacts would also be the same as those expected from the Proposed Action. As in the Proposed Action, no impacts are anticipated to occur to current land uses, floodplains, vegetation, wildlife, wetlands, minority and low-income populations, cultural resources, visual resources, or hazardous wastes from the Proposed Action.

No-Action Alternative

Selection of the No-Action Alternative would result in the continued use of the existing water system supply system, which would allow existing conditions to prevail. No change to current conditions of human health and safety, air quality, noise, land use, geological resources, water resources, biological resources, transportation and circulation, visual resources, cultural resources, socioeconomics or environmental management would occur from the No-Action Alternative.

**FINAL
ENVIRONMENTAL ASSESSMENT
FOR AN ARSENIC COMPLIANCE SYSTEM
AT
KIRTLAND AIR FORCE BASE**

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SECTION 1

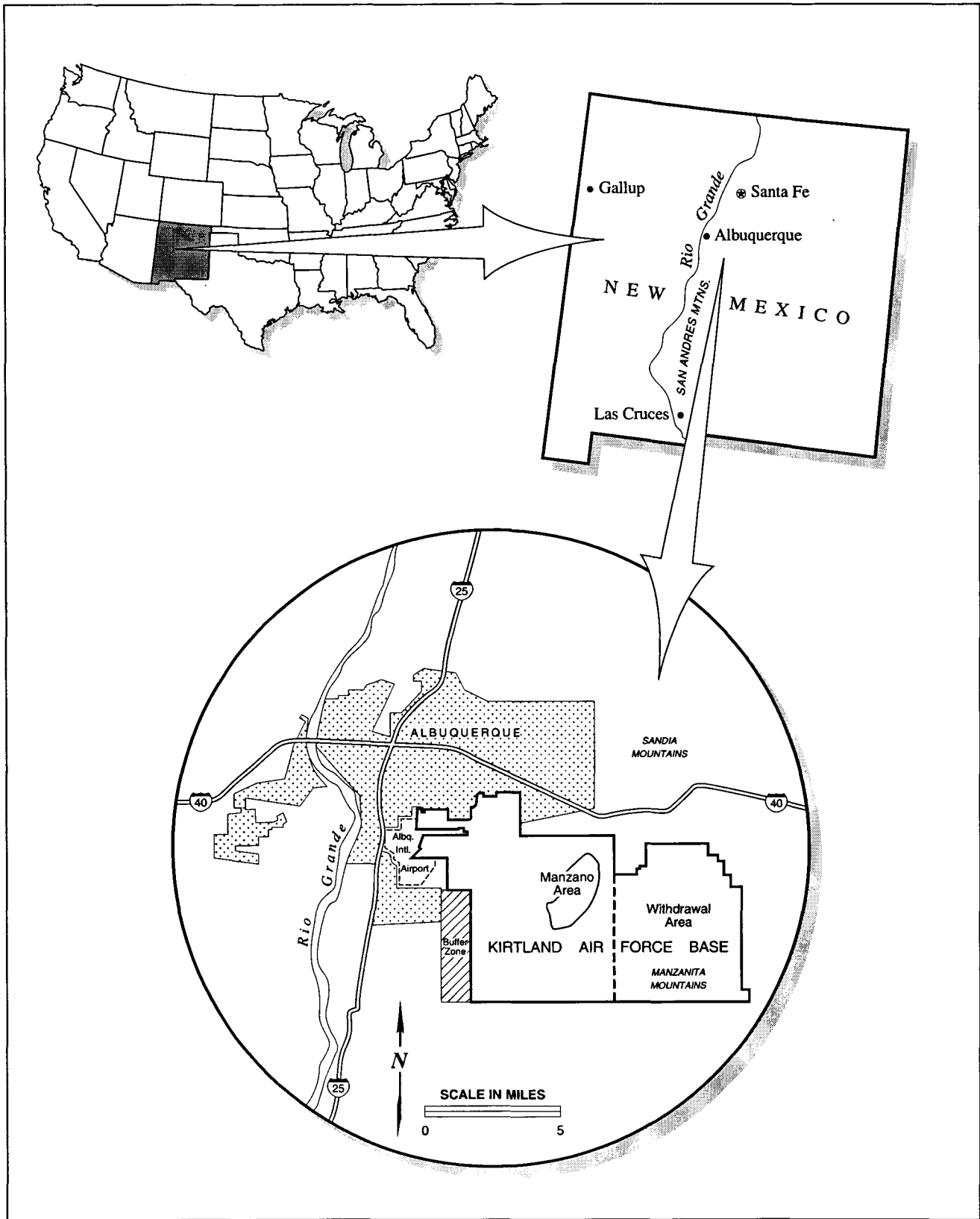
PURPOSE AND NEED FOR THE PROPOSED ACTION

This Environmental Assessment (EA) evaluates the potential impacts on environmental and human resources associated with the construction of an arsenic compliance system for drinking water at Kirtland Air Force Base (AFB). This EA also describes how the No-Action Alternative would affect the resources and factors analyzed in this document. This document is part of the Environmental Impact Analysis Process (EIAP) set forth in Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process*, which implements the National Environmental Policy Act (NEPA) of 1969; and the regulations implementing NEPA promulgated by the President's Council on Environmental Quality (CEQ) as Title 40 of the Code of Federal Regulations (CFR) 1500-1508.

1.1 BACKGROUND

Kirtland AFB is located just southeast of Albuquerque, New Mexico at the foot of the Sandia and Manzanita Mountains (Figure 1-1). These mountains rise to over 10,000 feet and define the eastern boundary of an area locally known as the East Mountains. Kirtland AFB encompasses over 52,000 acres with elevations ranging from 5,200 feet to almost 8,000 feet above mean sea level (US Geological Survey 1990 a, b, c; 1991 a, b, c). Land use for areas adjacent to the base includes Cibola National Forest to the northeast and east, the Manzano Mountains and the Isleta Indian Reservation to the south, and residential and business areas of the City of Albuquerque to the west and north.

Kirtland AFB was originally established in the late 1930s as a training base for the Army Air Corps. In 1941, construction of permanent barracks, warehouses, and a chapel was completed, and a B-18 bomber, Kirtland AFB's first military aircraft, arrived. Troops soon followed, and Kirtland AFB grew rapidly with US involvement in World War II. The base served as a training site for aircrews for many of the country's bomber aircraft, including the B-17, B-18, B-24, and the B-29. After the war, Kirtland AFB shifted from a training facility to a test and evaluation facility for weapons delivery, working closely with both Los Alamos National Laboratory and Sandia Army Base (Sandia National Laboratories). Kirtland AFB and its adjoining neighbor to the east, Sandia Army Base, were combined in 1971. The two divisions of the base are still referred to as Kirtland West and Kirtland East, respectively.



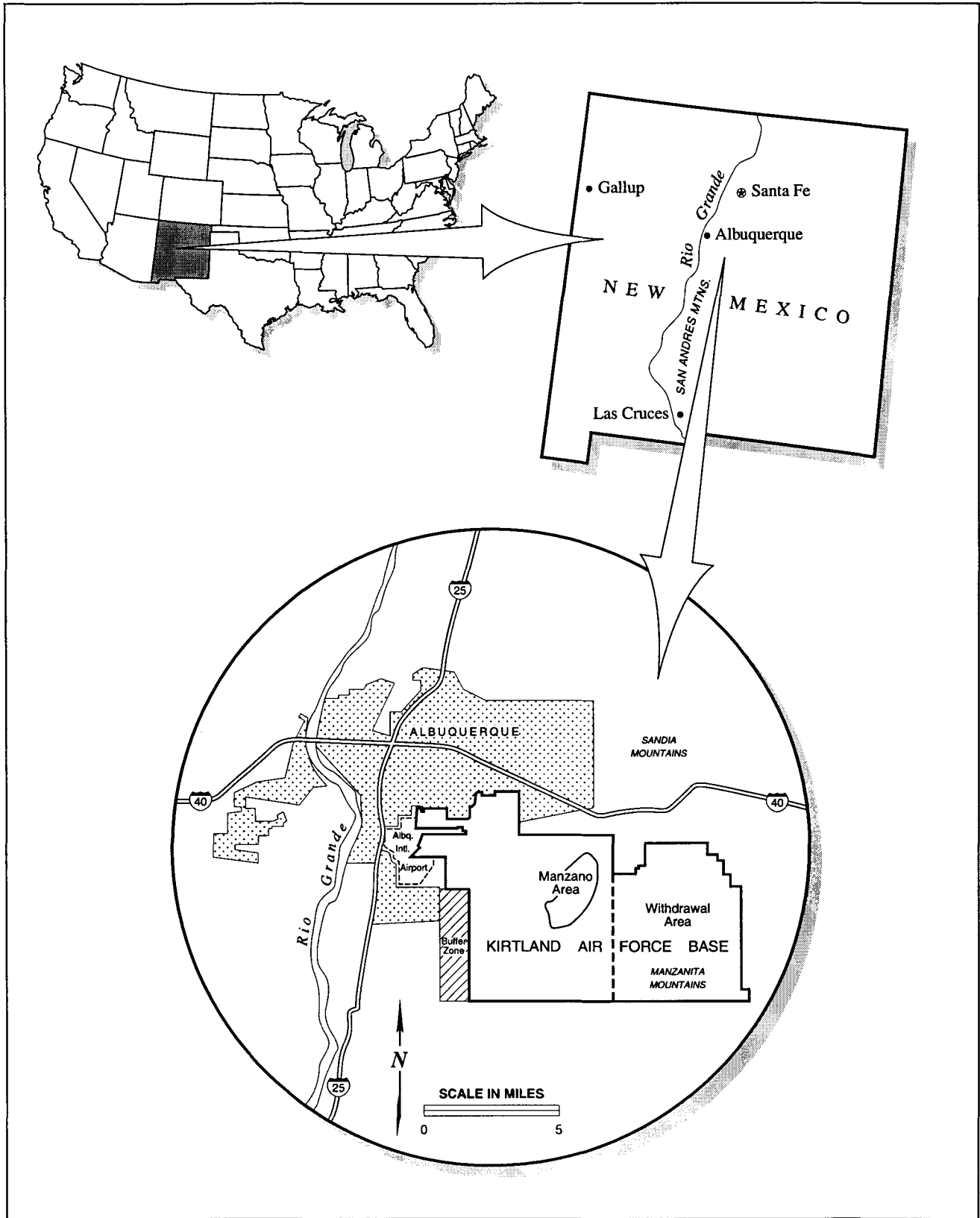
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FIGURE

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Location of Kirtland Air Force Base

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FIGURE

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Location of Kirtland Air Force Base

1-1

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

Kirtland AFB serves as a center for research and development for Air Force Research Laboratory and Sandia National Laboratories. The base functions as a test and evaluation center for the Space and Missile Systems Center and Air Force Operational Test and Evaluation Center. It is also the headquarters for operational organizations such as the Air Force Inspection Agency, the Air Force Safety Center, and the National Nuclear Security Administration Service Center of the US Department of Energy (DOE). Kirtland AFB functions as a training base for the 58th Special Operations Wing of Air Education and Training Command's 19th Air Force and the 150th Fighter Wing of the New Mexico Air National Guard is stationed on the base.

The US Air Force (USAF) owns most of the land at Kirtland AFB, but several other ownership's 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 leased to the USAF by the US Forest Service (USFS). These lands have been withdrawn from public use and are known as the Withdrawal Area (refer to Figure 1-1). The DOE owns certain areas of the base and leases other areas from the USAF and the USFS (USAF 1995).

1.2 COMMUNITY CHARACTERISTICS

The area surrounding Kirtland AFB ranges from urban to unpopulated wilderness. Albuquerque, the largest city in the state of New Mexico, is adjacent to the base on the northwest. The Albuquerque Metropolitan Statistical Area is now over 723,000 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 31,000 people (USAF 2002). Kirtland AFB's estimated annual economic contribution to the Albuquerque metropolitan area exceeds \$5.6 billion (USAF 2002).

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The 377th ABW at Kirtland AFB proposes to install an arsenic compliance system that would ensure that water from Wells #15 and #16 meets US Environmental Protection Agency (EPA) drinking water regulations before being added to the base water supply system.

1.3.1 Purpose of the Proposed Action

The purpose of the Proposed Action is to install an arsenic compliance system that would allow blending of water from wells that are within arsenic standards for drinking water with water from Wells #15 and #16, which currently do not meet EPA drinking water standards.

1.3.2 Need for the Proposed Action

In January 2001, the EPA issued new changes to the Safe Drinking Water Act (1974, amended in 1986 and 1996), which reduced the maximum contaminant level for arsenic in drinking water from 50 micrograms per liter ($\mu\text{g/l}$) to 10 $\mu\text{g/l}$. Naturally occurring concentrations of arsenic in Kirtland AFB drinking water supply wells #15 and #16 are currently above 10 $\mu\text{g/l}$.

1.4 DECISION TO BE MADE AND DECISION-MAKER

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

1.5 ALTERNATIVE IDENTIFICATION

The CEQ guidelines implementing NEPA, and AFI 32-7061, which implements the USAF NEPA process, require the consideration of reasonable alternatives to a proposed action. Only those alternatives that are determined to be reasonable relative to their ability to fulfill the need for the action warrant a detailed environmental analysis. The identification of such alternatives involves the definition of a set of criteria based on the need for the action that an alternative must meet. Once defined, these criteria must be applied consistently to each of the candidate alternatives. For the Proposed Action,

alternatives were required to address the need to comply with EPA drinking water regulations.

1.6 REGULATORY COMPLIANCE

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

1.6.1 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 policies 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.

AFI 32-7061 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.

1.6.2 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 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.

1.6.3 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, and wildlife, and recreation in and on the water.

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources – rivers, lakes, reservoirs, springs, and ground water wells. (The Safe Drinking Water Act does not regulate private wells which serve fewer than 25 individuals.) The Safe Drinking Water Act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. EPA, states, and water systems then work together to make sure that these standards are met.

1.6.4 Biological Resources

The Endangered Species Act 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.

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

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.

1.6.5 Cultural Resources

AFI 32-7065, *Cultural Resources Management*, implements Air Force Policy Directive 32-70, *Environmental Quality*, and Department of Defense Directive 4710.1, *Archaeological 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. NEPA 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 may 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.

1.6.6 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. Federal agencies are directed to consider the proximity of their actions to or within floodplains. Where information is unavailable, agencies are encouraged to delineate the areal extent of floodplains at their site.

1.6.7 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 minority and low-income populations within their region of influence. 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 may 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' region of influence. 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 may 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.

1.6.8 Public Involvement

Section 1.6.8 of EO 12372, 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, this document will be released for public review prior to completion of the decision-making process.

1.7 ORGANIZATION OF THIS DOCUMENT

Section 1 of this EA describes the Purpose and Need for the Proposed Action. Section 2 provides the Description of the Proposed Action and alternatives. Section 3 describes the Affected Environment on a resource and factor basis. Section 4, Environmental Consequences, assesses the potential impacts of the Proposed Action and alternatives on the resources and factors described in Section 3. Section 5 lists Persons and Agencies contacted in the preparation of this EA. Section 6 is the List of Preparers and Section 7 contains the References and Bibliography.

SECTION 2

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The 377th Air Base Wing (377th ABW) of Air Force Materiel Command (AFMC) proposes to construct an arsenic compliance system for drinking water at Kirtland Air Force Base (AFB) in Albuquerque, New Mexico. The following section describes the Proposed Action, alternatives to this action, and other actions at Kirtland AFB that may have cumulative effects on environmental and/or human resources at the base when considered with the Proposed Action addressed in this Environmental Assessment.

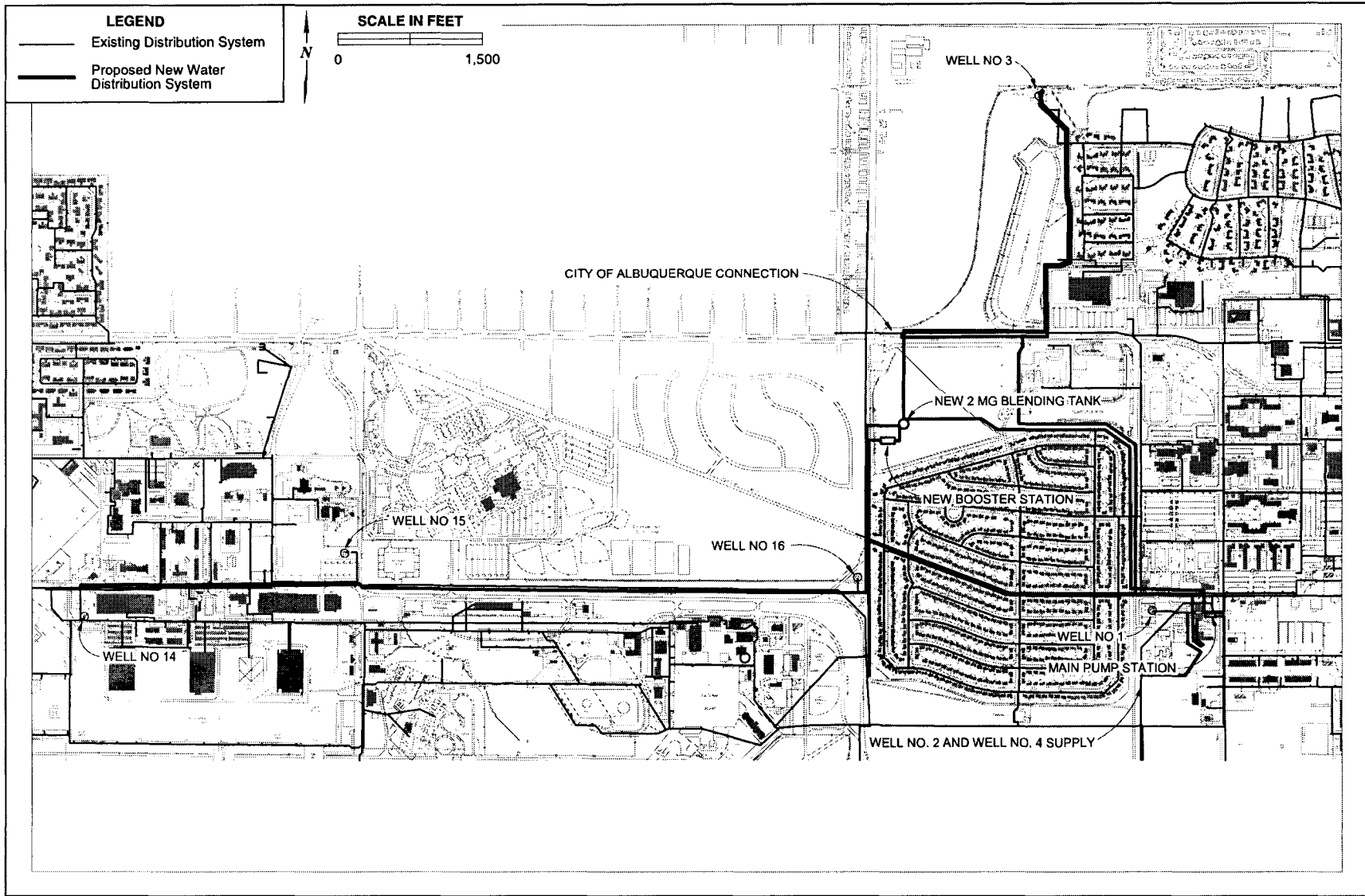
2.1 DESCRIPTION OF THE PROPOSED ACTION

The US Environmental Protection Agency (EPA) has issued new changes to the Safe Drinking Water Act, which reduces the maximum contaminant level (MCL) for arsenic in drinking water from 50 micrograms per liter ($\mu\text{g/l}$) to 10 $\mu\text{g/l}$. Naturally occurring concentrations of arsenic in Kirtland AFB drinking water supply wells #15 and #16 are currently above 10 $\mu\text{g/l}$.

Arsenic is a chemical that occurs naturally in the earth's crust. When rocks, minerals, and soil erode, they release arsenic into water supplies. When people either drink this water or eat animals and plants that drink it, they are exposed to arsenic. For most people in the US, eating and drinking are the most common ways that people are exposed to arsenic, although it can also come from industrial sources. Studies have linked long-term exposure of arsenic in drinking water to a variety of cancers in humans.

To protect human health, an EPA standard limits the amount of arsenic in drinking water. In January 2001, EPA revised the standard from 50 parts per billion, ordering that it fall to 10 parts per billion by 2006. After adopting 10 parts per billion as the new standard for arsenic in drinking water, EPA decided to review the decision to ensure that the final standard was based on sound science and accurate estimates of costs and benefits. In October 2001, EPA decided to move forward with implementing the 10 parts per billion standard for arsenic in drinking water.

The Proposed Action is to install an arsenic compliance system that would ensure that water from Wells #15 and #16 meets the more stringent arsenic MCL of 10 $\mu\text{g/L}$ (Figure 2-1) before being added to the base water supply system. The Proposed Action includes



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FIGURE

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Proposed Arsenic Compliance System at Kirtland Air Force Base

2-1

the construction of a 2-million gallon (MG) blending tank near the existing main pump station. The existing main pump station, where flows from wells #1, #2, and #4 are presently being delivered, would be re-equipped with larger pumps making use of the existing suction and discharge piping.

The Proposed Action would also include the installation of a dedicated pipeline to deliver flows from wells #14, #15, and #16 to the vicinity of the new 2-MG blending tank. Wells #14, #15, and #16 would be disconnected from their points of connection to the existing main 24-inch transmission pipeline. The new transmission line from these wells would vary in diameter, using 14-, 18- and 20-inch-diameter pipe. A new 10-inch transmission pipeline from well #3 would join the flows from a new 16-inch transmission line from the City of Albuquerque connection near the Gibson Gate. An 18-inch pipeline would deliver these combined flows to the vicinity of the new 2-MG blending tank. The transmission line delivering flows from wells #14, #15, and #16 would join the transmission line delivering flows from well #3 and the city connection at a location approximately 900' west of the existing main pump station site. From this point, a 24-inch transmission line would deliver the combined flows to the new 2-MG blending tank. Disinfection would be provided with sodium hypochlorite injection at the new 2-MG blending tank.

Groundwater from wells #1, #2, and #4 is presently routed to the existing main pump station storage reservoirs, and the pipelines would require the following modifications to allow delivery to the new 2-MG blending tank: a 14-inch transmission line would be included from wells #2 and #4 to the new 2-MG blending tank; and a section of 18-inch transmission line would be installed to deliver the combined flows from wells #1, #2, and #4 to the new 2-MG blending tank. The total proposed area of disturbance would be about 4.26 linear miles, but would be limited to the width of the trench for the new pipe lines.

2.2 INFORMATION COMMON TO ALL PROJECTS

2.2.1 Construction

The construction activities that would be required for the proposed project have many characteristics in common. Bulldozers, backhoes, and front-end loaders would be on site throughout periods of excavation and/or site preparation. Dump trucks would be on site

intermittently, as would concrete-mixers and asphalt vehicles and associated machinery. Sufficient amounts of fuels, hydraulic fluids, and oils and lubricants required to support contractor vehicles and machinery would be stored on site during the project. No other hazardous fuels or solvents would be stored on site.

All materiel needs (e.g., pipe lines, concrete, asphalt) would be supplied by off-site vendors. The project site would require small amounts of electricity for construction activities. No natural gas or steam would be required.

Any non-hazardous construction debris would be transported to the Kirtland AFB landfill for disposal. Kirtland AFB, in an effort to meet Department of Air Force waste diversion standards, requests monthly reports by item description and weight of any materials removed for recycling or reuse by the contractor. An on-site dumpster would be provided by the contractor for other non-hazardous municipal solid waste (e.g., plastics, paper, and food waste) that could be generated by worker activity at the project site. When the dumpster is full, the debris would be transported to a permitted Subtitle D landfill. Any cardboard waste would be separated and delivered to the base landfill or the Sandia National Laboratories, Solid Waste Transfer Station where a roll-off unit is available for cardboard recycling.

In accordance with Department of Defense (DoD) Instruction 4715.4, *Pollution Prevention*, paragraph F.2.c.(3)(f), salvageable metal debris resulting from construction activities would be removed and transported to the Defense Reutilization and Marketing Office, located at Kirtland AFB, for recycling or to any certified recycling facility. If a dust nuisance or hazard occurs during the activities, water, supplied by Kirtland AFB, would be used for dust control.

Adequate parking would be available for worker vehicles on locations at and adjacent to the project site. Potable water would be available to the workers in coolers furnished by either the general contractor or individual crews. Restroom facilities would consist of portable chemical toilets. No additional potable water or disposition of wastewater would be required.

2.2.2 Permits and Consultations

The project proposed by the 377th ABW would not disturb more than 5 acres overall. However, individual construction sites (or common sites of development) that would result in disturbance of 1 to 5 acres of total land area, would require the preparation of a Notice of Intent to discharge and a Storm Water Pollution Prevention Plan in accordance with the Phase II Storm Water National Pollutant Discharge Elimination System requirements of the Clean Water Act. Permitting of these 1 to 5 acre construction activities would be coordinated through the Kirtland AFB Environmental Management Flight.

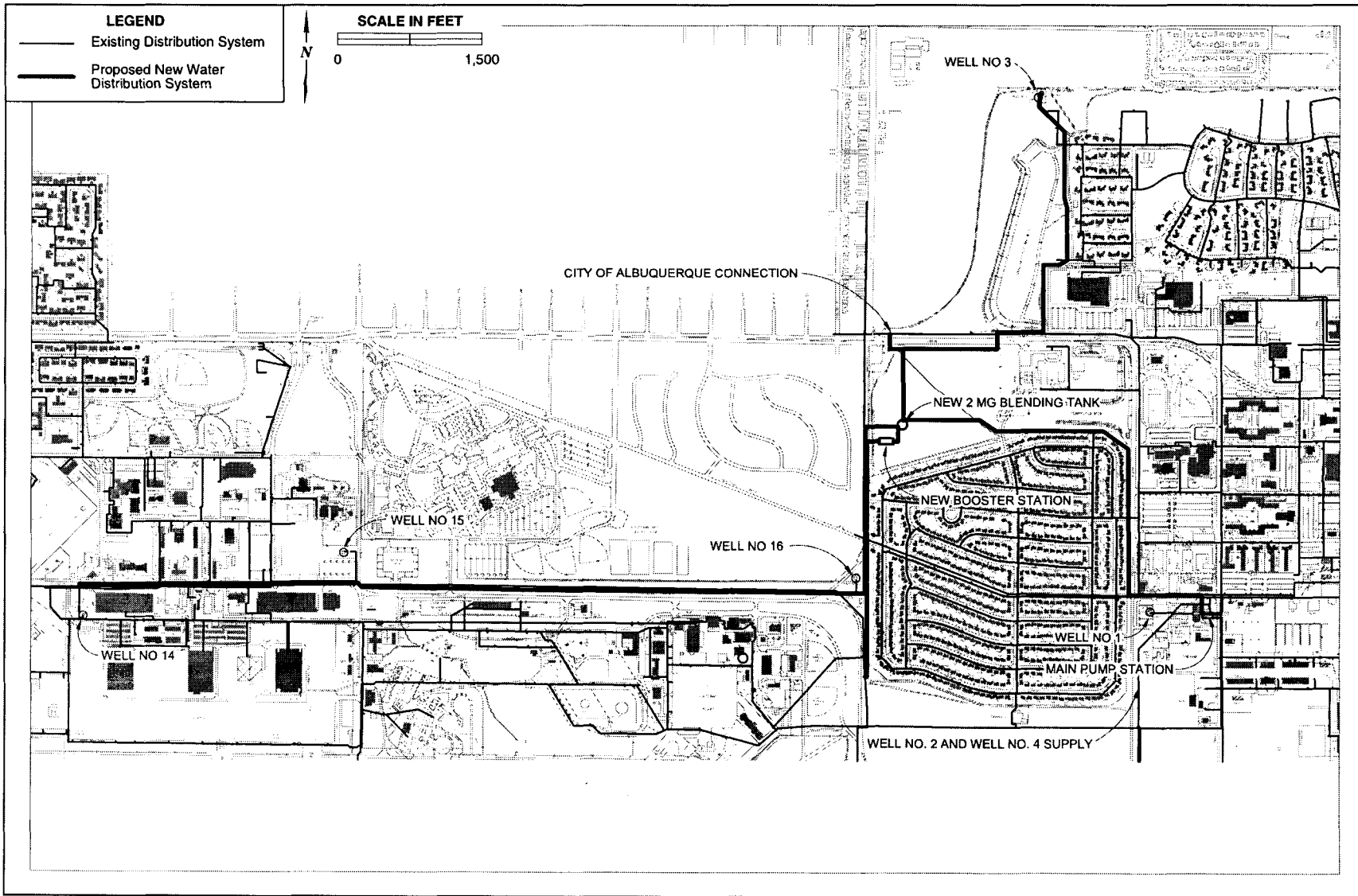
The construction contractor would be required to obtain a Soils Disturbance (Dust) Permit from the City of Albuquerque for those portions of the project that would disturb in excess of 0.75 acres.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 Alternative 1

Alternative 1, like the Proposed Action, would include the installation of a new 2-MG blending tank. Unlike the Proposed Action however, this blending tank would be located southwest of the intersection of San Pablo Street and Gibson Boulevard (Figure 2-2). The 2-MG blending tank, located at grade, would receive flows from wells #14, #15, and #16; from wells #1, #2, #3, and #4; and from the city connection at the Gibson Gate.

A new 14-, 18-, and 20-inch-diameter pipeline would be constructed to collect and convey groundwater from wells #14, #15, and #16 to the new 2-MG blending tank. A new 14-inch transmission pipeline would be constructed from the discharge of the existing main pump station to the 2-MG blending tank. This new transmission pipeline would be used to repump the groundwater from wells #1, #2, and #4 to be blended with



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Alternative 1

FIGURE

2-2

the other production wells. New transmission lines would be constructed for delivering the combined flows from the City of Albuquerque connection and well #3 for delivery to the blending tank. This portion of the system would include a 10-inch transmission line from well #3 to a point at which it would join a 14-inch transmission line from the city connection. An 18-inch transmission line would convey the combined flows from the 10-inch and 14-inch transmission lines to the blending tank. A backflow prevention device would be installed on the 14-inch city connection transmission line to prevent backflow of water from the Kirtland AFB system into the city system.

A booster pump station would be constructed at the blending tank, and the combined flows would be pumped into the existing 24-inch main transmission trunk line in the vicinity of well #16. Disinfection would be provided with sodium hypochlorite injection at the new 2-MG blending tank.

The existing booster pump discharge at well #3 is assumed to be adequate for delivering flows to the new 2-MG blending reservoir. Wells #14, #15, and #16 would be modified to pump with only the head pressure required to deliver flows to the new 2-MG blending reservoir. The existing main pump station would convey water directly to the new 2-MG blending tank from wells #1, #2, and #4.

A new pump station would be required to deliver the blended water from the 2-MG blending tank to the distribution system through a new 24-inch transmission line. This new transmission line would connect to the existing 24-inch transmission trunk line at a location adjacent to Randolph Avenue, approximately 1,000 feet south of well #16. The total area of disturbance would be about 4.46 linear miles, but would be limited to the width of the trenches required for the new pipe lines.

2.3.2 No-Action Alternative

The No-Action Alternative would be to not install the arsenic compliance system described in the Proposed Action, which would allow existing conditions to prevail, resulting in non-compliance with EPA guidelines, the Federal Safe Drinking Water Act and DoD and US Air Force directives.

2.4 OTHER FUTURE ACTIONS ON THE BASE

There are no current or reasonably foreseeable actions in the vicinity of the Proposed Action that should be considered as contributing to potential cumulative impacts in this document.

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 Environmental Assessment (EA) does not affect the type or frequency of aircraft operations conducted at Kirtland Air Force Base (AFB) or Albuquerque International Sunport, this safety analysis focuses only on ground-based safety issues. Because of the project's location near the runways, the distribution and significance of runway protection zones (RPZs) at the ends of the runways are discussed.

Siting requirements for munitions and ammunition storage and handling facilities are based on safety and security criteria. Air Force Manual 91-201, *Explosive Safety Standards*, requires that defined distances be maintained between munitions storage areas and other types of facilities. These distances, called quantity-distance (QD) arcs, are determined by the type and quantity of explosive material to be stored. Each explosive material storage or handling facility has QD arcs extending outward from its sides and corners for a prescribed distance. Within these QD arcs, development is either restricted or prohibited altogether in order to ensure safety of personnel and minimize potential for

damage to other facilities in the event of an accident. In addition, explosive material storage and handling facilities must be located in areas where security of the munitions can be maintained at all times.

Because children may suffer disproportionately from environmental health risks and safety risk, Executive Order (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 risks and safety risks to children. This section identifies the distribution of children and locations where numbers of children may be proportionately high (e.g., schools) in relation to areas potentially affected by implementation of the Proposed Action.

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 disasters or accidents, created or natural, affecting assigned and associate organizations at Kirtland AFB, as well as 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 would also 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 personnel 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 Runway Protection Zones

At Department of Defense (DoD) owned airfields, land use compatibility and RPZs are addressed under the Air Installation Compatible Use Zone Program (US Air Force [USAF] 1994). The USAF further divides RPZs into clear zones and accident potential zones. For joint use airfields, such as Albuquerque International Sunport, RPZs are established in accordance with Federal Aviation Administration (FAA) regulations. RPZs are trapezoidal zones that extend outward from the ends of active runways at commercial airports. They delineate areas recognized as having the greatest risk of aircraft mishaps, most of which occur during takeoff or landing. Development restrictions within RPZs are intended to preclude incompatible land use activities from being established in these areas that are subject to increased accident potential.

The following land uses are generally restricted or prohibited within RPZs:

- Uses that release substances into the air that would impair visibility or otherwise interfere with aircraft operation,
- Uses that emit light or reflections that would interfere with pilot vision,
- Uses that produce electrical emissions that would interfere with pilot vision,
- Uses that produce electrical emissions that would interfere with aircraft communication or navigation systems,

- Uses that attract birds or waterfowl,
- Uses that provide for structures within 10 feet of aircraft approach, departure, or transitional surfaces, and
- High population density functions such as multi-story buildings, places of assembly (e.g., churches, restaurants, schools, theaters), and high-density office uses.

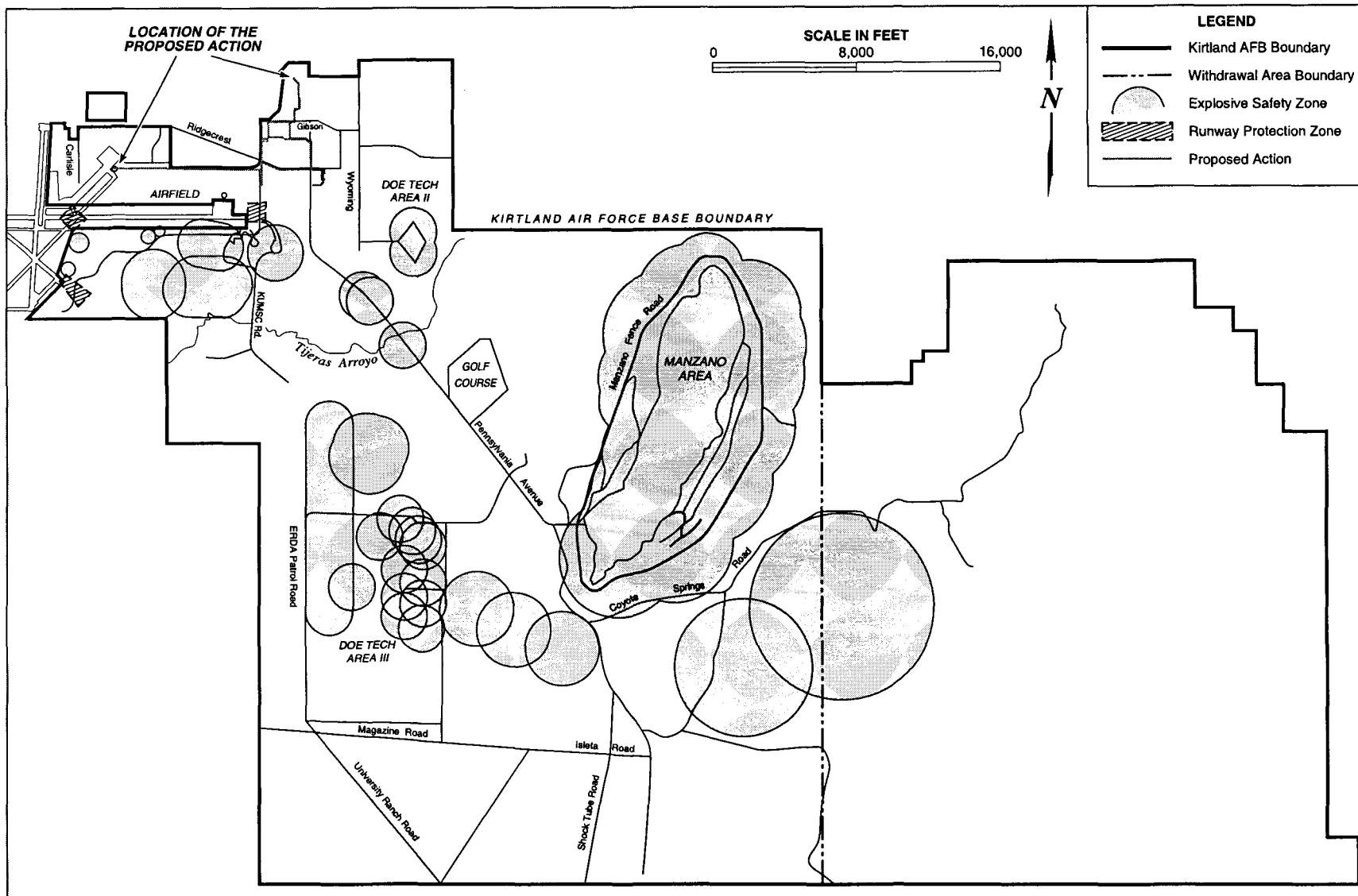
Presently, no incompatible land use is occurring in RPZs associated with the Albuquerque Sunport and current zoning designations would prohibit such development in the future. The Proposed Action is not within any of these zones as shown on Figure 3-1.

3.1.2.5 Airfield Clearance Requirements

Airport obstruction-free areas and “imaginary surfaces” relative to runways and taxiways, defined by Federal Aviation Regulation Part 77.28, *Military Airport Imaginary Surfaces*, impose constraints on facilities adjacent to the runways. Aeronautical charts indicate the locations of most transmission lines and obstructions 200 feet above ground level or higher. Further, potentially hazardous obstructions are listed in the special operating procedures of DoD Flight Information Publication AP-1B used by aviators and navigators. However, the proposed project site would not result in new structures that would interfere with aircraft on approach or departure.

3.1.2.6 Explosive Safety Zones

The installation requires explosive safety zones around facilities containing potentially explosive materials. Within these safety zones, other structures or activities are restricted. Figure 3-1 also shows the locations of the explosive safety zones on Kirtland AFB. As can be seen from the figure, the Proposed Action would not be located within any of these zones.



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FIGURE

EA

Locations of Explosive Safety and Runway Protection Zones on Kirtland Air Force Base

3-1

3.2 AIR QUALITY

3.2.1 Definition of Resource

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. The US Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants, including ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter equal to or less than ten microns in diameter (PM₁₀), and Pb. The Clean Air Act (CAA) requires that all states attain compliance through adherence to the NAAQS, as demonstrated by the comparison of measured pollutant concentrations and the NAAQS.

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. These pollutants are typically quantified in units of parts per million, milligrams per cubic meter, or micrograms per cubic meter. The State of New Mexico has adopted additional standards for air quality, the New Mexico Ambient Air Quality Standards (NMAAQs), which apply a more stringent standard for CO, SO₂, and for the 24-hour standard for NO₂. Both the NAAQS and NMAAQs are depicted in Table 3-1.

An area is designated as one of four categories in complying with the NAAQS. An area is “in attainment” if it does not exceed the NAAQS. It is classified as “nonattainment” when ambient air quality repeatedly exceeds the NAAQS. A “maintenance” area is an area that was previously designated as “nonattainment” that has improved its air quality to meet the NAAQS, but is on a probationary period for 10 years. Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant(s) is referred to as “unclassifiable.” An area can be considered an attainment area for certain pollutants and a nonattainment area for others. The State of New Mexico uses the NAAQS for attainment determinations; the NMAAQs are used for permitting purposes only.

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

Pollutant	Averaging Time	NAAQS ^a	(Primary) ^b (Secondary) ^c	NMAAQS ^d
O ₃	1-hour	0.12 ppm (235 µg/m ³)	Primary & Secondary	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)	Primary	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)	Primary & Secondary	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)	Primary	0.02 ppm (52 µg/m ³)
	24-hour	0.14 ppm (365 µg/m ³)	Primary	0.10 ppm (260 µg/m ³)
	3-hour	0.50 ppm (1300 µg/m ³)	Secondary	0.50 ppm (1300 µg/m ³)
PM ₁₀ ^f	Annual	50 µg/m ³	Primary & Secondary	60 µg/m ³
	24-hour	150 µg/m ³		150 µg/m ³
PM _{2.5} ^g	Annual	15 µg/m ³	Primary & Secondary	15 µg/m ³
	24-hour	65 µg/m ³		65 µg/m ³
Pb	Quarter	1.5 µg/m ³	Primary & Secondary	1.5 µg/m ³

Environmental Protection Agency 2002. Title 40, Part 50 of the Code of Federal Regulations.

- 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 Secondary Standards presents protection against decreased visibility, and damage to animals, crops, and buildings.
 - ^d Standards are presented for pollutant data reported in the State of New Mexico Air Quality Bureau annual report summaries.
 - ^e Particulate matter equal to or less than ten micrometers in diameter.
 - ^f Particulate matter equal to or less than 2.5 micrometers in diameter.

NAAQS = National Ambient Air Quality Standards

NMAAQS = New Mexico Ambient Air Quality Standards

O₃ = Ozone

ppm = parts per million

µg/m³ = micrograms per cubic meter

CO = carbon monoxide

NO₂ = nitrogen dioxide

SO₂ = sulfur dioxide

PM₁₀ = particulate matter equal to or less than ten micrometers in diameter

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

Pb = lead

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.

3.2.2 Existing Conditions

3.2.2.1 Climate and Regional Air Quality

The climate in the Albuquerque area is mild, sunny, and dry. High temperatures at Kirtland AFB average 90 degrees Fahrenheit (°F) and low temperatures average 62°F during the summer months. Winters are substantially cooler, with an average daily low temperature of 27°F and an average daily high temperature of 58°F (October to April). Annual average precipitation in Bernalillo County ranges from 8 inches in the county's arid valley and mesa areas to 30 inches in the mountains east of Kirtland AFB. Precipitation increases with increasing elevation and occurs primarily during the summer months (US Department of Agriculture 1977). Half of the average annual precipitation falls from July to October, with an average of 44 heavy thunderstorms occurring each year, mostly during this period. Average annual snowfall ranges from approximately 10 inches in the valley to 3 feet in the foothills and up to 10 feet in the higher mountains. The snow season in the valley extends from November to early April, but snow seldom stays on the ground for more than 1 day. Humidity is low and averages 43 percent year round (New Mexico State Climatologist 2003).

Prevailing winds in the area are from the north during the winter months, and from the south along the river valley in the summer. The average annual wind speed is 9 miles per hour, with the spring months being the windy season. 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 No. 2, which is one of 8 regions in the state. Region No. 2 includes all of northwestern New Mexico. The Albuquerque Environmental Health Department Air Quality and Vehicle Pollution Management Divisions administer local, state and federal air quality control regulations to Bernalillo County, and the Albuquerque-Bernalillo County Air Quality control Board governs them.

In the past, NAAQS and NMAAQs violations have occurred at major intersections and in uptown Albuquerque as a result of high volumes of automobile emissions. The City of Albuquerque has been designated as being in maintenance status for CO as of 15 June 1996 and is currently in attainment for all other federally regulated pollutants (EPA 2002). CO levels are currently at their lowest since the 1970s (CO levels were consistently violated during the 1970s and 1980s). O₃ levels have been increasing since 1990 and have exceeded standards twice in 1999 (primarily oxides of nitrogen [NO_x] and volatile organic compounds (VOCs) from automobile emissions and industry) (Albuquerque Environmental Health Department 2000).

There are 11 air-monitoring sites in Bernalillo County. Six of these sites measure CO, six measure O₃, one site measures NO_x, eleven sites measure PM₁₀ (eight are gravimetric, three are automated), and five sites measure particulate matter equal to or less than 2.5 microns in diameter (three are gravimetric, two are automated).

CO emissions have decreased as a result of improved automobile technology and the Vehicle Pollution Management Program. Bernalillo County places restrictions on wood burning, has an oxygenated fuel program, and enforces inspection and maintenance of automobiles, which have all helped to reduce CO emissions.

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 State of New Mexico's Air Quality Bureau is currently working with local communities to identify human-caused sources of windblown dust and to minimize dust emissions. Table 3-2 displays 1996 CO emissions data for Bernalillo County. These are the latest accurate data available from the Albuquerque Environmental Health Department (Frye 2003).

3.2.2.2 Air Quality in the Project Area

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. An inventory was conducted at Kirtland AFB during 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 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. Kirtland AFB is currently a minor source of Hazardous Air Pollutants under Title III of the CAA.

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

Source Category	CO Emissions (tpy)
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: ^aOn Road Sources include Light and Heavy Duty Gasoline and Diesel Vehicles and Trucks and Motorcycles.

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

tpy = tons per year NA = not applicable

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 3-3 summarizes the CO emissions inventory for Kirtland AFB.

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

Pollutant	Emissions	
	Actual ^b (tpy)	Allowable ^b (tpy)
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

Source: United States Air Force 2002.

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.

tpy = tons per year

CO = carbon monoxide

NO_x = oxides of nitrogen

PM = particulate matter

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

SO_x = sulfur oxides

VOC – volatile organic compounds

HAP = hazardous air pollutants

3.2.2.3 State Implementation Plan

The CAA Amendments of 1990 place most of the responsibility on the states to achieve compliance with the NAAQS. The primary vehicle for implementation is the State Implementation Plan (SIP), which the EPA requires each state to prepare. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that would lead the state into compliance with all federal air quality standards. Changes to the compliance schedule or plan must be incorporated into the SIP, which outlines measures by which the state can attain the NAAQS for criteria pollutants. Areas not in compliance with a standard can be declared a nonattainment area by the EPA and/or the appropriate state or local agency.

Estimated air quality measurements that apply to the air quality in the vicinity of Kirtland AFB are taken from air monitoring stations located near the installation. The closest of these stations, is located about a mile northwest of the base and monitors CO, total suspended particulates, and wind speed and direction. These air monitoring stations are operated and maintained by the Albuquerque Environmental Health Department.

The primary source of air pollutants at Kirtland AFB is privately owned vehicles. Kirtland AFB, through its transportation management program, is engaged in a phased conversion of government-owned gasoline-powered vehicles to natural gas. Other

primary emission sources on the installation include aircraft operations and maintenance, EOD, fuel storage, corrosion control, emergency generators, and fire fighting training. Major hydrocarbon emission sources include fuel evaporative losses from fuel storage, transfer, and use.

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). 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 are a unit of measure based on a logarithmic scale (e.g., 10-dB increase corresponds to a 100 percent increase in perceived sound). Any change in hearing level that is less than 5-dB is generally not noticeable or considered significant (EPA 1974). Table 3-4 shows the perceived change in loudness by decibel level. 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 6,000 Hertz or cycles per second).

Table 3-4. Perceived Change in Loudness

+ 1-dB	Unnoticeable
+ 3-dB	Barely Noticeable
+ 5-dB	Quite Noticeable
+ 10-dB	Sounds Twice as Loud
+ 20-dB	Sound Four Times as Loud

Source: Minneapolis-Saint Paul International Airport – Part 150 Update 2002.

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.

A Day-Night Average A-Weighted Sound Level (DNL) 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. This penalty is intended to compensate for generally lower background noise levels at night and the increase in annoyance associated with nighttime noise events. DNL is the preferred noise metric of the US Department of Housing and Urban Development, US Department of Transportation, FAA, EPA, the Veterans' Administration, and DoD. A 65 DNL dB is the threshold of significance for determining compatible land uses (FAA 14 CFR Part 150).

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). Table 3-5 identifies noise levels associated with common indoor and outdoor activities and settings. This table further identifies subjective human judgment of noise levels, specifically the perception of noise levels doubling or being halved.

3.3.2 Existing Conditions

Localized sources of noise in the area, both on and off base, include military and civilian aircraft operations at Albuquerque International Sunport and vehicle traffic at Kirtland AFB. 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 Albuquerque International Sunport requires that all aircraft implement certain noise abatement procedures, which include restricted use of runways for aircraft at certain times and restrictions of time and locations of night engine runups. There are currently nine permanent noise-monitoring stations and one mobile station in and around the Albuquerque area and the airport. The current noise abatement program prohibits flights over residential areas after 9:00 p.m. The Sunport Noise Committee works with Kirtland AFB to manage the noise levels around the airport from military aircraft and allows engine runups for maintenance only in remote areas of the airport (City of Albuquerque 2003a).

Table 3-5. Typical A-Weighted Sound Levels

Noise Source	A-Weighted Sound Level in Decibels	Noise Environment	Subjective Evaluations
Near 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
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.

Traffic at Kirtland AFB constitutes a relatively small, localized source of noise. Gibson Boulevard is the roadway most frequently used for accessing the base. From a small sample of observations in the vicinity of Kirtland AFB, it was noted that the peak traffic volumes entering and exiting the base through the Gibson Boulevard gate occur between the hours of 6:30 a.m. and 8:30 a.m. and between the hours of 3:30 p.m. and 5:30 p.m.

The Proposed Action would generate noise from construction equipment and construction vehicles. Table 3-6 shows typical noise levels generated from various types of construction equipment.

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

In the vicinity of Kirtland AFB, land use varies from urban to open rangeland. Kirtland AFB is bordered on the north and west by the City of Albuquerque and its suburbs and on the south by the Isleta Pueblo, with the National Forest bordering the east. Immediately north of the installation, land use is predominantly urban and suburban. Open spaces and forestland are present northeast of the base. West of Kirtland AFB, land use is a mixture of urban areas and open space. South 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.

Historically, as with urbanization in most major cities, a decrease has occurred in agricultural, forestlands, and wetlands. In the years between 1945 and 1992, land used for forest and pastureland was converted to transportation, industrial, and urban uses (US Geological Survey [USGS] 2000). In the last 100 years, the Albuquerque metropolitan statistical area (MSA) increased from 2,000 to 103,000 acres. Indian lands account for about 3,900 square miles or 40 percent of this land area (USGS 2000).

Table 3-6. 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	90			
		Tractors		75	90			
		Scrapers, graders		80	90			
		Pavers			85	90		
		Trucks			85	100		
	Materials handling	Concrete mixers			80	90		
		Concrete pumps			85	90		
		Cranes, movable			80	90		
		Cranes, derrick				90		
	Stationary	Pumps		70				
		Generators			80	90		
Compressors				80	90			
Impact equipment	Pneumatic wrenches			85	90			
	Jackhammers and rock drills			80	100			
	Impact pile drivers, peaks					100	110	
Other	Vibrator		70	85				
	Saws			80	90			

Source: Environmental Protection Agency 1972.

Notes: Based on limited available data samples
 ft = feet dBA = A-weighted decibel scale

3.4.2.1 Kirtland AFB Land Use

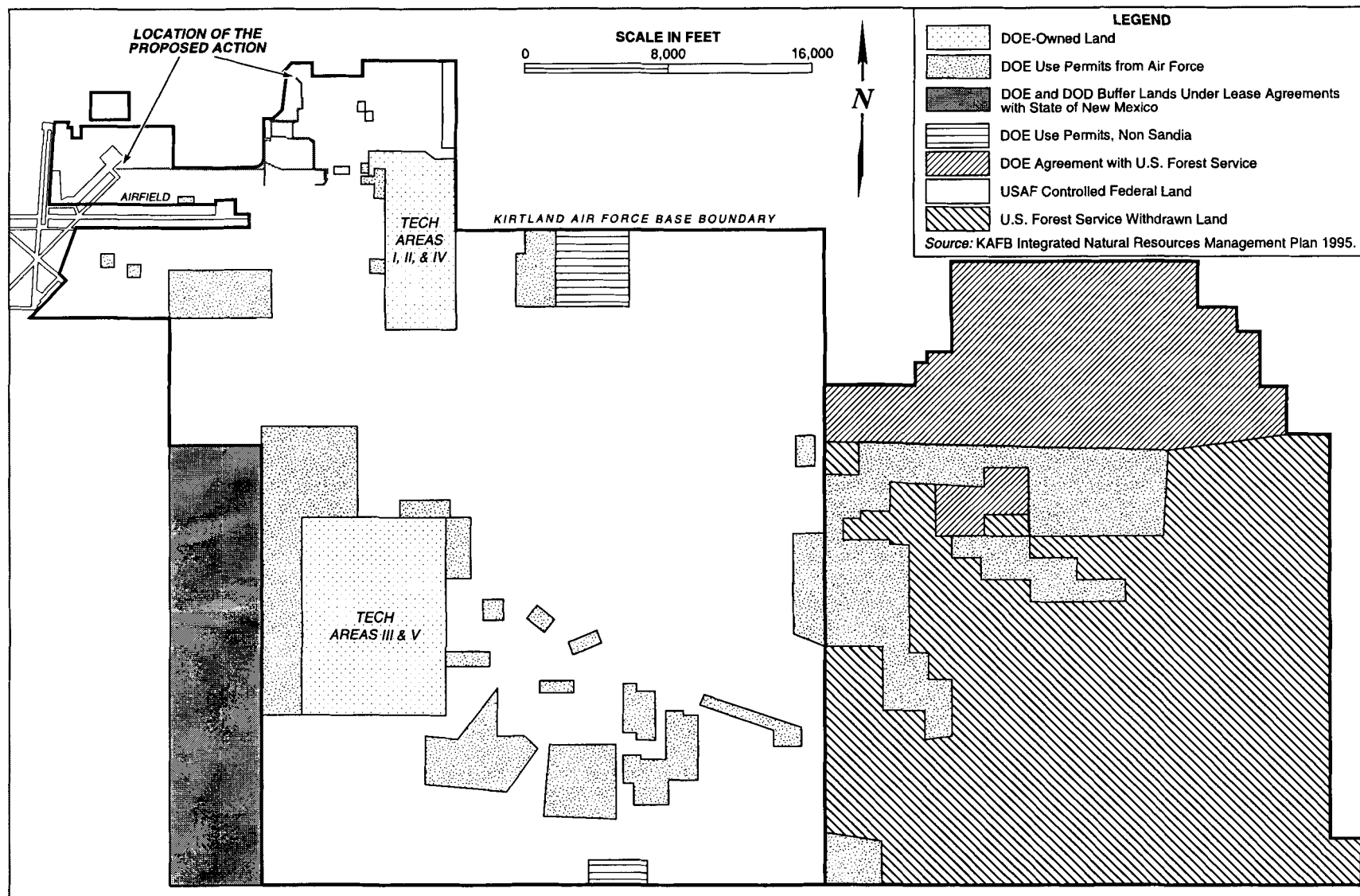
Kirtland AFB is among the largest bases (land area) owned by the USAF with 51,558 acres of land (62 square miles). Kirtland AFB manages a wide variety of land ownerships and land use agreements with multiple state and federal agencies (Figure 3-2). According to Kirtland AFB's 2002 General Plan, the land at Kirtland AFB is primarily owned by the USAF (20,783 acres unimproved and 7,311 acres improved), but several other ownerships and leases apply. The landfill occupies 40 acres. The eastern portion of Kirtland AFB is primarily Cibola National Forest land (15,891 acres) leased to the USAF by the US Forest Service (USFS). These lands have been withdrawn from public use and are known as the Withdrawal Area. The US Department of Energy (DOE) owns certain areas of the base (7,533 acres) and leases other areas from the USAF (USAF 2001).

The airfield complex serving Kirtland AFB is shared with Albuquerque International Sunport, located adjacent to the northwest corner of the base. Airfield operations and aircraft support facilities, including aircraft maintenance are concentrated in the airfield complex area. The remainder of the intensive development on base consists of administrative and research, industrial, medical, open space/recreation, and housing located north and east and south of the airfield complex in the northwest corner of the base within the cantonment area. The Proposed Action would be confined to the northwest corner of the base within the cantonment area.

3.4.2.2 City of Albuquerque Land Use

The Albuquerque MSA consists of 5,951 square miles. Kirtland AFB is located southeast of Albuquerque, adjacent to the Albuquerque International Sunport. Areas in and surrounding Albuquerque include Central Albuquerque, North Albuquerque, North Valley, West Side, Mid Heights, Southwest Mesa, East Gatteway, South Valley, Near Heights, and Foot Hills.

Residential areas in the north and east sections of Albuquerque contain both single-family and multi-family residential dwellings. Industrial, public/institutional, parks and recreation, and commercial land use occupies areas in the West Side, and Southwest Mesa. These neighborhoods include public and private grade schools and public parks. The University of New Mexico, the New Mexico State Fairgrounds, and numerous



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FIGURE

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Kirtland Air Force Base Land Agreements

3-2

commercial businesses make up the central business district, which lies adjacent to the north and west boundaries of Kirtland AFB. St. Joseph's, Presbyterian, and Memorial Hospitals are located just west of Kirtland AFB.

Southwest of Kirtland AFB is Mesa Del Sol, a 12,400-acre mixed-use planned community that is held in trust by the New Mexico State Land Office for the University of New Mexico and statewide public schools. The community's mixed-use development will consist of office, retail and residential areas through activity centers including neighborhood, village, community, urban and employment centers. La Semilla is a planned community within Mesa Del Sol located along the eastern border. It will be a 2,800-acre nature refuge and environmental education campus. The US Department of Energy and Sandia National Laboratories are partnering with the community to provide an Ecological Field Station, Native Plant Garden, Arboretum and Horticultural Research Center, Wildlife Rehabilitation Center, the McCormick Interpretive Site, Renewable Energy Research and Demonstration Area and an Agriculture and Research Center.

Montesa Park, which is located within the Tijeras Arroyo, is in this southern section and contains a number of public facilities. Land uses just to the east of the Rio Grande River, which runs north-to-south through the City of Albuquerque, range from vacant marshland to commercial and industrial areas. West of the Rio Grande River, land uses consist primarily of single-family residential with some commercial and industrial areas. Schools and parks are also located in this area, as well as the PetroGlyph National Monument. The southwest section of Albuquerque contains commercial, industrial, and residential land uses, as well as the Rio Grande Zoological Park, Convention Center, and Albuquerque Biological Park.

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 study, 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.

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. The basin is demarcated to the south by the Socorro Channel, to the north by the Nacimiento Uplift, to the west by the Puerco Plateau and Lucero Uplift, and to the east by the Sandia and Manzanita Mountains. The Albuquerque Basin is at its widest point in the Kirtland AFB area and tapers off at its north and south ends. Large-scale faulting which occurred between 11.2 and 5.3 million years ago deepened the basin and tilted the local mountains. As a result, basin deposits (and those at Kirtland AFB) are a mixture of volcanic and sedimentary rocks (Energy Research and Development Administration 1977). 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 within the boundary of Kirtland AFB. Lurance, Madera and Sol se Mete Canyons are located in the Withdrawal Area.

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, 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: Bluepoint-Kokan association, Gila-Vinton-Brazito association, Madurez-Wink association, Tijeras-Embudo association, Seis-Orthids association, and Kolob-Rock outcrop association.

The Gila-Vinton-Brazito and Bluepoint-Kokan soil associations are deep, level to steep, soils on flood plain dissected terraces. They are well drained to excessively drained loamy, sandy and gravelly soils. Elevations range from 4,900 to 6,000 feet. These soil associations are moderately to severely susceptible to water erosion.

The Madurez-Wink and Tijeras-Embudo soil associations are deep, level to moderately steep, soils on mesas. They are well drained loamy and gravelly soils. Elevations range from 4,800 to 6,500 feet. These soil associations are slightly to moderately susceptible to water erosion.

The Seis-Orthids and Kolob-Rock soil associations are shallow to deep soils on mountains and footslopes. They are well drained, very cobbly, stony, very stony and loamy soils. Elevations range from 6,000 to 10,500 feet. These soil associations are moderately to severely susceptible to water erosion.

3.5.2.3 Proposed Action

Arsenic Compliance System. The major soil types that occur in the general area of the Proposed Action are Latene sandy loam, Wink fine sandy loam, and Tijeras gravelly fine sandy loam. Soils are deep and well drained. These soils are moderately alkaline with the Wink and Latene associations having calcareous to strongly calcareous properties respectively. Permeability is moderate and available water capacity ranges from 3 to 8 inches. Runoff is medium and the hazard of water erosion and soil blowing is moderate.

3.6 WATER RESOURCES

3.6.1 Definition of Resource

Water resources include all surface waters and groundwater and their availability for human use. For this analysis, those water resources 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) were investigated. 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.

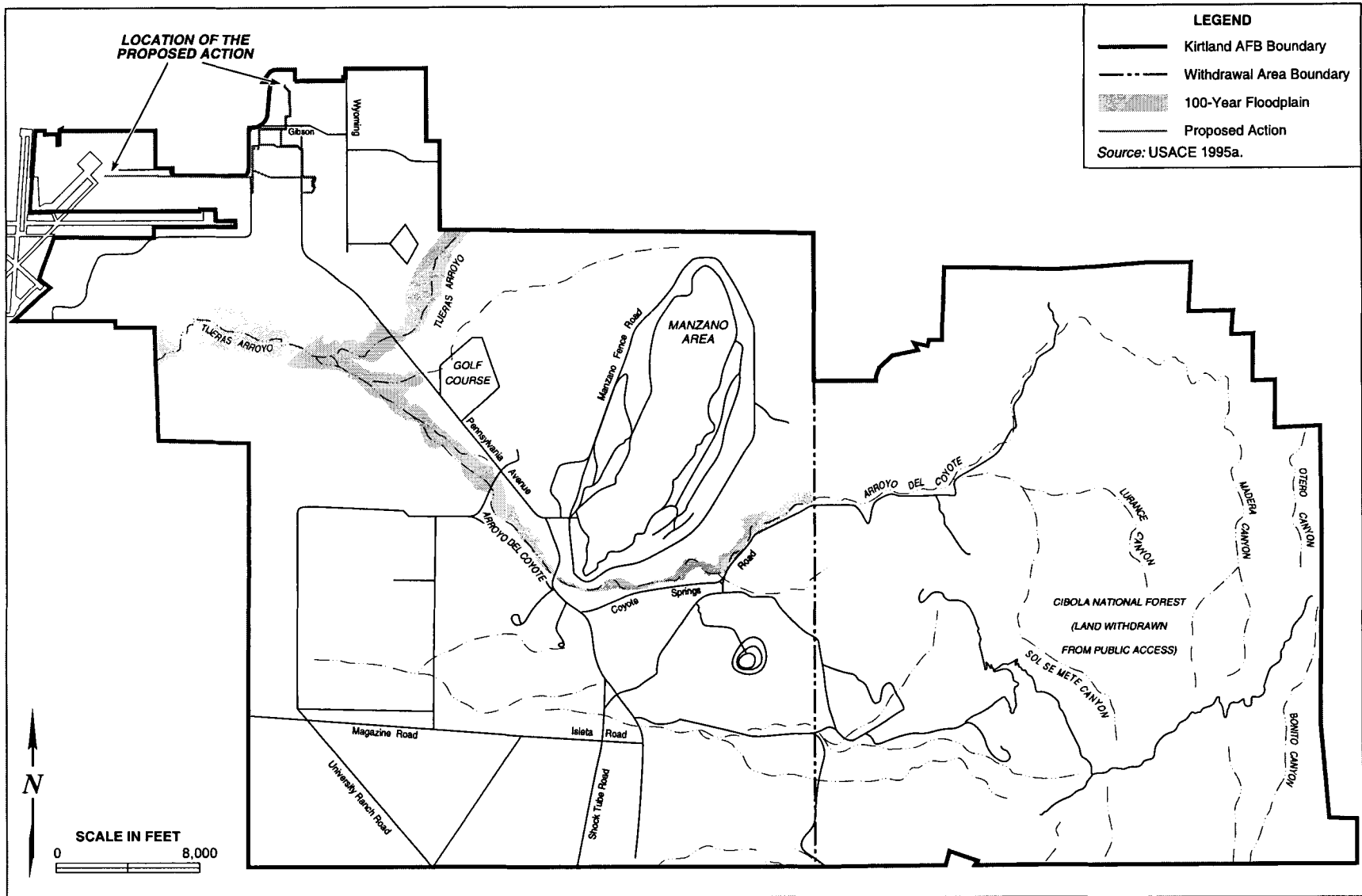
Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 100-year floodplains. Floodplains are often belts of low, level ground present on one or both sides of a stream channel and are subject to either periodic or infrequent 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 3-3.

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. The East Mesa, on which Kirtland AFB is located, has a west-southwest ground surface slope from about 250 feet per mile near the mountains to 20 feet per mile near the Rio Grande River. The mesa's width ranges from 3 miles in its northern section to 9 miles in its southern section. 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.

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 collects water from Madera, Lurance and Sol se Mete Canyons in the Manzanita Mountains and drains into Tijeras Arroyo approximately one mile west of the Tijeras Arroyo Golf Course.



Both Arroyo del Coyote and Tijeras Arroyo flow intermittently during heavy thunderstorms and spring snowmelt (US Army Corps of Engineers [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 Action is located more than a mile north of the Tijeras Arroyo waterway. The Kirtland AFB Storm Water Pollution Prevention Plan includes this area of the base.

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 and causing flooding. A 100-year floodplain encompasses these arroyos and follows their paths. As stated above, the Proposed Action would be located well to the north of the 100-year flood plain of the Tijeras Arroyo.

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. The volume of recoverable fresh groundwater in the Rio Grande Basin is estimated at 2.3 billion-acre feet.

Albuquerque relies on groundwater as its sole potable water source. The municipal water system of Albuquerque has a total city system capacity of 289 million gallons-per-day (mgd); the current city usage is less than 40 percent of the total city system capacity. A localized change in the direction of flow of the regional groundwater flow beneath Kirtland AFB has occurred towards Albuquerque because of Albuquerque's extensive water pumping. 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).

The USGS performed a study in 1993-1994 to provide an understanding of the Albuquerque basin groundwater supply. Public supply, industrial, and military requirements (Kirtland AFB) in the Albuquerque area are primarily met by groundwater supply. Recent studies indicate that the most productive zone of the aquifer system is much less extensive than was formerly assumed. Water level declines, greater than those predicted by hydrologic investigations in the early 1960s, have occurred in the basin. A study by the City of Albuquerque Water Conservation Office (CAWCO) cites the USGS 1993 study and notes that water levels have dropped as much as 160 feet since the 1960s (CAWCO 1997). In the fall of 1994, the city developed a comprehensive water policy that targets a 30 percent reduction in use through conservation. This plan was adopted in March 1995 with a goal of reducing water use per person by 30 percent from 250 to 175 gallons-per-day by 2004 (CAWCO 1998).

3.6.2.4 Kirtland AFB

Water Supply

Water is supplied by eight installation water wells and two separate but interconnected distribution systems. These systems were developed separately for Sandia Base and Kirtland AFB before they were combined into a single installation. Two previously operational wells have been filled in (Wells 6 and 10) and four wells were removed in 1999 (Wells 5, 8, 12, and 13). Two new wells (Wells 15 and 16) became operational in December 1997. The installation pumps an average of 5.5 mgd of treated, potable water through 160 miles (849,087 linear feet) of distribution mains including a 60-70 pounds per square inch (psi) routine pressure area and a 80-90 psi high pressure area. Well 7 has high nitrate levels and has been physically disconnected from the base potable water system and is now being used to supply water for the base golf course turf irrigation.

Water lines are generally properly sized and in good condition. The water utilities system is approximately 45 years old. The installation water system is being completely restored. About 35 percent of original valves and 15 percent of fire hydrants have been replaced. The plan is to replace all of the original hydrants and valves over the next ten years.

Water is also purchased from the City of Albuquerque. Water purchased from the city is primarily for use in meeting peak demands, for providing water when wells are out of service and to keep water production within water rights allocations.

The total supply capacity will be 12.3 mgd with all eight wells running 24 hours a day. The city connection adds 8.5 mgd. Kirtland AFB has over 5.5 million gallons of on-site potable water storage capacity.

The range of summer and winter water consumption rates are:

- Summer daily rate: 6 to 10 mgd
- Winter daily rate: 2 to 4 mgd

The level of produced and purchased water supply since 1971 can be seen on Figure 3-4. There is a water main serving the southern portion of the installation, including the golf Course, extending as far south as the Lovelace Respiratory Research Institute, as well as some other facilities in this region. The High Energy Research and Technology Facility and the Kirtland Underground Munitions Maintenance and Storage Complex, as well as Coyote Canyon, all have small wells and are not on the main water line. Fiscal Year (FY) 2001 funding will provide a quarter million gallons of storage capacity for fire protection.

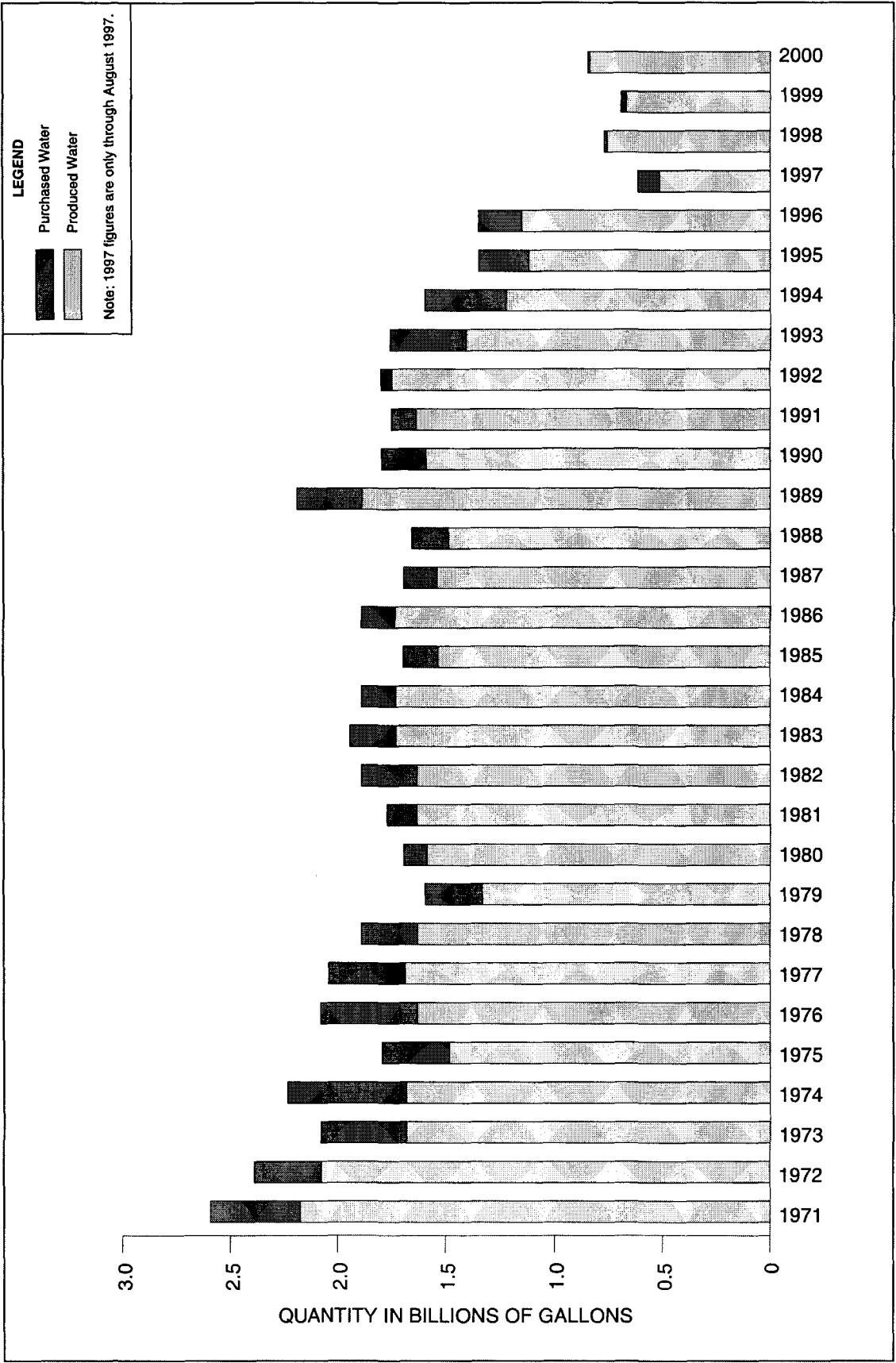
Recent Upgrades

With the upgrade of the new water system, Kirtland AFB utilities should be able to meet current needs and any increased needs incurred by Kirtland AFB's growth. Recent completed projects include an upgrade to the golf course irrigation system, a 4-bay car wash, improvements to the Manzano water system, potable water to Hangar 760, repairs or closure of wells and various landscape projects.

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



FIGURE

3-4

Annual Water Consumption Rate at Kirtland AFB

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areas. Protected species are defined as those listed as threatened, endangered, proposed, or candidates for listing by the US Fish and Wildlife Service (USFWS); New Mexico Energy, Minerals, and Natural Resources Department (NMEMNRD); and/or New Mexico Department of Game and Fish (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 assessing impacts of an action on biological resources. The New Mexico Natural Heritage Program (NMNHP) 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 Clean Water Act (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 Code of Federal Regulations [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

Vegetation at Kirtland AFB comprises four main plant communities: grassland, pinyon-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. Two transitional zones have been delineated in the grassland community and include the juniper-grassland and sagebrush steppe. The grassland and pinyon-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 3-5. Only the grassland community is described in this section because of the location of the Proposed Action.

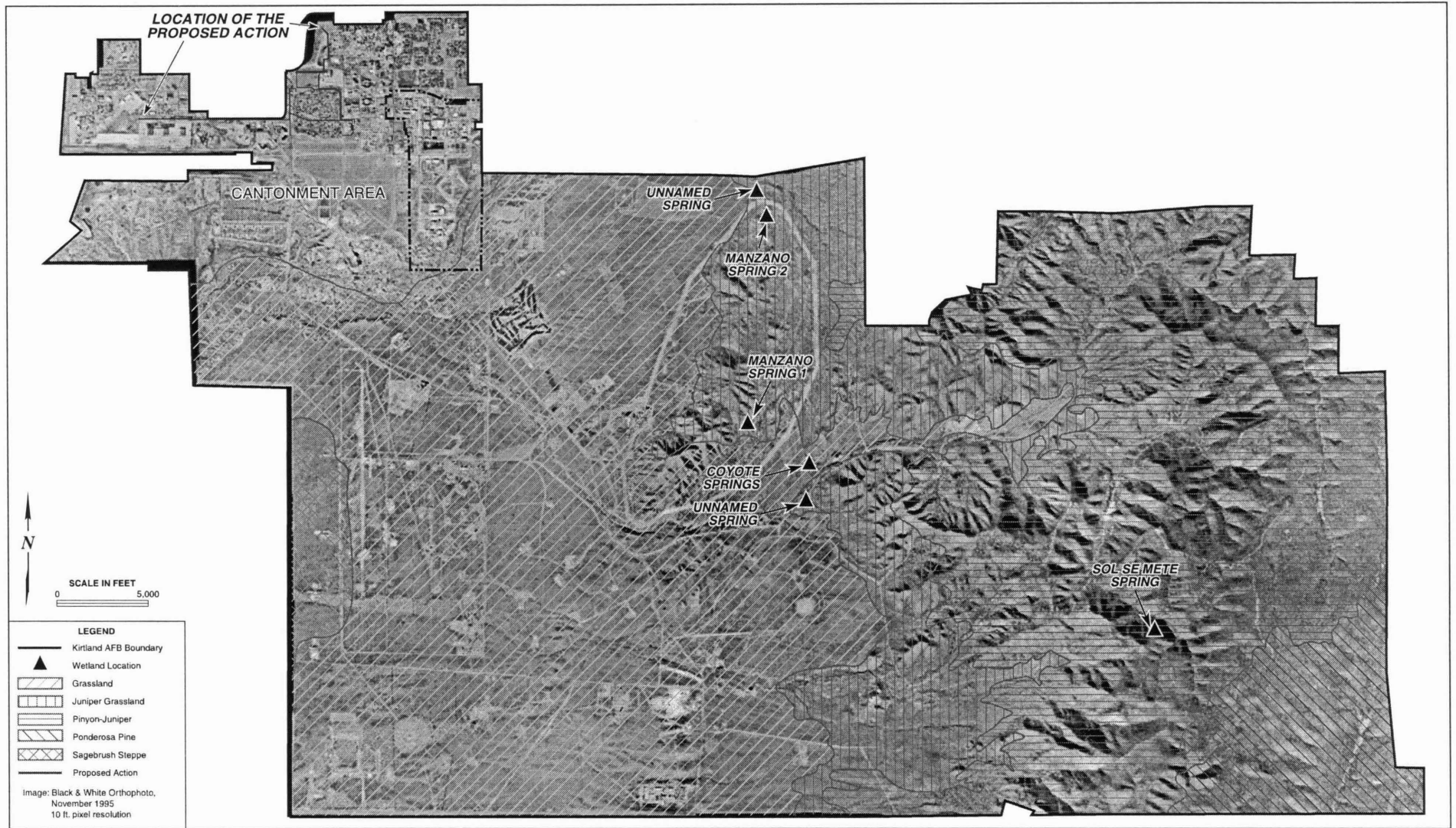
The sites for the Proposed Action and alternatives are currently occupied by existing buildings in semi-improved areas where vegetation consists largely of annual weeds, early successional perennials, and some native grasses and shrubs with areas of bare ground. Vegetation typical of the surrounding grassland community includes broom snakeweed (*Gutierrezia sarothrae*), Great Plains yucca (*Yucca glauca*), Indian ricegrass (*Oryzopsis hymenoides*), purple three-awn (*Artemisia pupurea*), black grama (*Bouteloua eriopoda*), blue grama (*Bouteloua gracilis*), galleta (*Hilaria jamesii*), foxtail barley (*Hordeum jubatum*), four-wing saltbush (*Atriplex canescens*), sand sagebrush (*Artemisia filifolia*), needle-and-thread grass (*Stipa comata*), globemallows (*Sphaeralcea* spp.), Siberian elm (*Ulmus pumila*), Mormon tea (*Ephedra trifurca*), New Mexican bitterweed (*Senecio neomexicanus*), ring muhly (*Muhlenbergia torreyi*), plains prickly-pear (*Opuntia polyacantha*), and bottlebrush squirrel tail (*Elymus longifolius*).

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). The wetlands recorded on base are associated with springs located north and east of the Manzano Base Area. There are no wetlands or riparian areas in the vicinity of the proposed project (refer to Figure 3-5).

3.7.2.3 Wildlife

Wildlife communities at Kirtland AFB are typical of woodland and grassland types of habitat within the central New Mexico region. The Proposed Action lies within the



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Native Vegetation and Wetland Locations on
Kirtland Air Force Base

FIGURE

3-5

grassland association and is located in the northwestern region of Kirtland AFB. Common birds associated with the grassland association at Kirtland AFB include horned lark (*Eremophila alpestris*), scaled quail (*Callipepla squamata*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), curved-billed thrasher (*Toxostoma curvirostre*), lark sparrow (*Chordestes grammacus*), black-throated sparrow (*Amphispiza bilineata*), western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), and house finch (*Carpodacus mexicanus*).

The birds of prey, or raptors, most commonly found in the grassland association include the northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), prairie falcon (*F. mexicanus*), long-eared owl (*Asio otus*), and great horned owl (*Bubo virginianus*). A common scavenger in this habitat type is the turkey vulture (*Cathartes aura*).

The grassland association has a mammal community dominated by rodents, rabbits, and hares. These include the desert cottontail (*Sylvilagus audubonii*), Gunnison's prairie dog (*Cynomys gunnisoni*), white-footed deer mouse (*Peromyscus maniculatus*), silky pocket mouse (*Perognathus flavus*), Merriam's kangaroo rat (*Dipodomys merriami*), and the northern grasshopper mouse (*Onychomys leucogaster*). Mammalian predators found in the grassland association include the coyote (*Canis latrans*), badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), striped skunk (*Mephitis mephitis*) and bobcat (*Lynx rufus*).

Amphibians and reptiles found on the grasslands at Kirtland AFB include the following: Woodhouse's toad (*Bufo woodhousii*), New Mexico spadefoot (*Spea multiplicata*), coachwhip snake (*Masticophis flagellum*), whiptail lizards (*Cnemidophorus spp.*), lesser earless lizard (*Holbrookia maculata*), and the western rattlesnake (*Crotalus viridis*). Several of these species have extensive periods of dormancy during dry conditions and rapid breeding cycles when temporary ponds occur after rains.

3.7.2.4 Threatened and Endangered Species

Thirty-three state and federally listed species could occur in Bernalillo County, seventeen of which are listed as either threatened or endangered. Several of these 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 3-7 lists species found in Bernalillo County and their potential for occurring on base or in the Withdrawal Area.

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 (*Hybognathus amarus*) is found only within its critical habitat in the Rio Grande River. The state threatened neotrophic cormorant (*Phalacrocorax brasilianus*) is attracted to large water bodies, such as Elephant Butte Reservoir in Sierra County, 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 at Kirtland AFB. The state threatened common black-hawk (*Buteogallus anthracinus anthracinus*) 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 at Kirtland AFB are sporadic and do not contain year-round water; therefore, well-developed riparian areas are not found at Kirtland AFB. The Bell's vireo (*Vireo bellii*) 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 (*Empidonax trailii extimus*) from occurring at Kirtland AFB. During a survey for the southwestern willow flycatchers conducted from 1994 to 1996, this species was discovered in riparian habitat along the Rio Grande River near Albuquerque, but not at Kirtland AFB (USAF 1998b).

Table 3-7. Special Status Species, Bernalillo County

Common Name	Scientific Name	Status	Occurrence at Kirtland AFB	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 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
mountain plover	<i>Charadrius montanus</i>	PT	Potential	No	R	SP, SM	Breeds
Black tern	<i>Chlidonias niger surinamensis</i>	FSC	No	No			
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 3-7. Special Status Species, Bernalillo County (continued)

Common Name	Scientific Name	Status	Occurrence at Kirtland AFB	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	Potential	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: New Mexico Department of Game and Fish 1999; 2002, New Mexico Natural Heritage Program 2002

Notes:

FE = Federal Endangered	ST = State Threatened	G = Grassland	AQ = Aquatic
FT = Federal Threatened	FSC = Federal Species of Concern	PJ = Pinyon/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			

The last 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 (*Grus americana*) 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 at Kirtland AFB. The federally endangered black-footed ferret (*Mustela nigripes*) could occur within a 50-mile radius of Kirtland AFB, but it has never been reported in the

area (USAF 1991). The black-footed ferret is presumed to be extirpated from Bernalillo County (NMDG&F 2001).

Two federal species of concern are known to occur at Kirtland AFB and the Withdrawal Area. The western burrowing owl (*Anthene cunicularia hypugaea*) inhabits the disturbed grasslands at Kirtland AFB and is typically associated with Gunnison's prairie dog towns. Burrowing owls have the potential to be found throughout Kirtland AFB but typically inhabit the disturbed grasslands surrounding Albuquerque's Sunport flight lines as well as other open areas about the cantonment area. Several burrowing owl nesting sites were known to occur around the Proposed Action in recent years, especially along Randolph Ave. (Integrated Natural Resources Management Plan 2001). The loggerhead shrike, another federal species of concern, is also commonly observed throughout Kirtland AFB. This species can be found throughout the grassland community as long as there is a shrub component present. It is a year round resident and likely breeds at Kirtland AFB during the spring and summer.

Ten 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. Brief descriptions of these species are provided below.

Bald eagle

The bald eagle (*Haliaeetus leucocephalus*), a federally threatened species, is endemic to North America and is the only North American representative of the fish or sea eagles. The bald eagle prefers aquatic or riparian habitats, but requires a large area to support its prey base. Prey is primarily fish, small mammals, or carrion. In winter, bald eagles congregate in areas that are close to open water and offer good perch trees and night roosts (USAF 1998b). The bald eagle could be found at Kirtland AFB as a fall transient in grassland, pinyon-juniper, and ponderosa pine habitats.

Mountain plover

The mountain plover (*Charadrius montanus*), recently proposed for federal listing as threatened, forages on insects and occupies short-grass prairies and prairie dog towns. Mountain plovers breed in New Mexico and spend their winters primarily in California

(NMDG&F 2001). These birds were once known to breed in Bernalillo County, but now may be extirpated from the county (NMDG&F 2001).

There is an historical record (period from 1864 to 1994) of mountain plovers breeding in northeast Bernalillo County and a 1995 nest site just to the north in Sandoval County. Results of a 1995 survey suggested that the species may be more numerous and widespread than expected, however, they were not found to inhabit Kirtland AFB (USAF 1998b). Although mountain plovers have never been observed on Kirtland AFB, their distribution range is nearby and appropriate habitat occurs on base.

Mexican spotted owl

The federally threatened Mexican spotted owl (*Strix occidentalis lucida*) forages on small to medium-sized rodents and primarily inhabits unmanaged, closed canopy forests dominated by conifers. In New Mexico, Mexican spotted owls occur in mixed conifer forests, ponderosa pine (*Pinus ponderosa*) forests, rocky canyons, and associated riparian forests (NMDG&F 2001). Habitat for Mexican spotted owls occurs in the Withdrawal Area's ponderosa pine vegetation community and in the pinyon-juniper woodlands. Mexican spotted owls are known to inhabit portions of the Sandia and Manzanita Mountains, which are very near Kirtland AFB (NMDG&F 2001).

American Peregrine Falcon

The state threatened American peregrine falcon (*Falcon peregrinus anatum*) occurs near cliffs or bluffs near open areas such as grassy meadows, lakes, mountain parks, and large river systems. Their main food items are small to medium sized birds and are therefore generally associated with areas that contain dense concentrations of this prey base. Peregrine falcons are considered to be rare to uncommon residents in all New Mexican mountain ranges (NMDF&G 2001). The potential exist for the falcon to occur as a transient throughout Kirtland AFB and the Withdrawal Area especially in the pinyon-juniper and ponderosa pine habitats.

White-eared hummingbird

The white-eared hummingbird (*Hylocharis leucotis borealis*) is a state-threatened bird that inhabits montane habitats in New Mexico. It is found primarily within pine and

pine-oak woodlands as well as moist montane canyons (NMDG&F 2001). The ponderosa pine habitat in the Withdrawal Area contains habitat for white-eared hummingbirds. This species has been listed as a rare transient in the Sandia and Manzanita Mountains and the potential exists for it to inhabit Kirtland AFB in the Withdrawal Area (NMDG&F 2001).

Gray vireo

The gray vireo (*Vireo vicinior*) is a state-threatened species known to occur in the Withdrawal Area. In 1993 and 1994, NMNHP personnel found gray vireos during a threatened and endangered species survey of Kirtland AFB and the Withdrawal Area (NMNHP 1995). According to the survey report, gray vireos were found in ungrazed juniper woodland at the base of the western foothills of the Manzanita Mountains in an elevational belt of 5,900 to 6,600 feet (NMNHP 1995). These birds primarily occurred in areas with a somewhat open canopy. Most of the vireos were observed in the Withdrawal Area, with few occurring in the easternmost portion of the base. In the Withdrawal Area, gray vireos were found in open juniper grassland/savanna habitat, along cobbly hillsides, and dry washes of juniper-dominated mesas. During the summer, the Withdrawal Area has the largest gray vireo colony in New Mexico (USAF 2000). Potential gray vireo habitat has been delineated for Kirtland AFB and the Withdrawal Area and includes portions of the pinyon-juniper community.

Baird's sparrow

The state threatened Baird's sparrow (*Ammodramus bairdii*) is a migrant in New Mexico that occurs primarily in the eastern plains and southern lowlands. It may winter in some areas of the state, but usually winters in Mexico (NMDG&F 2001). This species occupies desert grasslands and feeds primarily on seeds and insects. This species is considered very rare in New Mexico with a recent high of 3 individuals found within the state in 1994 (NMDG&F 2001). Due to the large amount of grassland habitat at Kirtland AFB and the transient behavior of this species, it has the potential to occur on base.

Spotted bat

The spotted bat (*Euderma maculatum*) is found in New Mexico from the Rio Grande valley westward where it occupies various habitats including riparian areas, pinyon-

juniper woodlands, and ponderosa pine forests – often near cliffs (NMDG&F 2001). Since these habitat types are found in the Withdrawal Area, the spotted bat may potentially be found here. A specimen of this state-threatened species has been collected in the City of Albuquerque, adjacent to Kirtland AFB. Records of spotted bats in New Mexico were all documented during warmer months. While a number of specimens have been collected throughout New Mexico, evidence suggests that the animals were en route to winter quarters (NMDG&F 2001).

New Mexican jumping mouse

The state threatened New Mexican jumping mouse (*Zapus hudsonius luteus*) is known to occur in the central Rio Grande valley and has been documented near Isleta and Belen, south of Kirtland AFB (NMDG&F 2001). This mouse prefers wetland and riparian habitats with permanent moisture and vegetation such as grasses, sedges, and forbs. This species is known to inhabit cattail (*Typha latifolia*) stands and areas with high soil moisture (NMDG&F 2001). Several of the small wetlands at Kirtland AFB are fed by springs that provide permanent moisture to these sites. However, these wetlands are very small and isolated, and provide limited habitat for the New Mexican jumping mouse.

Great Plains ladies'-tresses orchid

The Great Plains ladies'-tresses orchid (*Spiranthes magnicamporum*) is common to the Great Plains, but rare in New Mexico. This state-endangered orchid has been reported in Bernalillo County and is found in moist, riparian areas of pinyon-juniper woodlands (NMEMNRD 1999). This plant may be found in riparian habitat in the Withdrawal Area and Kirtland AFB.

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 are described in terms of volume-to-capacity (V/C) ratio, which is a comparison of average daily traffic (ADT) volume to roadway capacity (Table 3-8). The V/C ratio corresponds to a Level of Service (LOS) rating, ranging from free-flowing traffic

conditions (LOS "A") for a V/C of less than 60 percent, to congested "stop-and-go" conditions (LOS "F") for a V/C at or near 100 percent.

Table 3-8. Level of Service and Volume-to-Capacity Ratio Descriptions

LOS	Quality of Traffic Operation	V/C Ratio
A	Free flow. Very good.	<0.60
B	Stable flow. Good.	0.61 - 0.70
C	Approaching unstable flow. Poor.	0.71 - 0.80
D	Unstable flow. Very poor.	0.81 - 0.90
E	Forced flow. Approaching failure.	0.91 - 1.00
F	Long delays. Failure.	≥1.00

Source: Highway Capacity Manual, Highway Research Board Special Report 209, National Academy of Services, Washington, DC

Notes: LOS = level of service V/C = volume-to-capacity

3.8.2 Existing Conditions

Kirtland AFB lies about 4 miles east of Interstate 25 and 2 miles south of Interstate 40. Principal access to the cantonment area is provided by Wyoming Boulevard on the north, Gibson Boulevard on the west, and Eubank Boulevard on the east. These boulevards link directly with the surface street grid system of southeast Albuquerque, although no limited access expressways serve the base directly.

Much of the region's peak traffic occurs inbound (toward central Albuquerque) in the morning and outbound (away from the central area) in the afternoon. Traffic tends to be especially heavy near the junction of the interstate highways and at arterial intersections with the interstates. Significant congestion in the area is greatest during morning and afternoon peak hours on major arterials and surface streets where urban conditions, such as high vehicle volumes and signalized intersections, tend to slow traffic.

The Middle Rio Grande Council of Governments along with the City Transit Department and the New Mexico Highway Transportation Department are currently working on the Middle Rio Grande Connections projects. The projects goal is to improve transportation for the future by providing a high-capacity transportation system. This system includes transit, freeway systems, expressways, high-occupancy vehicle lanes, and commuter rail (City of Albuquerque 2001).

Air Transportation

Air transportation services in the Albuquerque area are primarily provided by Albuquerque International Sunport. The airport offers freight and passenger services. It services nine commercial carriers and has nonstop service to 28 cities. Located on the West Mesa, the Double Eagle II Airport offers general aviation services including training, and military flights, air ambulance, charter, and private and corporate flights (City of Albuquerque 2003b).

Bus Transportation

The City of Albuquerque transit system runs the Sun Tran Trans System. There are currently about 3,200 bus stop locations throughout the city including service to Kirtland AFB. A new park and ride facility is currently planned for the northwest corner of Coors By-Pass and Ellison. This site will provide transit service to Kirtland AFB and Sandia National Laboratories (City of Albuquerque 2003c).

Rail Transportation

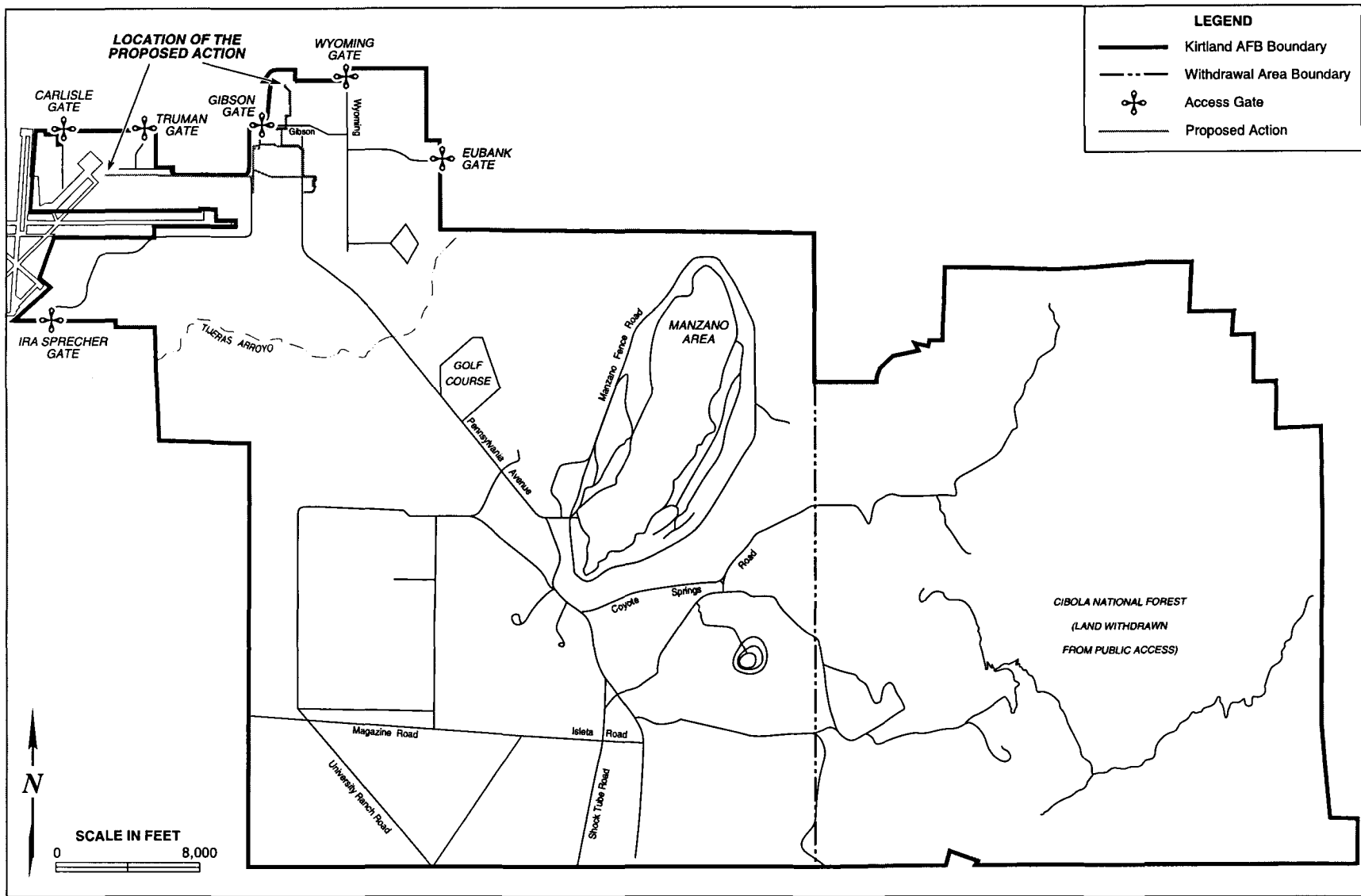
Rail transportation in Albuquerque consists of passenger and freight rail traffic. Amtrak provides passenger services and Burlington-Northern Santa Fe provides freight service in the Albuquerque area.

Biking Lanes/Routes

Albuquerque provides biking lanes and paths throughout the city. As of 2000, the city maintained 200 miles of bike routes, 65 miles of bike lanes, and 73 miles of bike trails, a total of 338 miles. This is an increase of 39 miles of bike lanes and trails from 1996 (City of Albuquerque 2003d). Kirtland AFB currently has a Bikeway Plan outlining 15.6 miles of bikeways throughout the cantonment area.

3.8.2.1 Access Gates

Access to Kirtland AFB is gained through seven entrance/exit gates shown in Figure 3-6. The Carlisle (at Carlisle Blvd. extension), Truman (at Truman Street, near the intersection of Truman Street and Aberdeen Avenue), Gibson (at Louisiana Blvd.), and



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FIGURE

EA

Kirtland Air Force Base Access Gates

3-6

Maxwell Gate (at Maxwell and Gibson Blvd.) provide access to the installation from the west and north along Gibson Boulevard. The installation can be accessed from the south through the South Valley gate at Ira Sprecher Drive. The gates at Eubank (at Eubank Blvd. extension) and Wyoming Bouelvars (at Wyoming Blvd.) provide access to Kirtland AFB from the east and north, respectively. The proposed action would be located directly southeast of the Gibson Gate.

3.8.2.2 Circulation at Kirtland AFB

Traffic flows relatively smoothly in the western portion of the cantonment area due to light traffic volumes and favorable intersection operations. A greater portion of the base population is located in the eastern portion of the cantonment area and many signalized intersections have been installed to control traffic. Traffic problems on Kirtland AFB generally occur during peak traffic periods (6:30 – 8:30 a.m. and 3:30 – 5:30 p.m.). The 1999 CAA Transportation Intermodal Study report for Kirtland AFB showed Pennsylvania Street (south of Gibson Blvd.), Wyoming Boulevard (south of M Avenue), Pennsylvania Street (north of Hardin Drive, and Truman Street (south of Truman Gate) were unacceptably congested during peak hours.

3.8.2.3 Traffic Volumes

Table 3-9 shows the traffic volumes for the 12 major intersections within Kirtland AFB. Because the base is the largest employer in the Albuquerque area, it is the principal destination for commuters in the southern side of the city. As a result, traffic tends to converge on the base gates with high ADT volumes and occasionally poor LOS ratings.

Table 3-9. Kirtland AFB Traffic Analysis Data

Intersection	ADT^a	Peak Hour	Peak Car/hr.	Avg. Car/hr.	LOS^b
Carlisle Blvd. and Aberdeen Drive	4,512	6:45 a.m.	903	188	B
San Mateo Blvd. and Randolph Ave.	6,768	6:45 a.m.	903	282	B
Pennsylvania St. and Gibson Blvd	13,512	4:00 p.m.	1,803	563	B (a.m.) C (p.m.)
Truman and Aberdeen Dr.	8,904	6:45 a.m.	1,083	371	A (a.m.) B (p.m.)
Pennsylvania St. and Hardin Dr.	8,976	7:00 a.m.	1,196	374	B
Texas St. and Gibson Blvd.	9,720	4:00 p.m.	1,299	405	B
Wyoming Blvd. and Gibson Blvd.	14,016	4:00 p.m.	1,869	584	C
Wyoming Blvd. and F Ave.	14,016	7:00 a.m.	1,870	584	B
Wyoming Blvd. and Hardin Dr.	8,832	7:00 a.m.	1,176	368	B
9 th St. and Hardin Dr.	6,480	7:00 a.m.	867	270	B
14 th St. and Hardin Dr.	9,072	7:00 a.m.	1,211	378	D
20 th St. and Gibson Blvd.	16,394	6:45 a.m.	2,490	812	A (a.m.) B (p.m.)

Source: Kirtland Air Force Base 1999

Notes: ^a ADT is defined as the number of vehicles in a 24-hour period.

^b LOS (from Highway Capacity Manual, Highway Research Board Special Report 209, National Academy of Services, Washington, DC).

ADT = average daily traffic

LOS = level of service

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.

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 area surrounding the installation predominantly varies from urban to open rangeland. The City of Albuquerque is to the north and west of the base and Cibola National Forest is located to the east and northeast as well as open spaces. The Sandia

Mountains are to the west. South of the installation, the Isleta Pueblo lands are generally open space, forests or vacant land. The proposed project site is located in the northwest portion of the base within the cantonment area.

3.10 CULTURAL RESOURCES

3.10.1 Definition of Resource

Historic properties (i.e. significant cultural resources) are classified as buildings, sites, districts, structures, or objects. A building is created to shelter any form of human activity. A structure is distinguished from a building in that it is a construction designed for purposes other than creating human shelter. Objects are constructions that are primarily artistic in nature or are relatively small and simply constructed. A site is the location of a significant event, a prehistoric or historic activity, or a building or structure whose location possesses value. A district is a concentration or linkage of sites, buildings, structures, or objects that are united historically or aesthetically by plan or development.

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

Over 400 historic and prehistoric cultural resources are known on Kirtland AFB. These include historic buildings, structures, and sites dating from European contact, ca. AD 1540, through the Cold War, ca. AD 1945-1991. Prehistoric sites dating from the Paleo-Indian Period to the Pueblo Period have been recorded.

Under Section 106 of the National Historic Preservation Act (NHPA) the USAF is required to assess the effects of undertakings prior to their initiation to ensure that there will 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).

The base cantonment has been subject to repeated surface modifications. An archaeological inventory of 16,090 acres of Kirtland AFB land was recently conducted under Section 110 (Sullivan et al. 2002). Included in this inventory were several sample transects through open areas of the cantonment. Significant ground disturbances were noted on all of these transects, generally from ground leveling, grading, utilities construction, and recreational activities. Sullivan et al. (1999a) also performed a cultural resource survey in other open areas of the cantonment as part of a proposed plan to privatize military housing units. All of these areas had undergone substantial ground modifications. Other small archaeological inventories conducted within the base cantonment resulted in the same conclusion. Among these were studies by Evaskovich (1993), Peyton (1992), Sullivan and Schilz (1999b and 1999c), and Sullivan et al. (1999b). None of these reported the presence of significant cultural resources; most stated that the level of ground disturbance was such, that it would have destroyed any cultural resource.

There are no archaeological sites located within a one-mile radius of the proposed undertaking.

3.11 SOCIOECONOMICS

3.11.1 Definition of Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population, housing, and economic activity. Economic activity encompasses employment, personal income, and economic growth. Impacts on these fundamental socioeconomic components can also influence other issues, such as housing availability and public service provisions.

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

3.11.2.1 Population

The Albuquerque MSA, which includes Bernalillo, Sandoval, and Valencia counties, had an estimated population of over 737,000 in 2002. This is an increase of 3.1 percent from 2000 (US Census Bureau 2003b).

Migrations to New Mexico come primarily from California, Texas, Arizona, Colorado, Florida, and New York. Most of the city's growth is expected to occur in areas on the west side of the river and the northeast quadrant.

New Mexico has the highest proportion of Hispanics of any state in the nation. The Hispanic or Latino population accounted for 42 percent in the 2001 census supplementary data (US Census Bureau 2003c). The non-Hispanic white population fell from 50.4 percent of the 1990 total to 44.7 percent in the 2000 census. The Black or African American population accounted for 2 percent of the total population, the American Indian and Alaskan Native population accounted for 10 percent, the Asian population accounted for 1 percent, and the other populations accounted for 17 percent (US Census Bureau 2003d).

3.11.2.2 Job Growth and Unemployment

Kirtland AFB plays an important role in the economy of the Albuquerque metropolitan area, since it is the largest employer in New Mexico. The base has over 6,500 military employees and over 4,300 civilian employees (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 2001 was estimated at \$5.6 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. Annual average unemployment rates in 2000 and 2001 within the Albuquerque MSA were at 3 percent, and 3.4 percent, respectively. The per capita personal income for the Albuquerque MSA in 2000 was \$25,894 (New Mexico Department of Labor 2003). Table 3-10 shows nonagricultural employment within the US, New Mexico, and the Albuquerque MSA.

3.11.2.3 Housing

Albuquerque MSA housing units in 2000 consisted of 239,074 housing units in Bernalillo County, 24,643 housing units in Valencia County, and 34,866 housing units in Sandoval County. There were 2.47 persons per owner-occupied unit in Bernalillo County, 2.86 persons per unit in Valencia County, and 2.84 persons per unit in Sandoval County. The home ownership rate in Bernalillo County in 2000 was 64 percent, in Valencia County it was 84 percent, and Sandoval County was 84 percent (US Census Bureau 2003d).

Table 3-10. 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 \$4.6 billion. Total economic impact from the annual operating expenditures from Kirtland AFB was estimated to be over \$5.6 billion. Table 3-11 provides additional information relating to the economic impact of Kirtland AFB activities on the local community (USAF 2002).

Employment at Kirtland AFB totaled 31,722 at the end of FY 2001. The DoD work force reached 6,539, of which 3,798 employees were active duty military, 1,792 reserve, and 949 Air National Guard personnel. Federal civilian employees totaled 4,319 in 2001. The contractor work force at Kirtland AFB by the end of FY 2001 totaled 20,864.

Table 3-11. Local Economic Impact, Kirtland AFB, 2001

Category	Amount
PAYROLL	
Military payroll	\$267,424,738
Federal Civilian payroll	\$259,605,680
Other Civilian/contractor payroll	<u>1,560,494,846</u>
TOTAL ANNUAL PAYROLL	\$2,087,525,264
ANNUAL EXPENDITURES IN THE LOCAL COMMUNITY	
Construction projects	\$135,386,300
Local service contracts	\$4,034,197
Other	<u>\$2,391,775,605</u>
TOTAL NON-PAY	\$2,531,196,102
TOTAL EXPENDITURES	\$4,618,721,366
TOTAL ESTIMATED ANNUAL DOLLAR VALUE OF JOBS CREATED	\$1,077,884,884
TOTAL ANNUAL ECONOMIC IMPACT ESTIMATE	\$5,696,606,250

Source: United States Air Force 2002

By the end of FY 2001, an estimated 1,300 military personnel (both active duty and guard/reserve) were living in family housing at Kirtland AFB, and approximately 2,498 military personnel were living off base.

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 Albuquerque MSA. 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 Minority Population

According to the 2000 Census, virtually every tract within the Albuquerque MSA had a population in which at least 25 percent of persons were minority or nonwhites. North and south of Albuquerque, along the Rio Grande River and east of the base, are a number of towns and villages, most with primarily Hispanic populations, including Los Ranchos (5,092, 37 percent Hispanic); Tijers Village (474, 56 percent Hispanic); Belen (6,901 persons, 69 percent Hispanic); Bernalillo (6,611 persons, 75 percent Hispanic); Bosque Farms (3,931 persons, 30 percent Hispanic); Corrales (7,334 persons, 26 percent Hispanic); Los Chaves (5,033 persons, 54 percent Hispanic); Los Lunas (10,034 persons, 59 percent Hispanic); Tome-Adelino (2,211 persons, 63 percent Hispanic); and Valencia (4,500 persons, 50 percent Hispanic) (US Census Bureau 2003e).

There are also nine primarily American Indian communities within the Albuquerque MSA. A major portion of the northern boundary of the Isleta Indian Reservation coincides with the southern boundary of Kirtland AFB, but the Isleta people primarily live near the Rio Grande, several miles from the boundary between the reservation and the base.

Seven additional Indian Reservations, with persons residing in dense settlements known as pueblos, are located in the Sandoval County portion of the Albuquerque MSA. In 2000, these reservations included Sandia Pueblo with 4,414 residents; Santa Ana Pueblo with 487 residents; San Felipe Pueblo with 3,185 residents; Santo Domingo Pueblo with 3,166 residents; Cochiti Pueblo with 1,502 residents; Zia Pueblo with 646 residents; and Jemez Pueblo with 1,958 residents (US Census Bureau 2003a).

3.11.3.2 Low-Income Population

In 2000, persons with low incomes were not nearly as prevalent throughout the Albuquerque MSA as were minority persons. High poverty levels were found primarily in the southern half of the city, with the greatest concentration of low-income persons situated in the southwest quadrant, in the unincorporated area known as the South Valley, with its 77 percent Hispanic population (US Census Bureau 2003). High levels of poverty were found in Native American communities in rural Sandoval County (12.1 percent), and western and southern Bernalillo County (13.7 percent); and Valencia, with 16.8 percent below poverty level (New Mexico Department of Labor 2003).

The most notable socioeconomic characteristic of the Indian communities is the large number of low-income persons. Based on 1999 incomes, the percentage of persons below the poverty level for each reservation was as follows: Isleta Pueblo (18.3 percent), Sandia Pueblo (17.7 percent), Santa Ana Pueblo (5.1 percent), San Felipe Pueblo (30.8 percent), Santo Domingo Pueblo (39 percent), Cochiti Pueblo (16.7 percent), Zia Pueblo (15.4 percent), Jemez Pueblo (25.5 percent), Acoma Pueblo (29.9 percent), Laguna Pueblo (26.9), and Cañoncito Navajo Reservation (41.1 percent) (US Census Bureau 2003a).

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

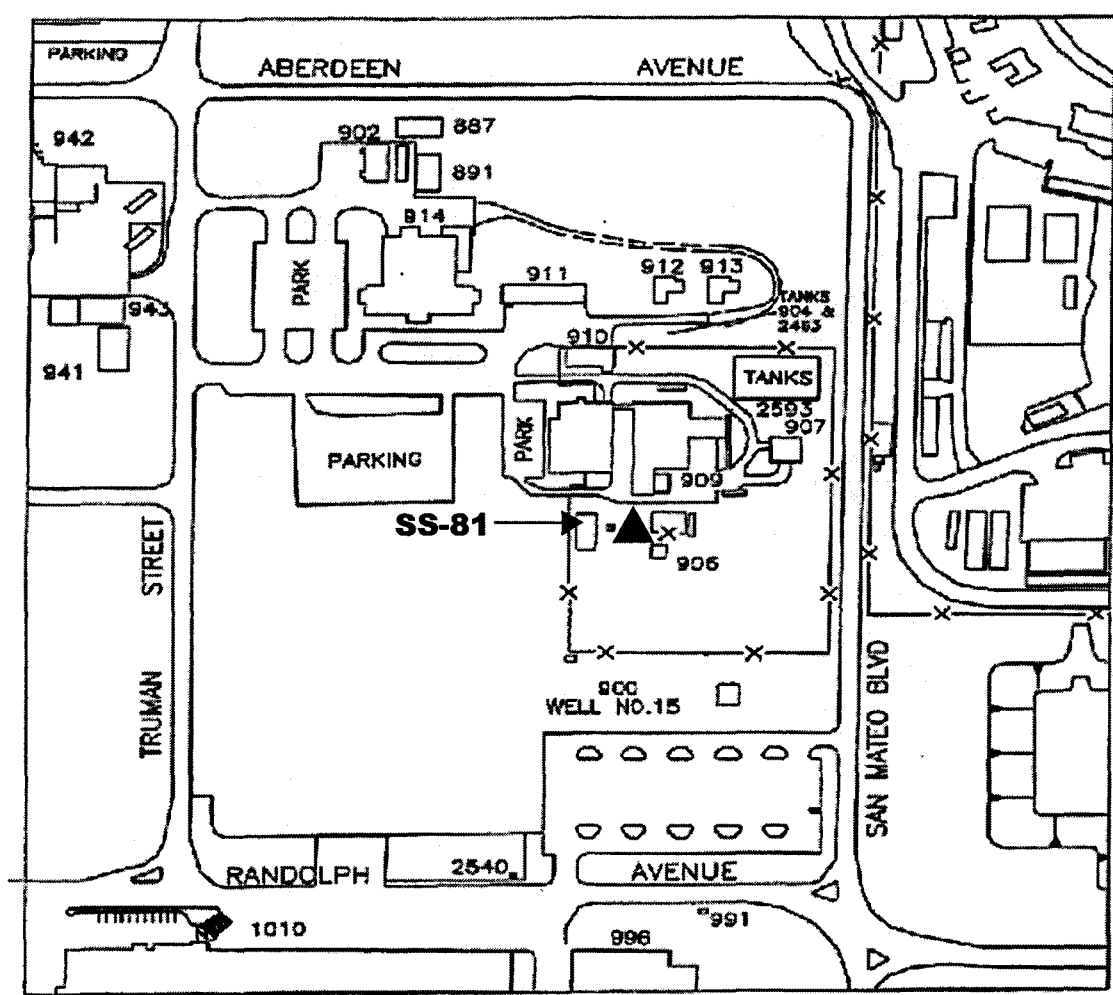
IRP sites located within 1,000 feet of the Proposed Action site are listed below.

The Building 907 Detention Pond and Yard (Solid Waste Management Unit [SWMU] SS-81) is located north of drinking water supply well #15 (Figure 3-7). The site includes a former detention pond used to store process cooling water, drain lines from Buildings 906, 907, and 908 to the detention pond, a storage yard where electronic components were stored and a former dielectric fluid aboveground tank farm.

A site assessment was performed at the site in 1998. Soil and sediment samples were collected and analyzed for metals, VOCs, Semi-Volatile Organic Compounds (SVOCs), and polychlorinated biphenyls (PCBs). Metals and SVOCs were detected in several samples at concentrations above Region 6 Human Health Risk-Based (HHRB) screening levels. PCBs were detected in two soil-samples at concentrations below Region 6 HHRB screening levels. Remediation of the soil and sediment (removal and off-site disposal) was completed in May 2002.

The Abandoned Railroad Spur (SWMU SS-77) is located southwest of drinking water supply well #16 (Figure 3-8). The site consists of the location of a former rail spur. The rails and ties were removed in the mid-1990s.

A site investigation was performed at three areas where load-out activities were performed. Soil samples were collected and analyzed for total petroleum hydrocarbons. Based on the analytical results, Kirtland AFB recommended no further action at the Abandoned Railroad Spur Site. The New Mexico Environment Department has rejected Kirtland AFB's recommendation and has requested additional sampling be performed at the site.



SITE PLAN



SCALE
0' 100' 200' 400'

LEGEND

- IRP Sites
- Proposed Action

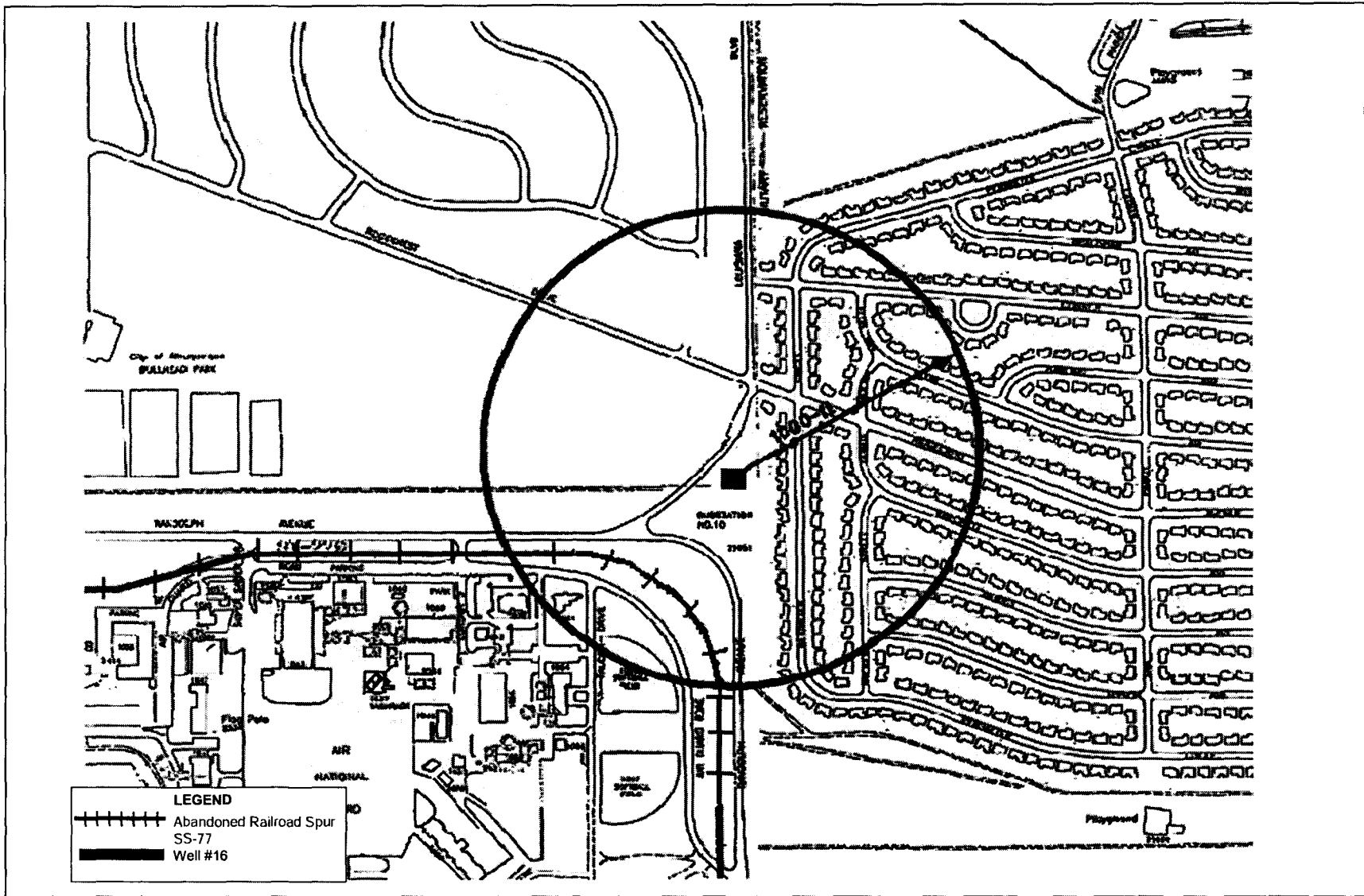
SEPT 2003

FIGURE

EA

**IRP Sites within 1,000 ft of Proposed Action
Kirtland Air Force Base**

3-7



SEPT 2003

EA

**IRP Sites Within 1,000 ft of Proposed Action
Kirtland Air Force Base**

FIGURE

3-8

The following sections describe solid waste, wastewater, and hazardous waste management at Kirtland AFB.

3.12.2.1 Solid Waste

Solid municipal waste from the base is sent to an off-base disposal site at the Cerro Colorado Landfill operated by the City of Albuquerque. Non-hazardous construction and demolition debris is disposed of in the Kirtland AFB landfill. The estimated rate of landfill usage on Kirtland AFB is shown in Table 3-12. All solid wastes are disposed of in accordance with USAF, Kirtland AFB, and applicable federal, state, and local regulations.

Table 3-12. Estimates of Waste Introduced to Kirtland AFB Landfill, 1996, 1997, 1998, and January – March 1999

Units	1996	1997	1998	January – March 1999
Cubic Yards	226,822	102,119	109,125	39,738
Tons	90,729	40,848	43,650	15,895

Source: Kitt 1999.

Note: Waste estimated at 800 pounds (0.4 tons) per cubic yard.

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 1996, the base contributed 2.27 mgd of wastewater to the city facility (USAF 1991). 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 National Pollutant Discharge Elimination System (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 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 actions 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).

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 the 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 or safety risks would be considered significant if the 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 explosive safety zones and RPZs present on the base. Encroachment on these zones was assessed compared with the risk of the actions involved.

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 the potential effects this action could have on children; and 3) assessment of the significance of potential impacts. If potential impacts are identified, mitigation measures are proposed to minimize or alleviate the impacts.

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.

The Proposed Action and alternatives are located outside of all explosive safety zones and RPZs on base. As a result, there would be no impact to any of these zones.

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 areas of the construction activities. The decrease of arsenic levels in drinking water at Kirtland Air Force Base (AFB) would benefit children on base and at the airport. Therefore, possible disproportionate negative impacts to children identified in Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, would not occur.

4.1.2.1 Proposed Action

Implementation of the Proposed Action would improve human health and the current safety environment at Kirtland AFB. The purpose of the Proposed Action is to install an arsenic compliance system that will allow blending from water supply wells that are below arsenic compliance levels with water supply wells #15 and #16, which currently do not meet US Environmental Protection Agency (EPA) drinking water regulations. This would reduce the health risks associated with the ingestion of naturally occurring arsenic in two of the base groundwater supply wells.

4.1.2.2 Alternative 1

As with the Proposed Action, Alternative 1 would improve the current health and safety environment at Kirtland AFB. The purpose of Alternative 1 is to install an arsenic compliance system that would allow blending from water supply wells that are below arsenic compliance levels with water supply wells #15 and #16, which currently do not meet EPA drinking water regulations. The difference as seen in Figure 2-2 would be the location of the proposed additional infrastructure.

4.1.2.3 No-Action Alternative

Selection of the No-Action Alternative would result in continued use of the existing facilities in their current condition. Kirtland AFB would continue to be in non-compliance with EPA guidelines, the Federal Safe Drinking Water Act, Department of

Defense (DoD), and US Air Force (USAF) directives. There would be no change to current conditions of health or safety risks to children on base.

4.1.3 Other Future Actions on the Base

The Proposed Action would have a beneficial impact to human health and safety. Therefore, when considered with the health and safety effects of the other future actions; they are not expected to have any significant cumulative negative impacts to health and safety at the base.

4.2 AIR QUALITY

4.2.1 Significance Criteria

The 1990 amendments to the Clean Air Act (CAA) require federal agencies to conform to the affected State Implementation Plan (SIP) with respect to achieving and maintaining attainment of the National Ambient Air Quality Standards (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 ozone (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.

If an Air Force installation is within an area that is “nonattainment” or is a “maintenance” area, the installation must meet the requirements of EPA regulation (40 Code of Federal Regulations [CFR] 93) *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* (USAF 1995). The purpose of the conformity process and requirements for nonattainment and maintenance areas where a federal action is being proposed is to make sure that these actions do not affect the timely attainment and maintenance of air quality standards.

General Conformity Rule. The initial step in identifying if a conformity determination is needed is to determine if a proposed action falls under Excluded Categories (40 CFR 93.153(b)). These categories include: “exempt” due to the nature of action; actions presumed to conform; and actions that are clearly *de minimis*. If the proposed action’s

emissions would not exceed the *de minimis* threshold for the applicable pollutant and the proposed action's emissions would be less than 10 percent of the total emissions for the region, the Conformity Rule is not applicable.

Because Kirtland AFB is covered by a carbon monoxide (CO) maintenance plan, 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.

The 1990 CAA amendments require a conformity analysis for actions potentially affecting air quality in nonattainment and maintenance areas. If total direct and indirect emissions are estimated to exceed emissions thresholds, a conformity determination is required. The calculation of total direct and indirect emissions does not have to make specific reference to conventional emission source categories (i.e. stationary, area, and mobile sources). The total direct and indirect emissions of criteria pollutants attributable to the proposed action (e.g., O₃ precursors) must be considered. O₃ precursors include volatile reactive organic compounds (VOCs) and oxides of nitrogen (NO_x). Indirect emissions that must be considered are limited to emissions that could be practicably controlled.

National Environmental Policy Act (NEPA). NEPA requires that emission of pollutants for which an area is in attainment be considered as well. Direct and indirect emissions of criteria pollutants for which an area is in attainment, or precursors to those pollutants, associated with a proposed action must be calculated, which include mobile, area, and stationary, as well as construction phase emissions. The Albuquerque-Bernalillo County air basin is in attainment for particulate matter equal to or less than ten microns in diameter, sulfur dioxide, VOCs and NO_x. The conformity analysis significance levels for these pollutants are also appropriate for determining significance of air quality impacts under NEPA. The significance level for all of these attainment pollutants in this air basin is 100 total tpy. However, even if the emissions are less than these significance levels, the emissions can still be considered significant if the total exceeds more than 10 percent of the area's total emissions.

4.2.2 Impacts

Under the CAA, new stationary sources that are proposed for areas are subject to the requirements of the Prevention of Significant Deterioration (PSD) regulations. The PSD regulations require new stationary sources with emissions of criteria pollutants above 250 tpy, or 100 tpy for specific source categories, to conduct an air quality impact analysis and demonstrate compliance with Best Available Control Technology requirements. Under the CAA Amendments Title V Operating Permits Program, all sources in attainment areas with emissions of criteria pollutants above 100 tpy must obtain a federal operating permit. The PSD/Title V major source threshold of 100 tpy for attainment pollutants was used to evaluate the proposed action's significance for air quality impacts, in accordance with the requirements of 40 CFR § 51.853.

A conformity applicability analysis is needed if required to determine whether a federally proposed action is subject to requirements for a conformity determination under EPA's General Conformity Rule. The initial step in determining applicability of the General Conformity Rule is to compare projected pollutant emissions with baseline emissions (40 CFR § 51.853[b]). Conformity determinations are conducted to ensure that NAAQS would not be exceeded and that the proposed action would comply with all federal and state air quality regulations, goals, and plans.

Under Section 176(c) of the CAA, a framework is provided to ensure that federal actions conform to appropriate state or federal implementation plans. Before a federal agency or department engages in, supports, finances, licenses, permits, or approves any activity, that agency must ensure that such actions conform to the applicable implementation plan. According to the 1990 CAA amendments, the purpose of an air quality implementation plan is to eliminate or reduce the severity and number of violations of NAAQS and achieving expeditious attainment of these standards. Federal actions must not conflict with the implementation plan by causing or contributing to any new violation, increasing the frequency or severity of any existing violation, or delaying timely attainment of a standard or required interim milestone. If the proposed action does not conform to the SIP, they cannot be approved or allowed to proceed.

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 on July 15, 1996. As a result, CO emissions are still being tracked. The EPA defines an

action as regionally significant when that action contributes at least 10 percent of a nonattainment area's total emissions for any criteria pollutant. Table 4-1 shows potential CO emissions from the proposed project. Because the Proposed Action is required due to EPA regulations, it falls under the excluded categories and is exempt by the EPA (40 CFR 93.153(b)) and does not require a conformity determination.

Table 4-1. CO Emissions Generated by Proposed Action

Categories	CO Emission Factors ^a	Total CO Emissions
	Lb/hr	Lb/hr
Contractor-Owned Vehicles ^b	2.19	10,512
Off-Highway Trucks	3.68	1,766
Excavator	5.20	2,496
Compressor	1.07	514
Crane	1.63	782
Tractor/Loader/Backhoe	2.91	1,397
Dumpers/Tenders	3.68	1,766
Other Construction Equipment	1.97	946
Total	22.33	20,179

Albuquerque/Bernalillo County Standard^c	200,000 lb/hr
EPA Standard^d	200,000 lb/hr

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 10 contractor-owned vehicles commuting to the base using a 30-mile round trip.

^c Standard obtained from Ambient Air Quality, New Mexico Environment Department, Air Quality Bureau, October 2002.

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

Assumptions:

The work period for each of the categories of equipment was calculated for two pieces of equipment running 8 hours per day for 5 days per week for 12 weeks. Each project would generate specific amounts of CO, based on the duration of the project. The amount of CO emitted is tabulated both individually by project, and combined as if all construction project activities occurred concurrently.

CO = carbon monoxide

EPA = Environmental Protection Agency

Emissions from the Proposed Action may temporarily affect sensitive receptors on base. Emissions from vehicles and equipment would be temporary. Estimated CO emissions from construction vehicles and equipment are outlined in Table 4-1. Dust emissions could be reduced using standard dust control measures, such as watering, soil stabilization, and planting rapidly growing vegetation in construction areas. CO

emissions could be reduced around sensitive receptors by taking alternative driving routes to get to and from the project site. Using alternative fuel vehicles would also contribute to reduced emissions.

4.2.2.1 Proposed Action

The Proposed Action would have a temporary short-term adverse affect as a result of increased air emissions from dust during ground disturbance and site preparation activities, and emissions from construction vehicles and heavy-duty equipment. This Proposed Action would not change the regional or site-specific air quality as described in Section 3.

Emissions from vehicles and equipment would be temporary. Estimated CO emissions from construction vehicles and equipment are outlined in Table 4-1. Dust emissions could be reduced using standard dust control measures, such as watering, soil stabilization, and planting rapidly growing vegetation in construction areas. CO emissions could be reduced around sensitive receptors by taking alternative driving routes to get to and from the project site. Using alternative fuel vehicles would also contribute to reduced emissions.

4.2.2.2 Alternative 1

As with the Proposed Action, Alternative 1 would have a temporary short-term adverse affect as a result of increased air emissions from dust during ground disturbance, site preparation activities, and emissions from construction vehicles and heavy-duty equipment. This Proposed Action would not change the regional or site-specific air quality as described in Section 3.

4.2.2.3 No-Action Alternative

No changes to air quality would result from selection of the No-Action Alternative.

4.2.3 Other Future Actions on the Base

The combined emissions from the Proposed Action, when considered with potential emissions from other future actions at the base, are not expected to have any significant cumulative negative impacts to air quality.

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 were violated, if sensitive receptors were disproportionately affected, or if damage resulted to personal property.

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 have a temporary noise impact while installation of the treatment systems occur. Noise would come from vehicles and heavy-duty construction equipment. Noise could 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 5 p.m.). Other mitigation measures include making sure that mobile equipment meets noise emission standards. Noise associated with the proposed construction activities on

base would be temporary and minor when compared to the noise generated on base by commercial and military aircraft overflights; therefore the Proposed Action would not significantly impact noise receptors.

4.3.2.2 Alternative 1

As with the Proposed Action, Alternative 1 would have a temporary noise impact while installation of the arsenic treatment system occurred.

4.3.2.3 No-Action Alternative

Selection of the No-Action Alternative would result in no changes to the noise environment on base.

4.3.3 Other Future Actions on the Base

The combined noise impacts from the Proposed Action, when considered with potential impacts from other future actions at the base, are not expected to have any significant cumulative negative impacts to sensitive noise receptors.

4.4 LAND USE

4.4.1 Significance Criteria

Potential impacts to land use, from a proposed action 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 projects, (2) examining the effects these actions 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

Land use under the Proposed Action would remain compatible with existing land uses. The Proposed Action requires installation of several miles of pipe along streets around the wells on base. This includes installing pipeline along residential streets within base housing. Since the Proposed Action consists of installing an arsenic compliance system on heavily disturbed land, and the land would continue to be used for current purposes following completion of construction, impacts to land use would be negligible.

4.4.2.2 Alternative 1

Implementation of Alternative 1 would have no impacts on land use at Kirtland AFB as described above for the Proposed Action.

4.4.2.3 No-Action Alternative

Selection of the No-Action Alternative would result in no changes to current land use.

4.4.3 Other Future Actions on the Base

No impacts to current land use would occur from the Proposed Action addressed in this document. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to land use from the other future actions, are not expected to have a significant cumulative negative impact on land use.

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

Implementation of the Proposed Action would result in no impacts to regional geological resources. The region's infrequent seismic activity would create no significant threat to construction workers given the use of standard construction procedures for facilities of this size and type.

4.5.2.2 Alternative 1

Implementation of Alternative 1 would have no impacts on the Geological Resources at Kirtland AFB as described above for the Proposed Action.

4.5.2.3 No-Action Alternative

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

4.5.3 Other Future Actions on the Base

No impacts to regional geological resources would occur from the Proposed Action addressed in this document or other currently known future actions. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to geological resources from the other future actions, are not expected to have a significant cumulative negative impact on geological resources.

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 yield 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 resulting from the Proposed Action and alternatives were analyzed by: (1) identifying and describing the effects the action may have on the resource, (2) examining the effects the action may 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, water quality would be improved by the blending of water from wells that are below the new arsenic standards with water from wells that are above the arsenic standards, thus bringing the drinking water into compliance with new EPA arsenic standard. Temporary water use for dust suppression may be conducted depending on site conditions. The site for the Proposed Action is more than three-fourths of a mile away from Tijeras Arroyo, which is well outside the floodplain for this surface channel. Runoff from the construction site would be controlled using erosion control methods discussed under Section 4.5, Geological Resources.

4.6.2.2 Alternative 1

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

4.6.2.3 No-Action Alternative

Under the No-Action Alternative, there would be no changes to current water resources because installation of the arsenic compliance systems would not take place and Wells #15 and #16 would remain non-compliant with current EPA standards.

4.6.3 Other Future Actions on the Base

No impacts to water resources would occur from the Proposed Action addressed in this document. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to water resources from other future actions, are not expected to have a significant cumulative negative impact on water resources in the area.

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 wetland resources are considered significant if high value wetlands would be adversely affected.

4.7.2 Impacts

Sensitive species or habitats in the vicinity of the project sites were identified and 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

Ground disturbance activities would be limited to either heavily disturbed areas, along existing roadways. Therefore, implementation of the Proposed Action would have insignificant impacts to vegetation and wildlife. As no wetlands occur in the area, this resource would not be impacted. Several burrowing owls have been known to nest in the area. To avoid impacts to this species, a burrowing owl survey would be conducted prior to construction activities. All burrowing owl sites located within 150 feet would be marked for easy identification. Construction activities would not be allowed within 150 feet of active burrows, as this is the minimum distance recommended as a buffer to avoid impacts (Skiba 2002). Construction would only be conducted around these burrows after the owls have migrated from the area (Between Nov. 1-Feb. 28). Implementation of these burrowing owl avoidance measures would prevent any long-term impacts to this species. No other sensitive species are known to occur in the area, therefore, no significant impacts would occur.

4.7.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on biological resources at Kirtland AFB to those stated above for the Proposed Action.

4.7.2.3 No-Action Alternative

Under the No-Action Alternative, there would be no changes to biological resources.

4.7.3 Other Future Actions on the Base

No impacts to biological resources would occur from the Proposed Action addressed in this document. Burrowing owls would not be adversely impacted from the Proposed Action, as long as the guidelines provided above are followed. A prairie dog relocation

program followed by fumigation is likely to occur in the immediate future. Under this program, prairie dogs would be captured and moved to an on-base relocation site. Burrowing owls are closely associated with prairie dog towns and translocating prairie dogs from the area would usually have long-term impacts to this species in the local area. However, since a new prairie dog town would be established in the immediate vicinity it is expected that burrowing owls would move to this new site. This may actually benefit the burrowing owl over the long-term, as human disturbances at the new prairie dog colony would be minimal. Therefore, cumulative effects of the Proposed Action, when considered with the potential disturbance to biological resources from other future actions, are not expected to have a significant impact on biological resources in the area.

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 disrupting existing local-area traffic patterns (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 over-capacity traffic volumes were forced to operate at or beyond its design capability. An impact also would 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 from the Proposed Action and alternatives were analyzed by: (1) identifying and describing transportation and circulation that could affect or be affected by the project, (2) examining the effects the action may have on the resource, (3) assessing the significance of potential impacts, and (4) providing measures to mitigate potentially significant impacts.

Non-hazardous construction debris would be transported to the Kirtland AFB landfill or a suitable off-site landfill for disposal. An on-site dumpster would be provided by the

contractor for other non-hazardous municipal solid waste (e.g., plastics, paper, and food waste) that could be generated by worker activity at the project sites. When the dumpster is full, the debris would be transported to a permitted Subtitle D landfill. Any cardboard waste that is generated would be separated and delivered to the base landfill or the Sandia National Laboratories, Solid Waste Transfer Station. In accordance with DoD Instruction 4715.4, paragraph F.2.c.(3)(f), salvageable metal debris resulting from construction or demolition activities would be removed and transported to the Defense Reutilization and Marketing Office, located at Kirtland AFB, for recycling or to any certified recycling facility.

Construction from the Proposed Action would result in increased construction worker and material-hauling vehicle trips to and from the project site as well as dump truck trips to landfills. Using off-peak hours for construction vehicle trips would help alleviate the congestion that these streets experience. If off-base landfills were utilized, avoiding main interchanges as much as possible and traveling in off-peak times would help to decrease the impacts of the Proposed Action.

4.8.2.1 Proposed Action

The Proposed Action would have a temporary short-term impact on transportation and circulation as a result of increased traffic from construction vehicles and heavy-duty equipment. Construction along Randolph Avenue and Louisiana Boulevard would be outside of traffic lanes and should not cause significant traffic delays or congestion. No significant traffic impacts are expected.

4.8.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on transportation and circulation at Kirtland AFB as those stated above for the Proposed Action with the exception of a section of piping that would run along Ridgecrest Avenue through the Zia housing development. Construction on this residential street would result in minor delays associated with temporary detours around the construction area. There is a potential to directly affect the residents of 61 houses along Ridgecrest Avenue as construction proceeds. In addition, construction would indirectly affect other residents of Zia Park that normally use Ridgecrest to enter and exist the housing area on the east and west sides. Traffic would be routed to the San Pablo Street exit on the north side of Zia Park

while construction occurred at the east or west entrance. Staggering construction at the east and west entrances also would help to mitigate temporary traffic impacts within the housing area. These potential impacts would be temporary and not significant.

4.8.2.3 No-Action Alternative

Selection of the No-Action Alternative would result in no change to current transportation and circulation conditions at Kirtland AFB.

4.8.3 Other Future Actions on the Base

No long term negative impacts to transportation and circulation would occur from the Proposed Action addressed in this document. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to transportation and circulation from the other future actions, such as demolition of housing in Zia Park and the construction of a training campus for the pararescue jumpers and combat rescue officers, are not expected to have significant cumulative negative impacts on transportation and circulation.

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

Construction activities would occur with implementation of the Proposed Action. These activities would occur in the cantonment area. The proposed above ground portions of the arsenic compliance system would be compatible with the current visual conditions present in the cantonment area. The remainder of the system would be underground. Since the action would not degrade the current visual conditions present at the project locations, no adverse impacts to visual resources would occur.

4.9.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on visual resources at Kirtland AFB to those stated above for the Proposed Action.

4.9.2.3 No-Action Alternative

No changes to visual resources would result from selection of the No-Action Alternative.

4.9.3 Future Actions on the Base

No impacts to visual resources would occur from the Proposed Action addressed in this document. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to visual resources from the other future actions, are not expected to have any significant cumulative negative impacts.

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 and Title 36 CFR Section 60.4 defines the criteria used to establish significance and eligibility to the National Register as follows:

“The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and

local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and,

- (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) That are associated with the lives of persons significant in our past; or
- (c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) That have yielded, or may be likely to yield, information important in prehistory or history.”

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.

Impacts are assessed by identifying the types and locations of proposed actions and determining the exact locations of cultural resources that could be affected.

4.10.2.1 Proposed Action

No significant cultural resources, historic or prehistoric are known to exist within the proposed project boundaries. The cantonment has been subjected to repeated modifications. As a result, no impacts are anticipated to occur to known cultural resources from implementation of the Proposed Action.

4.10.2.2 Alternative 1

No significant cultural resources, historic or prehistoric, are known to exist within the proposed project boundaries. The cantonment has been subjected to repeated modifications. As a result, no impacts are anticipated to occur to known cultural resources from implementation of Alternative 1.

4.10.2.3 No-Action Alternative

No changes to cultural resources would result from selection of the No-Action Alternative.

4.10.3 Other Future Actions on the Base

No impacts to cultural resources would occur from the Proposed Action addressed in this document. Therefore, the cumulative effects of the Proposed Action, when considered with potential disturbances to cultural resources from the other future actions, are not expected to have significant cumulative negative impacts.

4.11 SOCIOECONOMICS

4.11.1 Significance Criteria

Impacts of population and expenditures are assessed by determining an action's direct effect on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly depending on the location of a proposed action; for example, the termination of an operation that employs 25 people in a major metropolitan area may be virtually unnoticed while the same action would have significant adverse impacts in a small community. A socioeconomic impact would be considered significant if implementation of an action would substantially shift population trends, employment, housing, or adversely affect regional spending patterns.

An impact to Environmental Justice (Section 3) 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 the 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 from implementation of the Proposed Action would be beneficial overall. Public health and safety would improve as a result of improved water quality from blending the water with the arsenic compliance system. Purchase of construction materials 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. However, these impacts would be negligible in a metropolitan area the size of Albuquerque.

4.11.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on socioeconomics at Kirtland AFB to those stated above for the Proposed Action.

4.11.2.3 No-Action Alternative

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

4.11.3 Other Future Actions on the Base

The overall impacts on socioeconomics from the Proposed Action would be beneficial in nature, but negligible. Minority and low-income populations on or off base would not be affected. Effects on socioeconomics from the Proposed Action, when combined with the other future actions, are not expected to significantly impact the area's socioeconomic environment.

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 substances is based on toxicity, ignitability, reactivity, and corrosivity. Generally, impacts associated with hazardous materials and wastes would be considered significant if implementation of the 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 the 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 the Proposed Action and alternatives, 2) assessment of the significance of potential impacts, and 3) provision of mitigation measures in the event that potentially significant impacts are identified.

4.12.2.1 Proposed Action

As part of the construction process, a short-term increase in non-hazardous and hazardous waste generation would occur. Non-hazardous construction wastes 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 in on-site dumpsters 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. With the exception of fuel, oils, and lubricants used by construction equipment, no hazardous wastes would be generated by the construction of the new facilities. These materials would be handled and disposed of in accordance with all applicable regulations.

The two existing IRP sites described in Section 3.12.2 would not be disturbed by construction associated with the Proposed Action. No other IRP sites exist near the proposed pipeline or tank construction sites. As a result, there would be no impact on IRP sites from the Proposed Action.

4.12.2.2 Alternative 1

Implementation of Alternative 1 would have similar impacts on environmental management at Kirtland AFB to those stated above for the Proposed Action.

4.12.2.3 No-Action Alternative

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

4.12.3 Other Future Actions on the Base

As part of the construction process, a short-term increase in non-hazardous and hazardous waste generation would occur for the Proposed Actions and other future actions. Because all of the hazardous wastes and IRP sites would be handled in accordance with the rules and regulations governing these materials, no negative impacts to their management would be associated with the Proposed Action. All non-hazardous wastes would be recycled or taken to permitted landfills for disposal. Therefore, the Proposed Action, when considered with other future actions, are not expected to have a significant cumulative negative impact on environmental management concerns on base.

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SECTION 7
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